

A Year of Passive DNS During The Pandemic: April 2020 Through March 2021

Farsight Security, Inc.

v1.0

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"Today we fight. Tomorrow we fight. The day after, we fight.
And if this disease plans on whipping us, it better bring a lunch,
'cause it's gonna have a long day doing it."

Jim Beaver, *Life's That Way*

Executive Summary

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Context: It's been said that the "pandemic changed everything." We know that this has been a challenging year for many people. Some have been directly impacted, either becoming sick with Covid-19 themselves, or having friends, family members, or neighbors sickened or even killed by the disease. Others may have lost their jobs. Many may have found themselves involuntarily thrust into new roles (such as "home schooling coordinator"). Many of the rest of us may feel as if we've ended up in a sort of "suspended animation" or "house arrest," limiting our travel and public interactions due to government-mandated (or self-imposed) limitations. We all hope that the current vaccine rollout will eventually allow everything to "return to normal" (whatever that may mean for each of us).

What We Measured And Expected To See: We may often not be able to measure Covid-related economic and personal impacts *directly*, but we can measure some of these changes *indirectly*, via Farsight Security's passive DNS. Farsight collects DNS "cache miss data" from a global network of sensors located above large shared recursive resolvers. If the pandemic had no impact, we'd expect DNS cache miss traffic volumes to be largely stable day-to-day (modulo things like normal day-to-day variation and various cyclical and seasonal impacts). However, if, for example, air travel is systemically down, we'd expect to see that reflected in less DNS traffic for major airline domains. Similarly, if people are increasingly working from home, we'd expect to see an increase in DNS traffic volumes associated with video conferencing service domains. Or if households are just hunkered down and binge-watching streaming video, we'd expect to see DNS traffic for streaming video sites to be up.

Some Details About The Data: We've previously reported on a two-month sample of passive DNS data for 316 selected domains taken from March and April 2020. This new report describes the volume that Farsight saw for 341 (partially overlapping) 2nd-level domains drawn from 12 broad areas, day-by-day, as collected over the period from April 2020-March 2021. (The data for this report is extracted from a proprietary internal Farsight Research data archive, which means that this is a fairly unique data product.)

The Graphs: The bulk of the report consists of summary graphs built in "R". We show two graphs for each selected domain, one a dotplot showing raw daily counts (and a smoothed 28-day moving average), and the other a boxplot showing data aggregated by month (with extreme outliers trimmed). Changes over time are readily discernible in both graphs for most sites. We've impressionistically tagged each graph according to its shape, overall volume, and whether or not DoS traffic may be present.

Limitations and Cautions: We explicitly remind you: we can't definitively "pin" noticeable changes on the pandemic *per se* (rather than on potential other causes such as ramped up marketing efforts, or technical changes (such as changes to TTL values)). This means you need to interpret the apparent evolution of traffic volumes for each domain with some care. Please also be careful when making comparisons *between* domains: due to the fact that we collect DNS cache miss traffic from above large recursive resolvers, minor differences (such as variations in DNS TTL values) can make two approximately-equally-popular services *appear* dramatically different when analyzed.

Evidence of DoS Traffic: We'd also like to emphasize that in addition to expected relatively-gradual changes in level that are likely due to pandemic-related changes, we continue to see alarmingly-large episodic traffic (2-10x or more normal volumes) for some domains. Those graphs are flagged with a "black sun" symbol ("☀") where noticed. We believe that these volumetric outliers represent evidence of randomized-subdomain denial of service (DoS) attacks. Identifying and mitigating that DNS-based abuse will be increasingly important over time.

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I. Introduction

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Combatting The Covid-19 Challenge Through Vaccination: The growing availability of multiple effective vaccines has given the world hope that the craziest days of the Covid-19 pandemic will soon be coming to an end. Until you can be safely vaccinated, we hope that you've all been taking suitable steps to protect yourselves and your families, friends, and neighbors.

The Earlier Report: Farsight previously published a 95 page report, "DNS Network Traffic Volumes During the 2020 Pandemic," see <https://info.farsightsecurity.com/pandemic-report> That earlier report looked at 316 sites from a variety of categories for an initial two month period from 03/01/2020 to 04/30/2020. Feedback from readers leads us to believe that many of you found the data from that initial report to be quite interesting, even though it only covered two months and a small subset of domains.

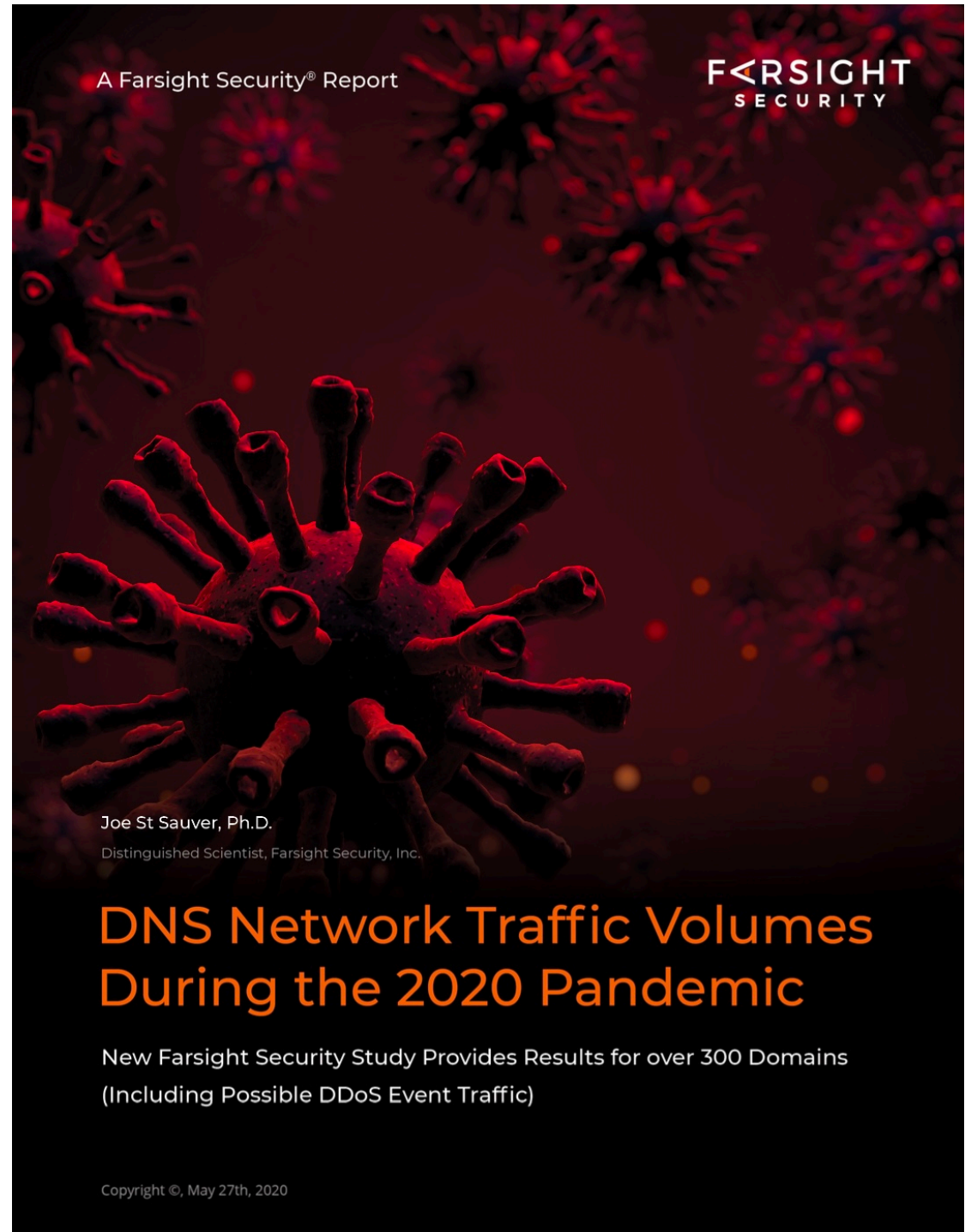
The New Report: Now that a year's gone by, we wanted to share data for a full year, from 4/01/2020 thru 3/31/2021. Many of the 341 domains we looked at for the current report are ones we'd also looked at last time, but to keep this report to a reasonable length (and to make room for newly relevant domains), we've dropped some less-interesting/lower-volume sites.

Volumetric Randomized Subdomain Attacks: In our original report we'd uncovered evidence of volumetric randomized subdomain attacks leveraging wildcard domains. We continue to see evidence of such attacks, with some domains showing traffic spikes that are many times normal levels. This remains a cause of substantial concern for us and for the community as a whole, directly threatening Internet security, stability and reliability.

Methodological Improvements: We've moved to a new faster tool for extracting the data we report, and have gone to a new larger and easier-to-read graph format, now showing two graphs per domain:

- The first graph for each domain is a scatter plot, showing raw counts plus a 28 day moving average, smoothing out random noise present in the data
- The second graph is a box plot showing monthly data with outliers trimmed. With outliers trimmed, we can better see normal traffic patterns.

We'll now further describe those two graph types.



Understanding The Scatter Plots: Scatter plots, such as the sample graph to the right, are fundamentally very simple graphs.

Given an "X" value (such as a date) and a "Y" value (such as the number of times a domain was seen, what we'll call a "count"), we can place a dot at that location on the chart. In this case, these are the red dots shown on the plot, one for each day over the course of the year.

We've also computed a 28 day moving average, shown on the graph as a sequence of blue-green dots. To compute those values, we sum the current value plus the 27 preceding values and then divide that sum by 28. (Because we need 28 days worth of data to compute that value, the blue-green values don't show up until day 28.)

You'll notice that the blue-green dots change gradually, generally tracking the shape of the cloud of red dots, but smoothly, and lagging big changes by a bit -- that's expected given that we're averaging four weeks worth of data for each blue-green point. The blue-green dots are generally so close to each other that they almost form a continuous line, but if you look at the most rapidly changing areas, you can see that in fact they're really just a series of dots.

If "nothing much had changed" during the pandemic year, we'd have expected the red dots and the blue-green dots to be overlaid and run approximately level across the graph. In this case, however, there clearly *were* changes happening during the year, with counts going from:

- Relatively high values (over 200,000 in April 2020)
- Down to a month of values in the 100,000-150,000 range in June
- Down still further to values in the 50,000-75,000 range in July through November
- Finally rebounding to values in the 85,000-130,000 range in Spring 2021.

The graph doesn't (and can't) say WHY these changes happened, it can only show you what the sensors feeding DNSDB saw and reported. The changes may represent actual changes in engagement, or technical changes (such as changes in domain time-to-live (TTL) values).

We should also explicitly note that this graph is showing the total count per day for ALL apache.org domain names (*.apache.org), and for all (non-DNSSEC) DNS resource record types, not any *single* apache.org domain name or single RRtype type.

*.apache.org (day-by-day counts and 28 day moving average)



Understanding The Monthly Box Plots: Our box plots are somewhat more complex. They attempt to succinctly represent key elements of a dataset's distribution. Specifically:

- The top edge of the box (the "upper hinge") shows the 75th percentile. Twenty five percent of observations are above that level, and 75% will be below that level.
- The heavy bar in the middle of the box shows the 50th-ile (or "median"). This is the point where half of observations are above that level, and the other half are below that level. (This is a more robust measure of "central tendency" than the mean, which can easily be distorted by individual extreme values.)
- The bottom edge of the box (the "lower hinge") shows the 25th percentile. Twenty five percent of observations are below that level, and 75% will be above.

Subtracting the 25th percentile value from the 75th percentile value gives us the "interquartile range" or "IQR." Months with more variability will have larger IQRs than months with smaller variability.

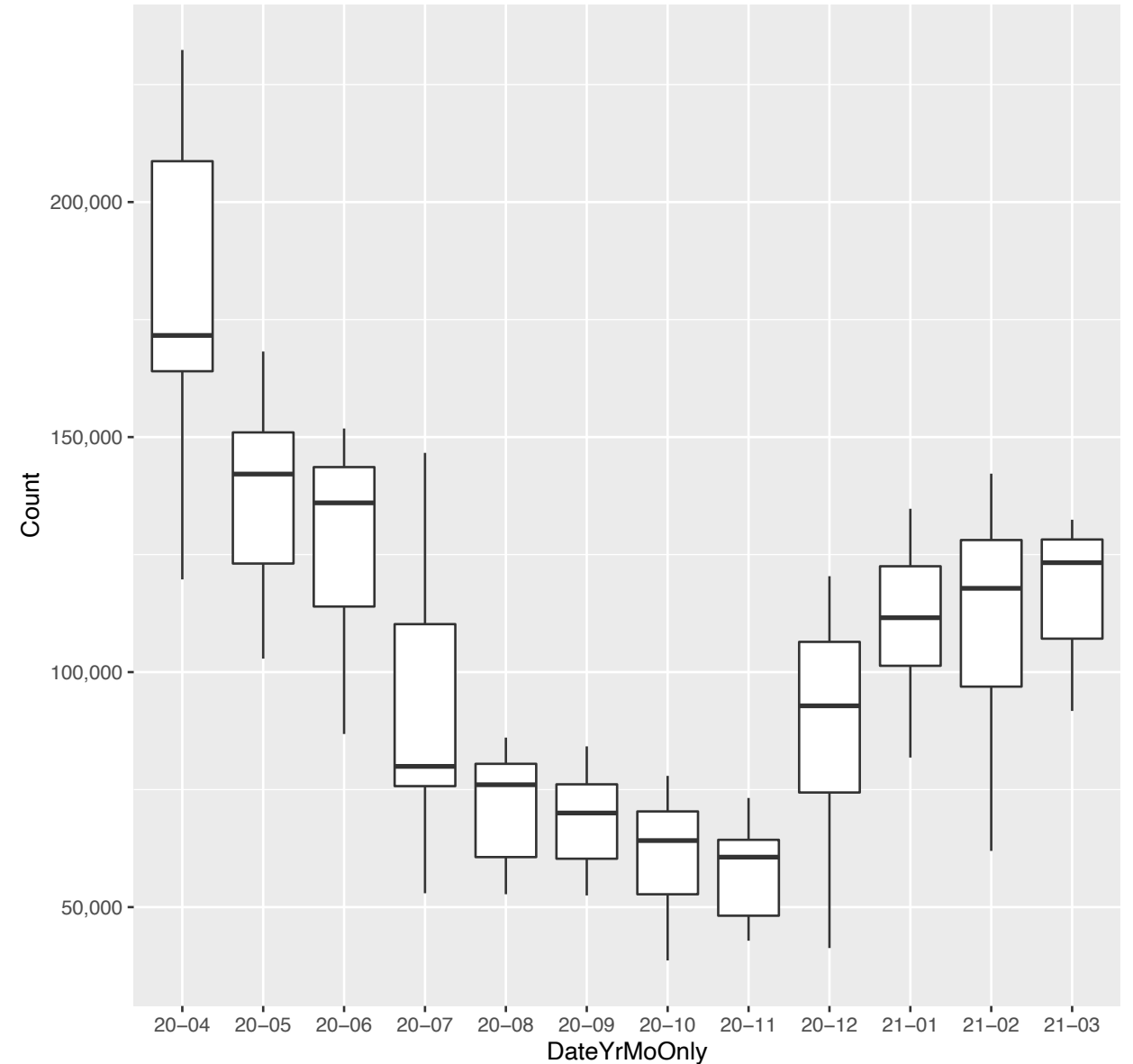
The "whiskers" extending above and below the central box are each drawn to the most extreme value that's within $1.5 \times \text{IQR}$ of the hinges.

Normally any points beyond the whiskers are shown as outliers. In this case we've intentionally trimmed those values to avoid having those outliers expand the range of the Y axis (one extreme outlier can completely rescale the range of the Y axis, thereby obscuring changes in up to a full year's worth of data).

Some may wonder why those extreme outliers exist at all in this data. We believe those data points usually represent outbound volumetric DDoS attack traffic. Those points can still be seen in the raw scatter plot even though those values are excluded from the box plots.

Important interpretive note: Because of the intentional exclusion of outliers in the box plots, the Y axis range will routinely differ between the scatter plot and the corresponding box plot! Be sure to carefully note the Y axis values on each graph!

*. apache.org (monthly boxplots (outliers trimmed))



'What Exactly Are These "Counts" That We're Graphing?'

Farsight collects and indexes DNS cache miss traffic from above large recursive resolvers. The counts reported here represent the number of cache misses seen by our global array of sensors for each domain studied.

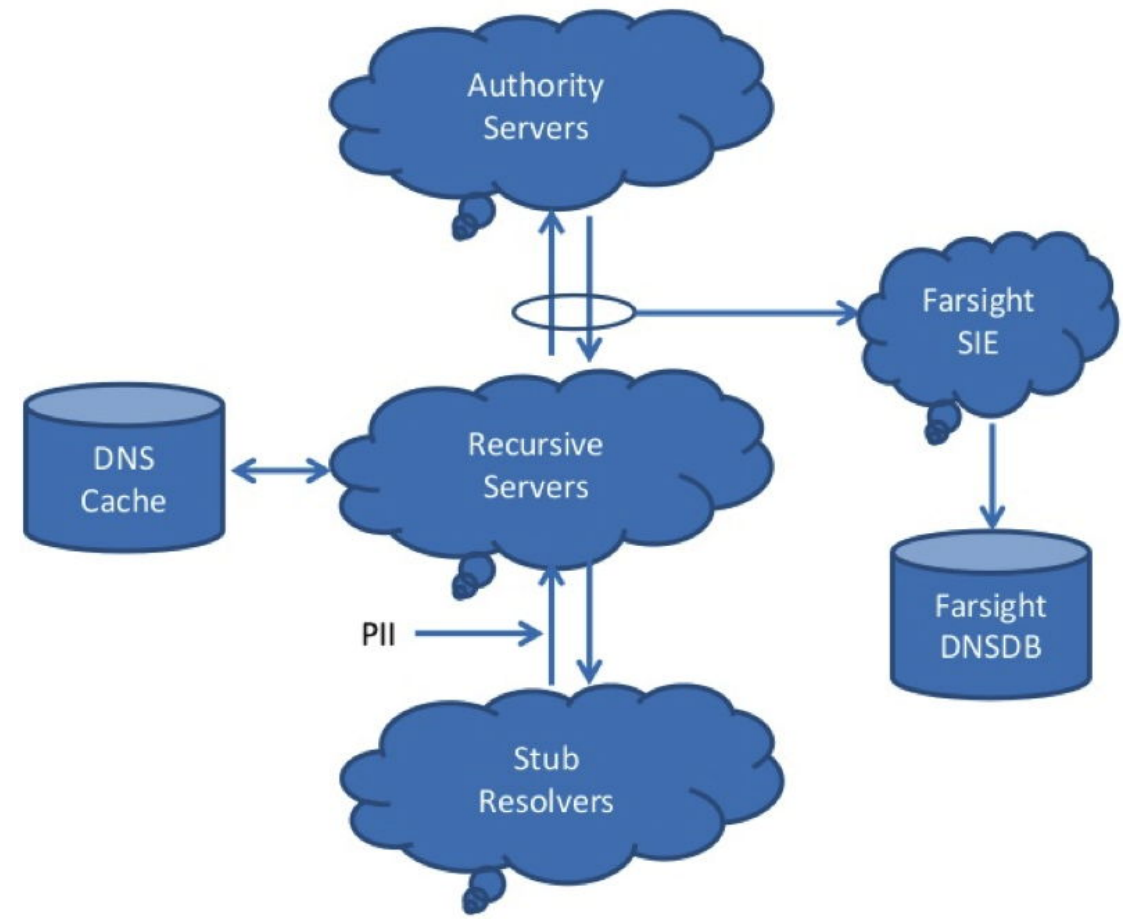
Let's talk a little about that DNS caching. DNS caching is important to the scalability of the domain name system because most users look at a relatively small number of Internet sites. While every ISP on the planet COULD re-resolve google.com (or facebook.com, or amazon.com, or ...) "from scratch" every time any user wants to visit one of those sites, doing so wouldn't make much sense. After all, in most cases, nothing will have changed since the last time a user at that site resolved those same names. That's why most ISPs configure their recursive resolvers to "cache" (or "temporarily remember") recent DNS resolutions -- it lets you avoid having to look up google.com (or facebook.com, or amazon.com, or ...) a gazillion times a second when there's nothing new to retrieve.

Domain owners hint about the length of time their names should be cached via the TTL (or "time to live") value they specify for each name. Highly dynamic name? It may have a short TTL (perhaps only a few seconds long). Longstanding and very stable name? The TTL in that case might be a day ($24 \times 60 \times 60 = 86400$ seconds) or even longer.

A cache miss occurs when a user wants to go to a site that's NOT been recently cached. In that case, the name of that site WILL need to be resolved, and that's when we see and collect data at our sensor partner sites. Each cache miss we see may represent one user visiting one page at a site, or hundreds (or thousands!) of users accessing a site. We simply can't tell from what above the recursive resolver.

The take away from the above is that cache miss volumetric traffic can be potentially tricky to interpret due to the impacts of TTLs and caching, among other things, so BE CAREFUL when comparing the traffic volumes of two or more sites.

We also note for the record that the location of our sensors (and any sensor changes, such as new sensor sites, changes to existing name server configurations, etc.) can also potentially impact observed traffic levels. Out of respect for sensor operator privacy, company policy is to not discuss sensor operators, sensor locations, or changes to sensors.



II. Categories Of Domains In This Report

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Recall that our general goal is to try to capture Covid impacts on DNS traffic volumes. We wanted to check nine main categories of domains that might be affected by the Corona virus:

1. [Baseline Sites](#) (8 sites)

We (perhaps naively) expected that some domains might be largely unaffected by the pandemic. Exemplars we'd selected for this category included Archive.org, Wikipedia and a variety of free/open source software domains, among others. Unfortunately, worldwide disruptions meant that even these "control" domains appear to have been impacted over the course of the last year.

2. [Covid-19/Coronavirus Governmental Sites](#) (19 sites)

This is a new category since our original report. Part of Federal, international and state response to the pandemic involves sharing public information and recommendations via new or existing websites. We chose to look at four leading Federal/International domains, plus a selection of state-level dedicated pandemic sites. Demand for information via these sites may have been offset by near-saturation coverage of pandemic-related topics by print and broadcast news media.

3. [News and Opinion Sites](#) (37 sites)

As in the original report, we've included a variety of news and opinion sites. We endeavored to include left-leaning news and opinion sites, right-leaning news and opinion sites, and sites that are more-or-less balanced. We dropped some domains from the original report that had lower traffic levels.

4. [Retail Sites](#) (90 sites)

Many retail businesses have been profoundly impacted by the pandemic. That impact may be negative (e.g., due to forced closures or government-imposed limitations), or positive (associated with new opportunities). This category includes diverse retail sites, ranging from Amazon and Ebay to grocery chains and general merchandise brick-and-mortar stores.

5. [Social Media Sites](#) (11 sites)

There's no question that social media has changed during the pandemic, the only question is HOW and to what extent. Typical reporting looks like: "Posting less, posting more, and tired of it all: How the pandemic has changed social media," <https://www.vox.com/recode/22295131/social-media-use-pandemic-covid-19-instagram-tiktok> In this section, we show you what we see for popular social media sites such as Facebook, LinkedIn, Twitter, and so on.

6. [Sports Sites](#) (8 sites)

Americans have always loved sports, whether grade school, high school, college, or professional. The pandemic has caused many states to forbid (or at least heavily limit) in-person sporting events. Where have those interested in sports gone? Are they perhaps visiting sports-related sites on the Internet more now? We report on some popular online destinations.

7. [Streaming Video Sites](#) (22 sites)

While in lock down, one of the most popular entertainment options has been watching TV, particularly streaming video sites. We looked at traffic to Netflix, Hulu and other newer and international streaming services.

8. [Travel/Tourism/Transportation Sites](#) (39 sites)

Another diverse category. The domains here include airlines, car rental companies, cruise lines, hotels, shipping companies, etc.

9. [Universities](#) (92 sites)

With many universities pausing (or capacity-limiting) on-campus instruction, we expected we'd see impacts to university domains, and we in fact did. The Harvard Business Review reported "The Pandemic Pushed Universities Online. The Change Was Long Overdue," see <https://hbr.org/2020/09/the-pandemic-pushed-universities-online-the-change-was-long-overdue> We looked at both an assortment of American universities and a number of leading international schools.

10. [Videoconferencing Sites](#) (4 sites)

With many working from home, videoconferencing has become ubiquitous. The media is discussing this in reports such as: "How the Pandemic Has Become a Windfall for Video Conferencing Platforms," <https://www.prnewswire.com/news-releases/how-the-pandemic-has-become-a-windfall-for-video-conferencing-platforms-301095229.html> To our surprise, one company appeared to be particularly popular (and it's not the one that often seems to gets all the publicity!)

11. [Video Gaming Sites](#) (11 sites)

Another increasingly popular pastime, video gaming also "took off" during the pandemic (see " Video Games Power Up During Pandemic: Lockdowns and next-generation consoles are supercharging growth," <https://www.morningstar.com/articles/1026611/video-games-power-up-during-pandemic> and "3, 2, 1 Go! Video Gaming is at an All-Time High During COVID-19," <https://www.nielsen.com/us/en/insights/article/2020/3-2-1-go-video-gaming-is-at-an-all-time-high-during-covid-19/>)

TOTAL: 341 sites (for context the previous report had 316 sites, although the specific sites and the distribution across the various categories varies from that report to this one)

III. Intentionally Omitted Categories Of Domains

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There were other categories of sites that we considered looking at, but ultimately decided to omit from the current study.

Reasons why we omitted some categories included:

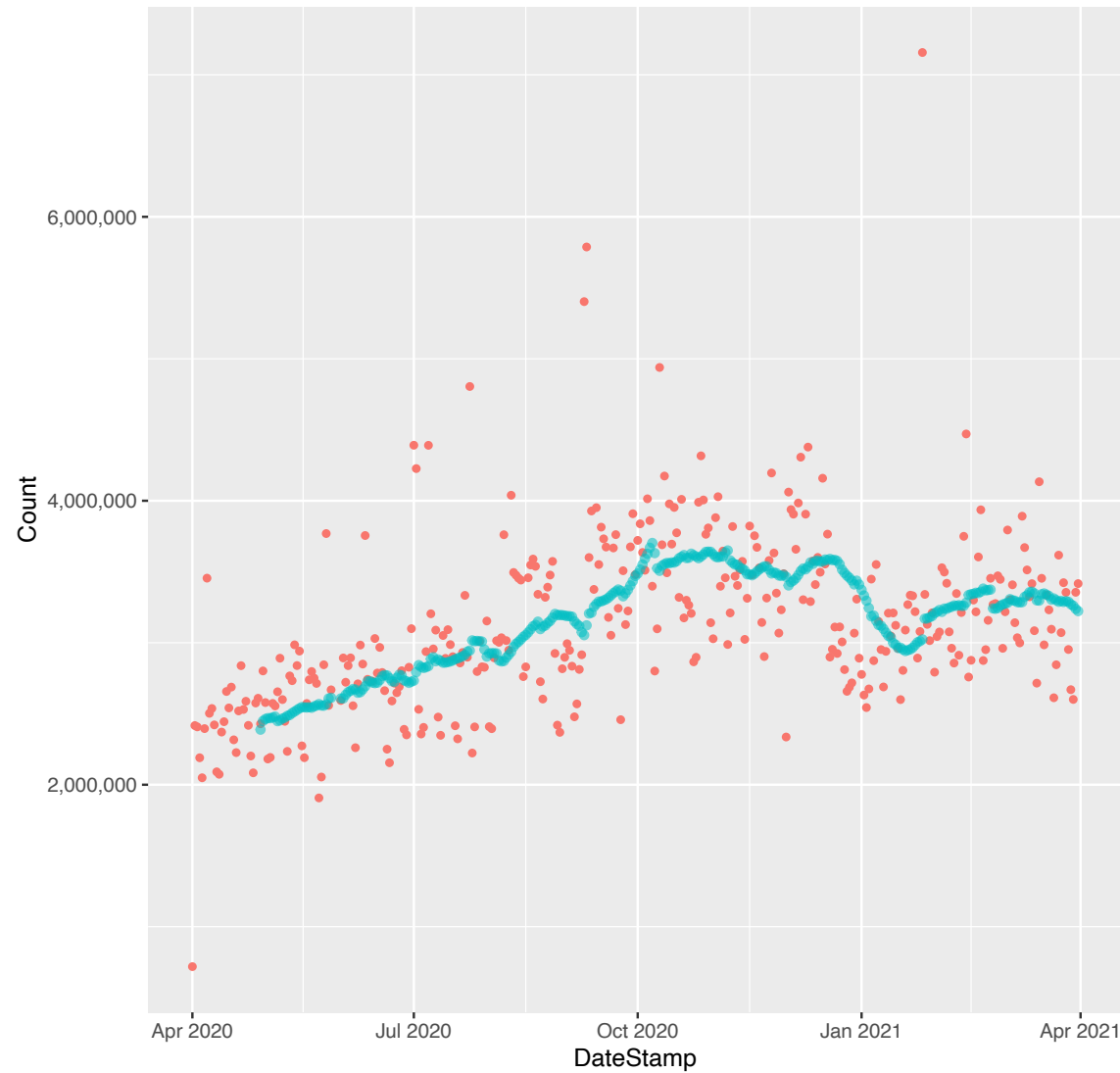
- There have been very real human costs to the pandemic. We want to show respect for those who've contracted Covid-19 and suffered or died from this disease. That's why we're not doing an extensive analysis of medical centers, pharmaceuticals/vaccine-related domains, and mortuary-related domains.
- There are other topics that are notorious for always being contentious, such as sex, politics, money and religion. In an effort to preserve harmony here (as at the holiday dinner table), we're going to voluntarily refrain from digging into those topics.
- Other sites are Covid-related but unlikely to be consumer focused -- for example, personal protective equipment is normally distributed via existing wholesale channels, rather than direct-to-consumer. For the most part, again, we're going to try to avoid those sort of "wholesale only" distributor sites.
- Finally, in some cases change may take place, but on a highly distributed basis. For example, consider real estate sales: those sales often take place face-to-face via a large number of local offices rather than via a small number of highly influential centralized brokers. We could investigate hundreds of smaller agencies, but we don't want the size of this report to get totally crazy!

We'll now go over some specific categories of excluded domains.

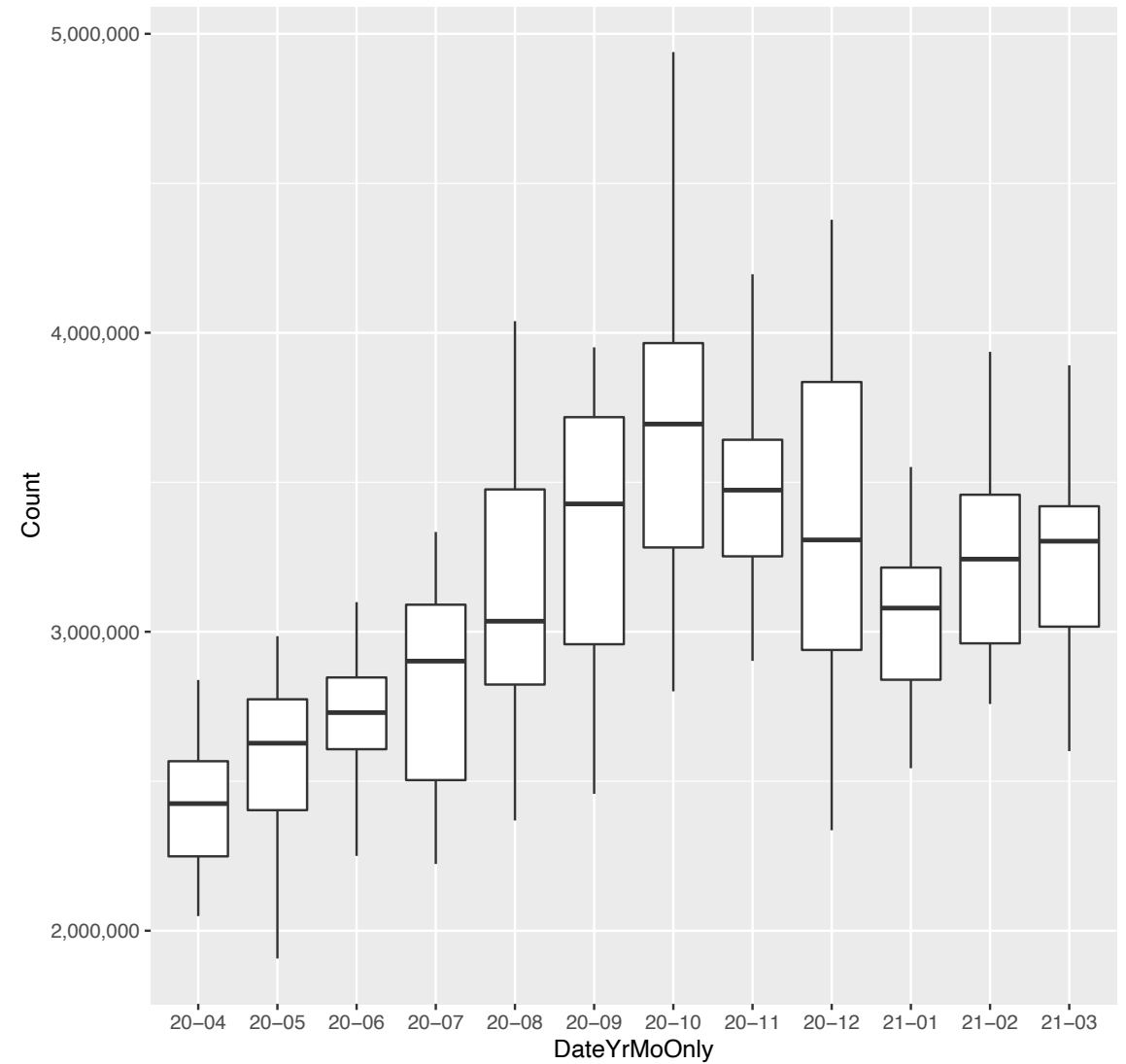
By way of illustration, we've elected to show a single sample graph for each category.

- OMITTED: Broadband Internet Service Providers** (such as centurylink.com, viasat.com, xfinity.com, etc.) and **Cellular/5G Wireless Providers** (such as t-mobile.com, verizon.com, etc.). Reporting on this category during the pandemic has been mixed, see for example "Retail stores still reign for wireless purchases, T-Mobile keeps customer satisfaction crown," <https://www.fiercewireless.com/operators/retail-stores-still-reign-for-wireless-purchases-t-mobile-keeps-customer-satisfaction> (Aug 14, 2020), but we believe consumer interest in wireless remains strong during the pandemic. We show graphs for *.verizon.com by way of example, but will not be reporting on other domains from this category.

*. verizon.com (day-by-day counts and 28 day moving average)

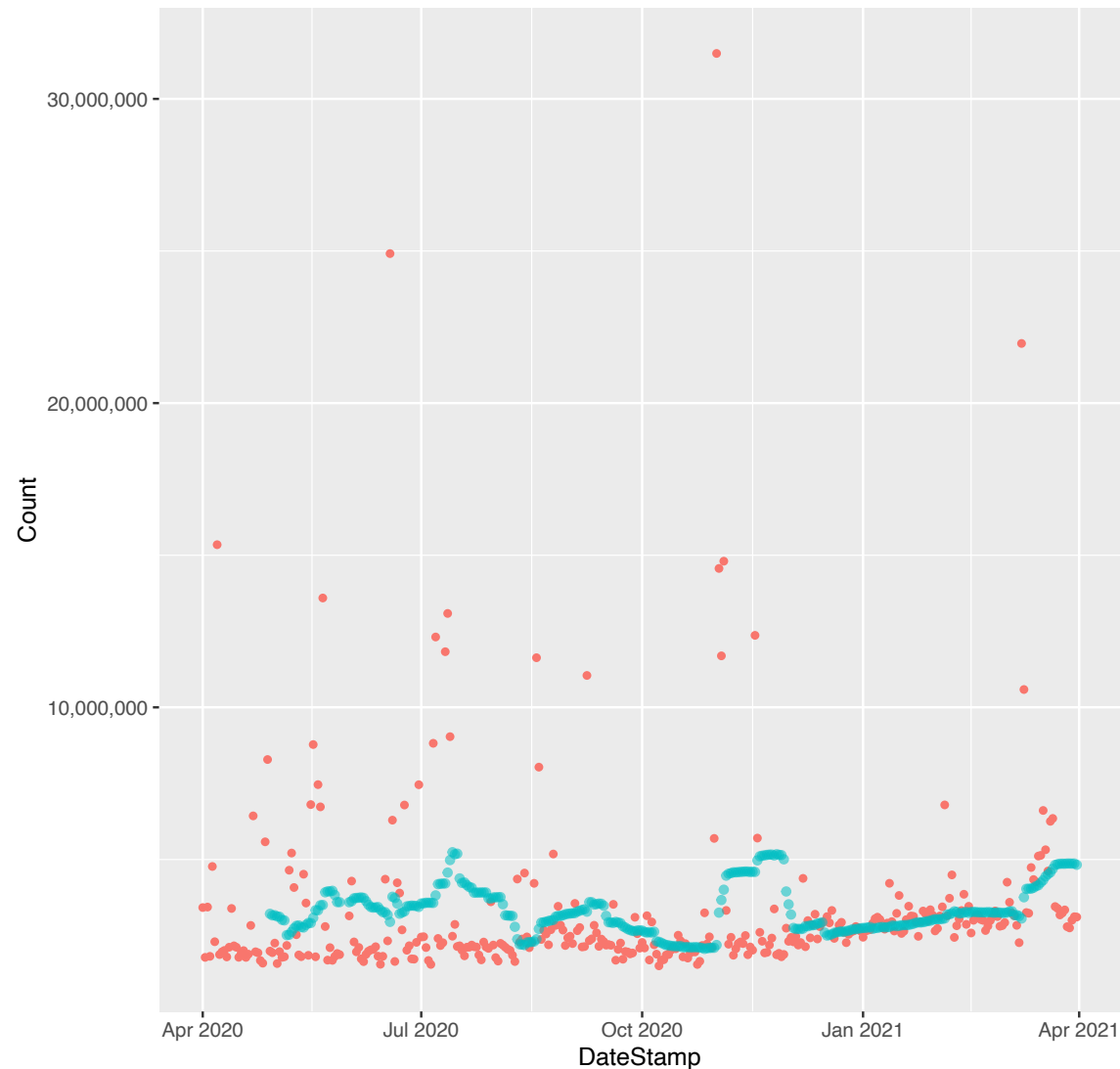


*. verizon.com (monthly boxplots (outliers trimmed))

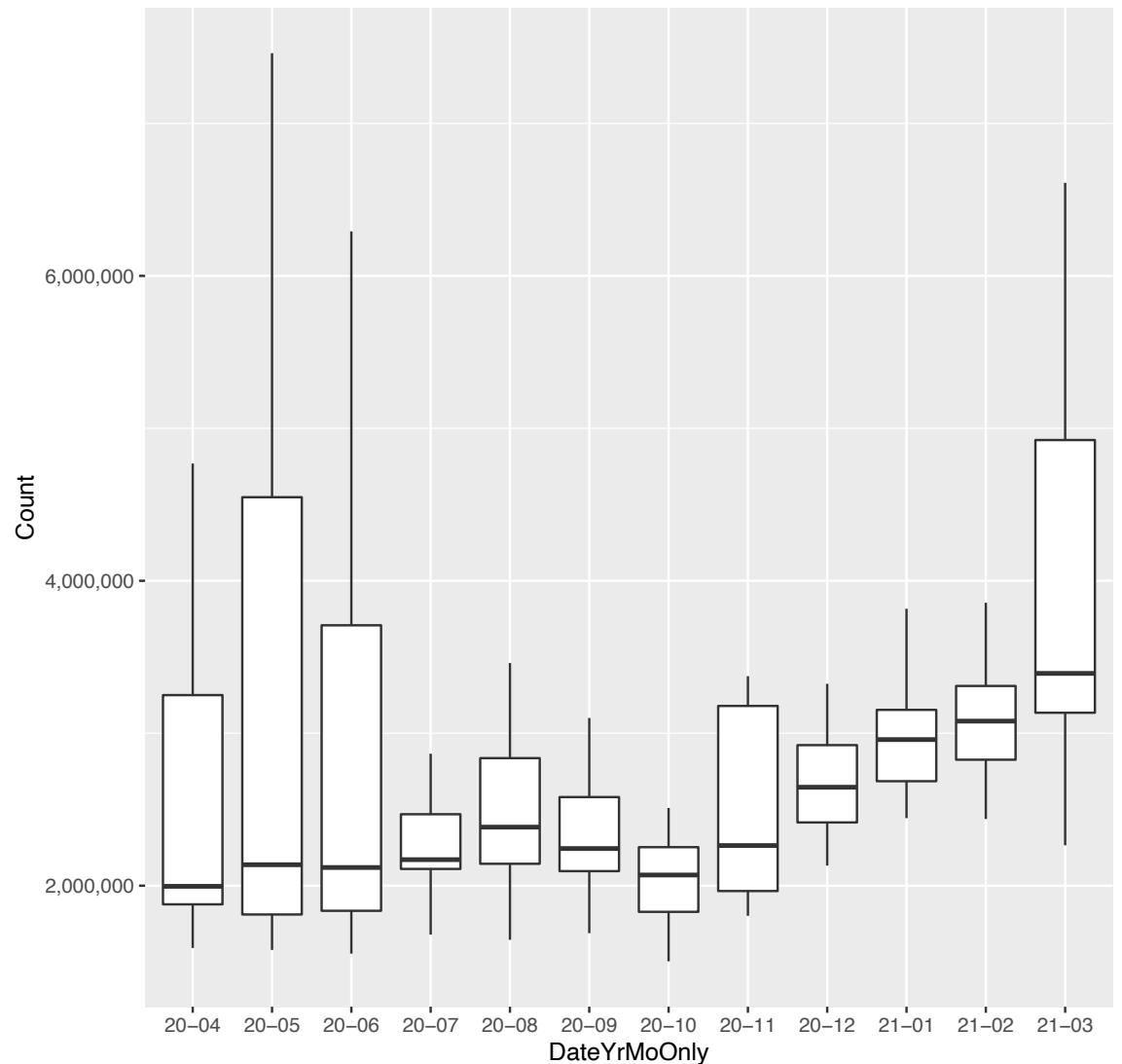


- OMITTED: Cars and Light Trucks** (domains for this category include sites such as autotrader.com, cargurus.com, carmax.com, cars.com, carsdirect.com, carvana.com, dodge.com, ford.com, gm.com, honda.com, jeep.com, nissan.com, ramtrucks.com, subaru.com, toyota.com, truecar.com, etc.). Reporting for this category has been mixed. For example, see "Increased new-car demand during pandemic has U.S. industry optimistic about 2021," <https://www.reuters.com/article/us-usa-autos-sales/increased-new-car-demand-during-pandemic-has-u-s-industry-optimistic-about-2021-idUSKBN29A1RY> but note also reporting such as "Coronavirus crippled U.S. auto sales in 2020 but it could have been far worse," <https://www.cnbc.com/2020/12/23/covid-19-crippled-us-auto-sales-in-2020-but-it-could-have-been-worse.html> We'll now show as an example graphs for *.ford.com (only):

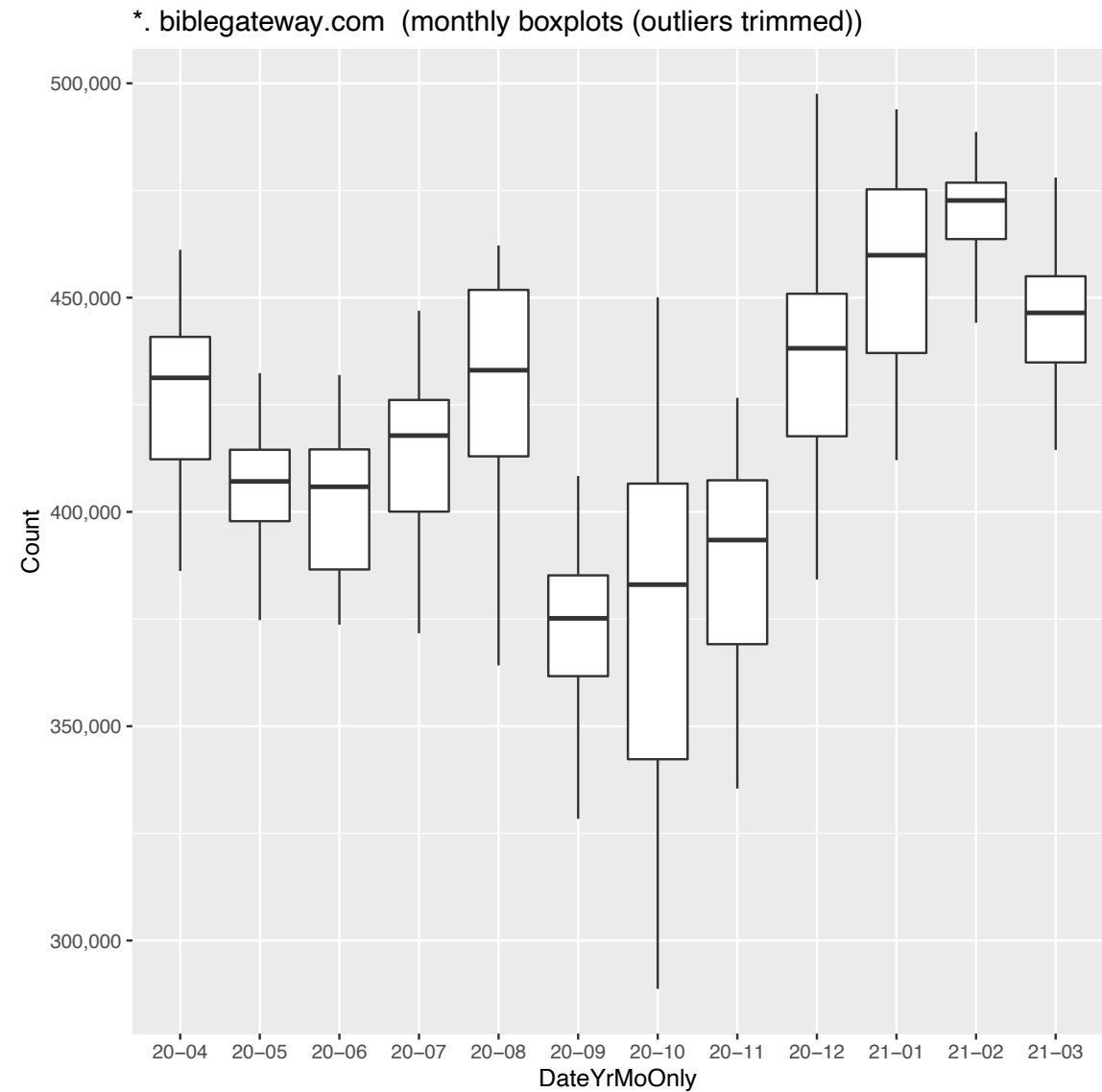
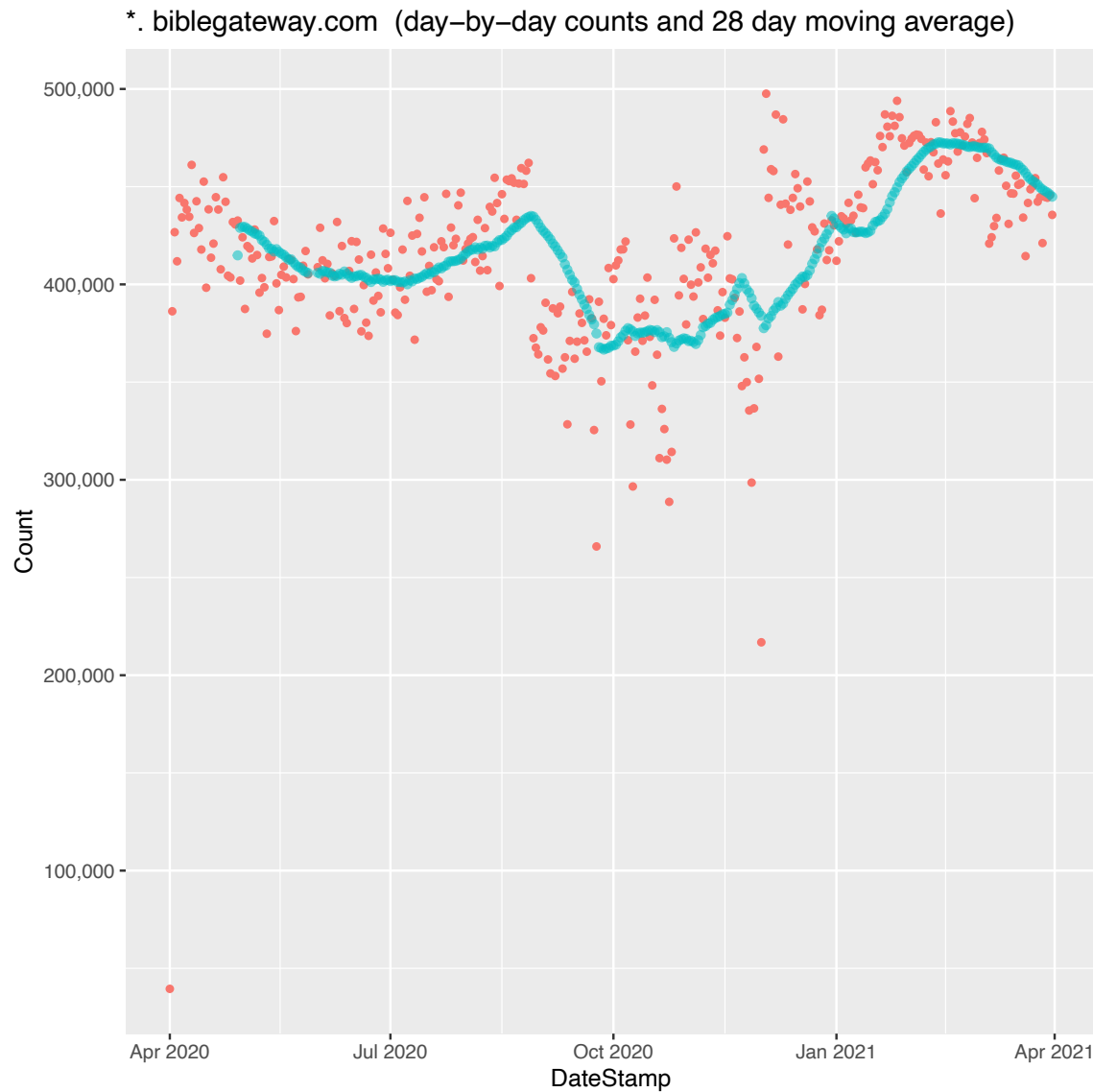
*.ford.com (day-by-day counts and 28 day moving average)



*.ford.com (monthly boxplots (outliers trimmed))



- OMITTED: Churches, Mosques, Synagogues and Other Online Religious Sites.** Many who wanted to worship in person found that they weren't able to do so. Some may have sought alternative opportunities for fellowship online, but we don't want to be potentially seen as disrespecting or commercializing religious observations. (See for example "Churches are closed, but religion has a new home on the internet," <https://www.fastcompany.com/90516325/churches-are-closed-but-religion-has-a-new-home-on-the-internet>). By way of example, we're going to show traffic for *.biblegateway.com:

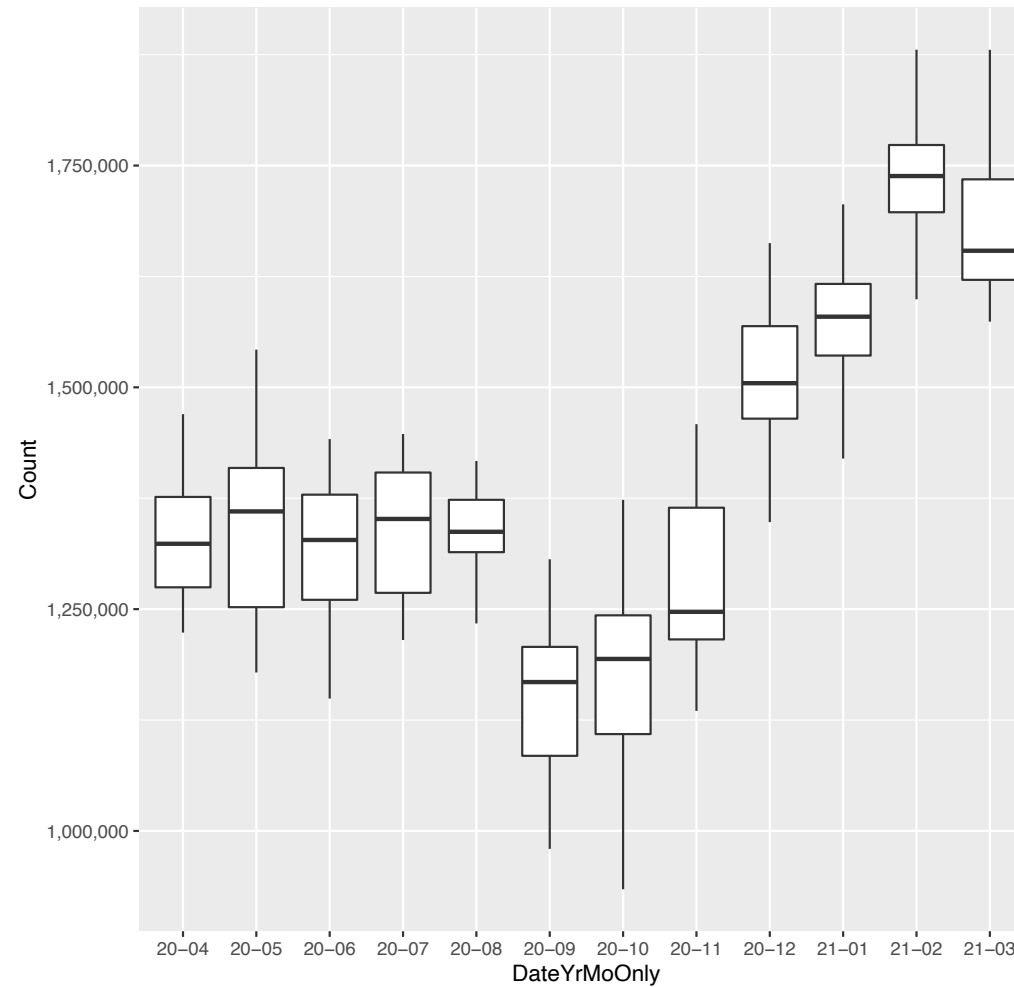


- OMITTED: Dating Sites.** One of the most obvious effects of the pandemic has been social isolation, as opportunities for singles to meet new friends/potential romantic partners through friends, at activities, or at a favorite neighborhood "watering hole," have largely disappeared. As an alternative, some apparently have turned to online matchmaking sites such as bumble.com, clover.co, eharmony.com, elitesingles.com, happn.com, hinge.co, match.com, okcupid.com, ourtime.com, pof.com, silversingles.com, theleague.com, tinder.com, zoosk.com, etc.? Apparently so, if we're to believe "Activity on dating apps has surged during the pandemic," <https://fortune.com/2021/02/12/covid-pandemic-online-dating-apps-usage-tinder-okcupid-bumble-meet-group/> That said, due to the potential sensitivity of this topic, we're only going to show one example, in this case for *.match.com:

*. match.com (day-by-day counts and 28 day moving average)

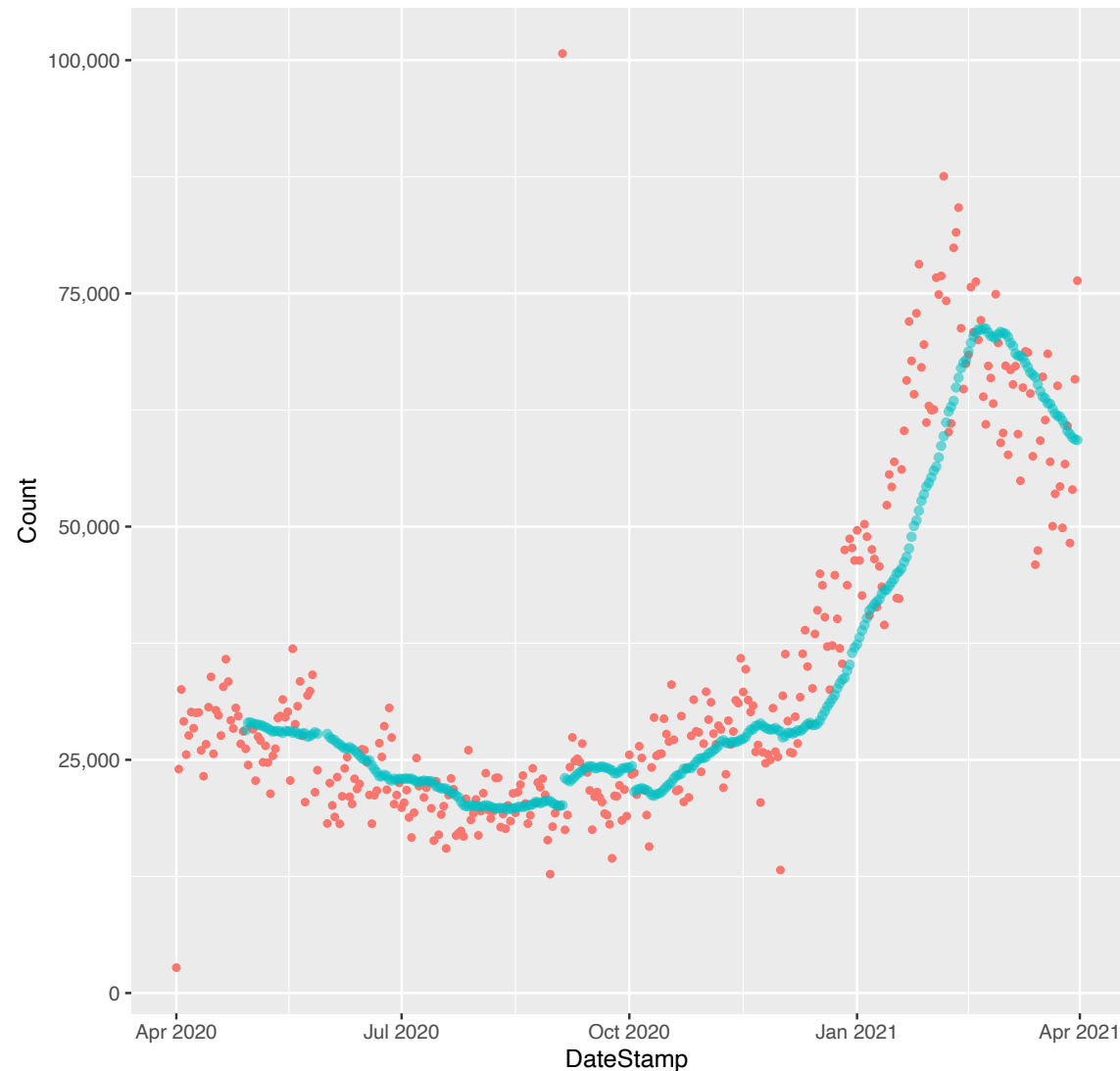


*. match.com (monthly boxplots (outliers trimmed))

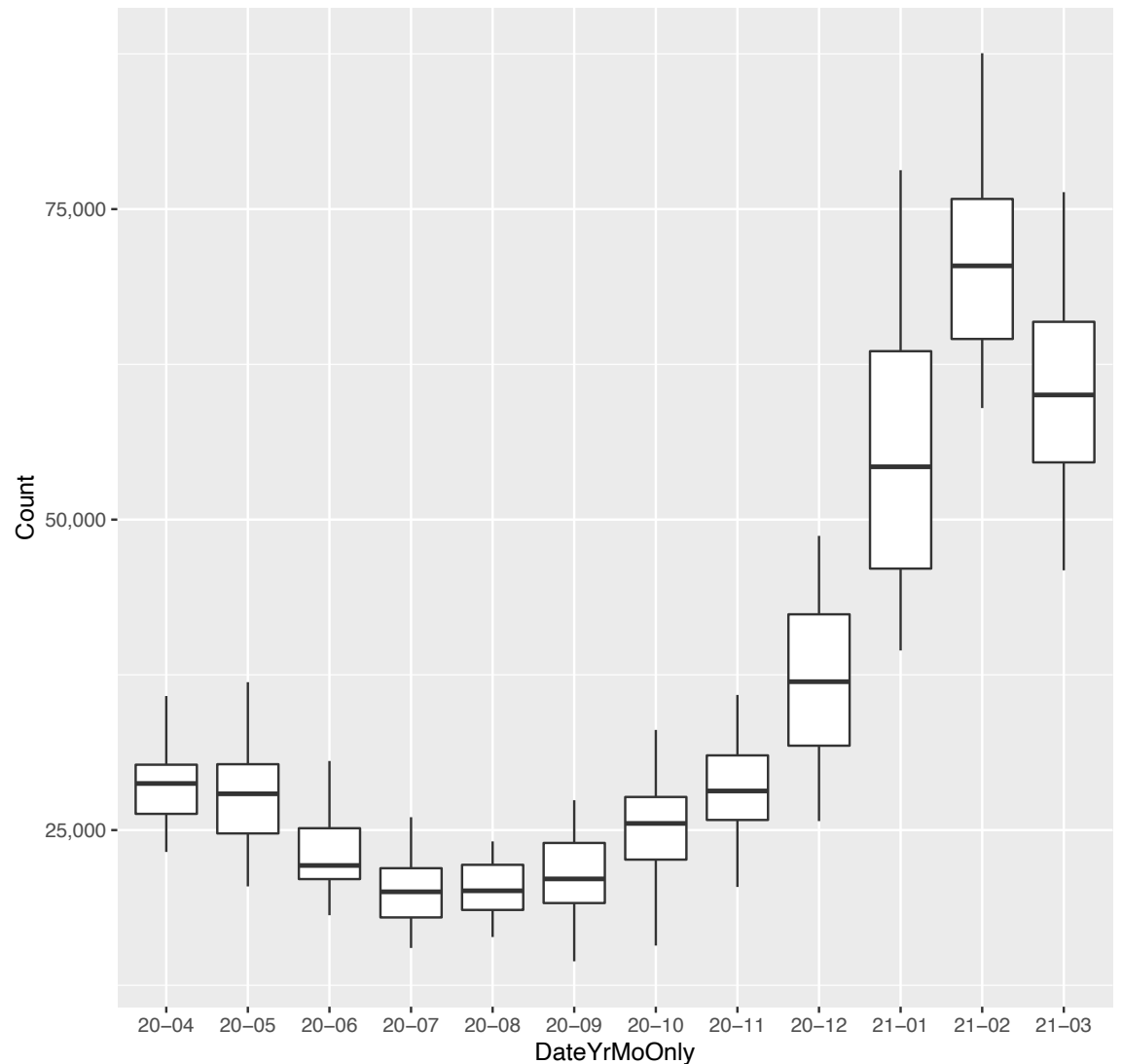


- OMITTED: General Aviation Aircraft Sales and Aircraft Leasing Services:** While sales of private planes struggled during the pandemic (see for example "Pandemic tanks aircraft sales in first half of 2020," <https://generalaviationnews.com/2020/09/15/pandemic-tanks-aircraft-sales-in-first-half-of-2020/>), private jet leasing services have reportedly thrived (see "Why private jet travel is booming in Hollywood during the pandemic," <https://www.latimes.com/entertainment-arts/business/story/2021-02-19/during-the-pandemic-private-jet-travel-takes-off-in-hollywood>). Some potentially relevant domains include: beechcraft.txtav.com, cessna.txtav.com, cirrusaircraft.com, flyvictor.com, flyxo.com, globeair.com, iconaircraft.com, jettly.com, jsx.com, magellanjets.com, netjets.com, oneaviation.aero, oxygenaviation.com, piper.com, vistajet.com, and wheelsup.com. One sample set of graphs:

*. netjets.com (day-by-day counts and 28 day moving average)



*. netjets.com (monthly boxplots (outliers trimmed))

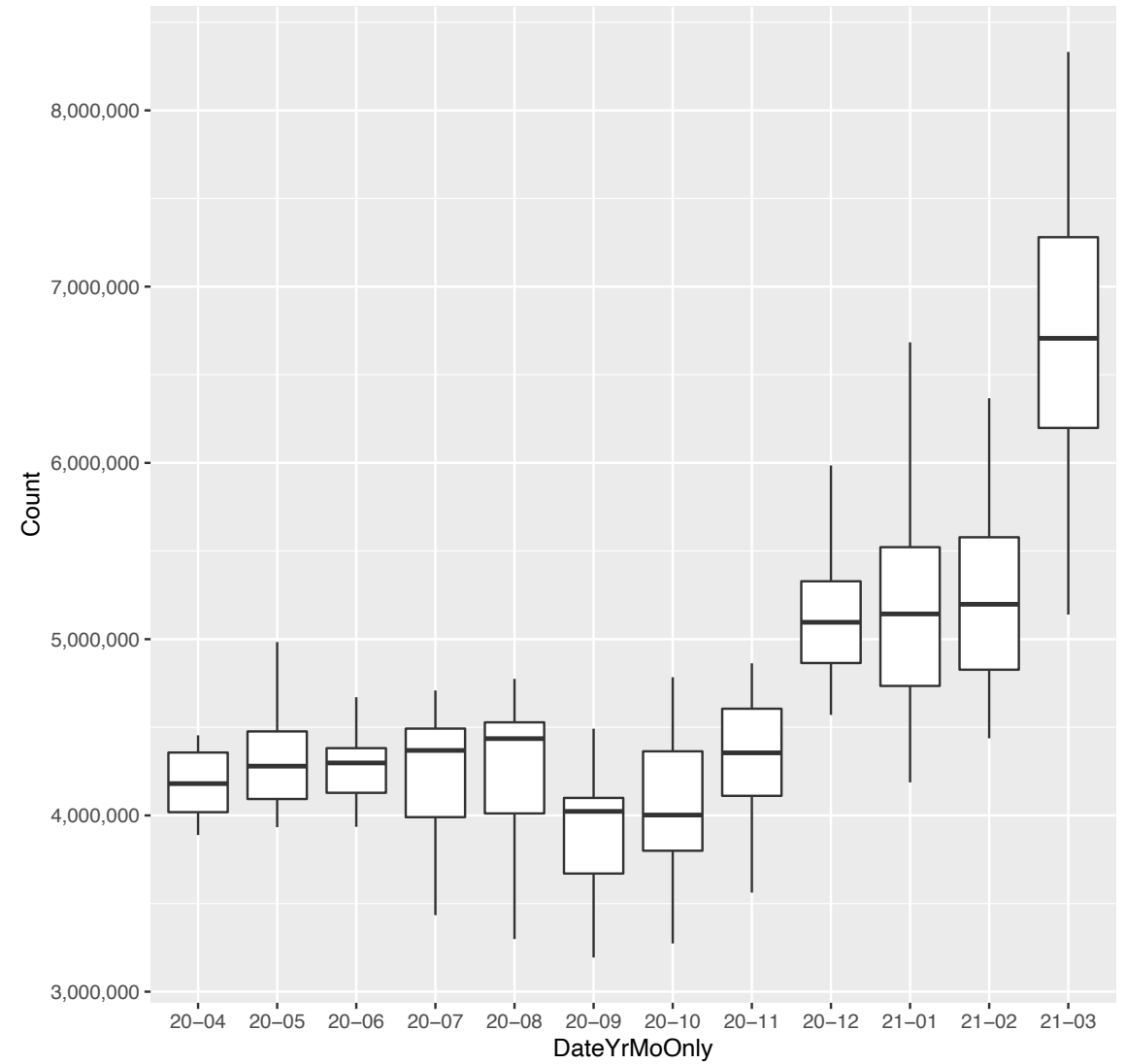


- **OMITTED: Health Insurance Companies** This is another highly potentially relevant industry given pandemic-related hospitalizations. Typical domains might include aetna.com, bcbs.com, cigna.com, kaiserpermanente.org, uhc.com, etc.). We're only going to show one domain, uhc.com (United Health Care) as an example of a single outfit from this category:

*. uhc.com (day-by-day counts and 28 day moving average)



*. uhc.com (monthly boxplots (outliers trimmed))

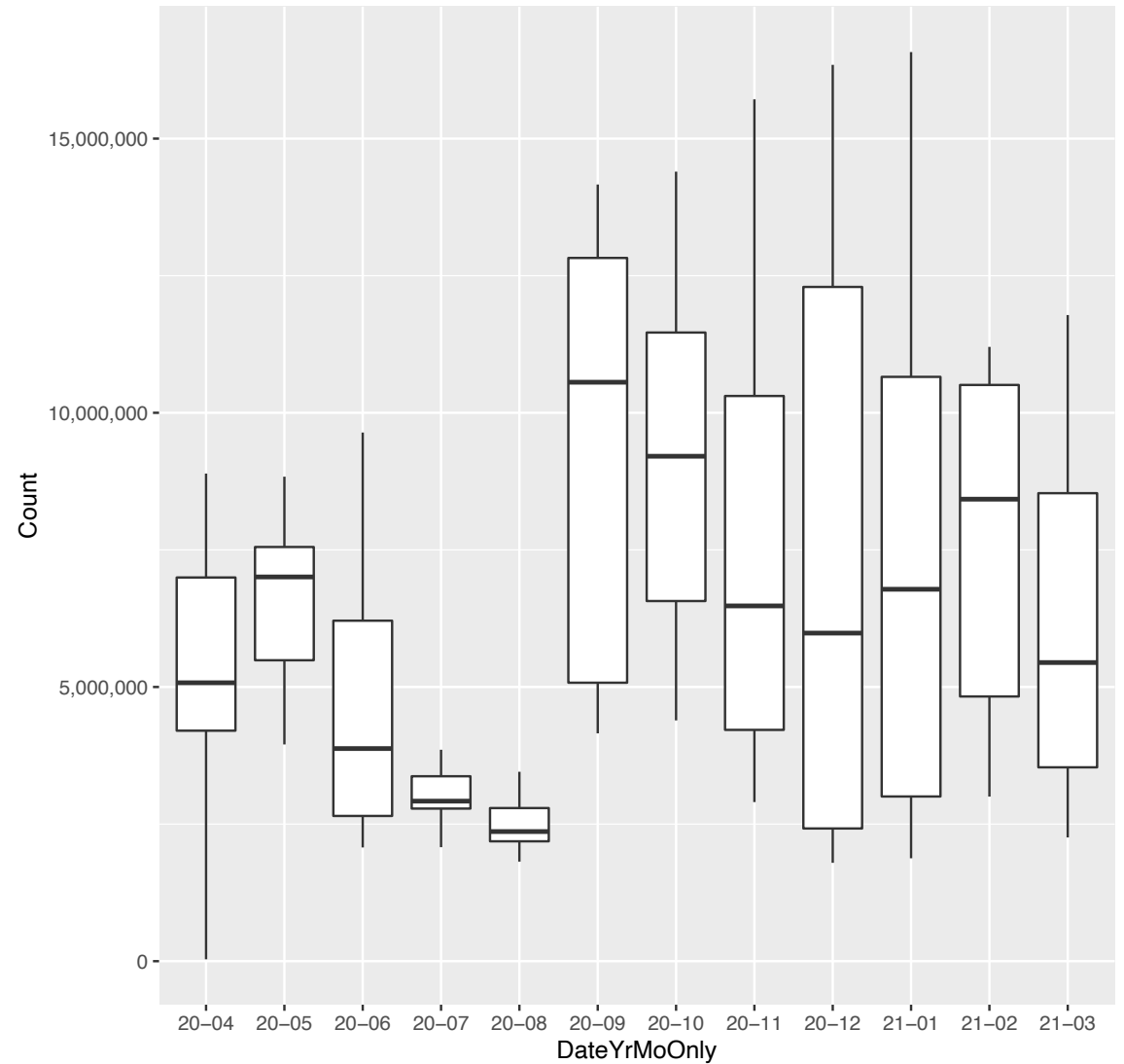


- OMITTED: K12 Schools** (think of your local school district here, or perhaps some of the country's mega school districts. One "mega district" is Fairfax County Virginia Public Schools: "FCPS is one of the largest school divisions in the U.S. with 198 schools and centers. We serve a diverse student population of more than 188,000 students [...]", see <https://www.fcps.edu/about-fcps> . Looking just at *.fcps.edu, we see:

*.fcps.edu (day-by-day counts and 28 day moving average)

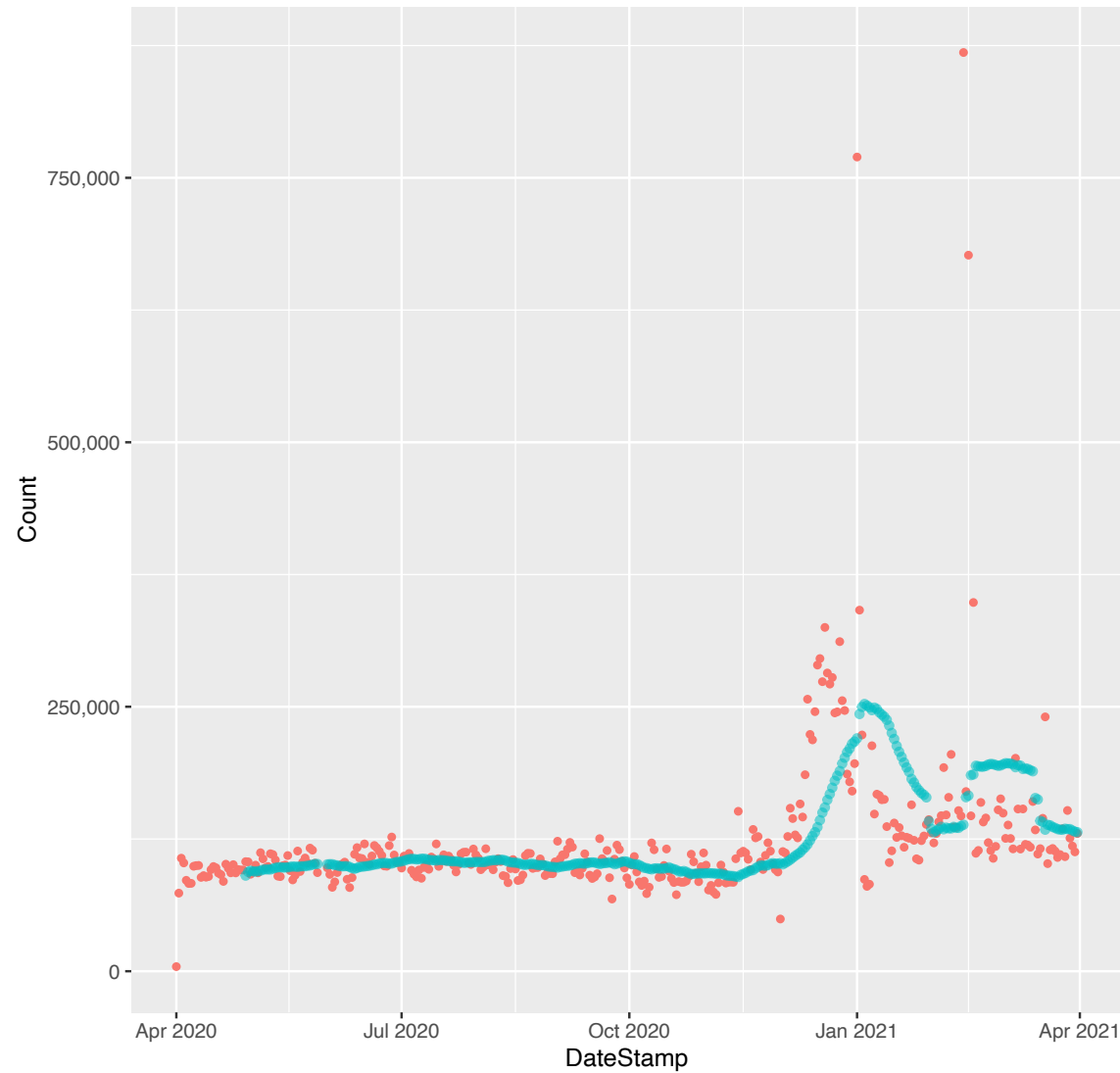


*.fcps.edu (monthly boxplots (outliers trimmed))

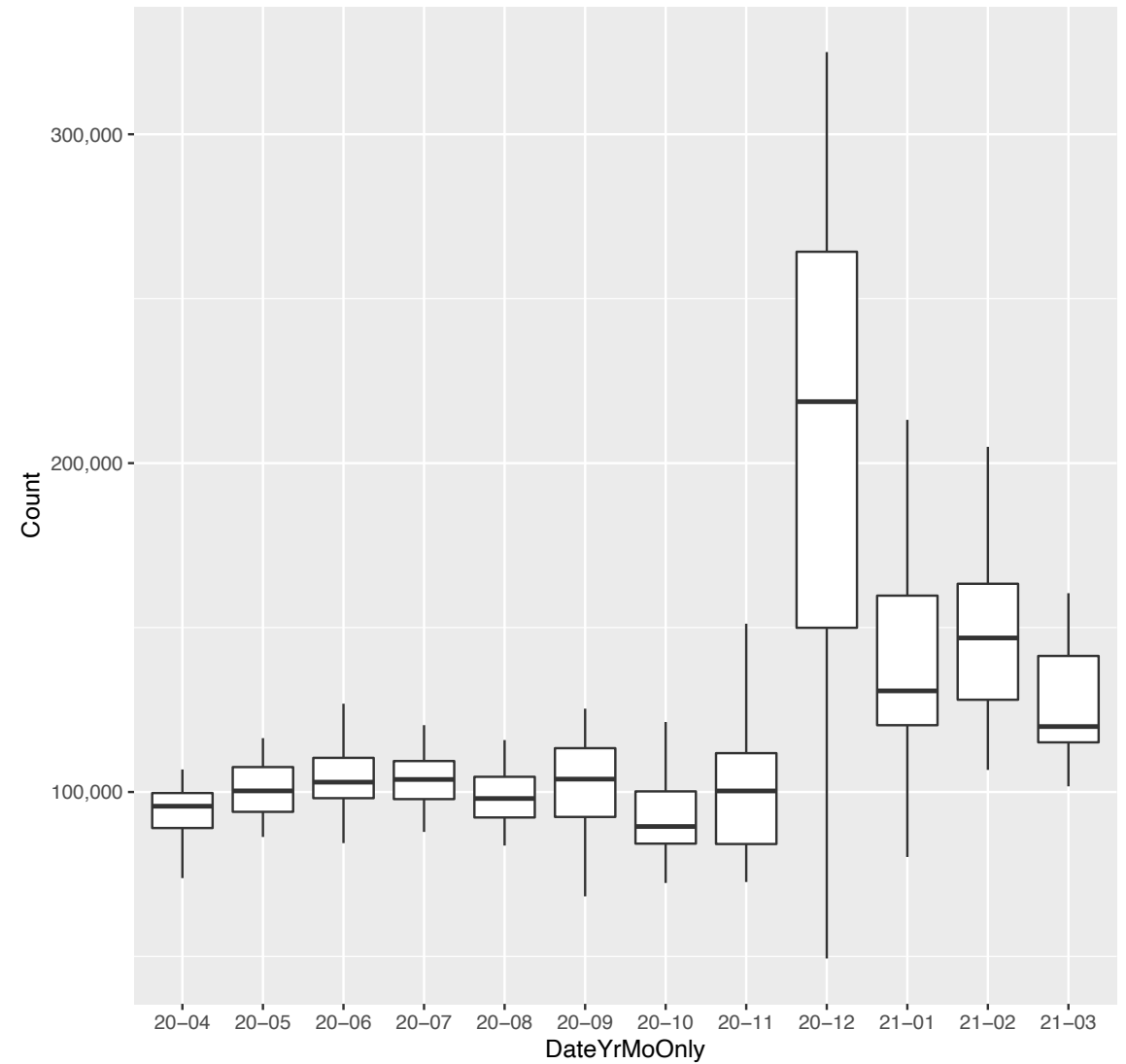


- OMITTED: Liquor/Wine/Beer Sales Online** Closed bars and restaurants, and the stress of coping with the consequences of the pandemic, has reportedly caused significant growth in online adult beverage sales (see "Online Alcohol Sales Surge Amid Coronavirus Pandemic," <https://www.forbes.com/sites/chrisfurnari/2020/12/01/online-alcohol-sales-surge-amid-coronavirus-pandemic/>). Examples of sites of this sort include cwspirits.com, drizly.com, liquorama.net, liquorstore-online.com, missionliquor.com, qualityliquorstore.com, uptownspirits.com, and winetoship.com.

*. drizly.com (day-by-day counts and 28 day moving average)



*. drizly.com (monthly boxplots (outliers trimmed))



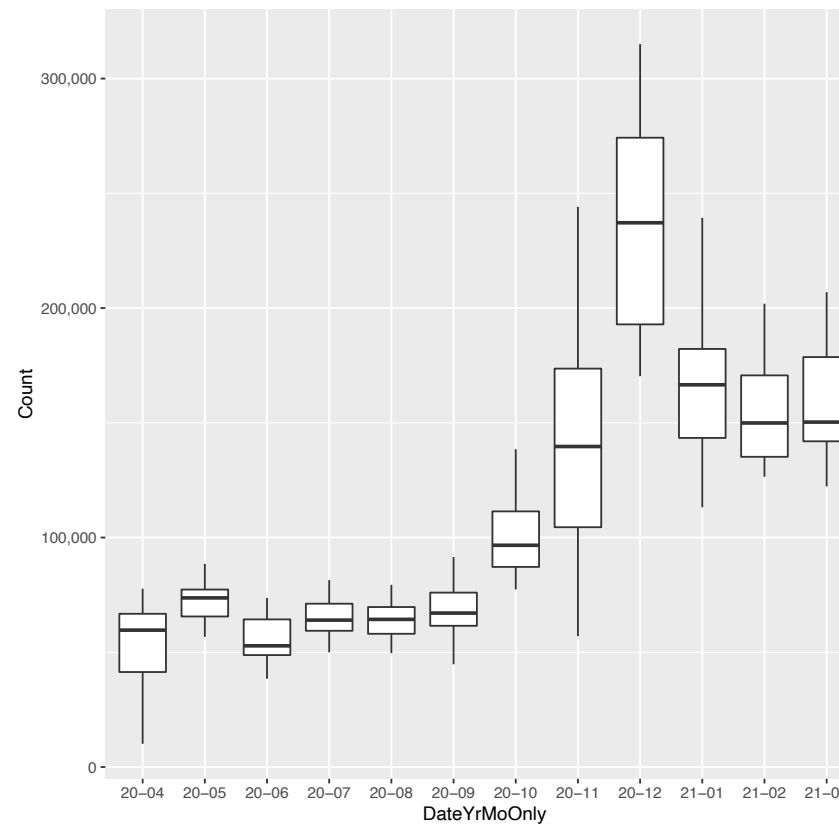
- **OMITTED: Luxury Goods (High Fashion, Fine Jewelry, and Perfume Sales)** Lxury goods are reportedly selling quite well during the pandemic:
 - *Time* has reported "During COVID-19, Luxury Fashion Has Thrived Online," see <https://time.com/5938014/fashion-luxury-farfetch-jose-neves/>
 - *The NY Times* has reported "Even in a Pandemic, Fine Jewelry Is Selling," see <https://www.nytimes.com/2020/12/03/fashion/jewelry-rising-sales-pandemic-.html> and
 - Allure published "How COVID-19 Has Changed the Fragrance Industry — at Least for Now," see <https://www.allure.com/story/fragrance-industry-covid19-pandemic> stating "Interestingly, almost every brand we spoke with reported that people are still buying perfume — and a lot of it. "We have seen our online sales increase between 150 and 200 percent, depending on the market," says Michelle Feeney, founder of Floral Street perfumes."

Some "luxury goods" domains we could have investigated include armani.com, bergdorfgoodman.com, bulgari.com, burberry.com, cartier.com, chanel.com, chloe.com, creedboutique.com, dior.com, fendi.com, givenchy.com, goutalparis.com, gucci.com, harrods.com, harrywinston.com, hermes.com, louisvuitton.com, loewe.com, messika.com, moncler.com, prada.com, ralphlauren.com, rolex.com, selfridges.com, tiffany.com, valentino.com, vancleefarpels.com, verdura.com, versace.com, and ysl.com. One sample:

*. ralphlauren.com (day-by-day counts and 28 day moving average)

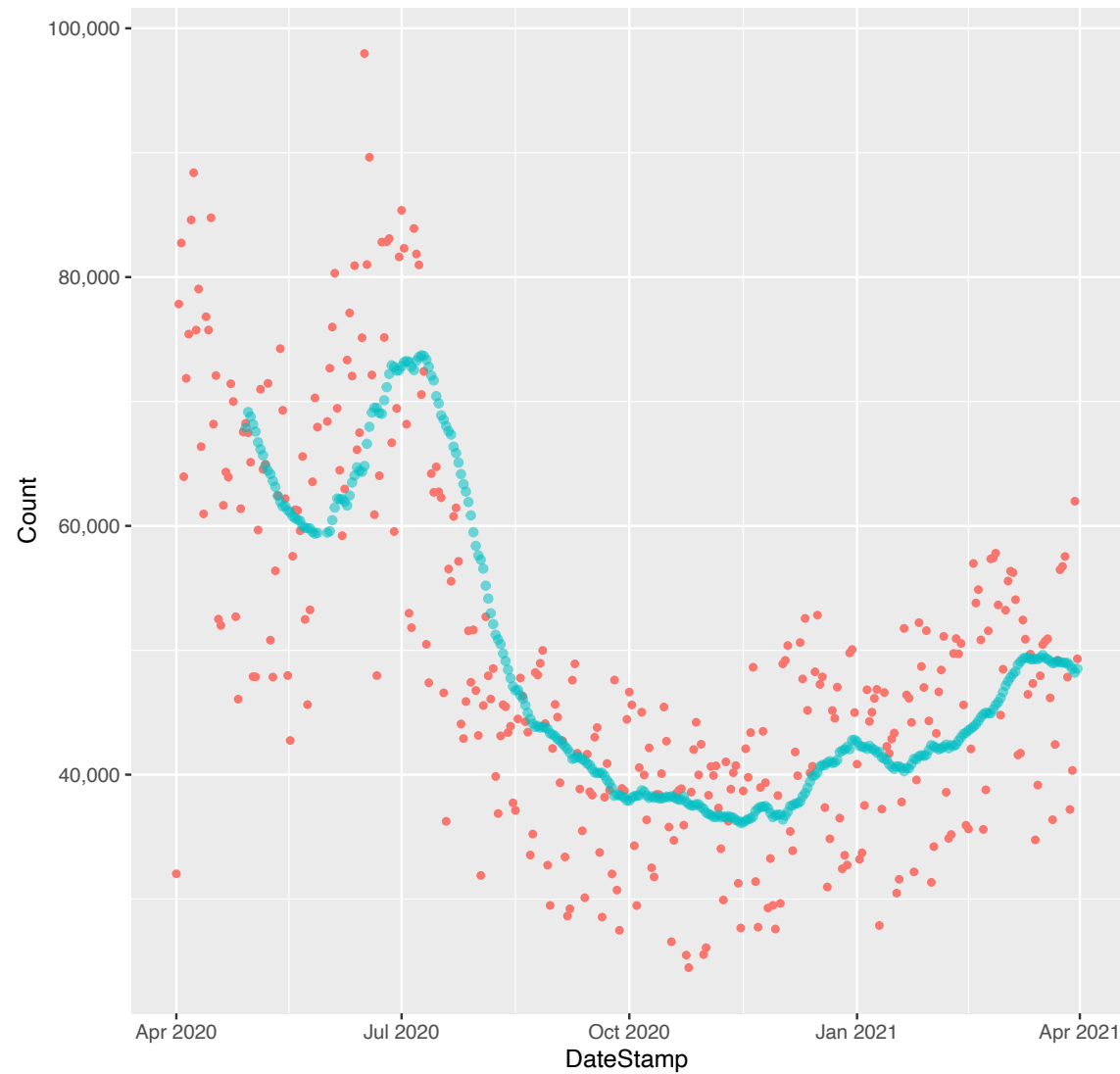


*. ralphlauren.com (monthly boxplots (outliers trimmed))

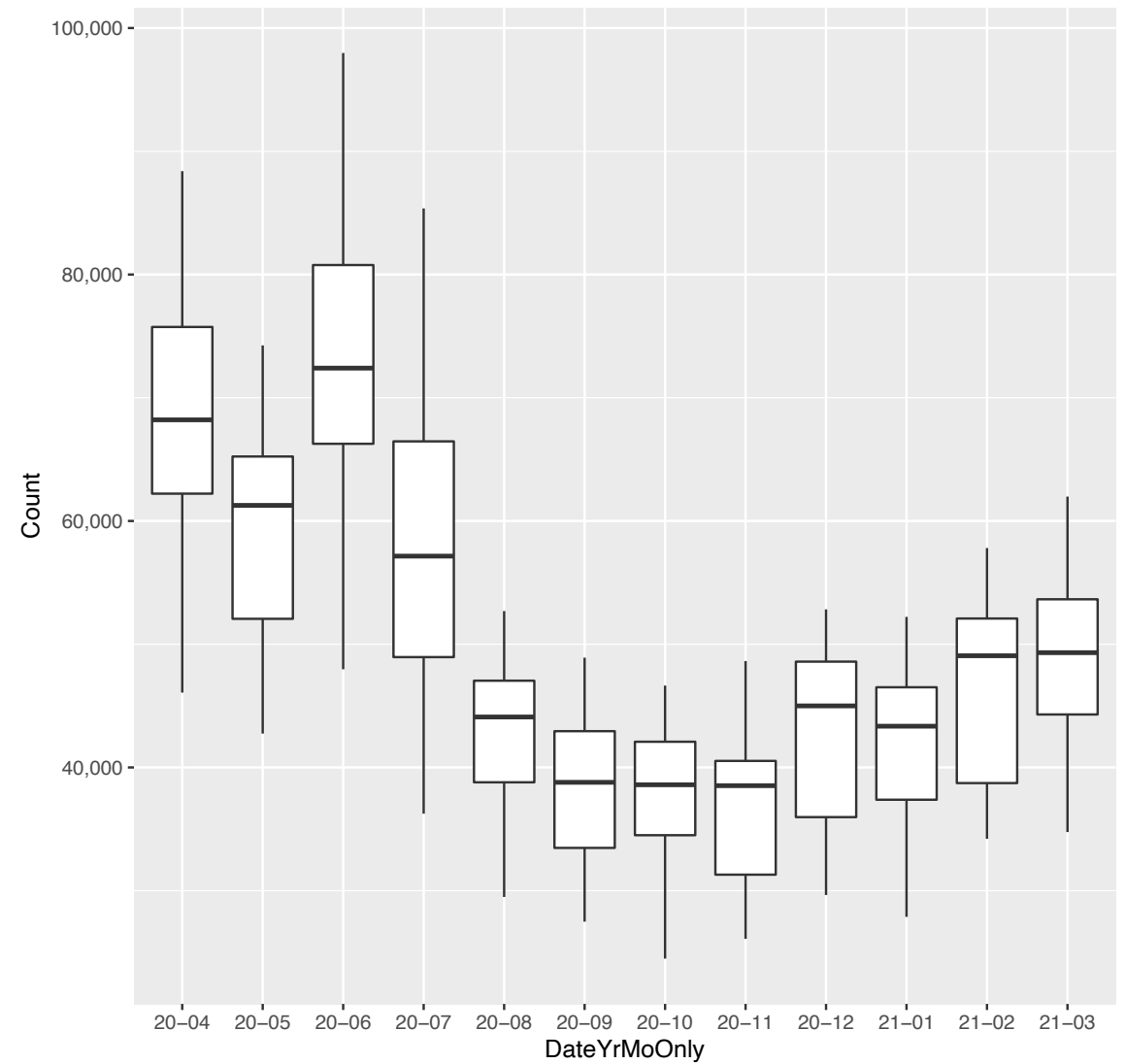


- OMITTED: Medical Centers** (this category potentially includes nationally-known medical centers (such as brighamandwomens.org, clevelandclinic.org, hopkinsmedicine.org, massgeneral.org, mayoclinic.org, mountsinai.org, etc.), as well as regional or local health care complexes (such as www.ohsu.edu, the Oregon Health & Science University in Portland OR). We'd expected that some of these sites might have been overwhelmed with Corona virus patients, but we also knew that the pandemic might result in patients deferring or forgoing elective procedures. Ultimately we chose to omit this category out of respect for all those who've become seriously ill and hospitalized by the pandemic.

*. mountsinai.org (day-by-day counts and 28 day moving average)



*. mountsinai.org (monthly boxplots (outliers trimmed))

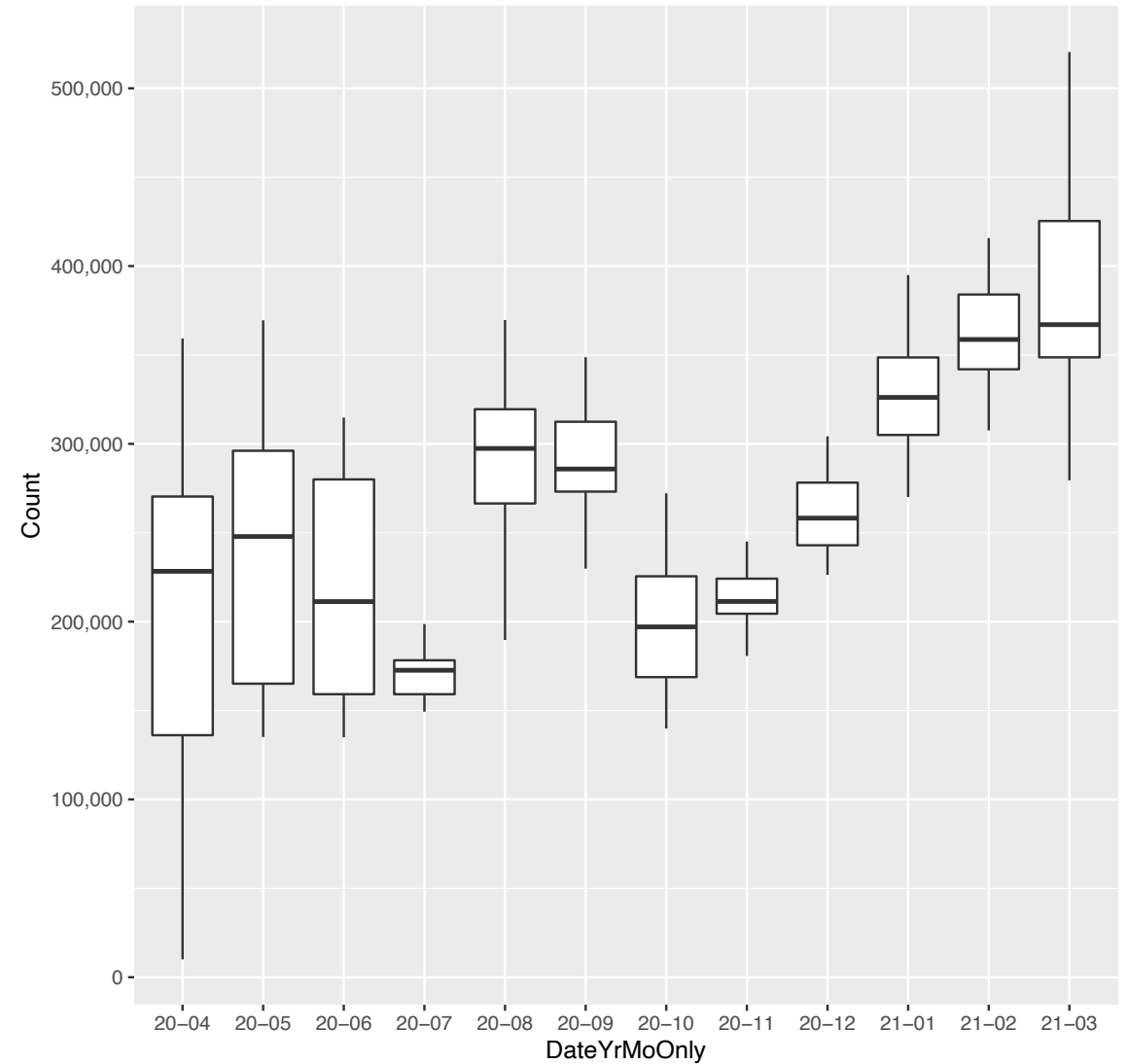


- OMITTED: Networked Exercise Equipment/Smart Home Gym Equipment** Media reports have included "The pandemic's home-workout revolution may be here to stay," <https://www.washingtonpost.com/road-to-recovery/2021/01/07/home-fitness-boom/> This topic is associated with domains such as echelonfit.com, ergatta.com, hydrow.com, joinfightcamp.com, mirror.co, myxfitness.com, nordictrack.com, onepeloton.com, soul-cycle.com, tempo.fit, and tonal.com. Just to show you one of those domains:

*. onepeloton.com (day-by-day counts and 28 day moving average)

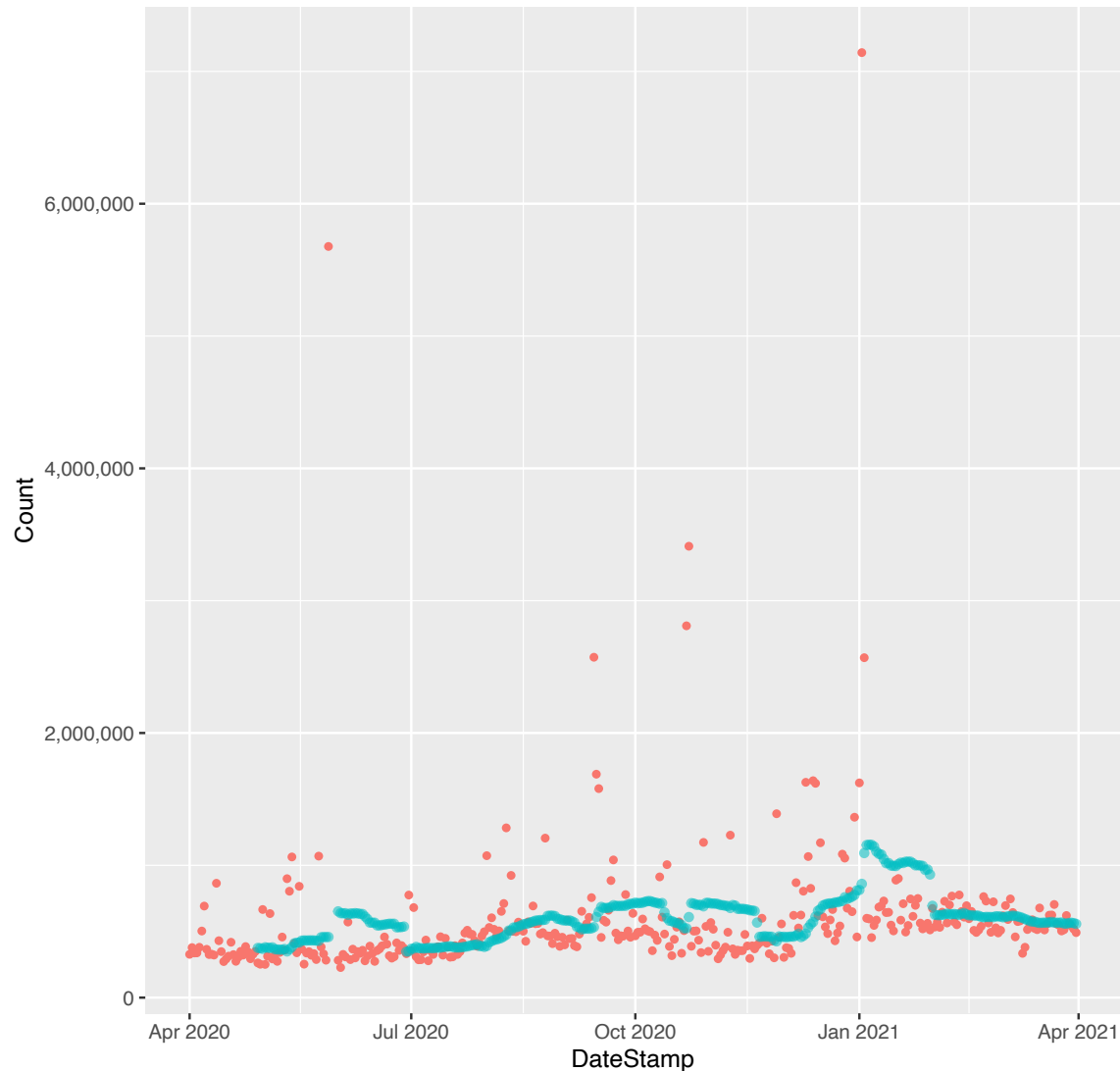


*. onepeloton.com (monthly boxplots (outliers trimmed))

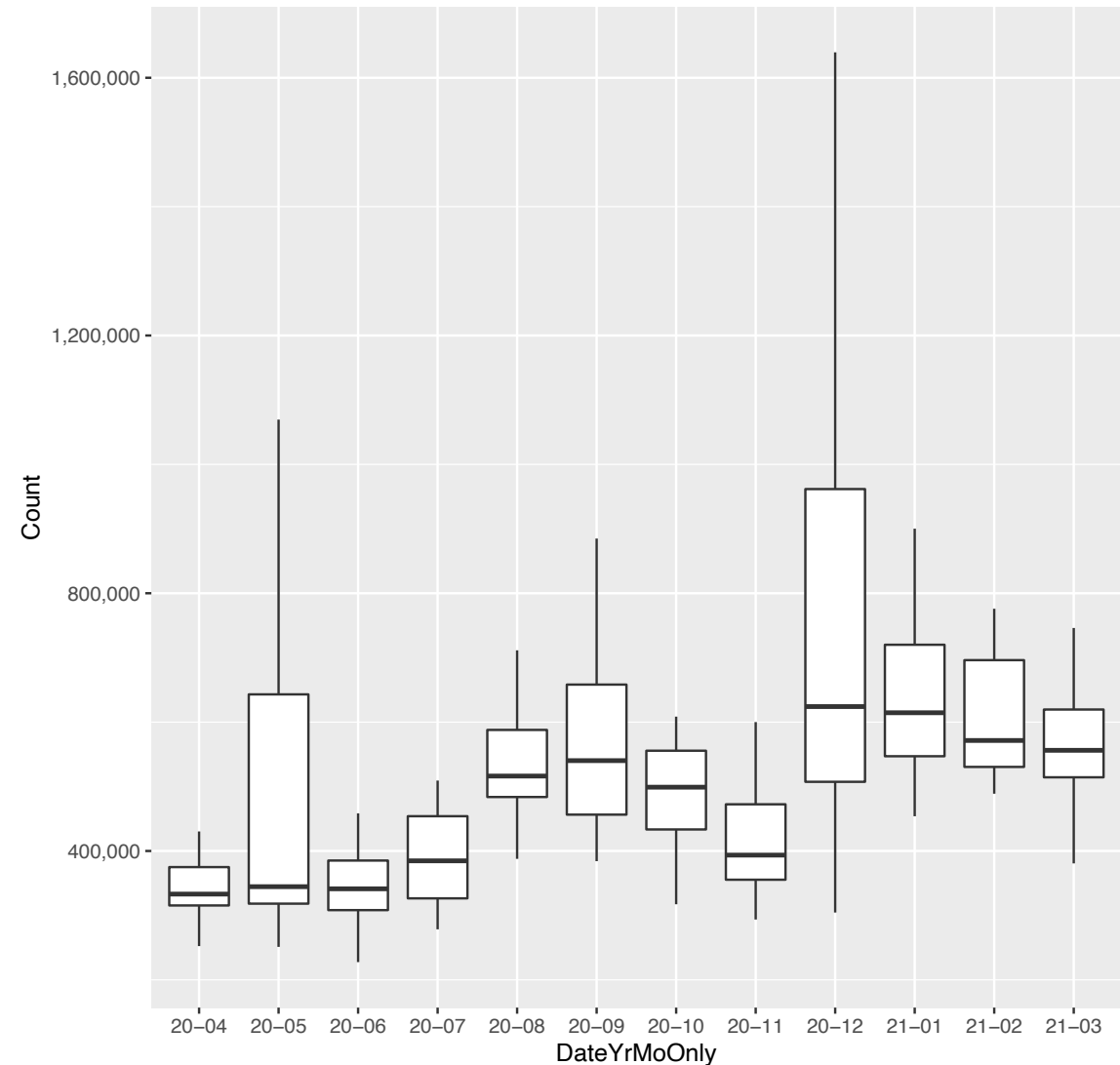


- OMITTED: Online Wagering** Reports are that online "Sports gambling has soared during the pandemic and continues to climb," see for example <https://www.cbsnews.com/news/sports-gambling-betting-draft-kings-fanduel-american-gaming-association/> We've intentional omitted this area from the current study. Examples of domains from this category include (please note: mention of any example domain here shall not be construed as an endorsement): betmgm.com, betnow.eu, betrivers.com, betus.com.pa, betway.com, bookmaker.eu, bovada.lv, draftkings.com, fanduel.com, foxbet.com, heritagesports.eu, intertops.eu, justbet.co, mybookie.ag, playsugarhouse.com, pointsbet.com, unibet.com, and williamhill.com. The graphs for one such domain looks like:

*. fanduel.com (day-by-day counts and 28 day moving average)

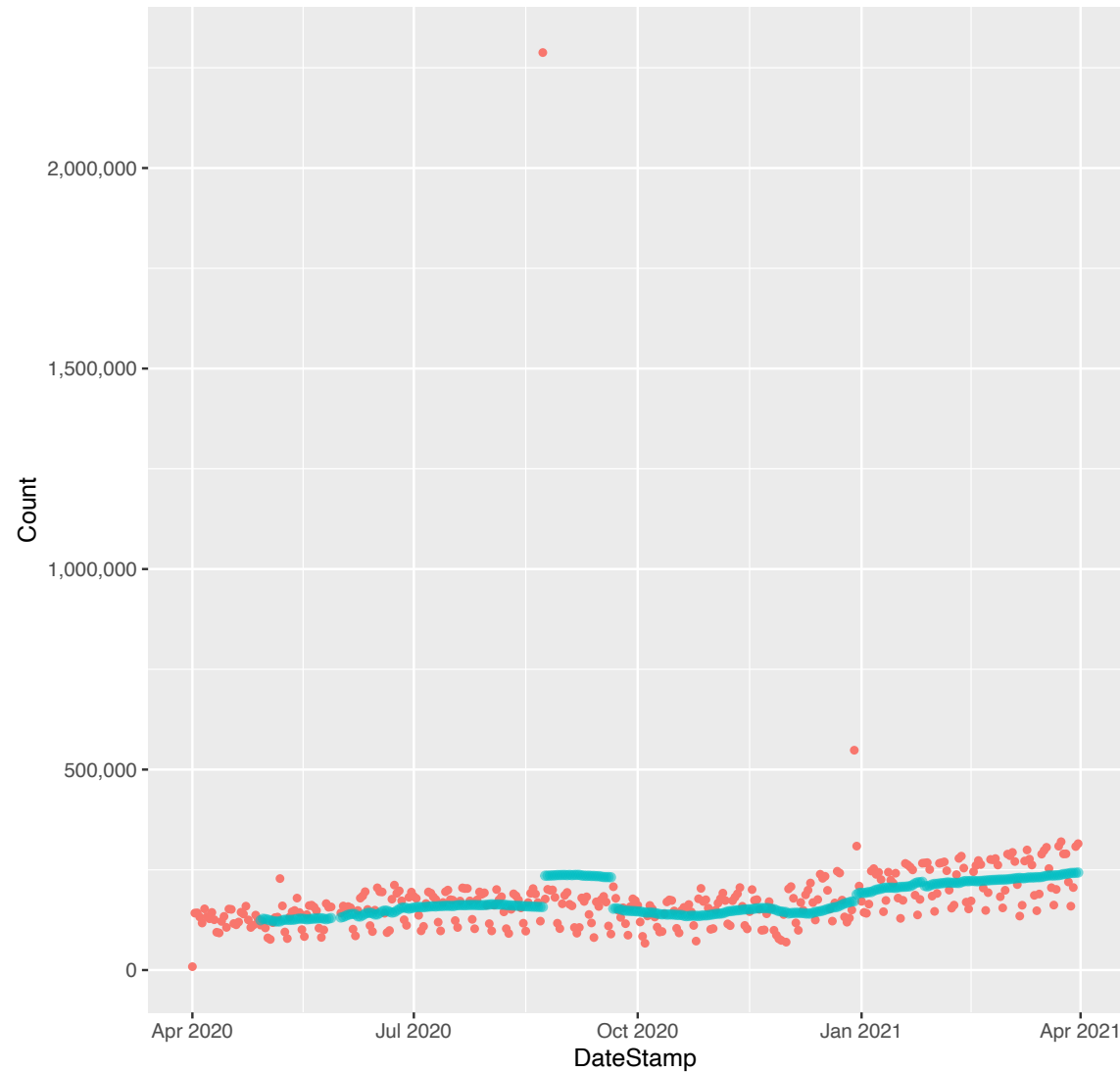


*. fanduel.com (monthly boxplots (outliers trimmed))

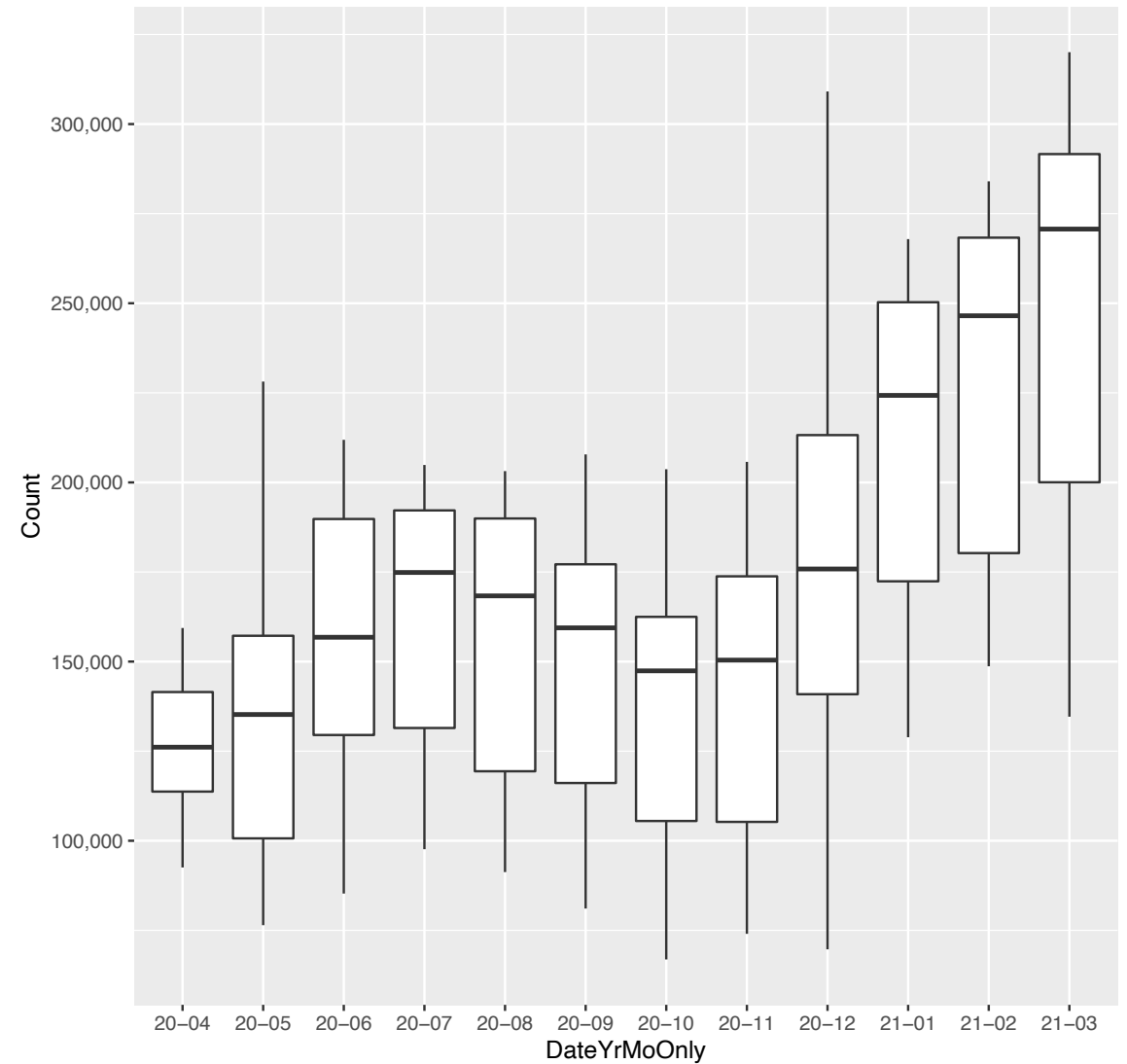


- OMITTED: Orthodontia and At-Home Aligner Services.** According to "Straightening Your Teeth Is the Latest Pandemic Project," <https://www.shape.com/lifestyle/mind-and-body/adults-braces-trend-covid-19-pandemic> , "While dental visits have seen a precipitous decrease during the pandemic, the orthodontics industry — whose global value is expected to reach nearly \$10 billion by 2026, according to Fortune Business Insights — has not seen the same impact." Some sites in this category include alignerco.com, byte.com, candidco.com, invisalign.com, newsmilelife.com, and smiledirectclub.com

*. invisalign.com (day-by-day counts and 28 day moving average)

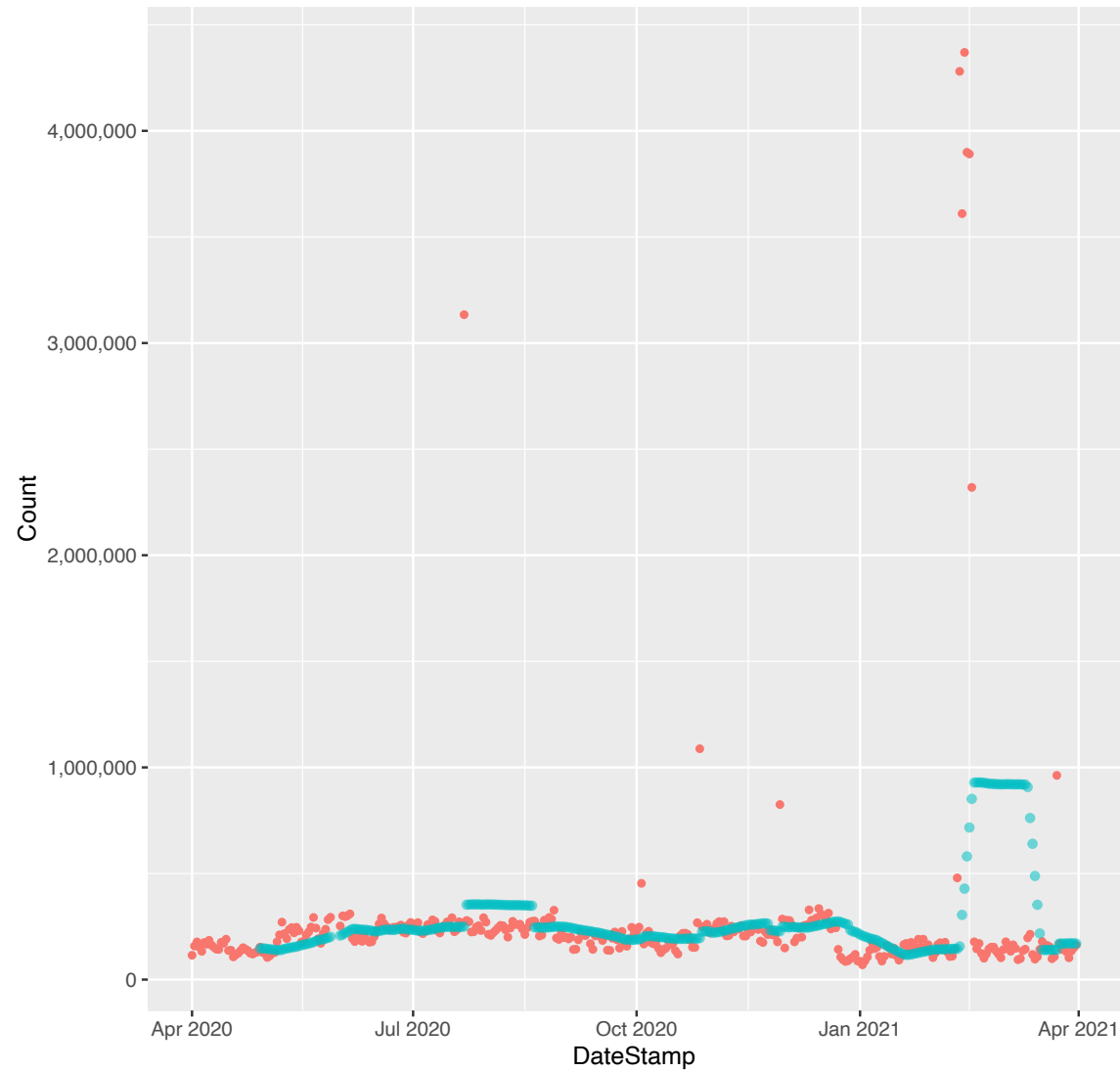


*. invisalign.com (monthly boxplots (outliers trimmed))

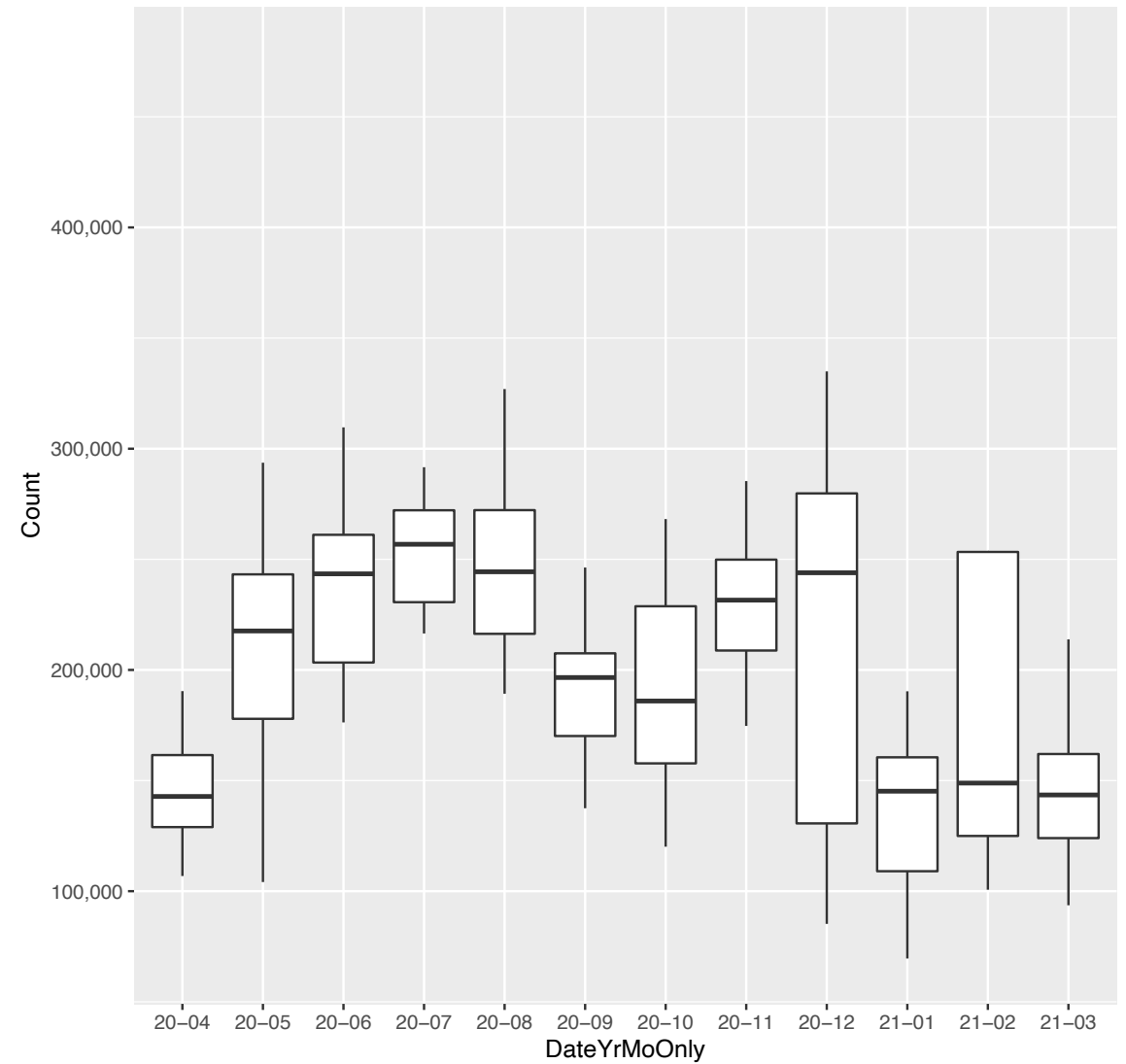


- OMITTED: Personal Protective Equipment Providers** (such as 3m.com, gojo.com (manufacturer of Purell), honeywellstore.com, etc.). During at least part of the pandemic, it seemed like everyone was desperate to get protective masks, face shields, and alcohol gel hand sanitizer. However, after thinking about this category, we realized that most consumer PPE purchases would be made from retail sources rather than directly from manufacturers or wholesalers. 3m.com offers a wide range of products, but nonetheless here's its graphs:

*. 3m.com (day-by-day counts and 28 day moving average)



*. 3m.com (monthly boxplots (outliers trimmed))

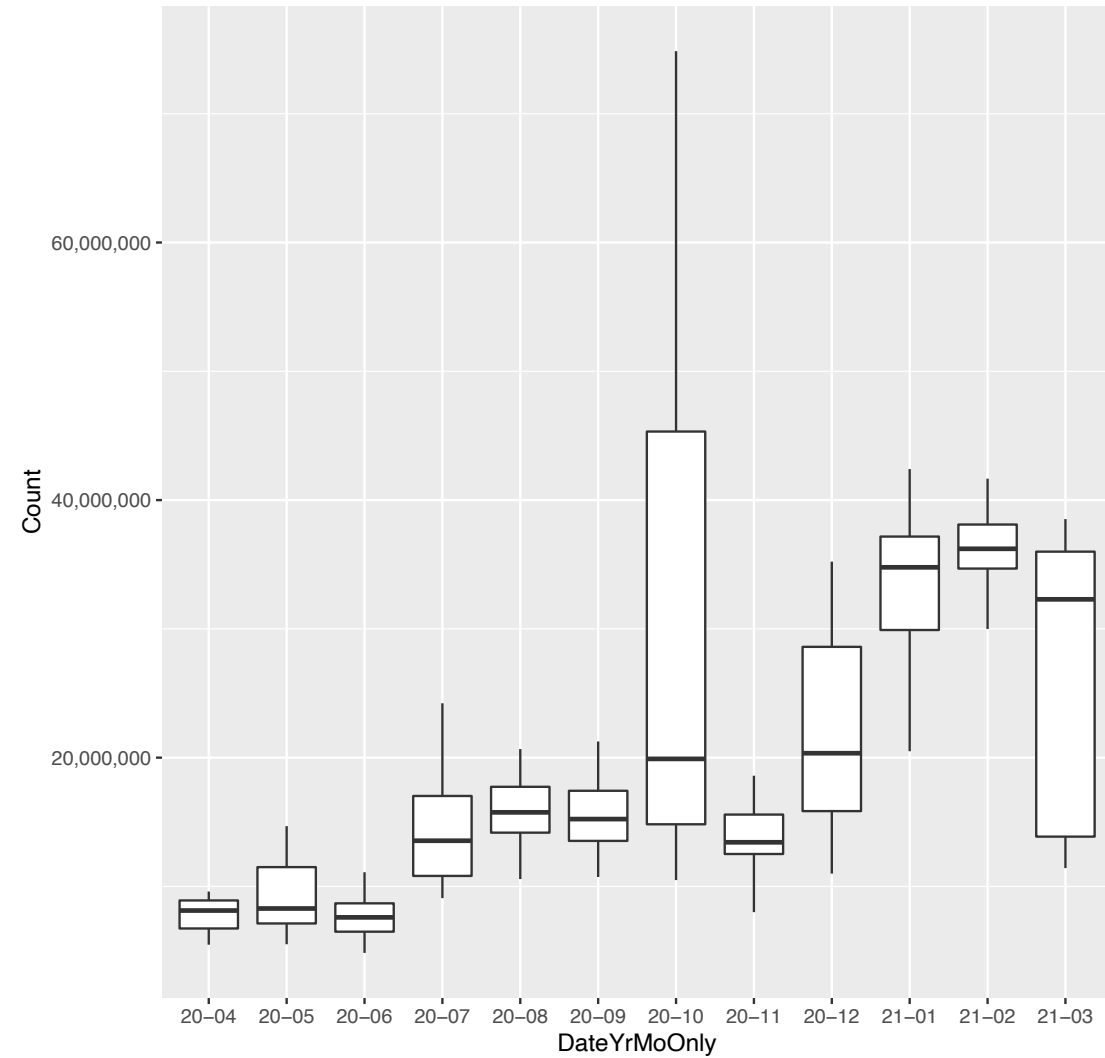


- **OMITTED: Pharmaceuticals, Dignostics, Laboratory Testing, and Vaccine Companies** (such as abbvie.com, lilly.com, jnj.com, modernatx.com, novavax.com, questdiagnostics.com, roche.com, etc.). We'll show *.roche.com as an example of companies from this category, but will not be reporting on other domains from this category.

*. roche.com (day-by-day counts and 28 day moving average)

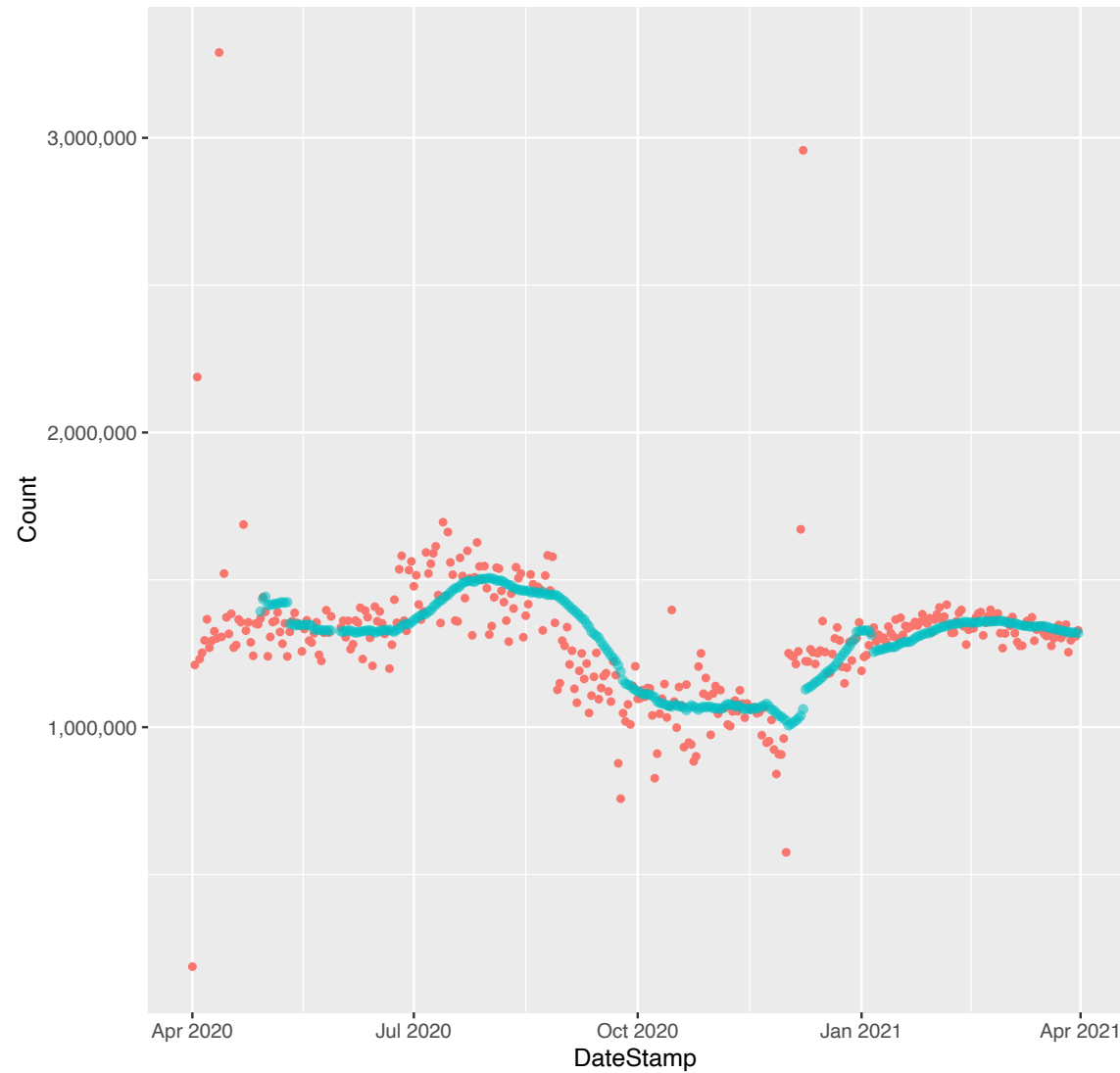


*. roche.com (monthly boxplots (outliers trimmed))

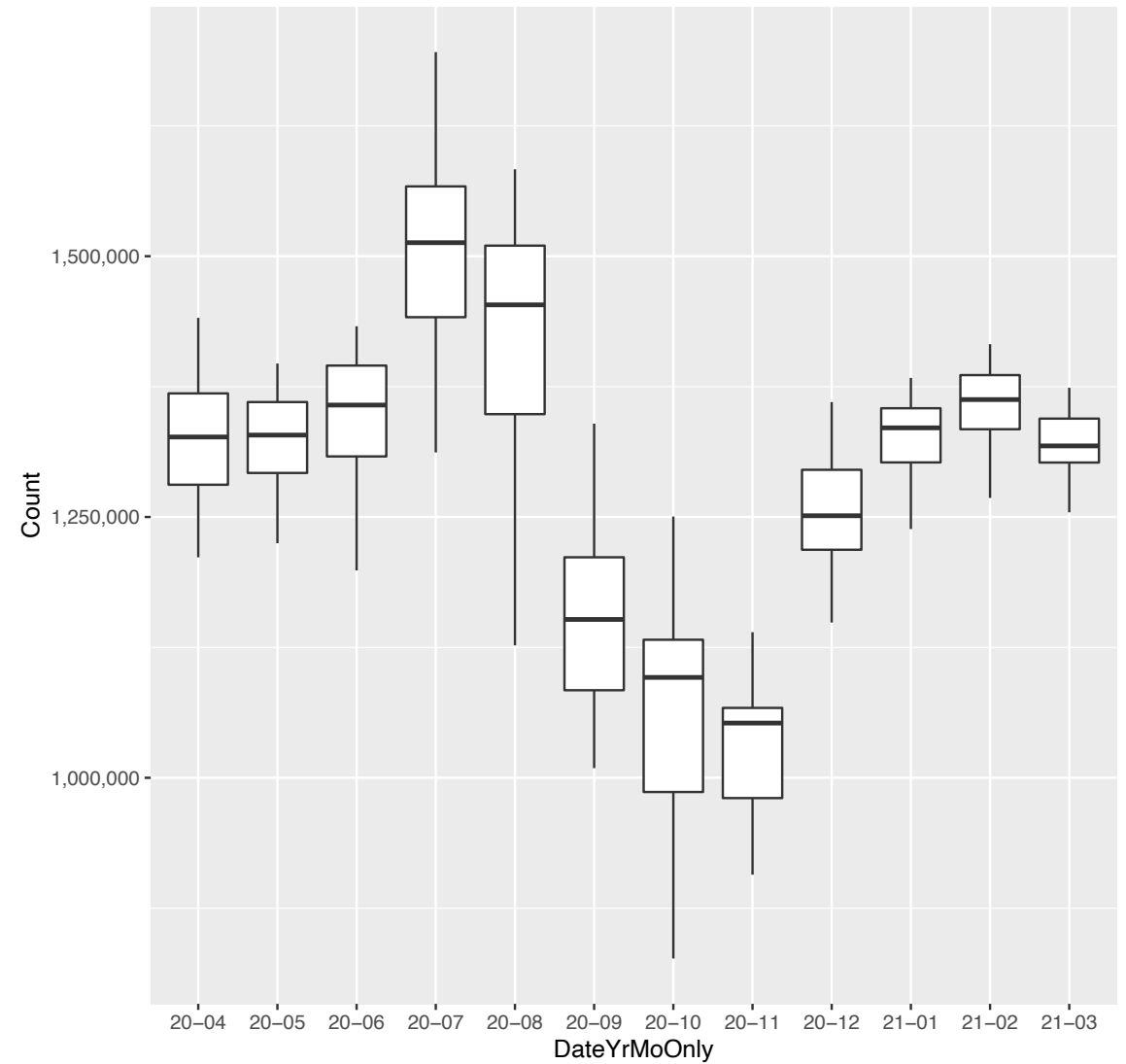


- OMITTED: Real Estate** (century21.com, coldwellbanker.com, compass.com, corcoran.com, homesandland.com, kwland.com, landandwildlife.com, landbrokermls.com, landsofamerica.com, landwatch.com, nationalland.com, ranchland.com, remax.com, unitedcountry.com, unitedrealstate.com, windermere.com, zillow.com, etc.) Real estate is another booming sector during the pandemic as people (no longer tied to a particular office) are able to relocate to lower cost/lower density areas, or seek homes with more room for videoconferencing. ("The housing market is red hot. How long can it last?", <https://www.latimes.com/business/story/2020-12-22/housing-market-red-hot-how-long-can-it-last>)

*. zillow.com (day-by-day counts and 28 day moving average)

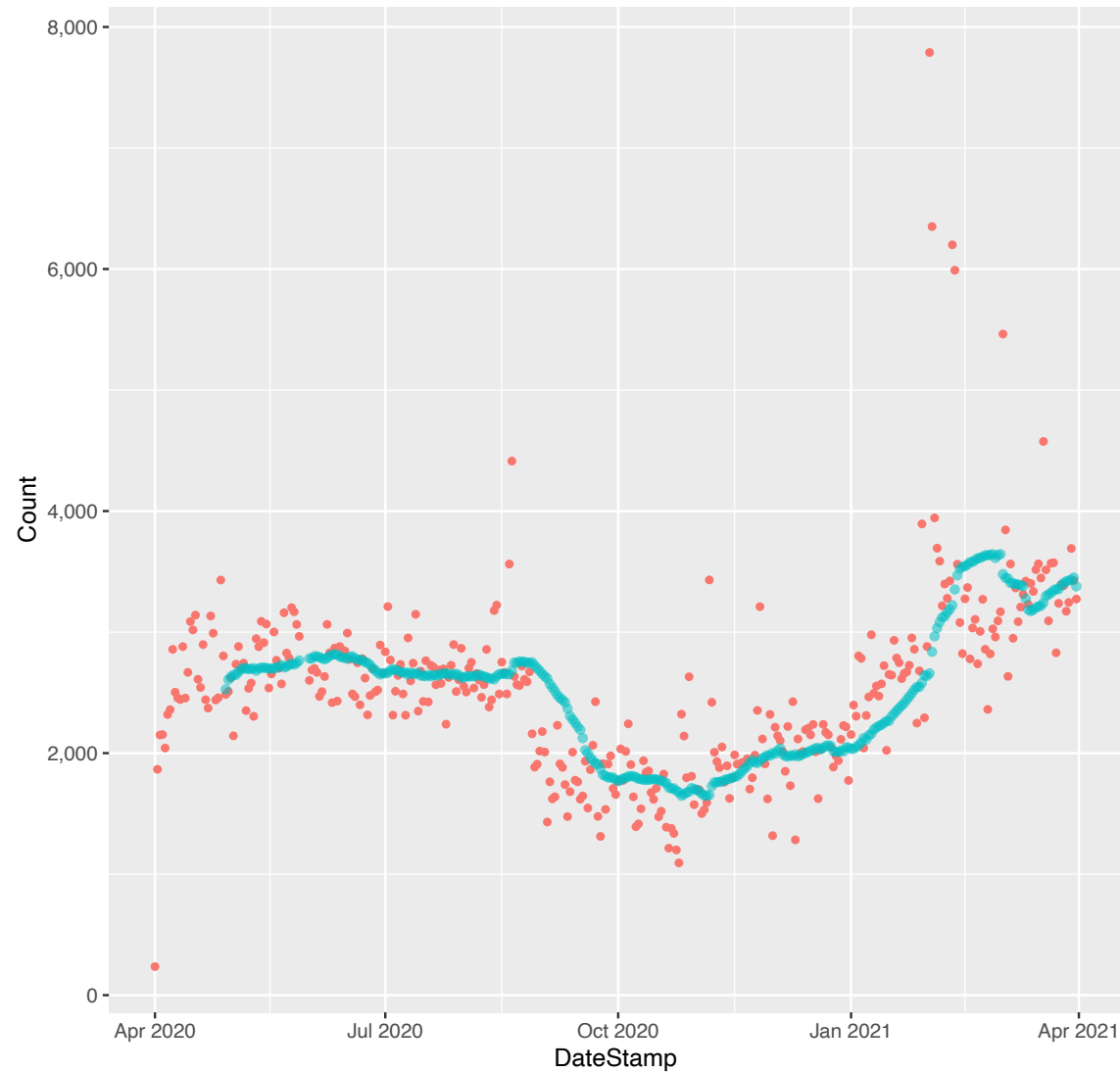


*. zillow.com (monthly boxplots (outliers trimmed))

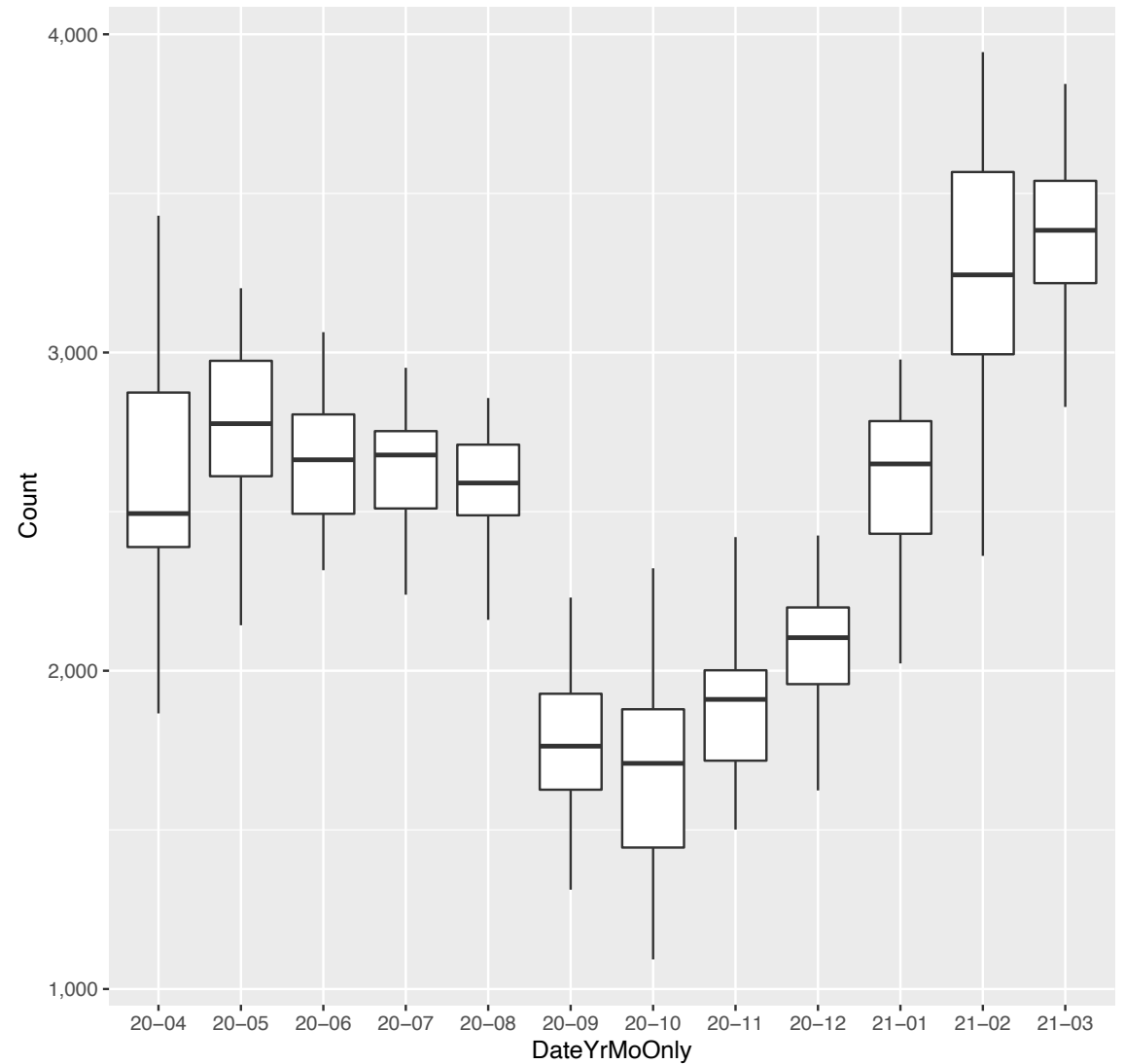


- OMITTED: Watercraft** represent another somewhat odd reported growth area, e.g., "Boat sales took off during the pandemic and now dealers can't keep up with demand," <https://www.cnbc.com/2021/03/19/boat-sales-took-off-during-pandemic-dealers-cant-keep-up-with-demand.html> Some boat domains include: alumacraft.com, bayliner.com, bertram.com, bostonwhaler.com, chaparralboats.com, chriscraft.com, crestliner.com, g3boats.com, gradywhite.com, loweboats.com, lundboats.com, maverickboats.com, searay.com, smokercraft.com, striperboats.com, trackerboats.com, vikingyachts.com, weldcraftmarine.com, and yamahaboats.com. We'll show you *.trackerboats.com now:

*. trackerboats.com (day-by-day counts and 28 day moving average)



*. trackerboats.com (monthly boxplots (outliers trimmed))



IV. Assessing Each Site's Graphs

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When looking at each site's graphs, we've been focused on **three primary areas**:

a) Is DDoS Traffic Noticeable?

For example, while typical domains will show relatively-consistent traffic levels, some sites may have "blips" during which time traffic may be two (or even ten!) times normal levels, potentially tens of millions of hits above normal. This is often easiest seen by comparing the left hand dot plots (which include any extreme values) and the right hand monthly box plots (which do not). When we see that sort of extreme behavior, we flag that site with a "black sun" DDoS tag: ☀

To help explain what we mean, see the graph to the right.

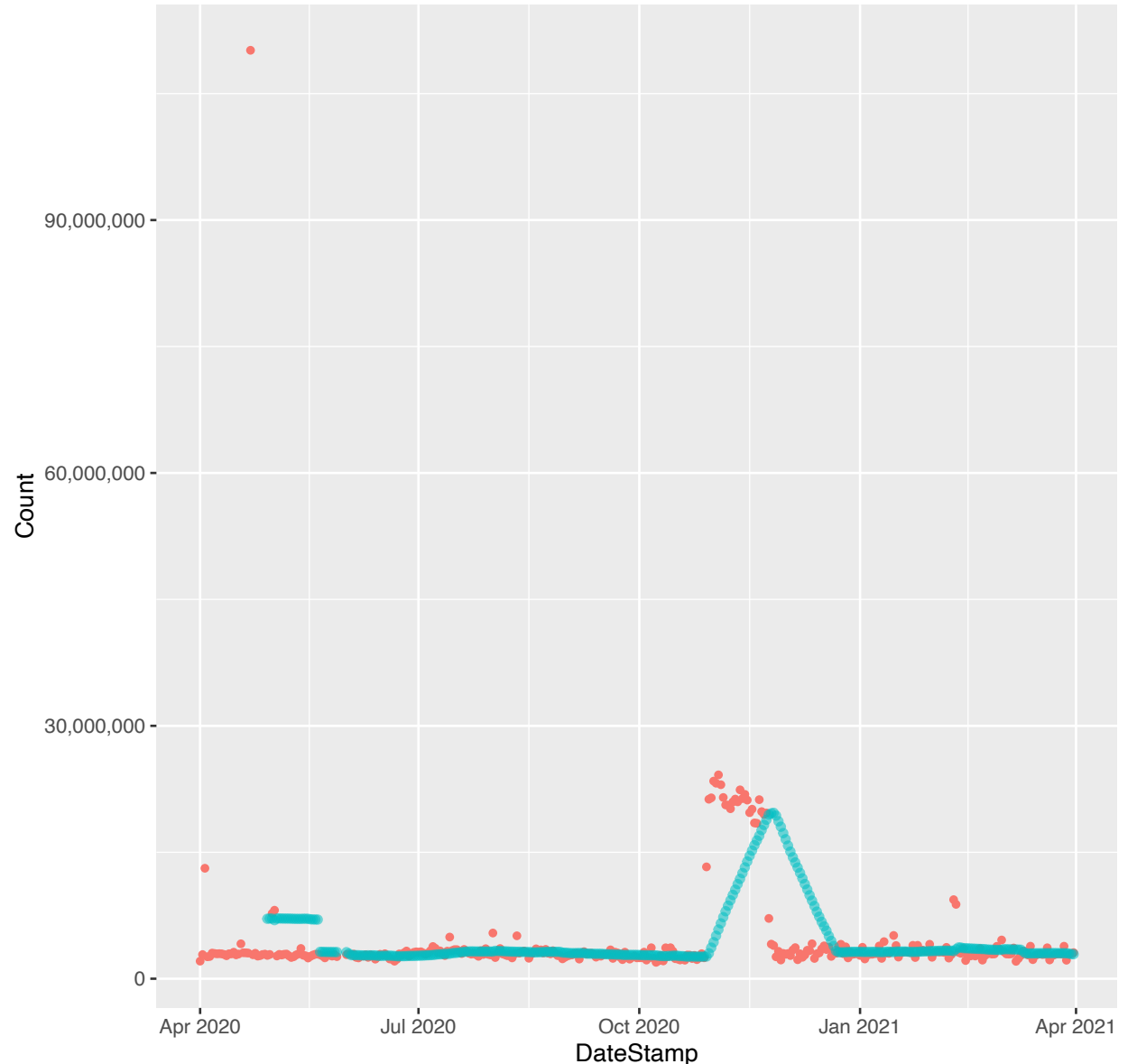
We believe the extreme red datapoint near the upper left corner of the graph (and the elevated cluster of points to the left of "the tip of the blue-green triangle") represent attack traffic. Some sample values from these regions look like:

```
20200422 110,141,083 <-- single point in the far upper left
[...]
20201030 21,291,955 <-- elevated cluster of points to the left of
20201031 21,458,014 "the tip of the green triangle"
20201101 23,445,835
```

That traffic is quite atypical for this domain. We believe it may be related to the fact that github.com has a wildcard record defined, so that any random hostname will resolve. We can test for wildcarding by trying to resolve a random hostname at the shell prompt (it obviously works in this case):

```
$ dig ijads9iuas9dja9sd.github.com +short
github.github.io.
185.199.109.153
185.199.111.153
185.199.108.153
185.199.110.153
```

*. github.com (day-by-day counts and 28 day moving average)



b) What Does The Graph's General "Shape" Or Overall "Pattern" Look Like?

Beyond flagging sites that appear to have had one or more DDoS-related event, we also tried to summarize the shape of each site's graphs. Some sites were clearly business-as-usual, humming along quite consistently. We tagged those sort of sites as being "level." Other sites were clearly rising or falling, and got corresponding rising or falling tags:

- Level: →
- Rising: ↗
- Falling: ↘

A third category of sites appeared to either be "cup" or "dome" shaped, having a curvilinear aspect with either symmetric starting and ending values, or asymmetric starting and ending values (e.g., either the starting or ending value was noticeably higher than the other side). We used special graphics to flag those sites:

- U shaped: ∪
- N shaped: ∩

We also saw some sites that start at relatively high levels, but then seemed to "fall off a cliff," dropping to new lower levels and staying there. We termed these sites as being "L shaped:"

- L shaped: L

Finally, a fair number of sites had "mixed" or "fluctuating" graph patterns. These graphs might oscillate, or be sawtoothed, or simply defy read categorization. Think of this squiggle symbol as our "miscellaneous" tag:

- Mixed: ~

c) Finally, What Was The Overall Sites Volume? Was It Particularly High?

Domains that are routinely particularly high volume are flagged with one or more "M" values. Note that a single high value or a small number of high values isn't enough for a domain to be flagged as "high volume" -- we're interested in sustained overall levels:

- Million+: **M**
- Ten Million+: **MM**
- Hundred Million+: **MMM**

We're now going to begin looking at some of the categories of sites that we studied in detail.

V. Baseline Sites

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1	*.apache.org	∪ (ending lower)		5	*.ieee.org	∪ shaped (ending lower)	
2	*.archive.org	↘	M	6	*.mozilla.com	L shaped	MM
3	*.github.com	✱ →	MM	7	*.w3.org	L shaped	
4	*.gnu.org	∪ (ending lower)	M	8	*.wikipedia.org	∪ shaped	

When we originally conceived this study (and the preceding pandemic study), we wanted to include some comparator sites we could use as a sort of "normative baseline." That is, while we'd expected the pandemic to dramatically impact travel and tourism sites, or to drive interest in news and opinion sites, we had NOT expected to see a large change in visits to wikipedia.org, or to leading F/OSS (free/open source software) sites, or to professional organizations such as the IEEE. We were thus somewhat surprised to see that the baseline sites we'd selected did NOT have relatively constant query volume. In some cases, some potential reasons for visit counts being down could be readily identifiable. For example:

- Mozilla has had major layoffs¹
- GNU.org has wrestled with the appropriate role (if any) for its "polarizing" founder, Richard Stallman²
- The Internet Archive has been the target of copyright lawsuits³
- IEEE membership development saw a notable decline⁴
- Wikipedia has been subject to censorship in numerous countries.⁵

¹ "Mozilla lays off about 70 employees including senior staffers; Known best for its Firefox browser, Mozilla laid off approximately 6% of its staff in the face of diminishing revenue." <https://www.zdnet.com/article/mozilla-lays-off-about-70-employees-including-senior-staffers/> (Jan 15th, 2020)

See also "Mozilla lays off 250 employees while it refocuses on commercial products." <https://www.zdnet.com/article/mozilla-lays-off-250-employees-while-it-refocuses-on-commercial-products/> (Aug 11, 2020)

² "Return of Stallman to FSF sparks outrage among open-source and free software leaders: Many open-source and free software people and organizations are upset that The Free Software Foundation has brought its founder, Richard M. Stallman, back to its board of directors.", <https://www.zdnet.com/article/return-of-stallman-to-fsf-sparks-outrage-among-open-source-and-free-software-leaders/> (Mar 24, 2021)

³ "A lawsuit is threatening the Internet Archive — but it's not as dire as you may have heard -- The Internet Archive spent years testing the boundaries of copyright law. Has it gone too far?" <https://www.vox.com/2020/6/23/21293875/internet-archive-website-lawsuit-open-library-wayback-machine-controversy-copyright>

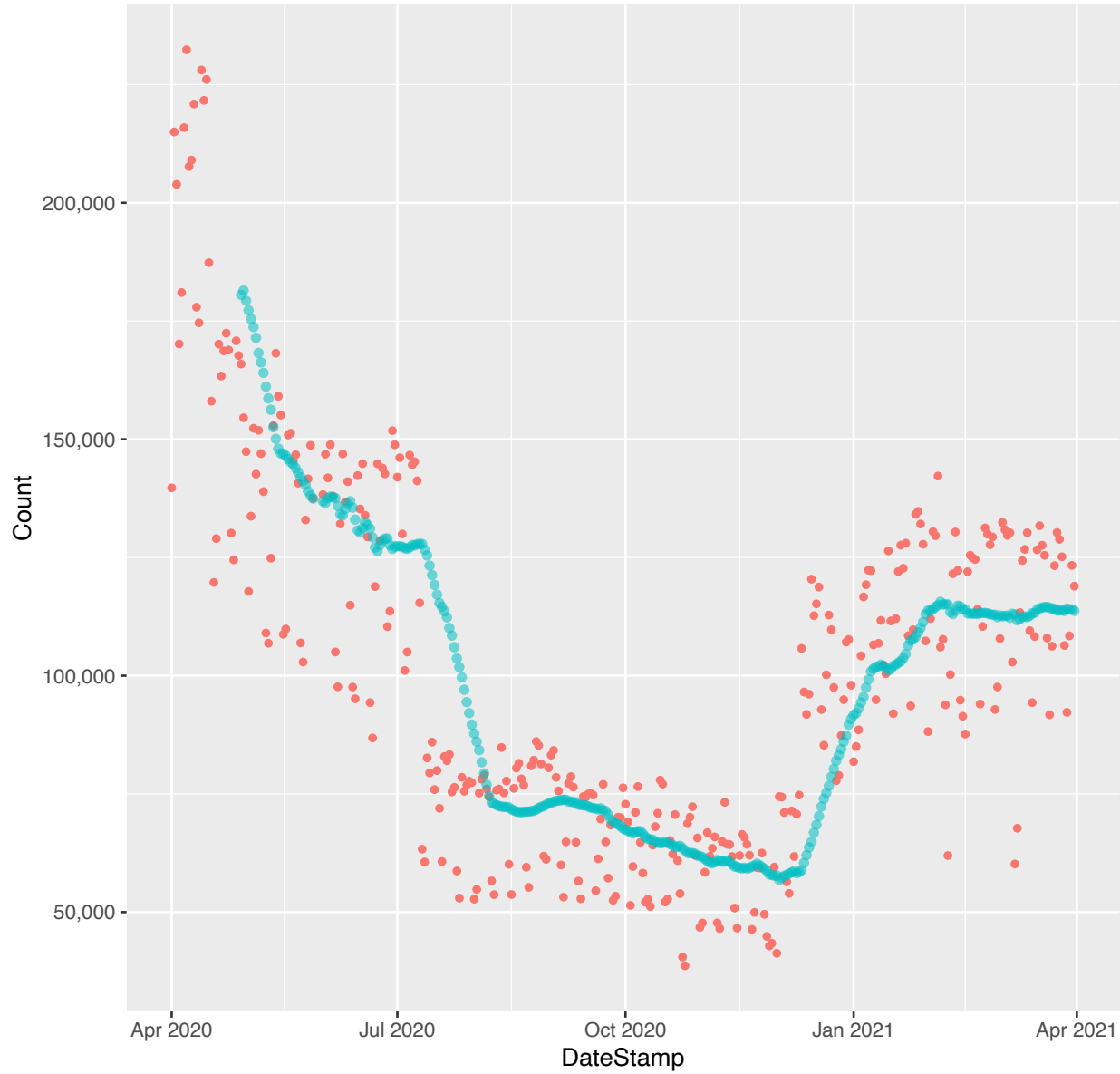
⁴ "November 2020 IEEE Membership Development Report," <https://r10.ieee.org/hk/2020/12/15/november-2020-ieee-membership-development-report/>

⁵ https://en.wikipedia.org/wiki/Censorship_of_Wikipedia

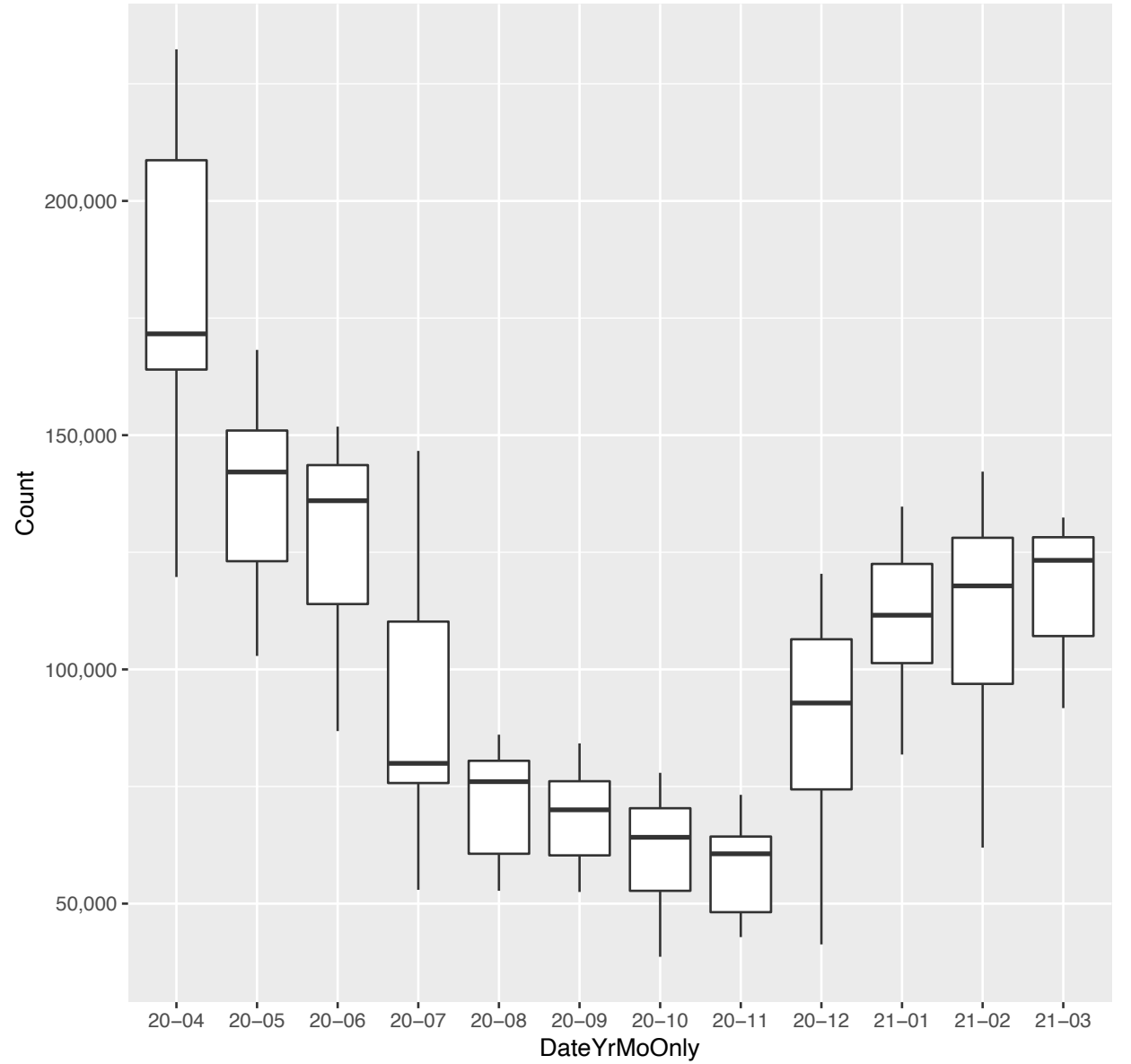
1. apache.org:

∪ (ending lower)

*. apache.org (day-by-day counts and 28 day moving average)



*. apache.org (monthly boxplots (outliers trimmed))

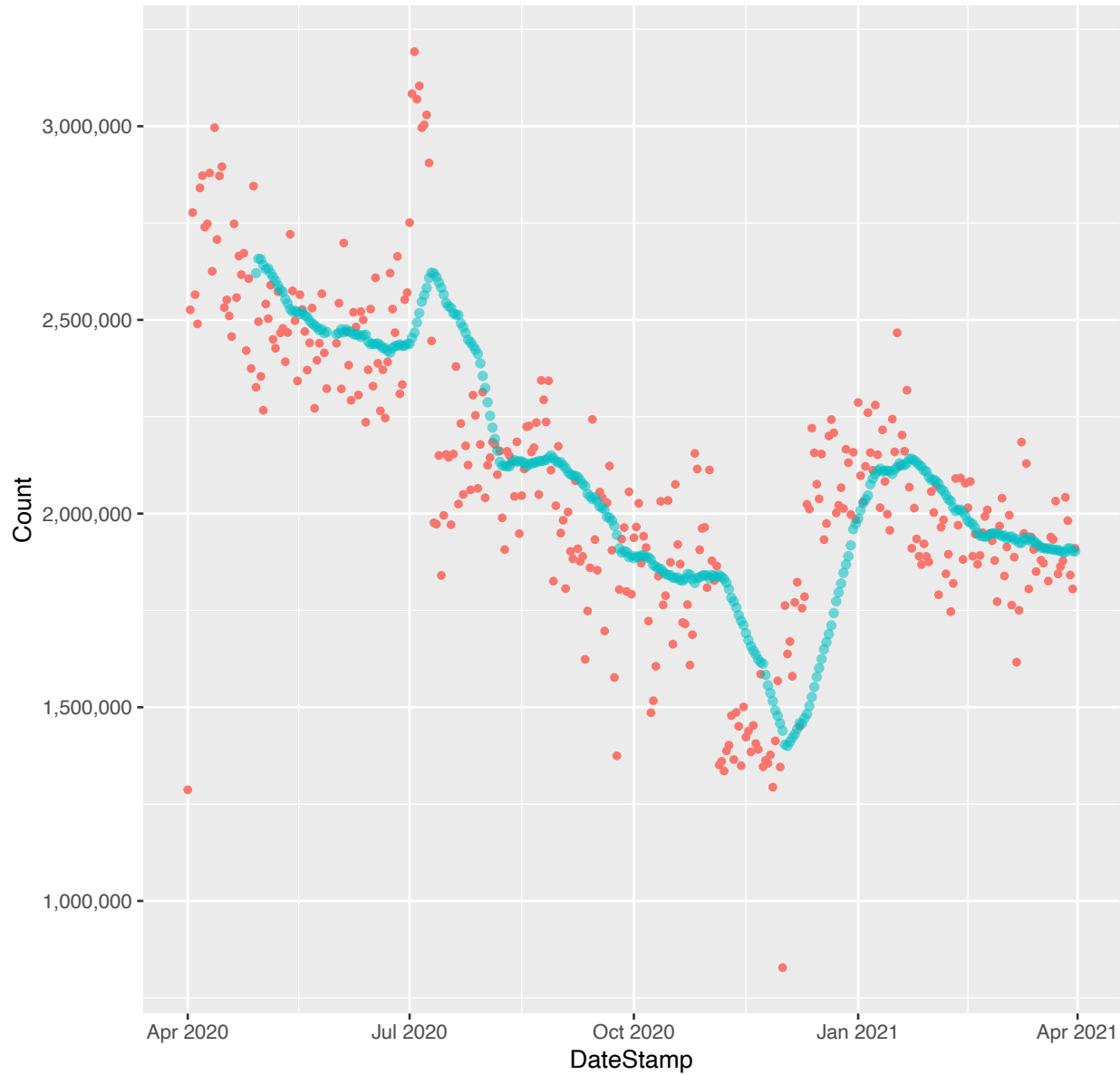


2. archive.org:

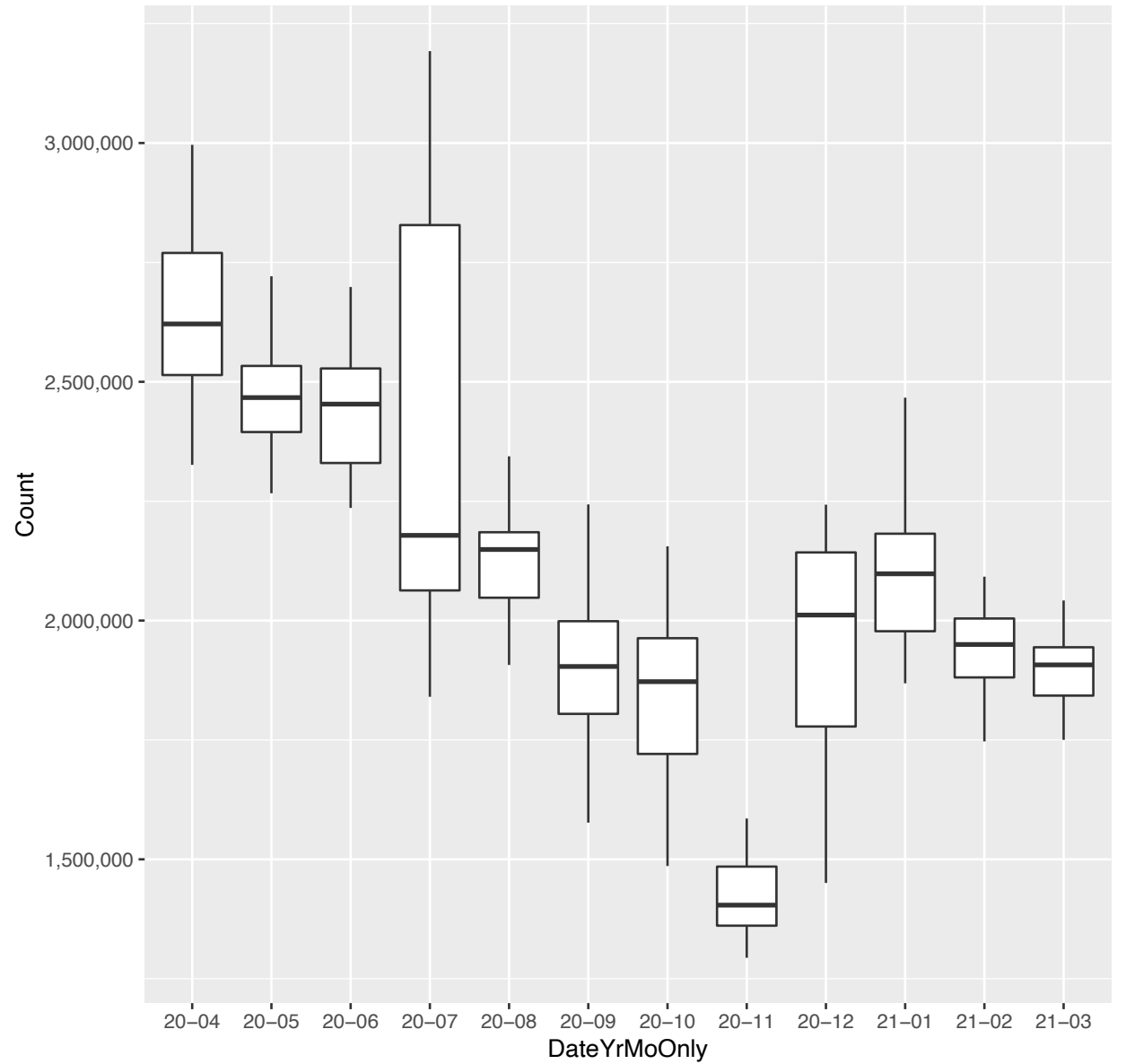


M

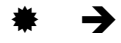
*. archive.org (day-by-day counts and 28 day moving average)



*. archive.org (monthly boxplots (outliers trimmed))

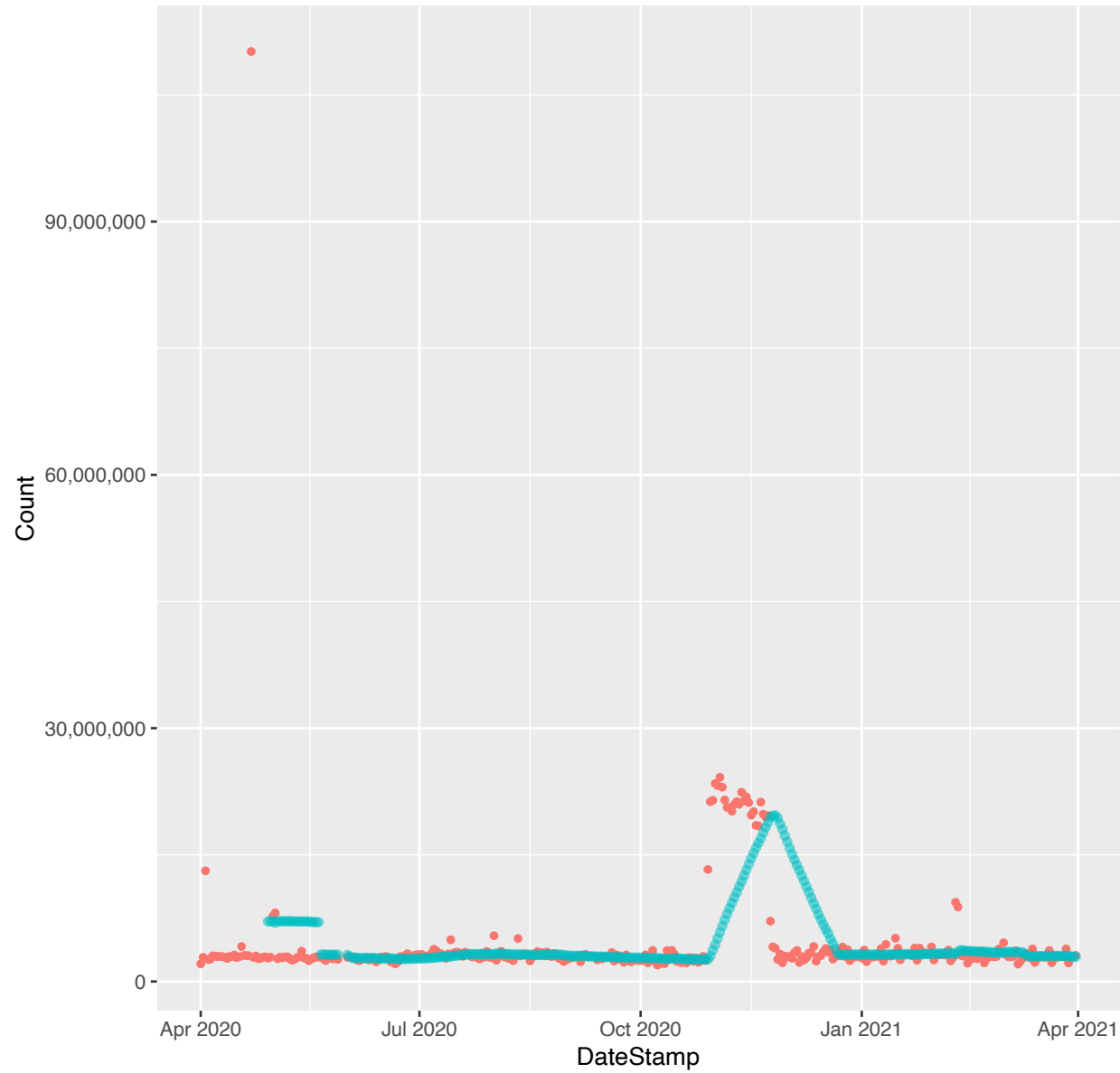


3. github.com:

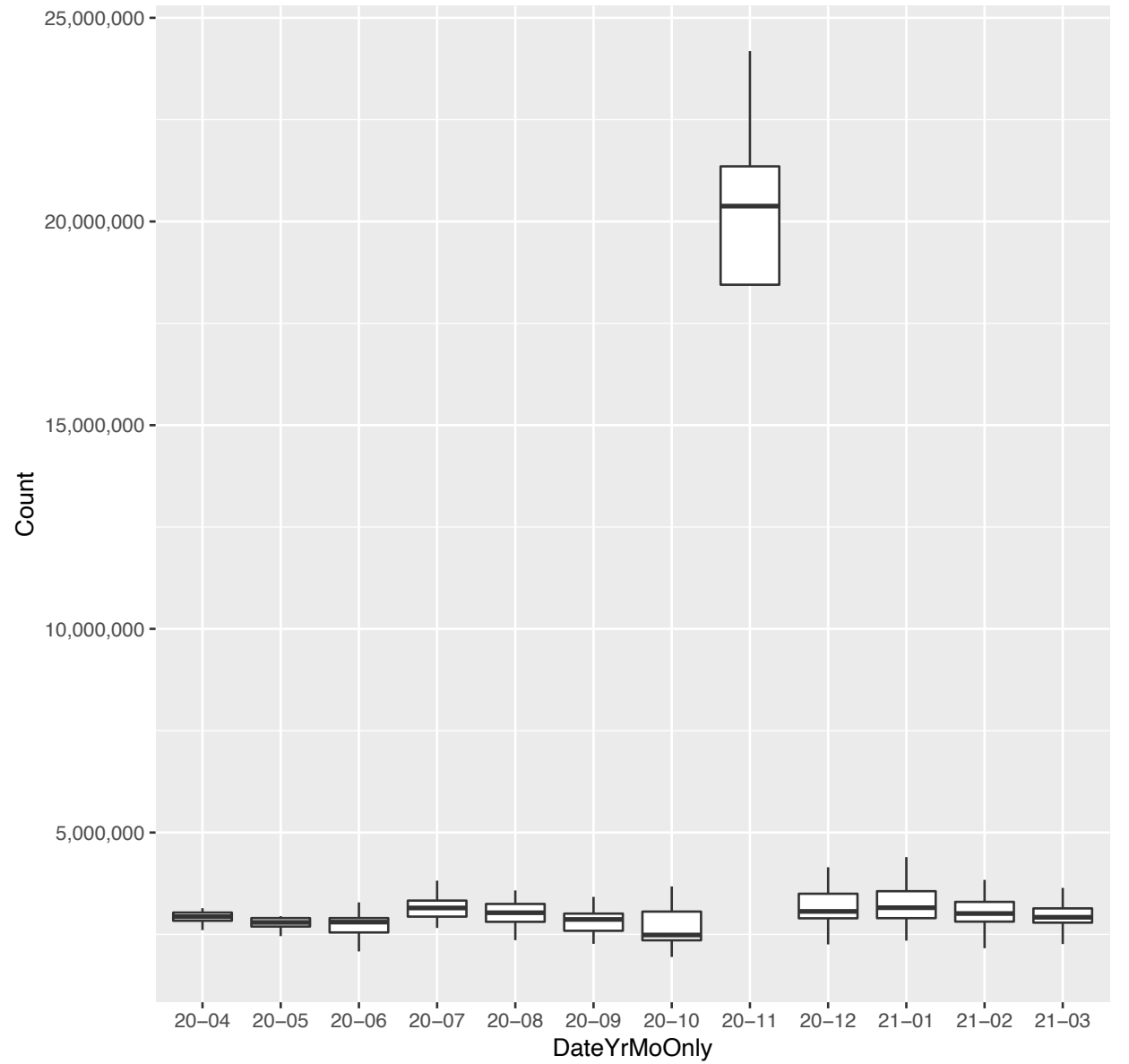


MM

*. github.com (day-by-day counts and 28 day moving average)



*. github.com (monthly boxplots (outliers trimmed))

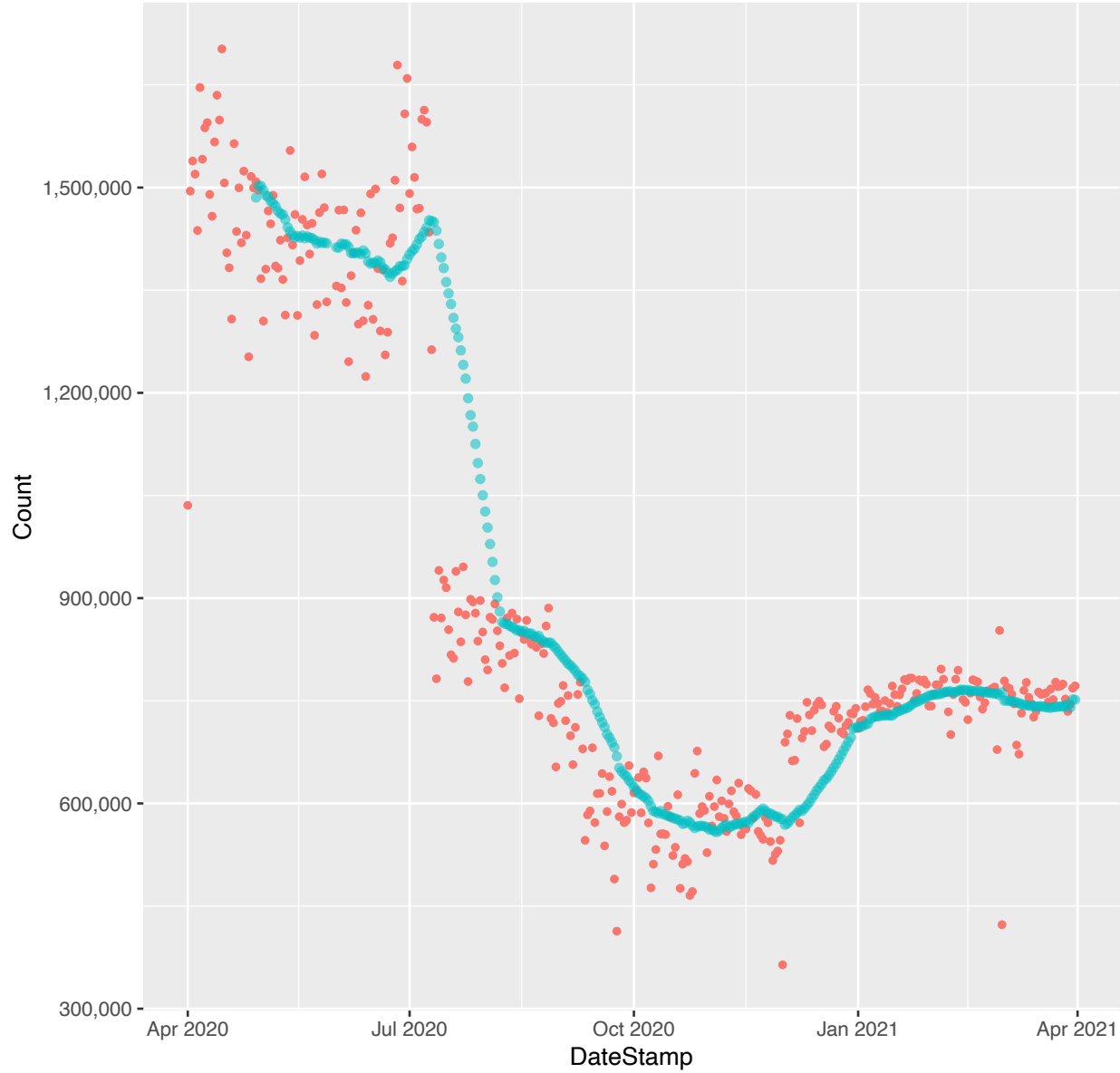


4. gnu.org:

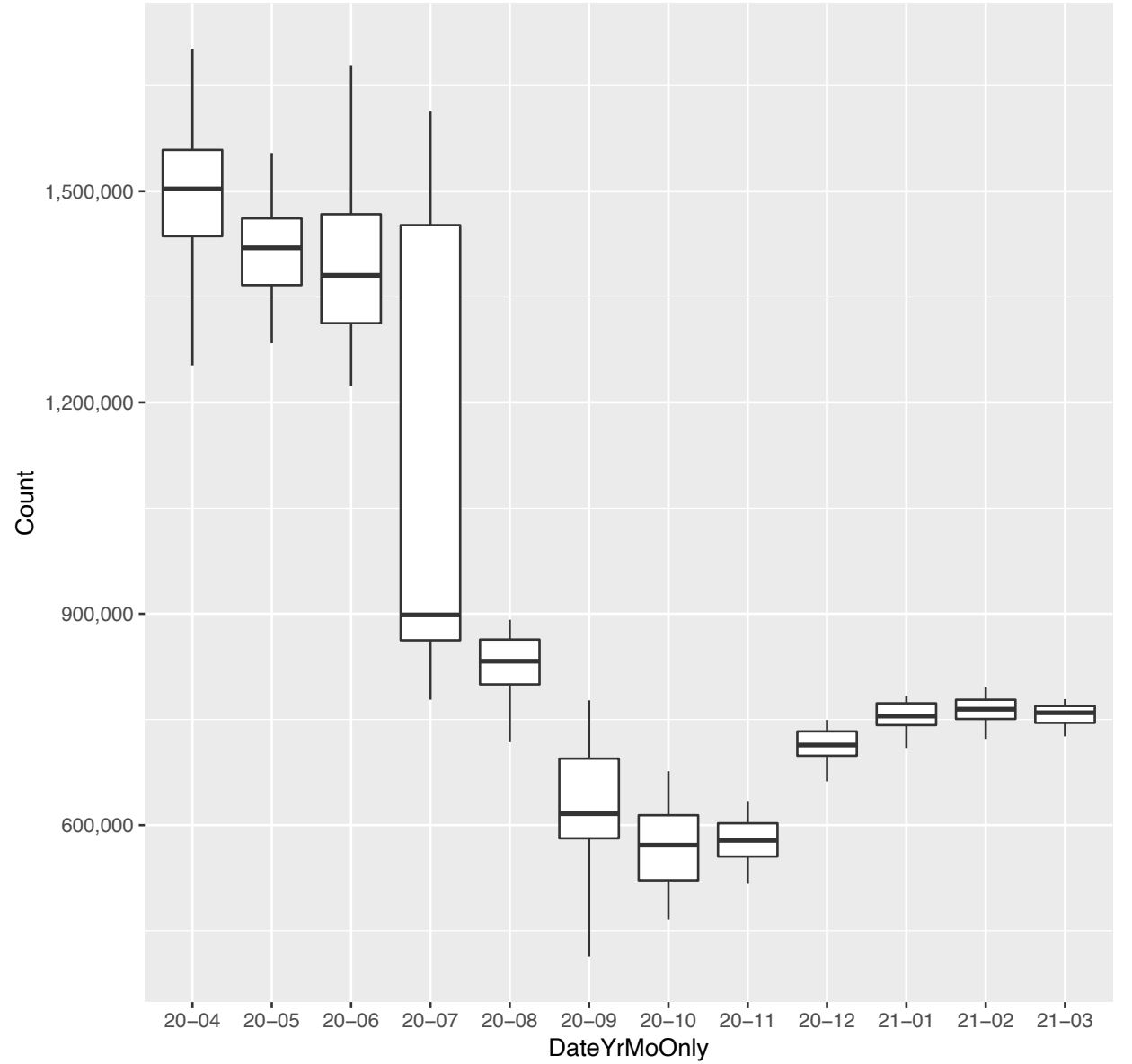
∪ (ending lower)

M

*. gnu.org (day-by-day counts and 28 day moving average)



*. gnu.org (monthly boxplots (outliers trimmed))



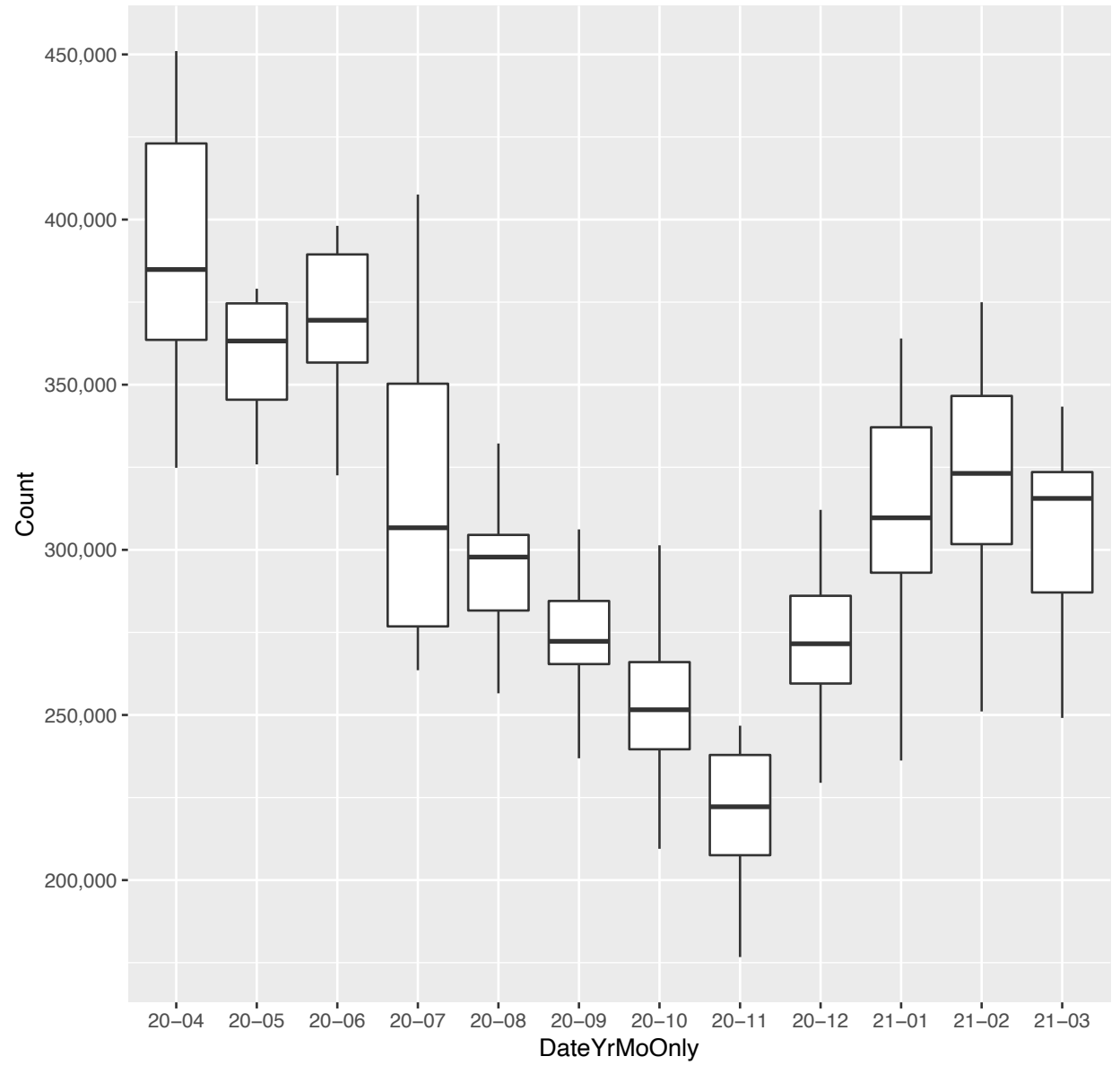
5. **ieee.org:**

⊂ shaped (ending lower)

*. ieee.org (day-by-day counts and 28 day moving average)



*. ieee.org (monthly boxplots (outliers trimmed))

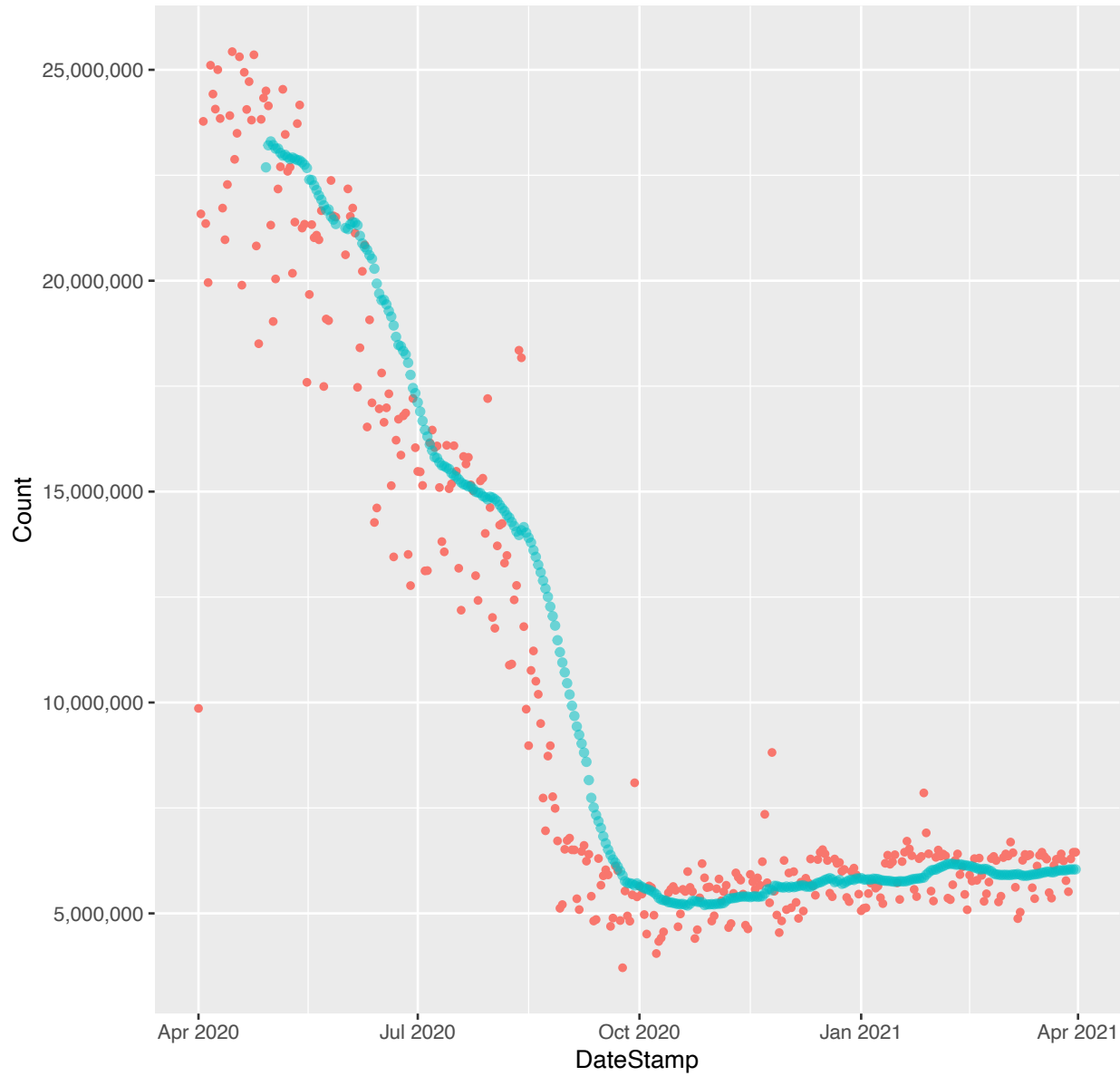


6. mozilla.com:

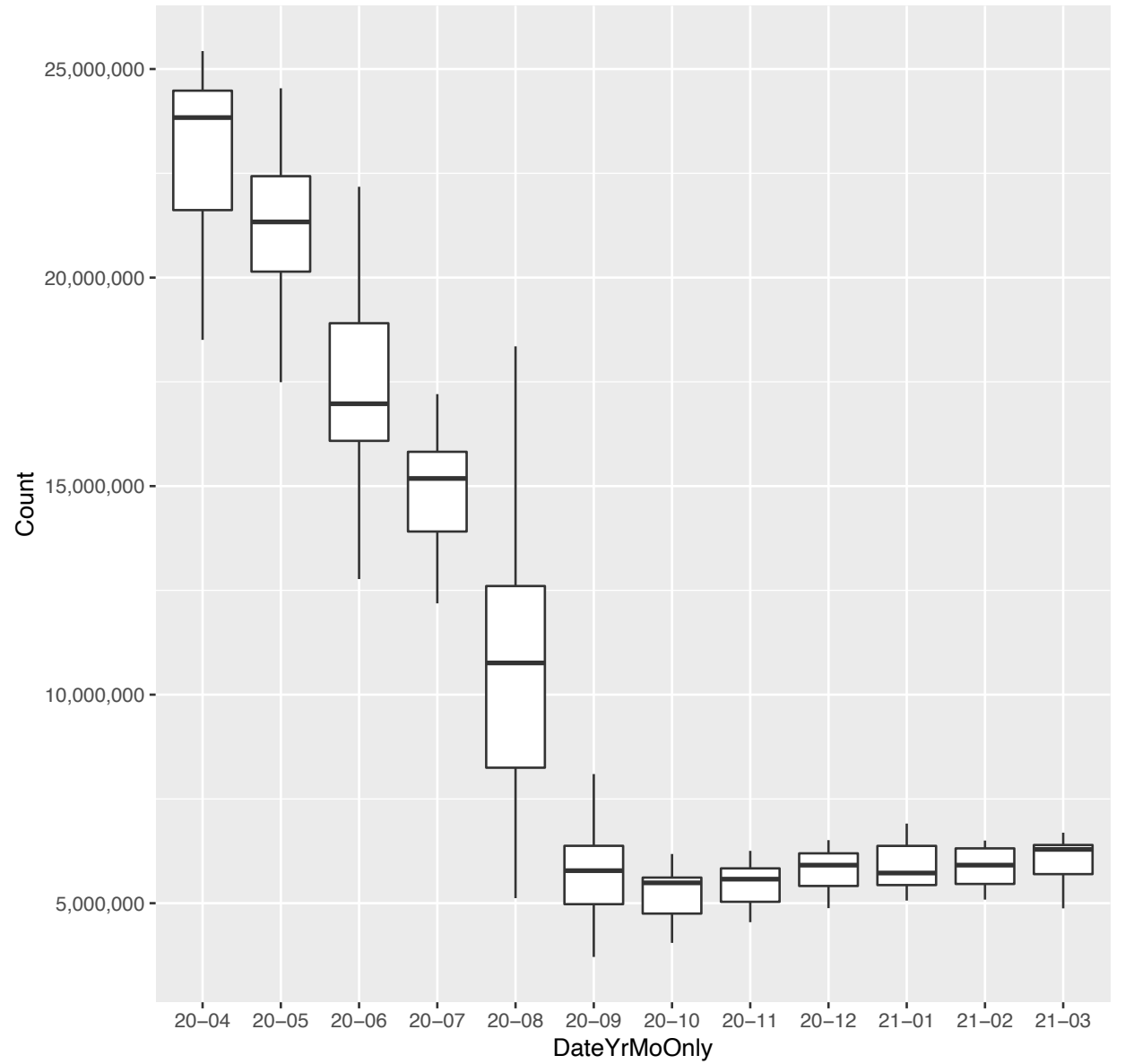
L shaped

MM

*. mozilla.com (day-by-day counts and 28 day moving average)



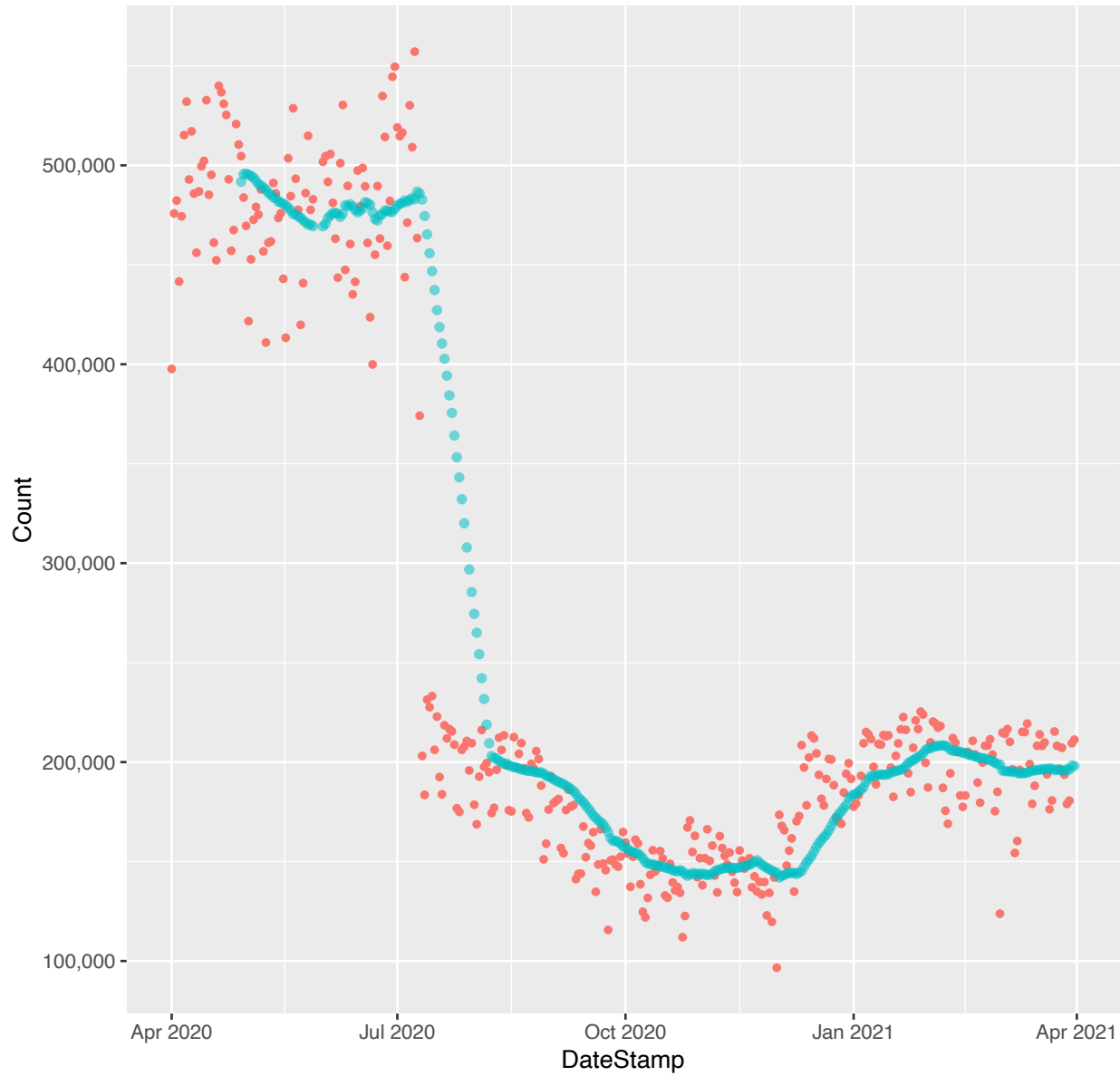
*. mozilla.com (monthly boxplots (outliers trimmed))



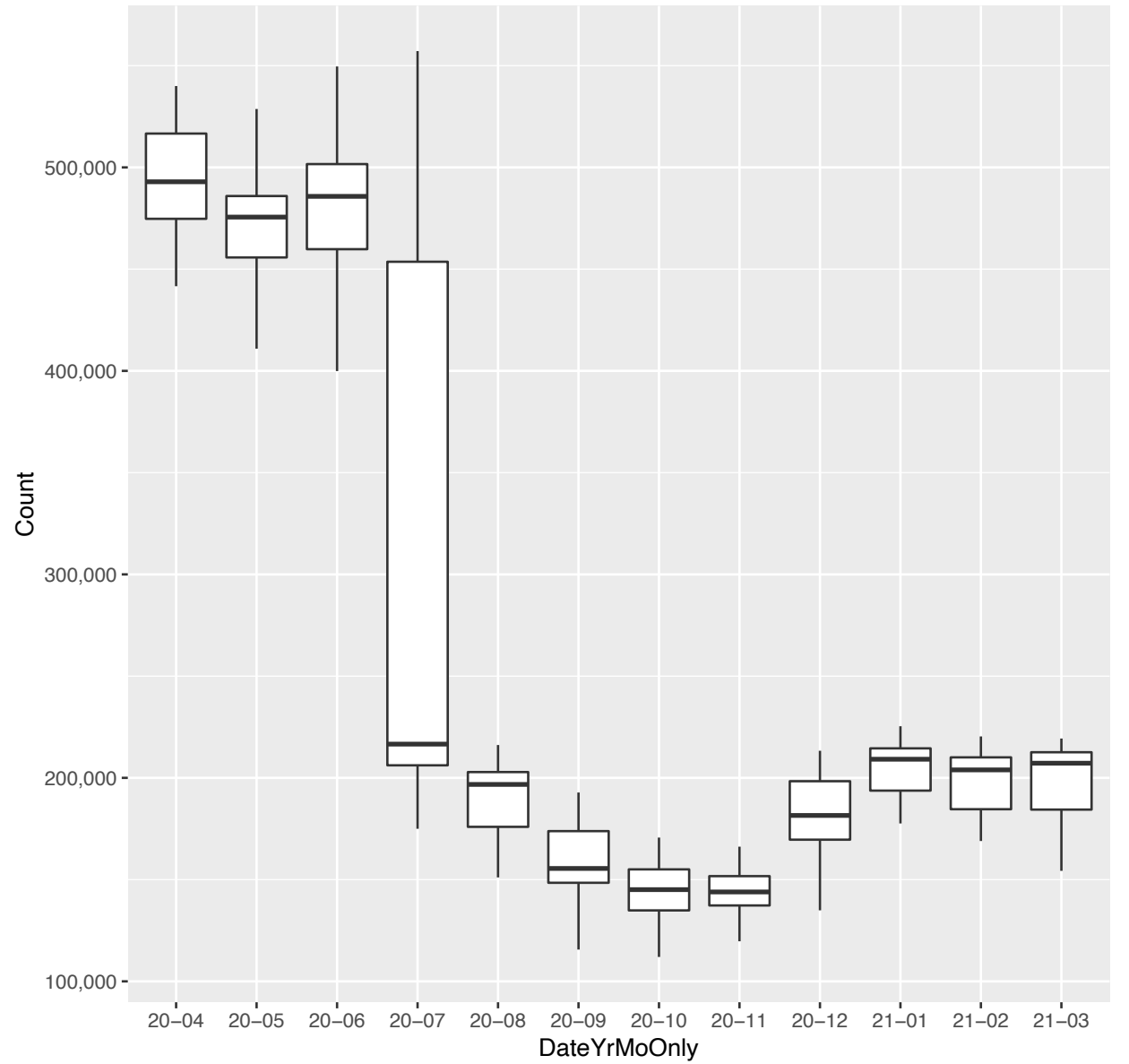
7. w3.org:

L shaped

*. w3.org (day-by-day counts and 28 day moving average)

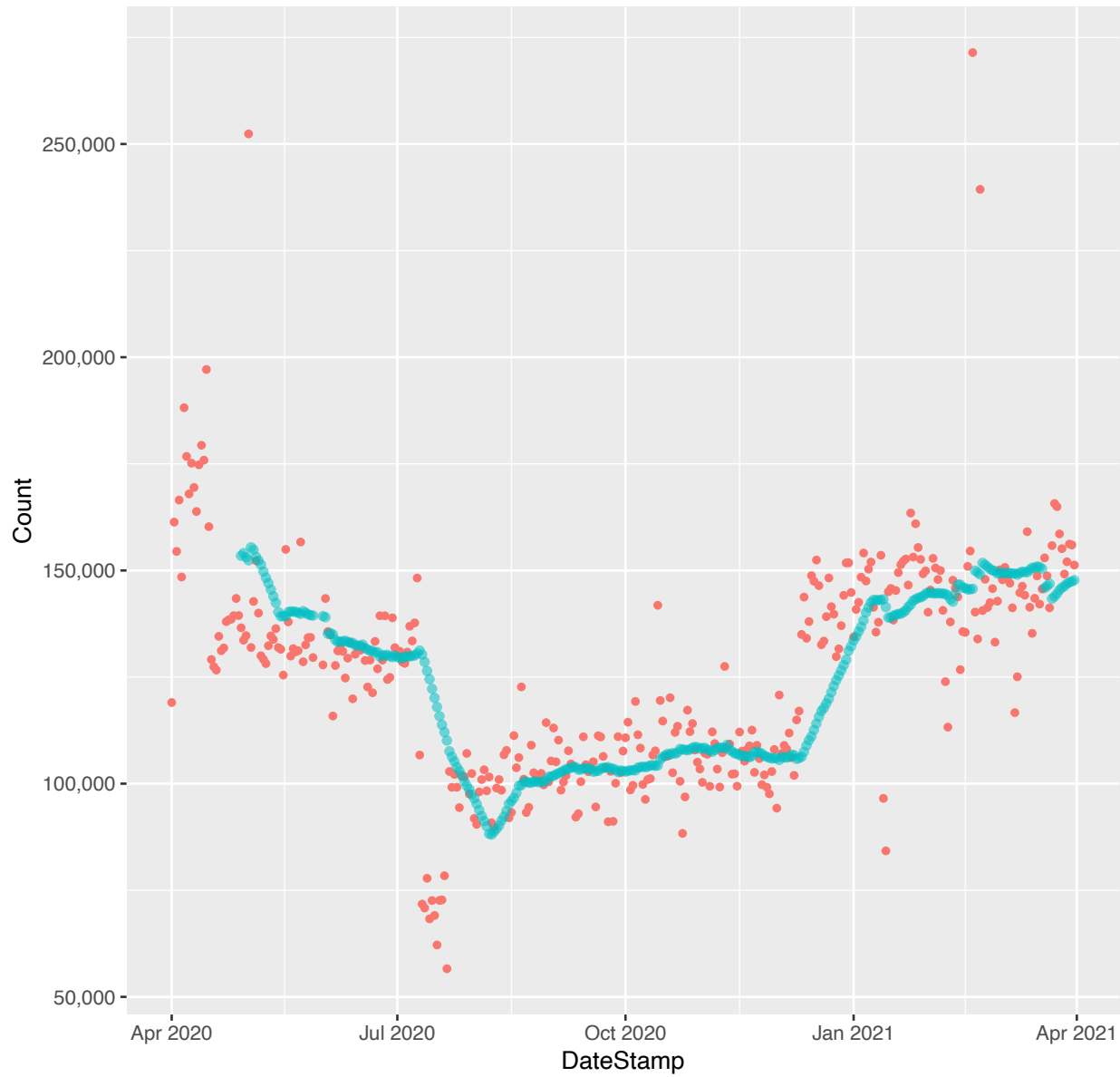


*. w3.org (monthly boxplots (outliers trimmed))

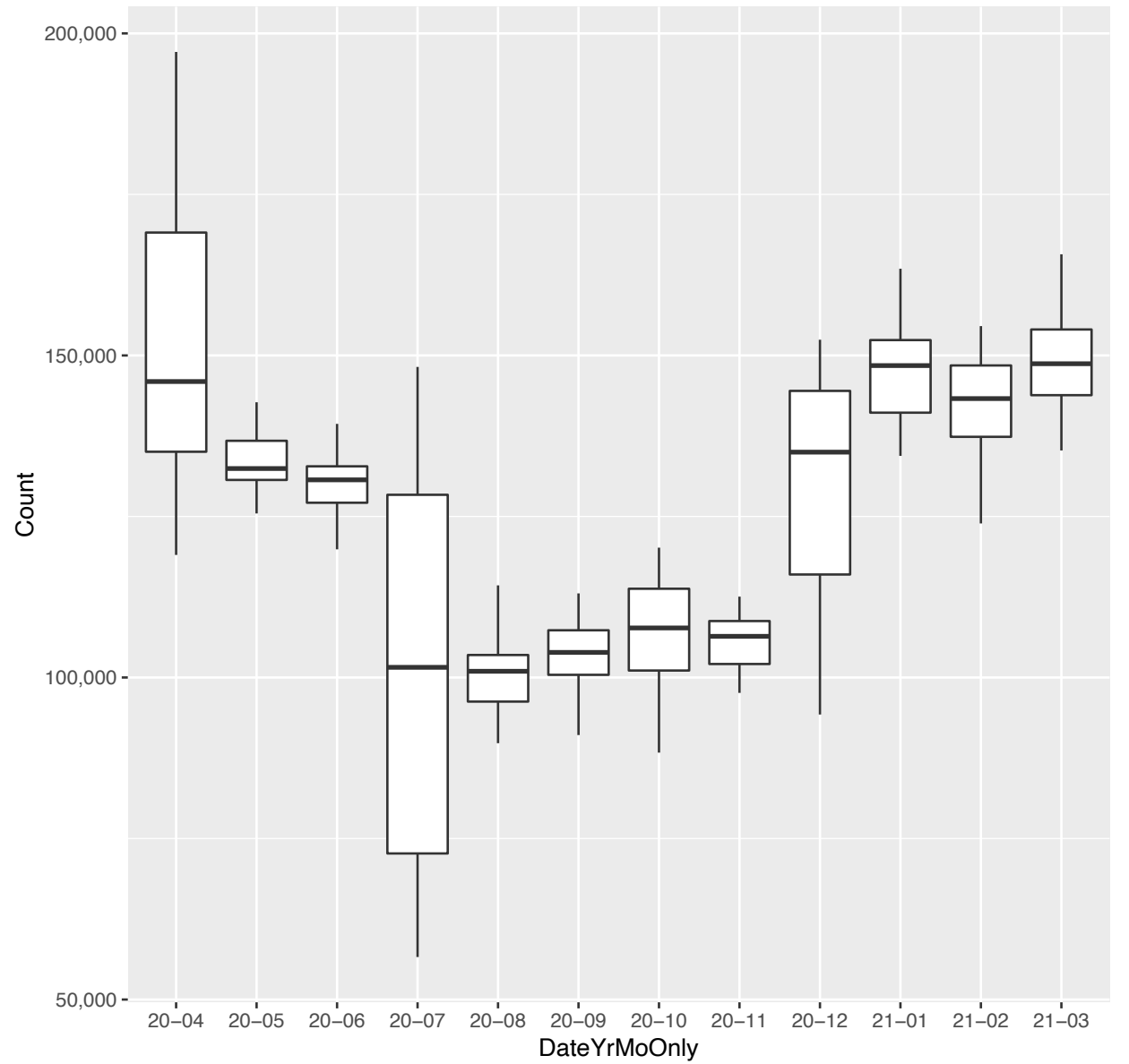


8. wikipedia.org: U shaped

*. wikipedia.org (day-by-day counts and 28 day moving average)



*. wikipedia.org (monthly boxplots (outliers trimmed))



VI. Government Covid-19 Sites

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There are two parts to this section.

The **first part** shows traffic to the following Federal government/international sites strongly associated with Covid-19/Coronavirus response:

- | | | | | | | | | |
|---|-------------------|---|----------|---|---|-----------|---|------------|
| 1 | *.cdc.gov | ☀ | ↗ | M | 3 | *.fda.gov | ~ | |
| 2 | *.coronavirus.gov | ☀ | L shaped | | 4 | *.who.int | ☀ | L shaped M |

While we would have expected all of these sites to "trend" due to popular interest in timely and authoritative Covid-19 information, of the four 2nd-level domain (2LD) wildcards mentioned in the first part, only *.cdc.gov appears to actually draw sustained/growing interest (as illustrated by its box plot below).

The **second part** of this section consists of some representative Covid-specific STATE Covid/Coronavirus sites. Sites that merely cover Covid-19 as part of a more general state health department website (such as <https://www.dshs.state.tx.us/coronavirus/> or <https://www.health.state.mn.us/diseases/coronavirus/index.html>) were not considered for inclusion here since traffic to those sites would likely be a mix of Covid-related and non-Covid-related interests.

Several of these state covid domains show user interest "at scale" and with a pattern of increasing interest over time. We'd also note that traffic volumes should be viewed in context of each state's underlying population -- you wouldn't expect "California-scale" traffic from a state with a much smaller population, such as Alaska. Some states might also have **multiple** dedicated Covid-19-related sites (for example, California has myturn.ca.gov (for vaccine scheduling) as well as covid19.ca.gov).

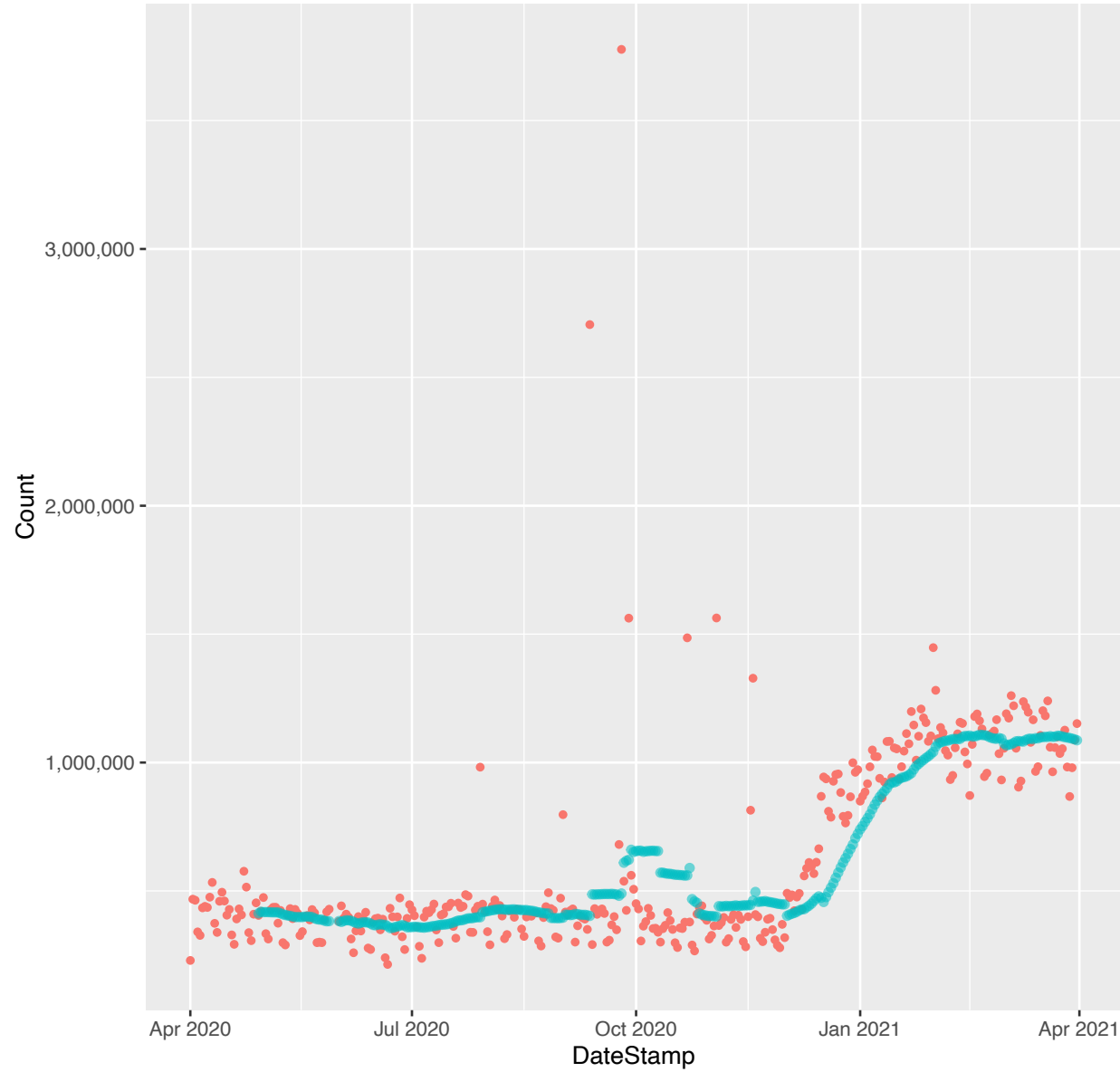
- | | | | | | | | |
|----|-------------|--|---|----|-----------------|--|---|
| 5 | Alaska: | covid19.alaska.gov | ↗ | 13 | North Carolina: | covid19.ncdhhs.gov | ↗ |
| 6 | California: | covid19.ca.gov | ↗ | 14 | Ohio: | coronavirus.ohio.gov | ↗ |
| 7 | Delaware: | coronavirus.delaware.gov | ↗ | 15 | Oregon: | coronavirus.oregon.gov | ↗ |
| 8 | Florida: | floridahealthcovid19.gov | ↗ | 16 | Tennessee: | covid19.tn.gov | ↗ |
| 9 | Hawaii: | hawaiiicovid19.com | ↗ | 17 | Utah: | coronavirus.utah.gov | ↗ |
| 10 | Indiana: | www.coronavirus.in.gov | ~ | 18 | Washington: | coronavirus.wa.gov | ~ |
| 11 | New Jersey: | covid19.nj.gov | ↗ | 19 | West Virginia: | coronavirus.wv.gov | ~ |
| 12 | New York: | coronavirus.health.ny.gov | ↗ | | | | |

1. cdc.gov:

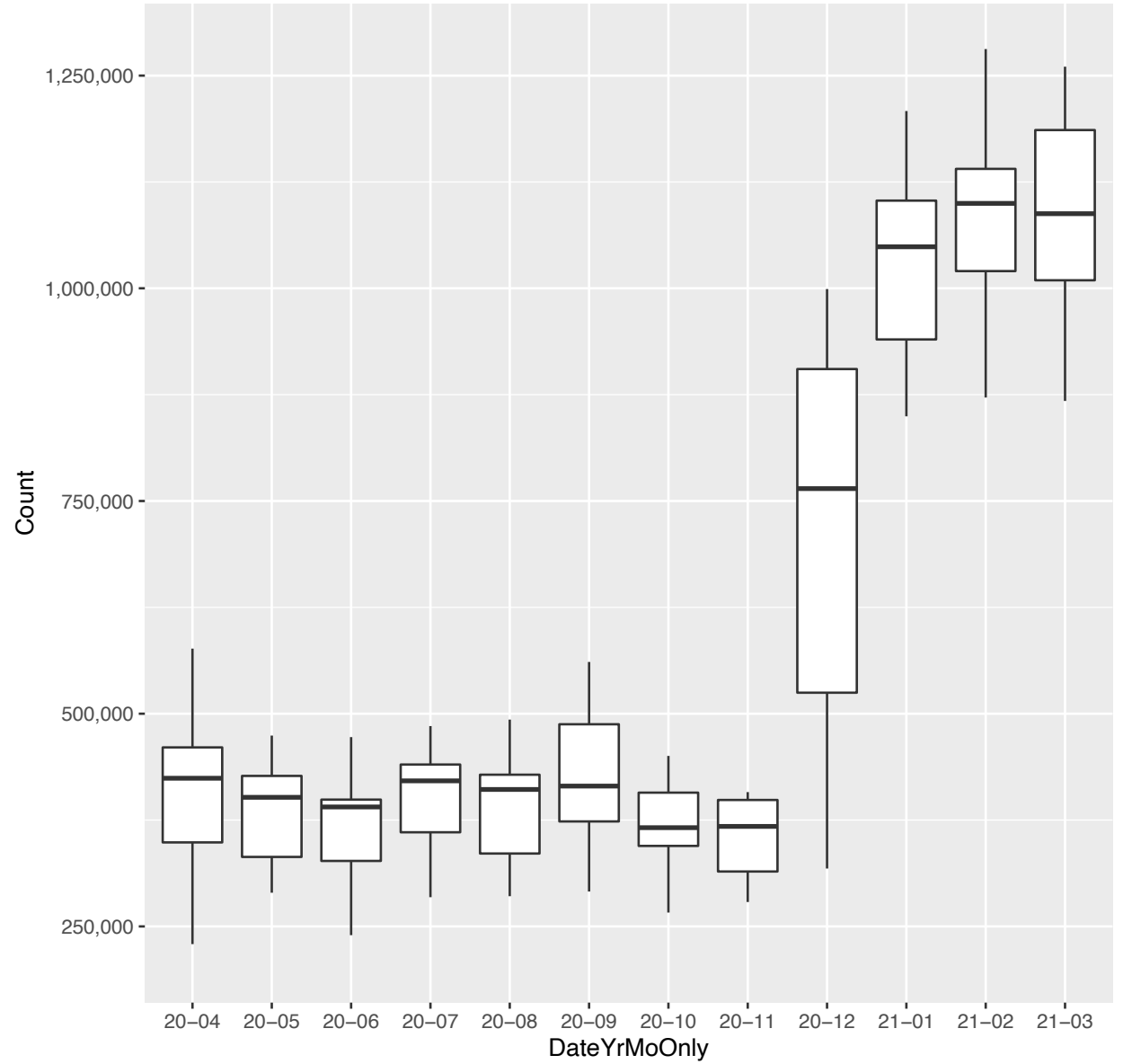


M

*. cdc.gov (day-by-day counts and 28 day moving average)

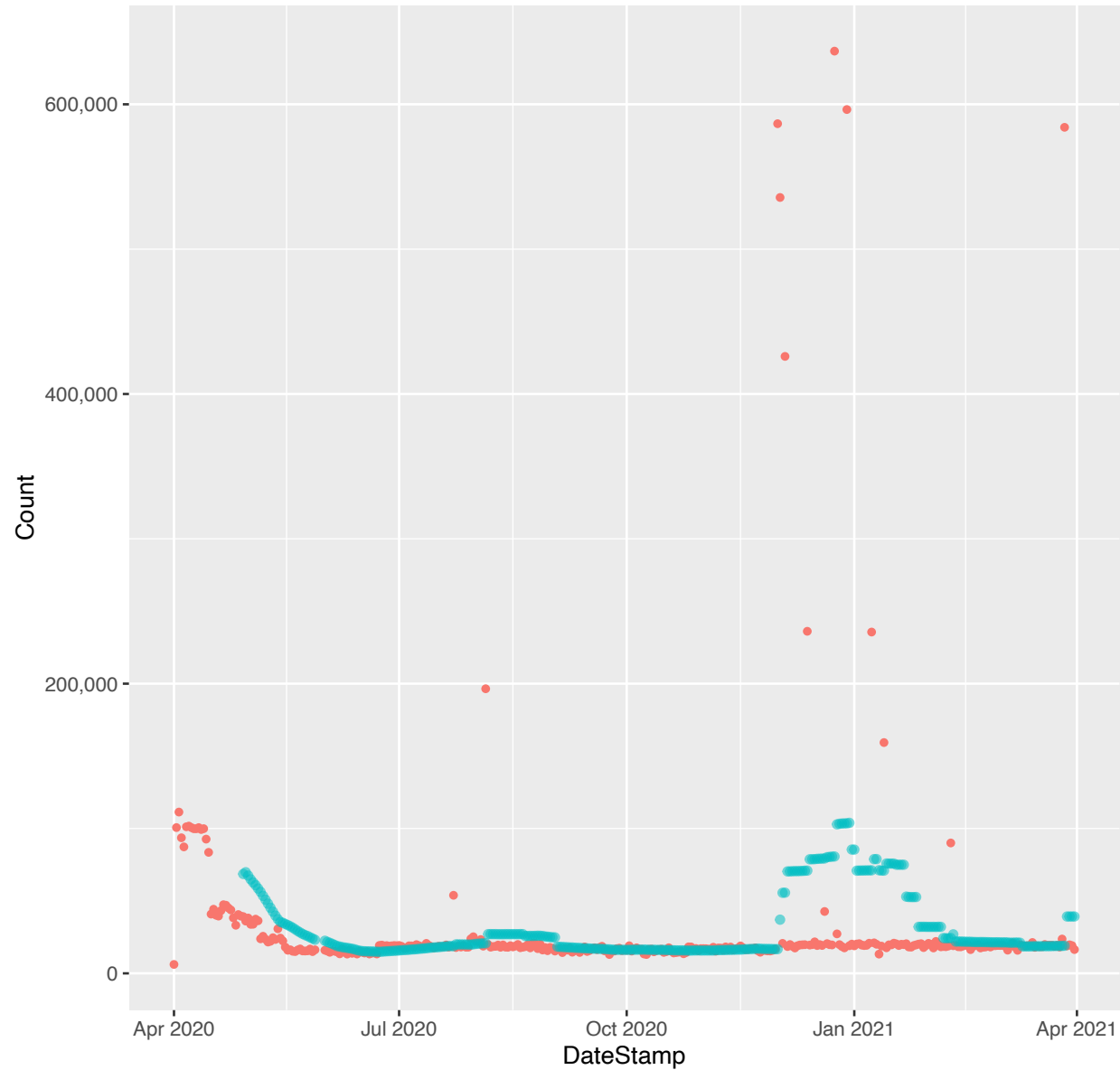


*. cdc.gov (monthly boxplots (outliers trimmed))

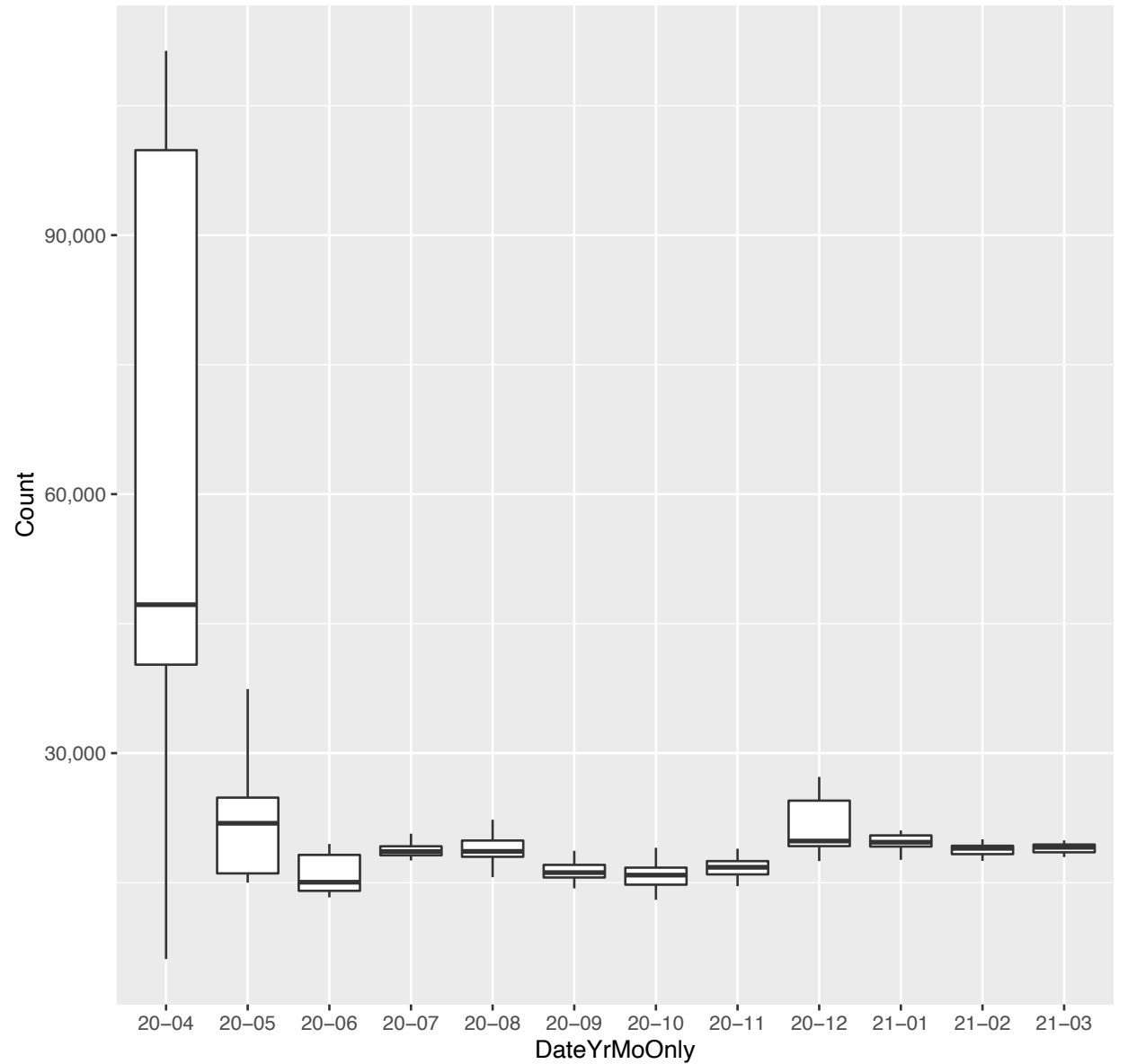


2. coronavirus.gov: * L shaped

*. coronavirus.gov (day-by-day counts and 28 day moving average)



*. coronavirus.gov (monthly boxplots (outliers trimmed))



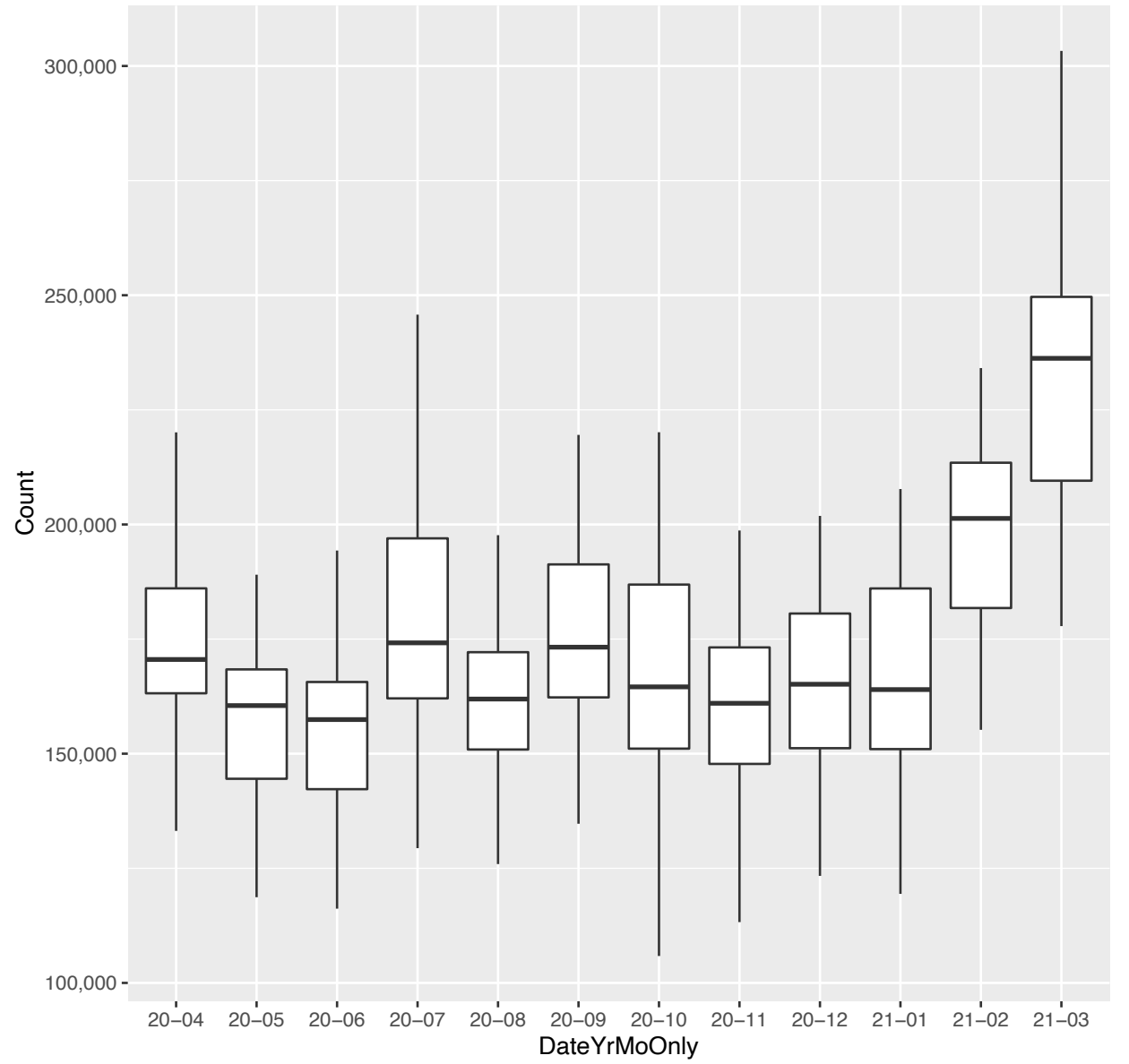
3. fda.gov:

~

*. fda.gov (day-by-day counts and 28 day moving average)



*. fda.gov (monthly boxplots (outliers trimmed))



4. who.int:

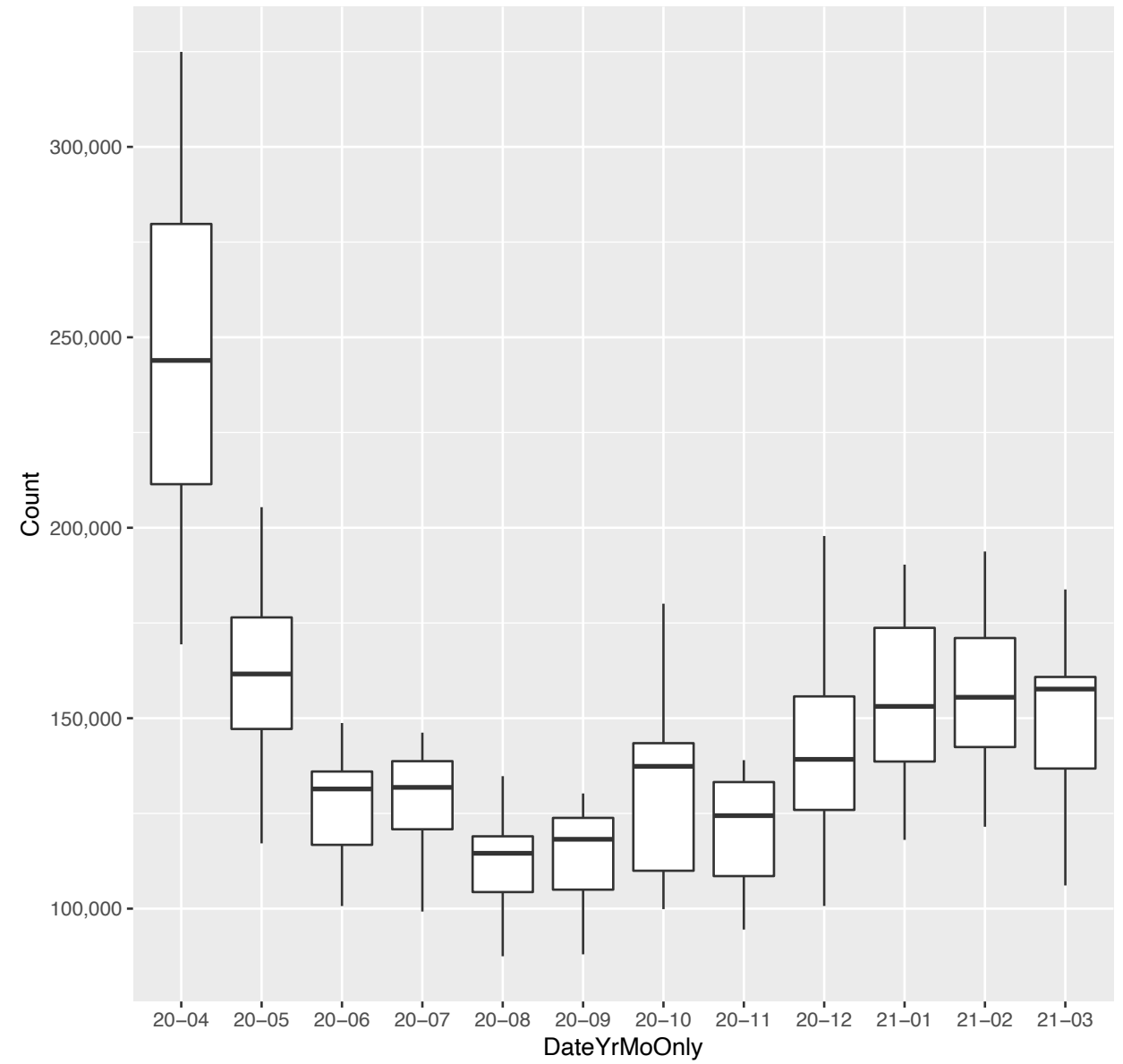
✱ L shaped

M

*. who.int (day-by-day counts and 28 day moving average)

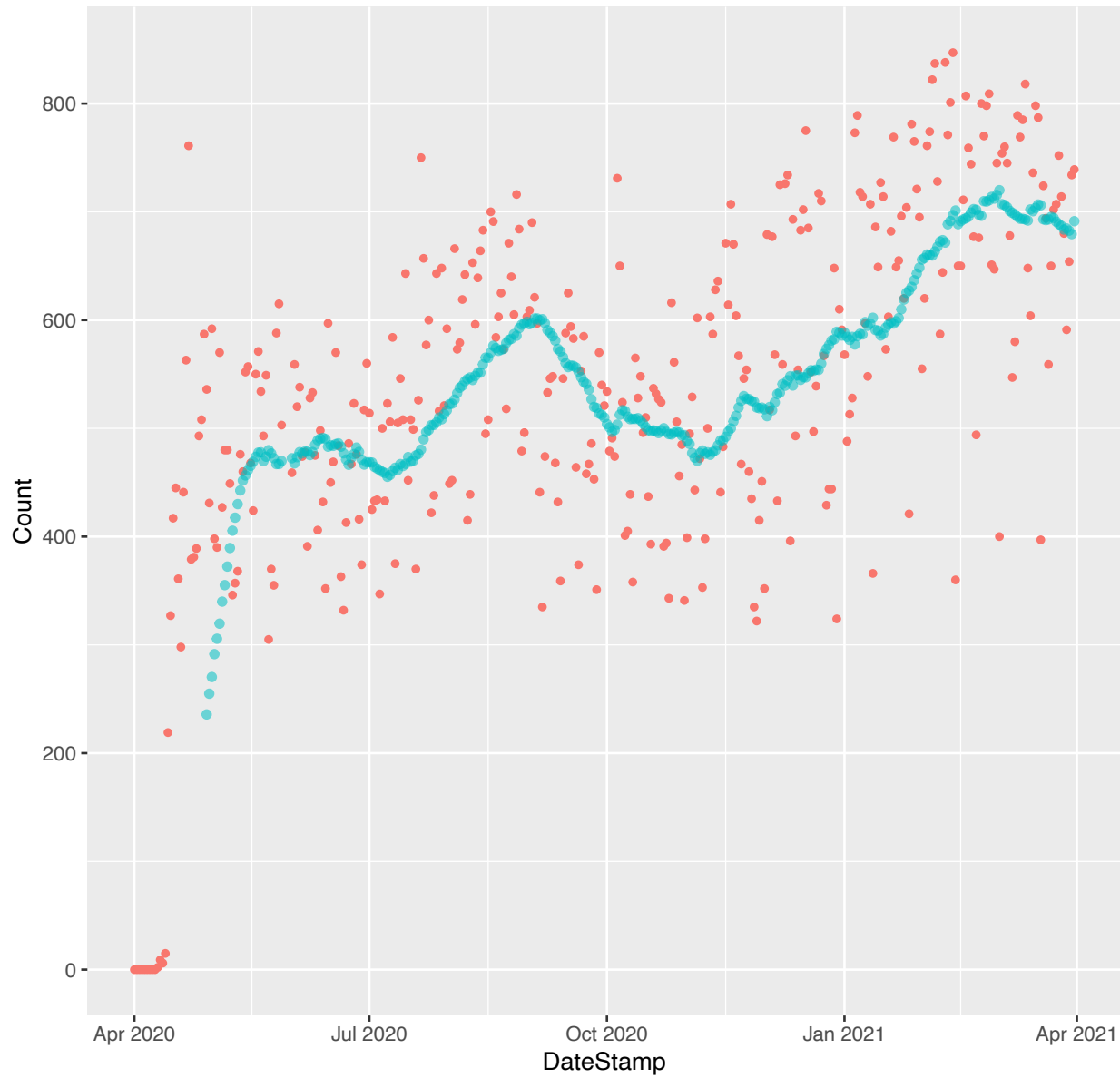


*. who.int (monthly boxplots (outliers trimmed))

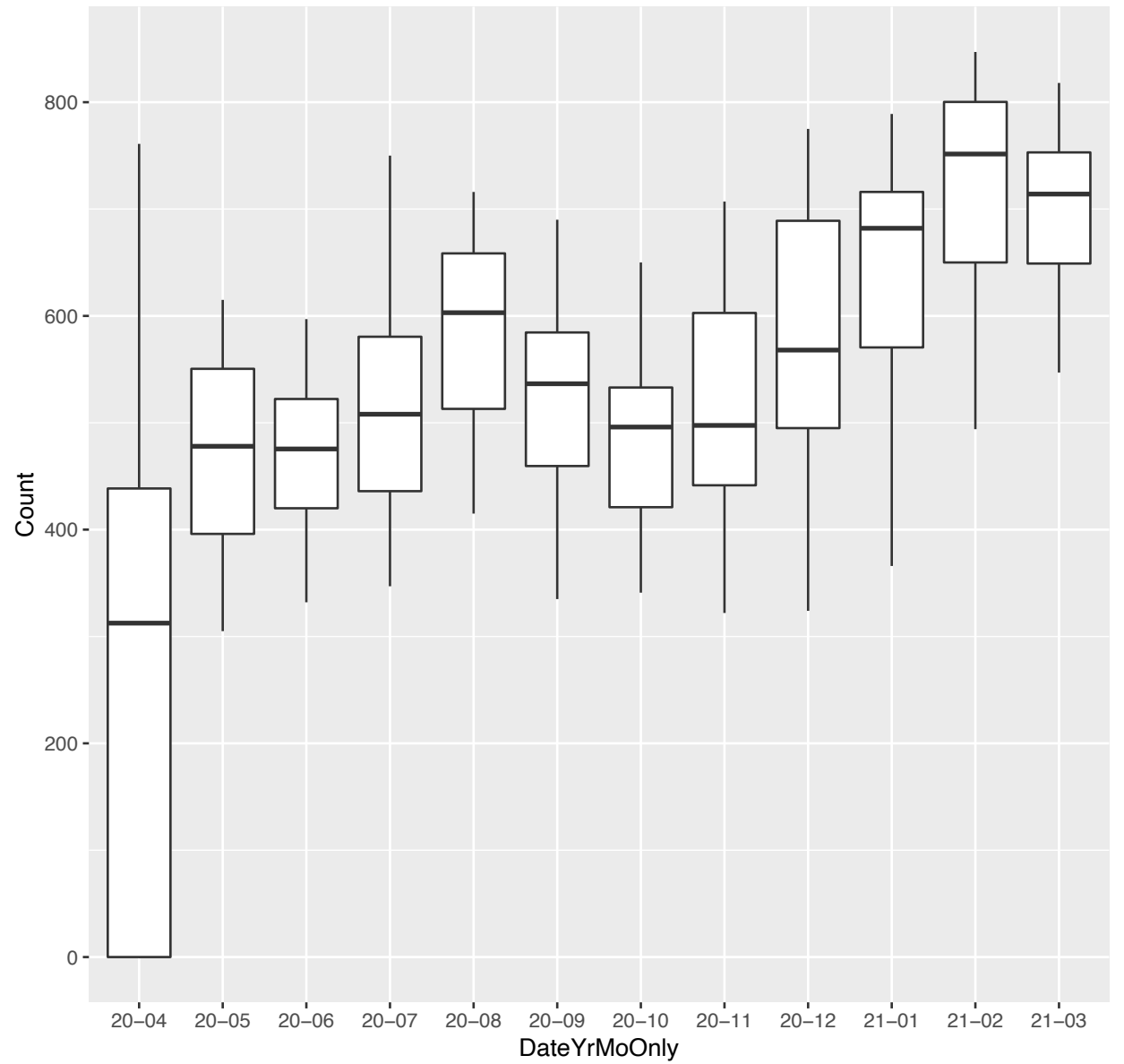


5. covid19.alaska.gov: ↗

covid19.alaska.gov (day-by-day counts and 28 day moving average)



covid19.alaska.gov (monthly boxplots (outliers trimmed))



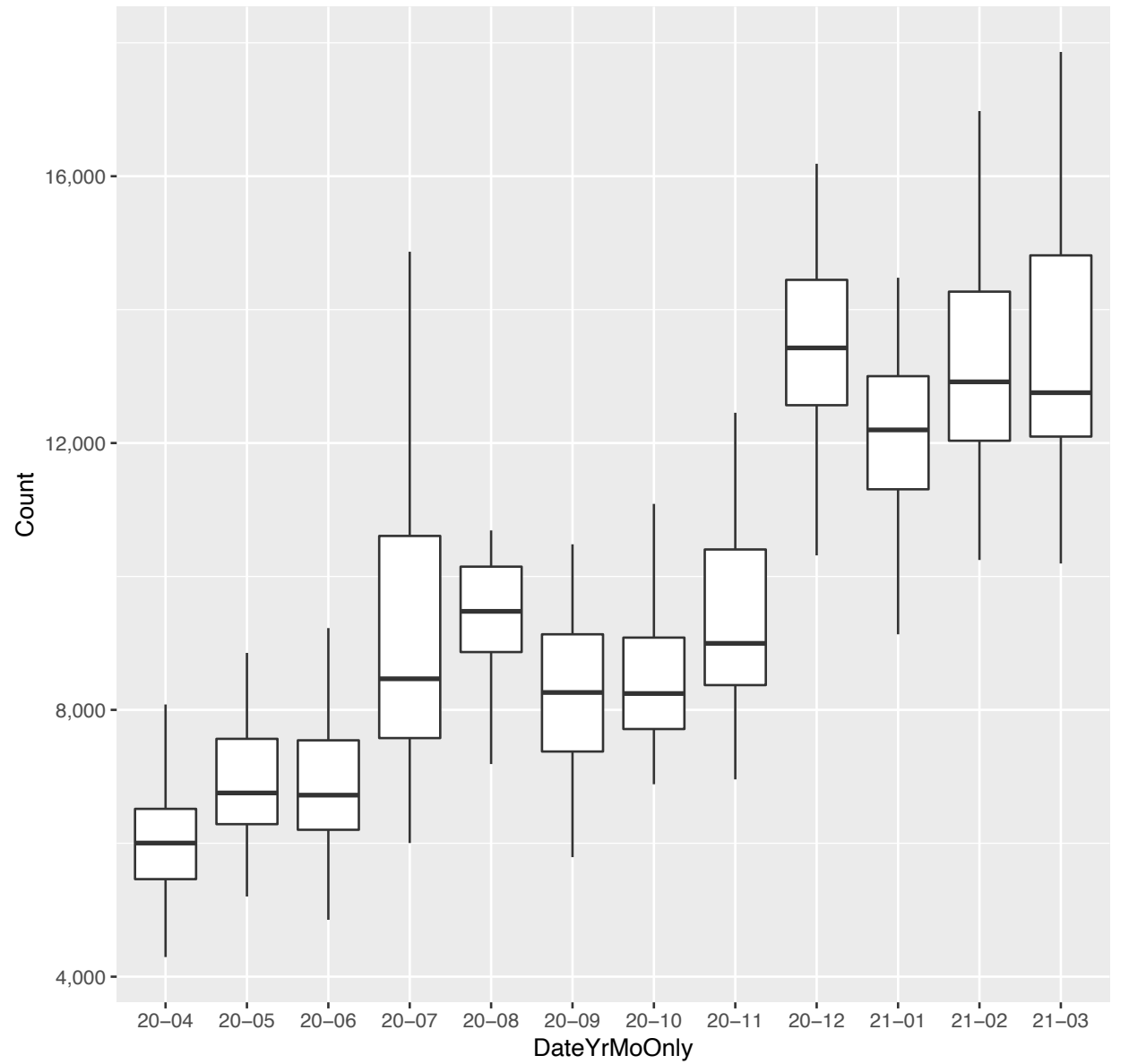
6. covid19.ca.gov:



covid19.ca.gov (day-by-day counts and 28 day moving average)

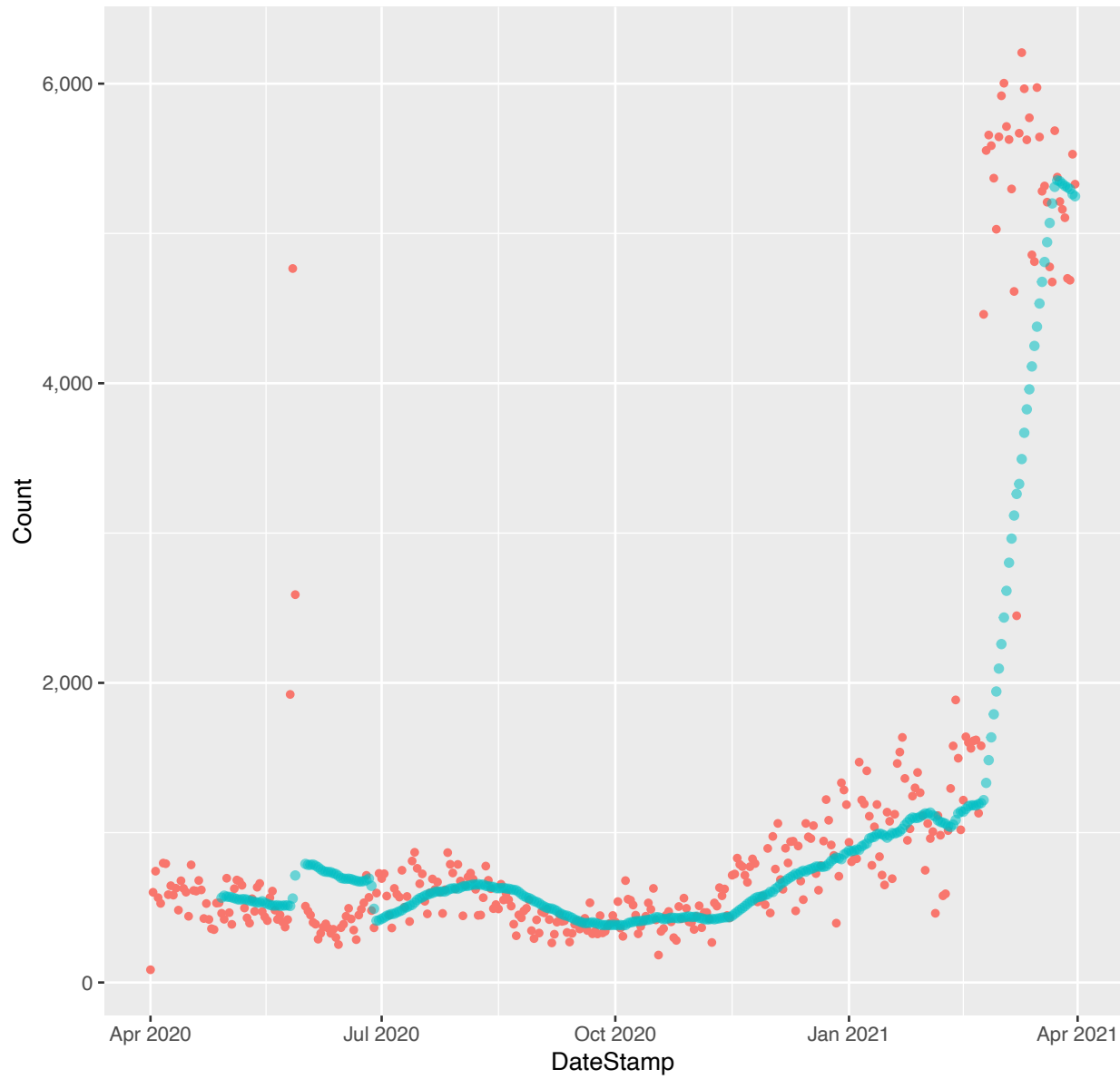


covid19.ca.gov (monthly boxplots (outliers trimmed))

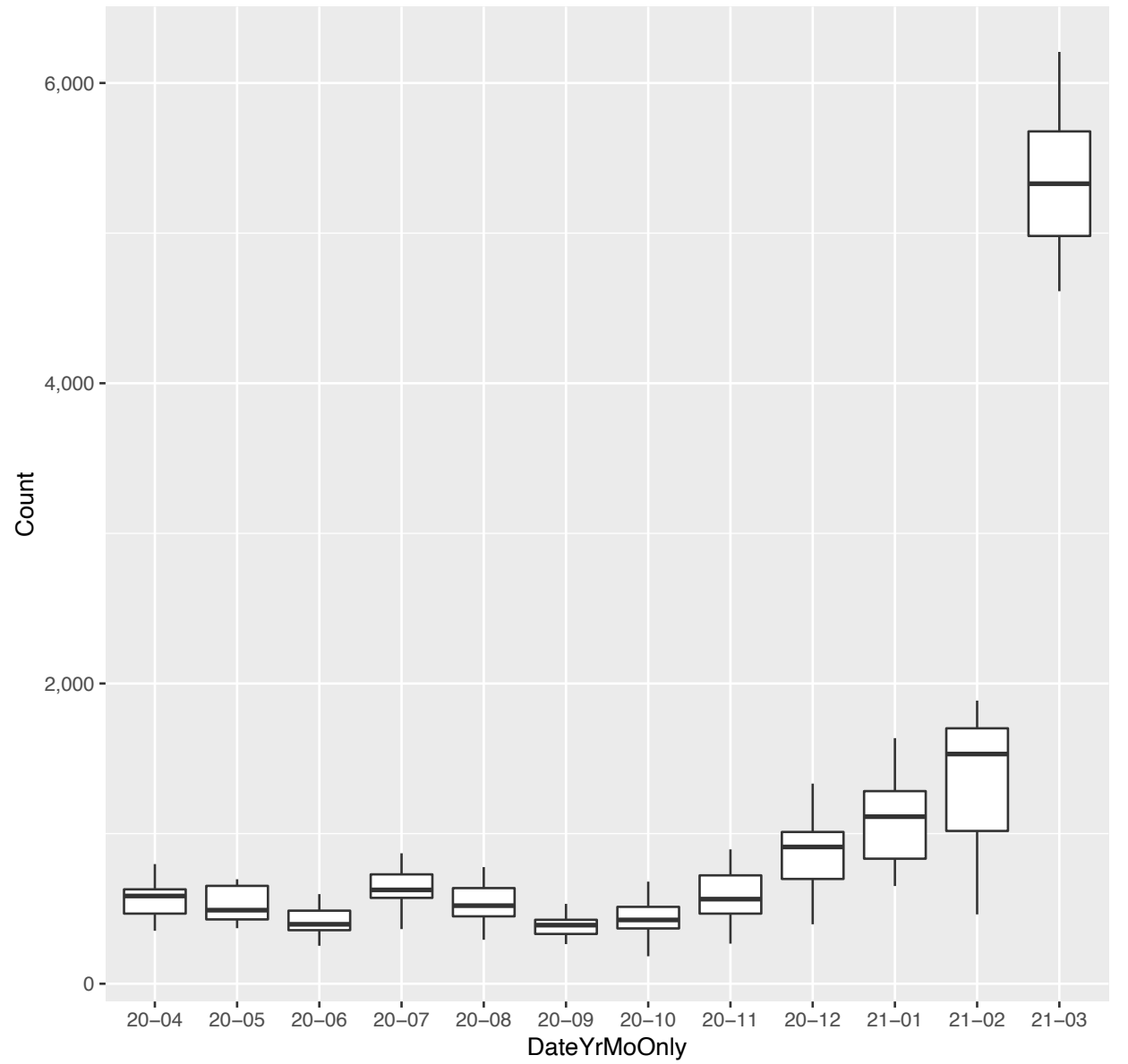


7. coronavirus.delaware.gov: ↗

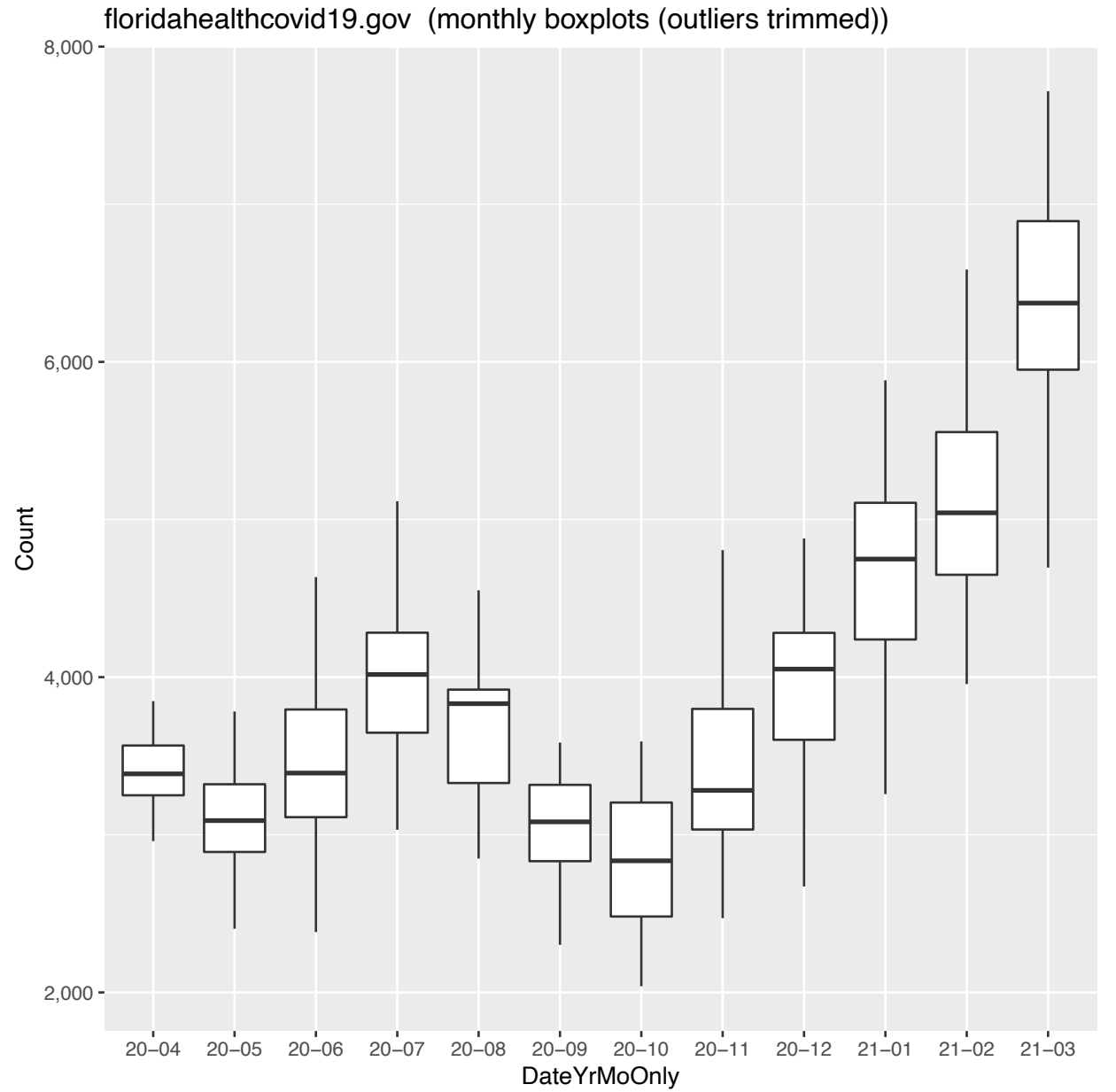
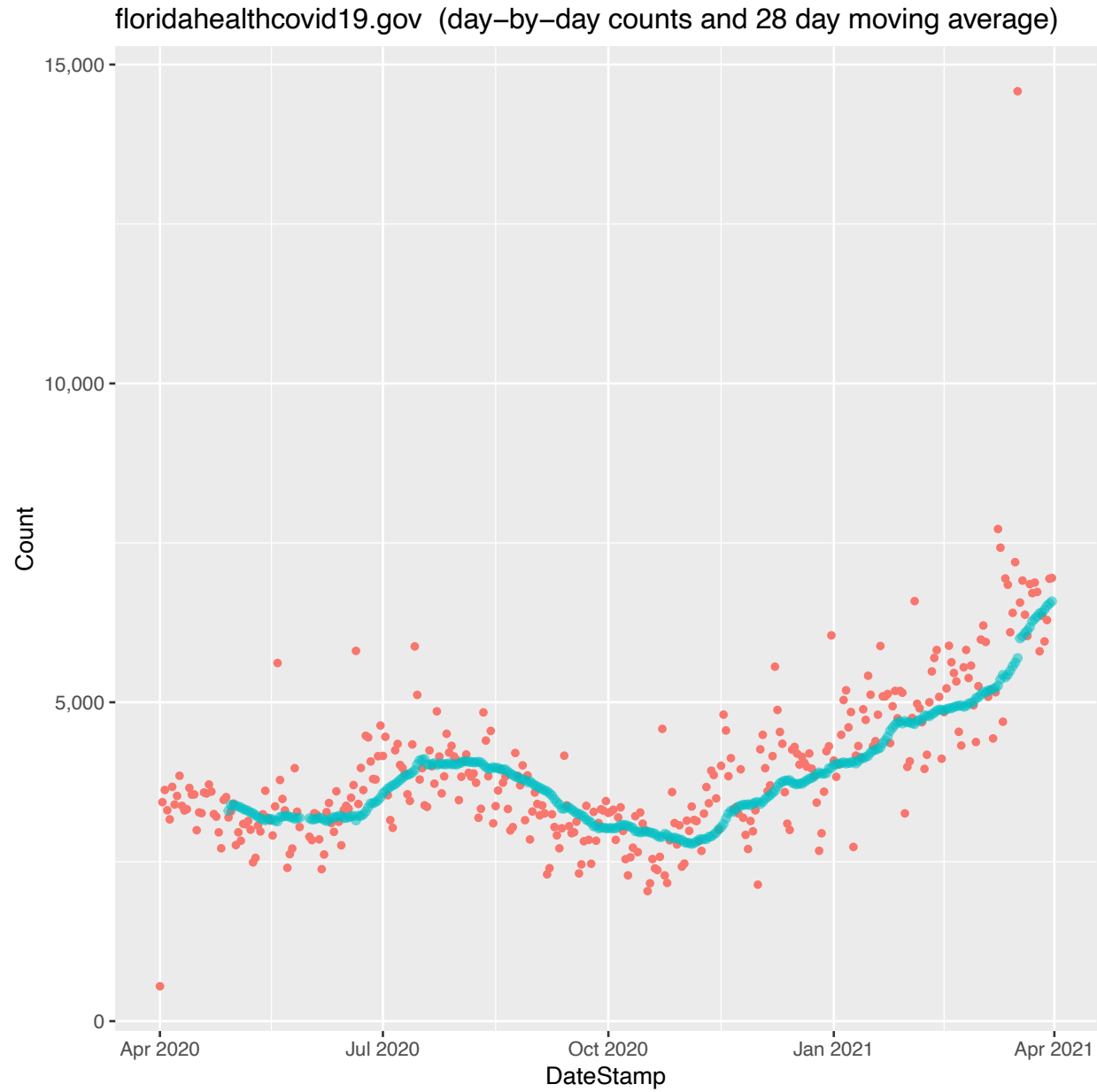
coronavirus.delaware.gov (day-by-day counts and 28 day moving average)



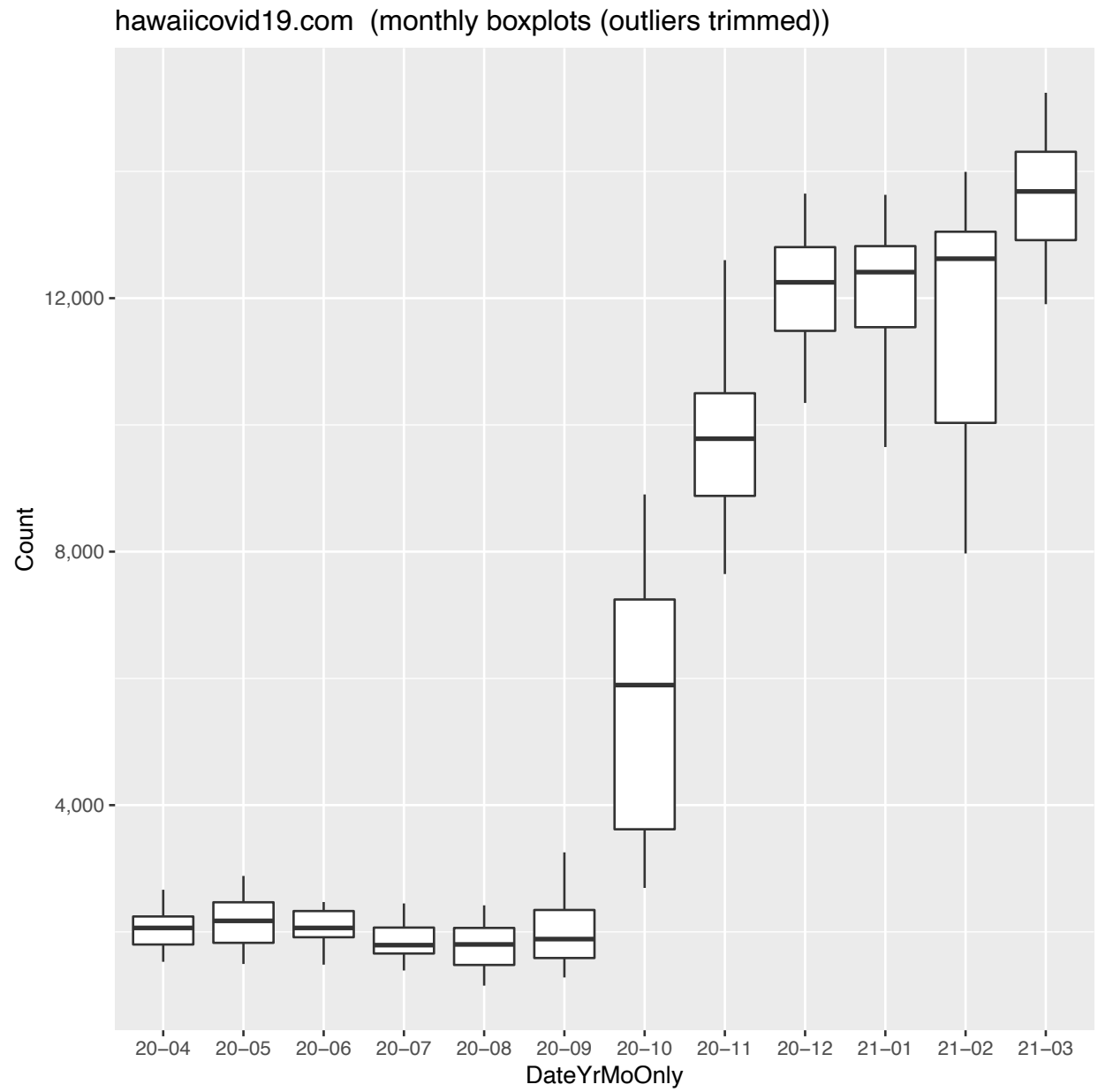
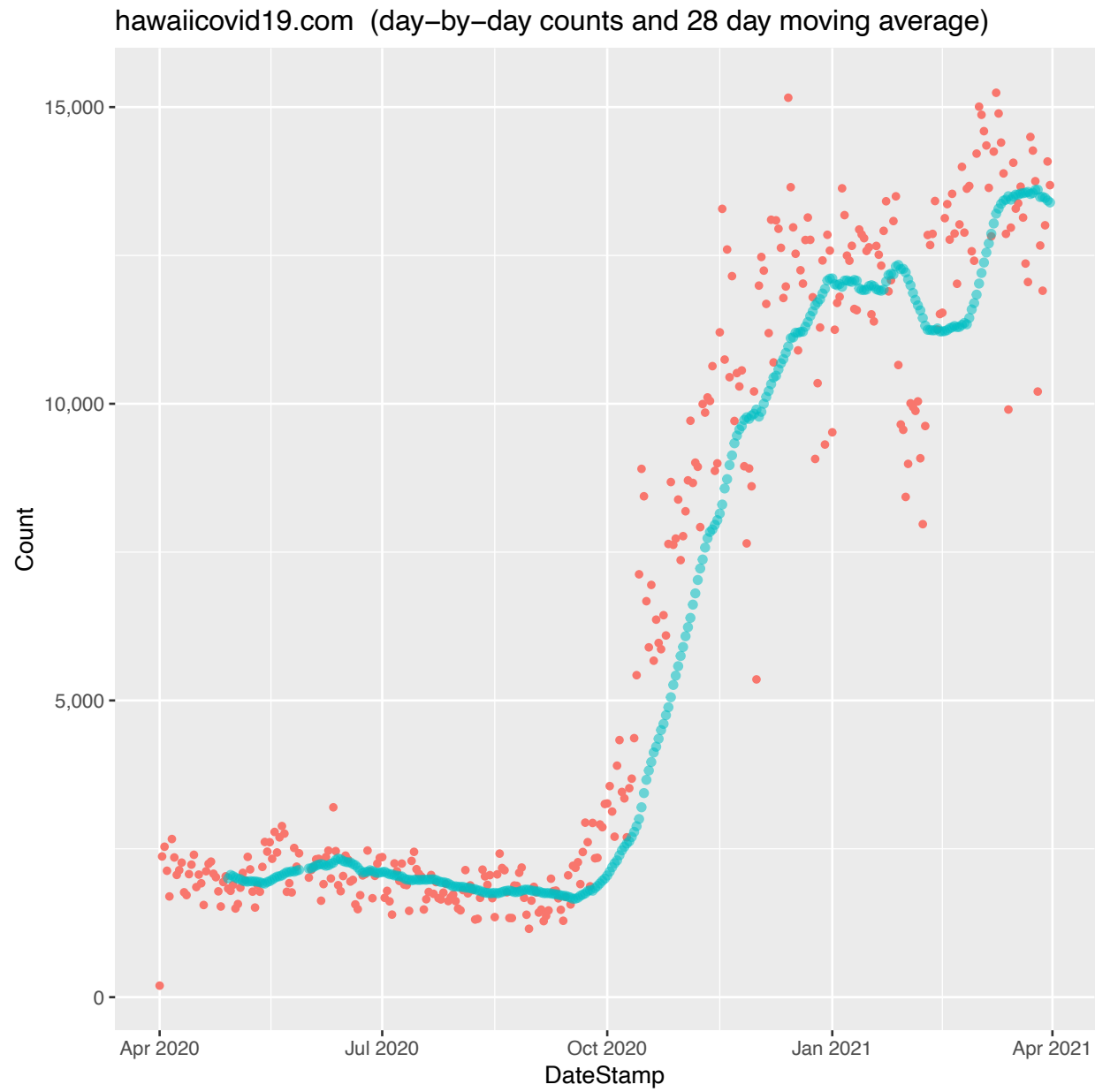
coronavirus.delaware.gov (monthly boxplots (outliers trimmed))



8. floridahealthcovid19.gov: ↗



9. hawaiiicovid19.com: ↗

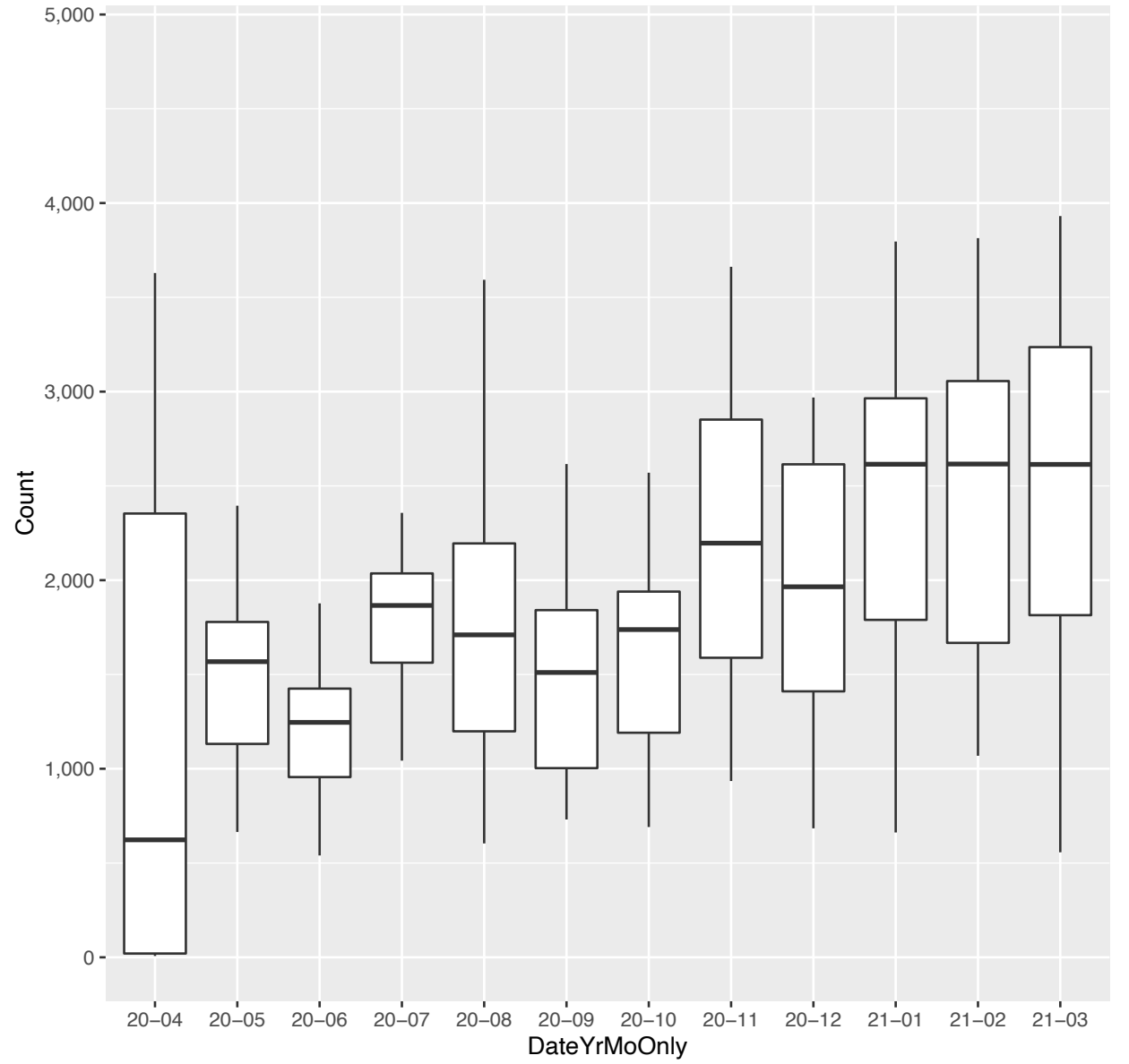


10. www.coronavirus.in.gov: ~

www.coronavirus.in.gov (day-by-day counts and 28 day moving average)



www.coronavirus.in.gov (monthly boxplots (outliers trimmed))

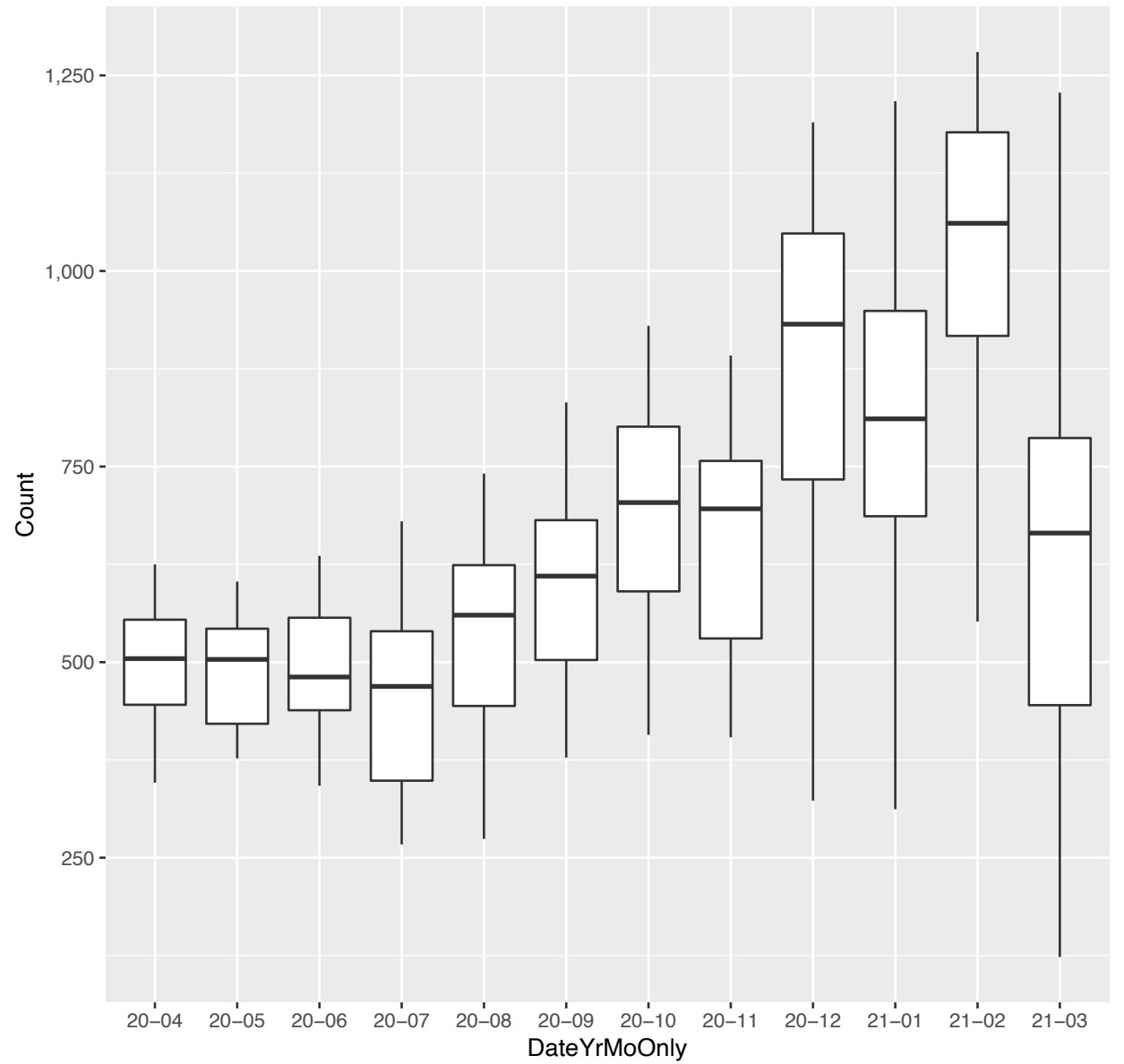


11. covid19.nj.gov: ↗

covid19.nj.gov (day-by-day counts and 28 day moving average)

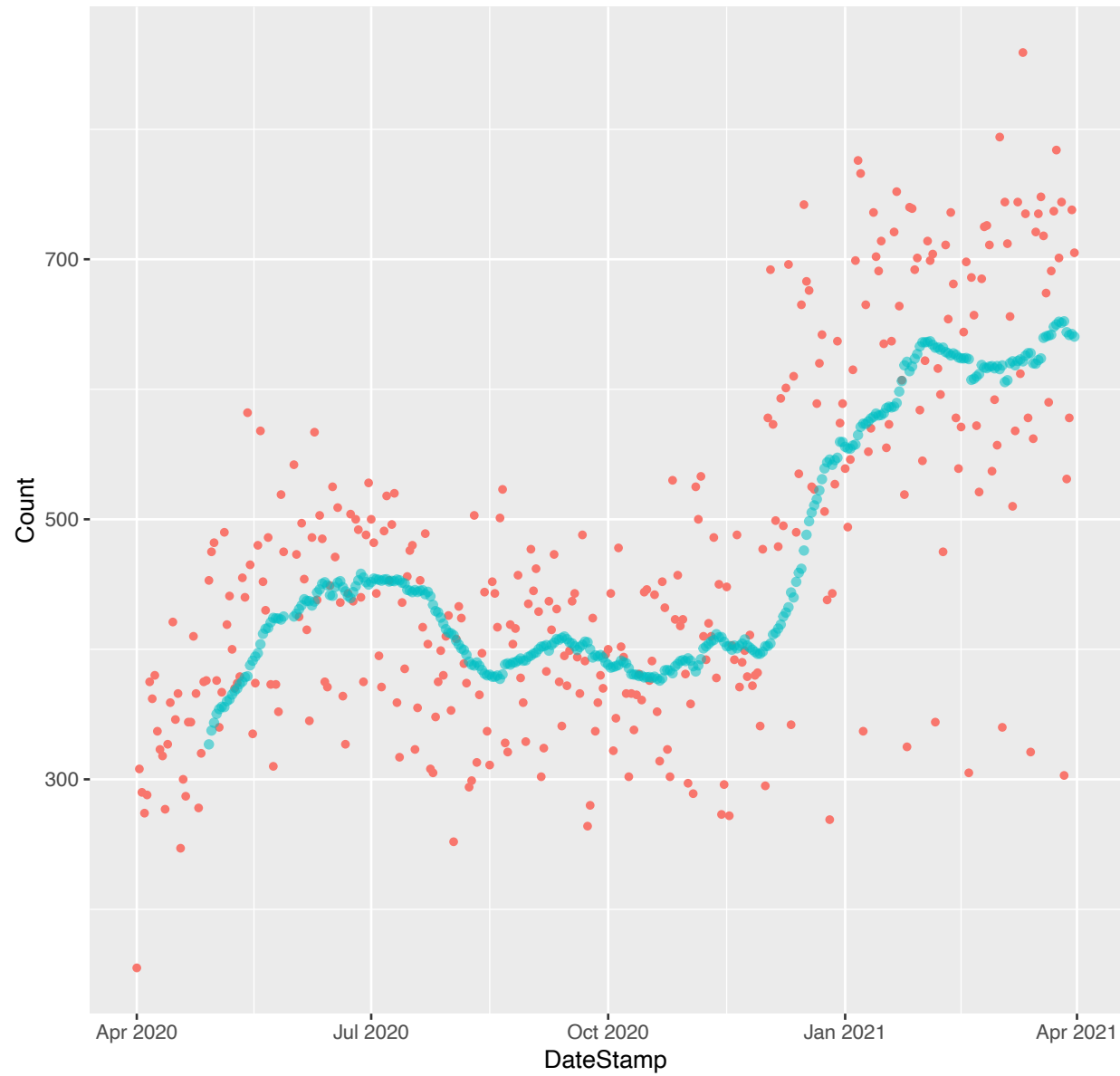


covid19.nj.gov (monthly boxplots (outliers trimmed))

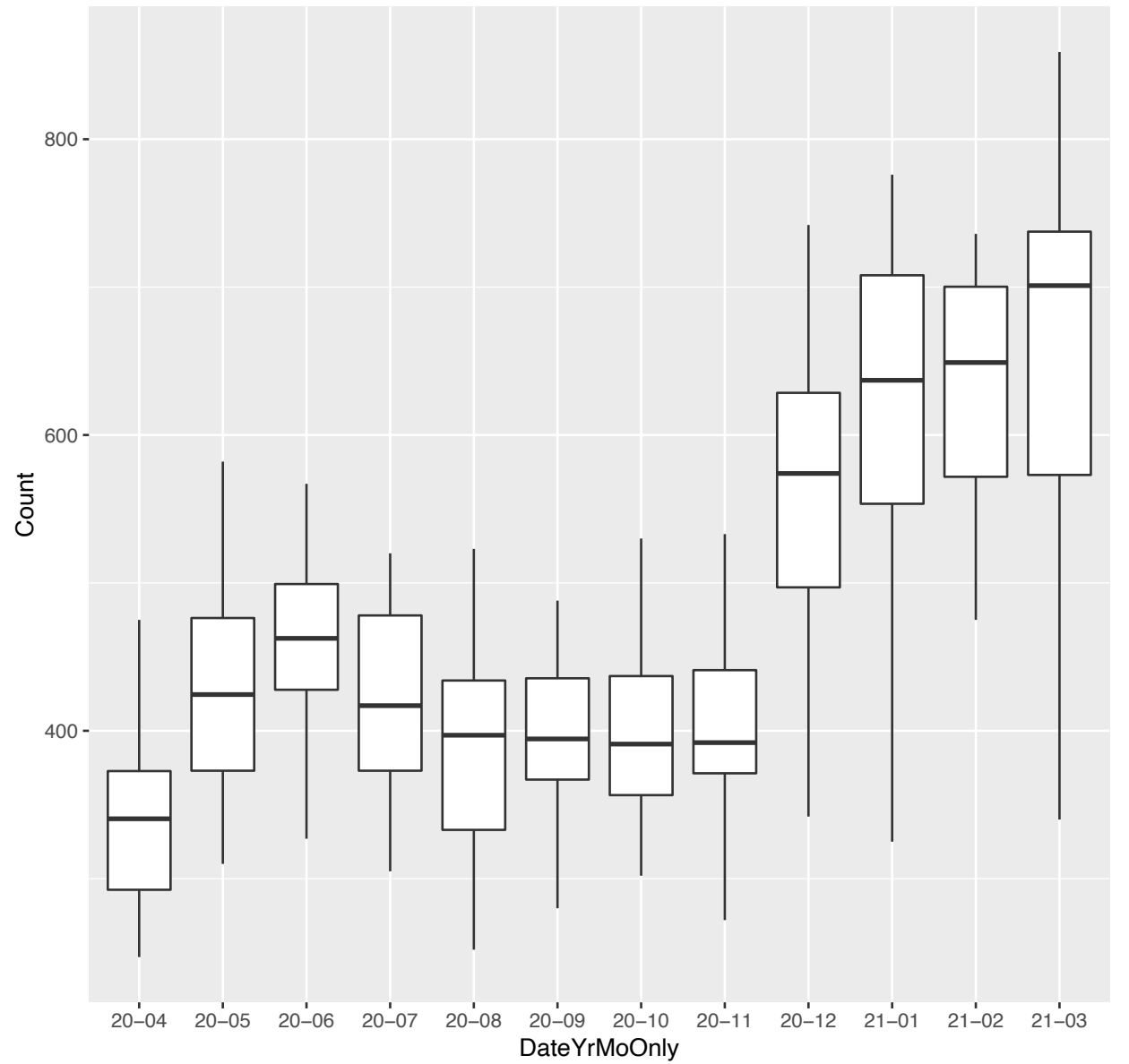


12. coronavirus.health.ny.gov: ↗

coronavirus.health.ny.gov (day-by-day counts and 28 day moving average)



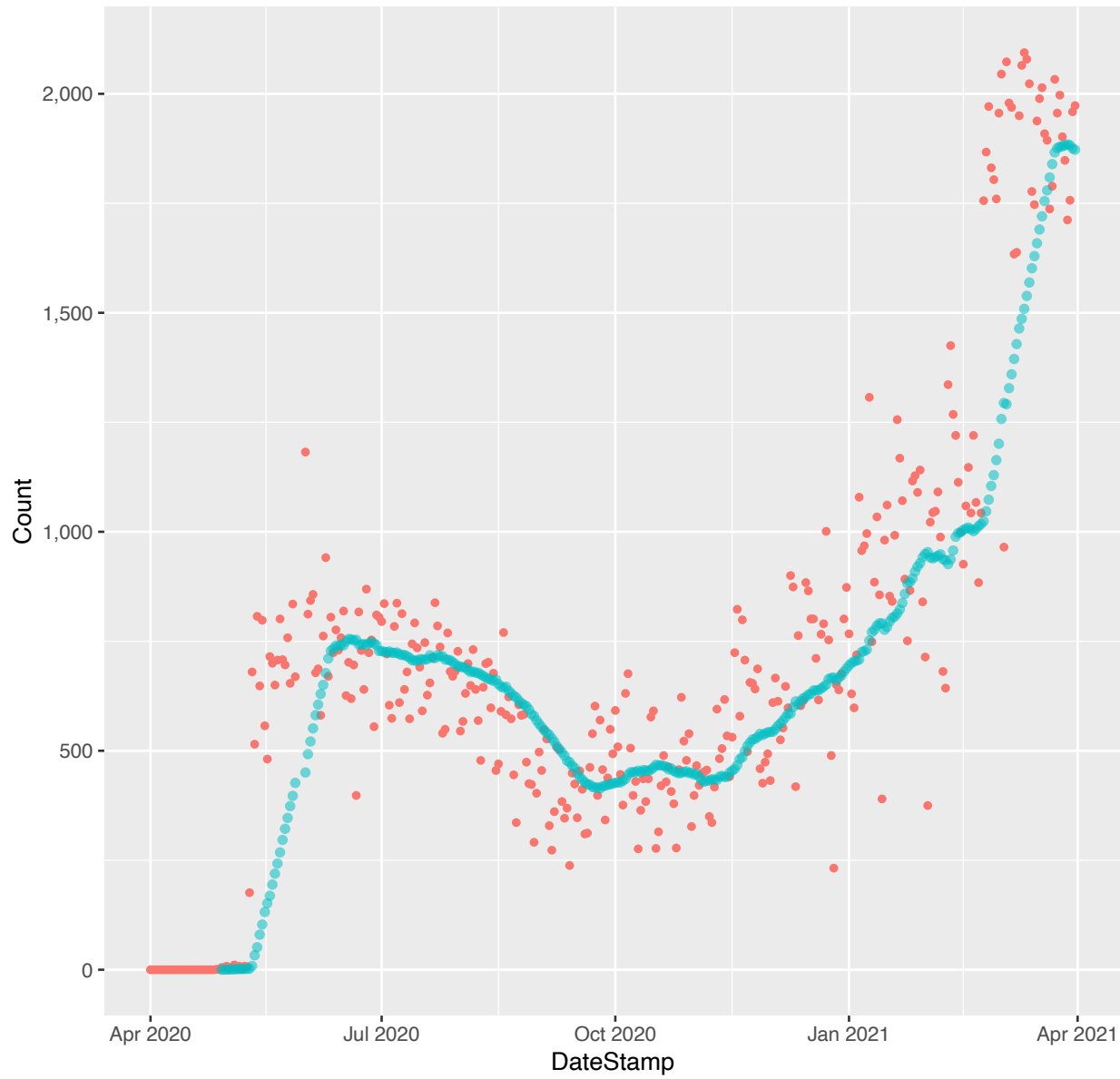
coronavirus.health.ny.gov (monthly boxplots (outliers trimmed))



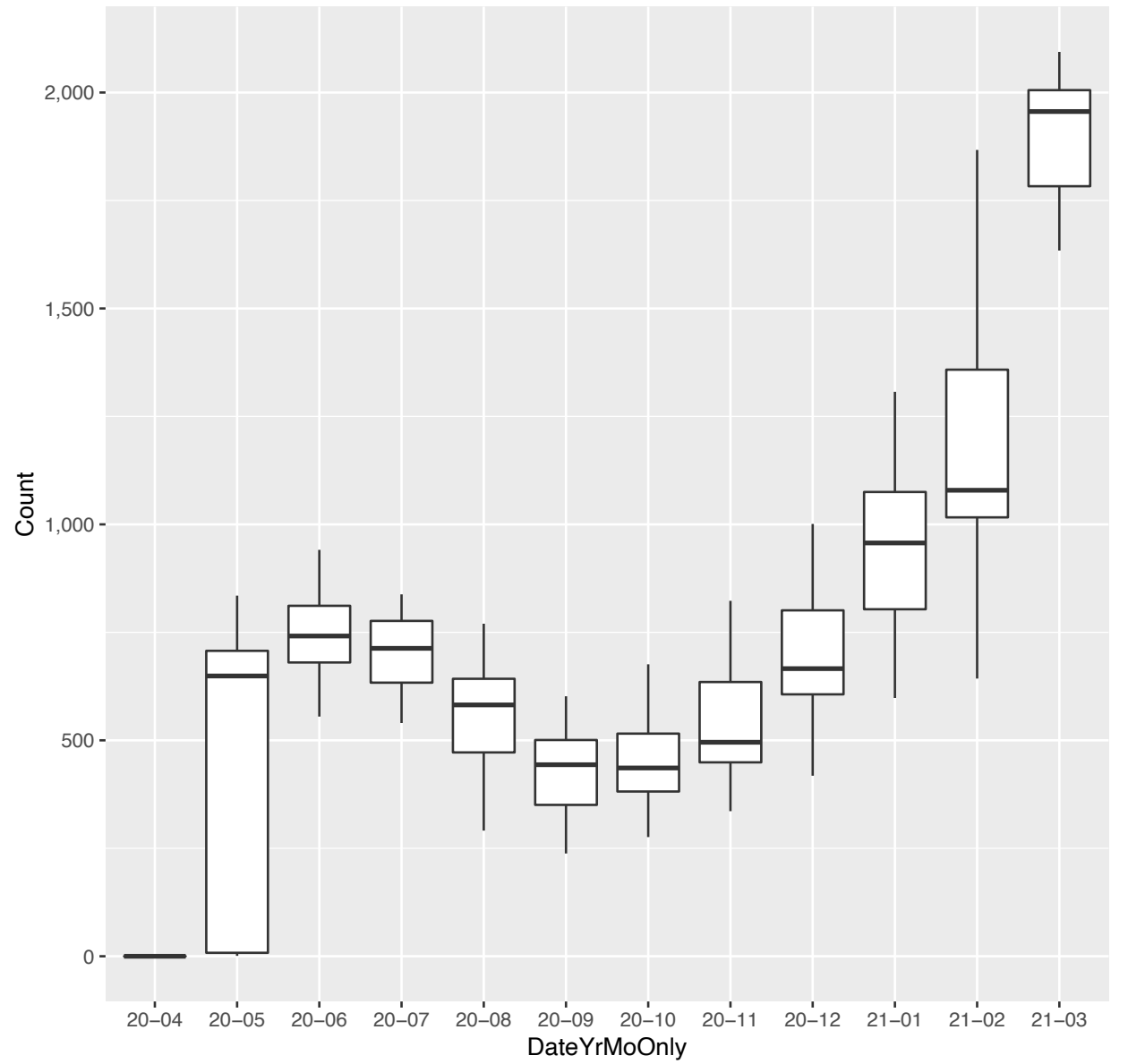
13. covid19.ncdhhs.gov:



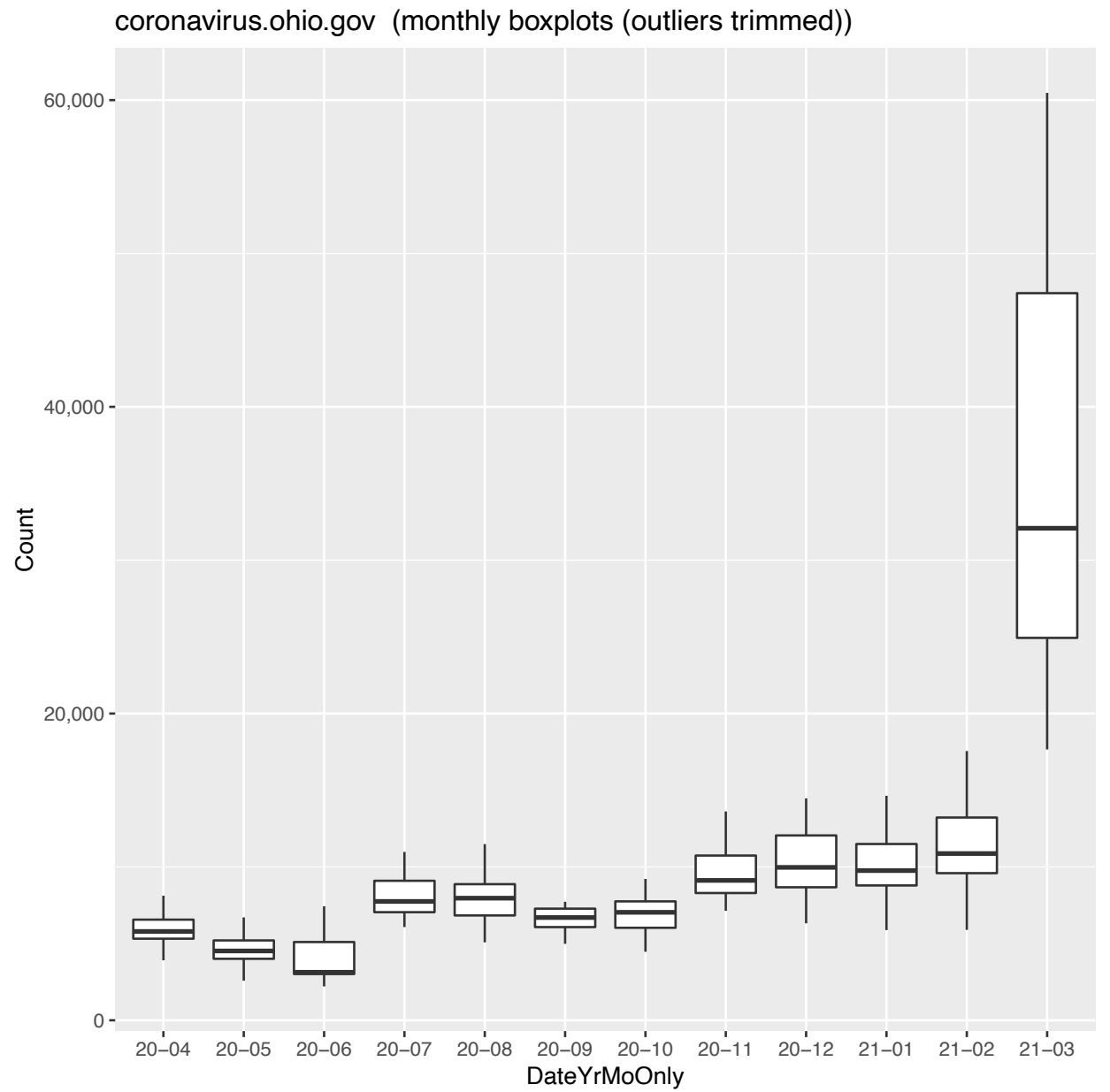
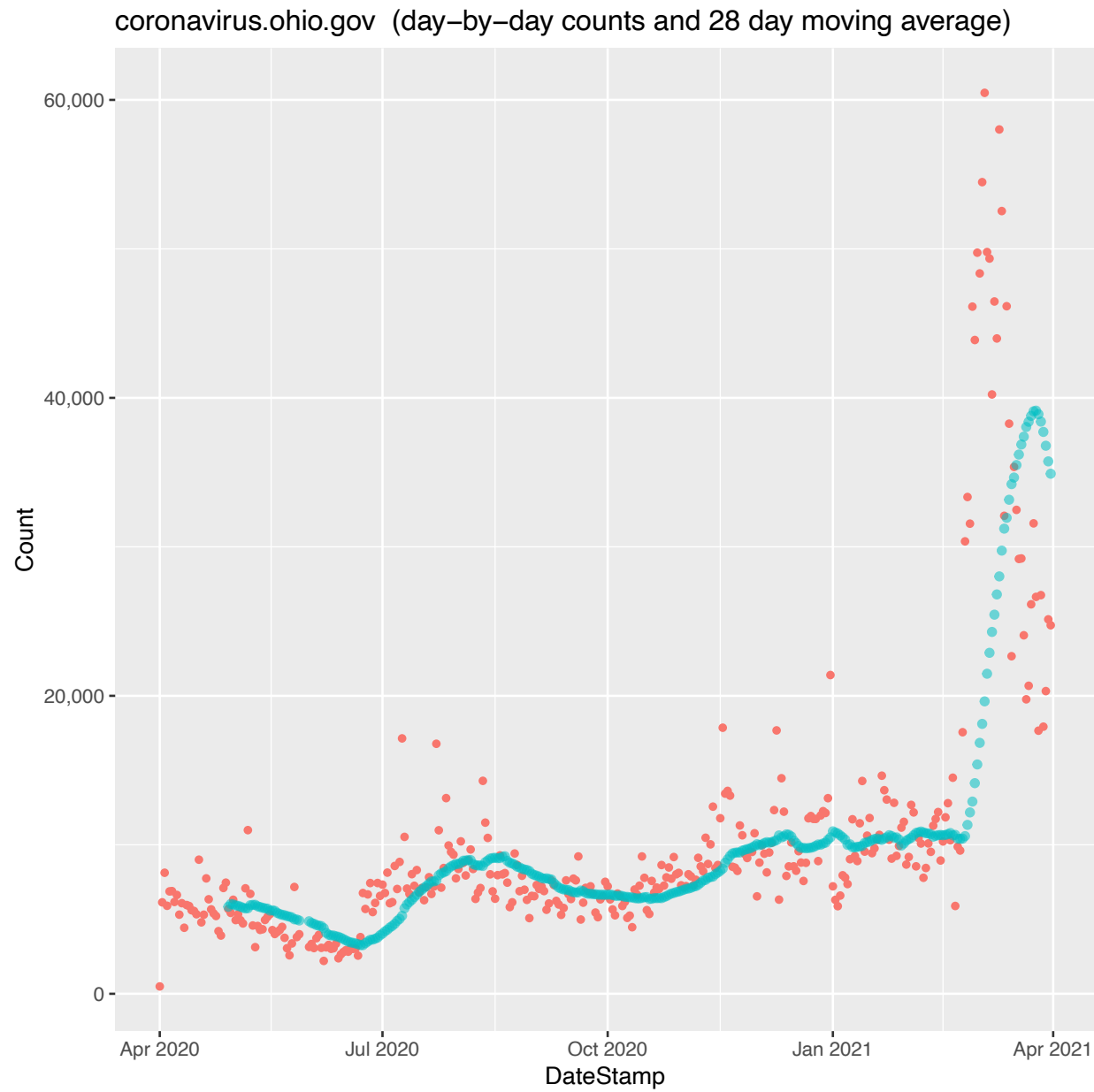
covid19.ncdhhs.gov (day-by-day counts and 28 day moving average)



covid19.ncdhhs.gov (monthly boxplots (outliers trimmed))

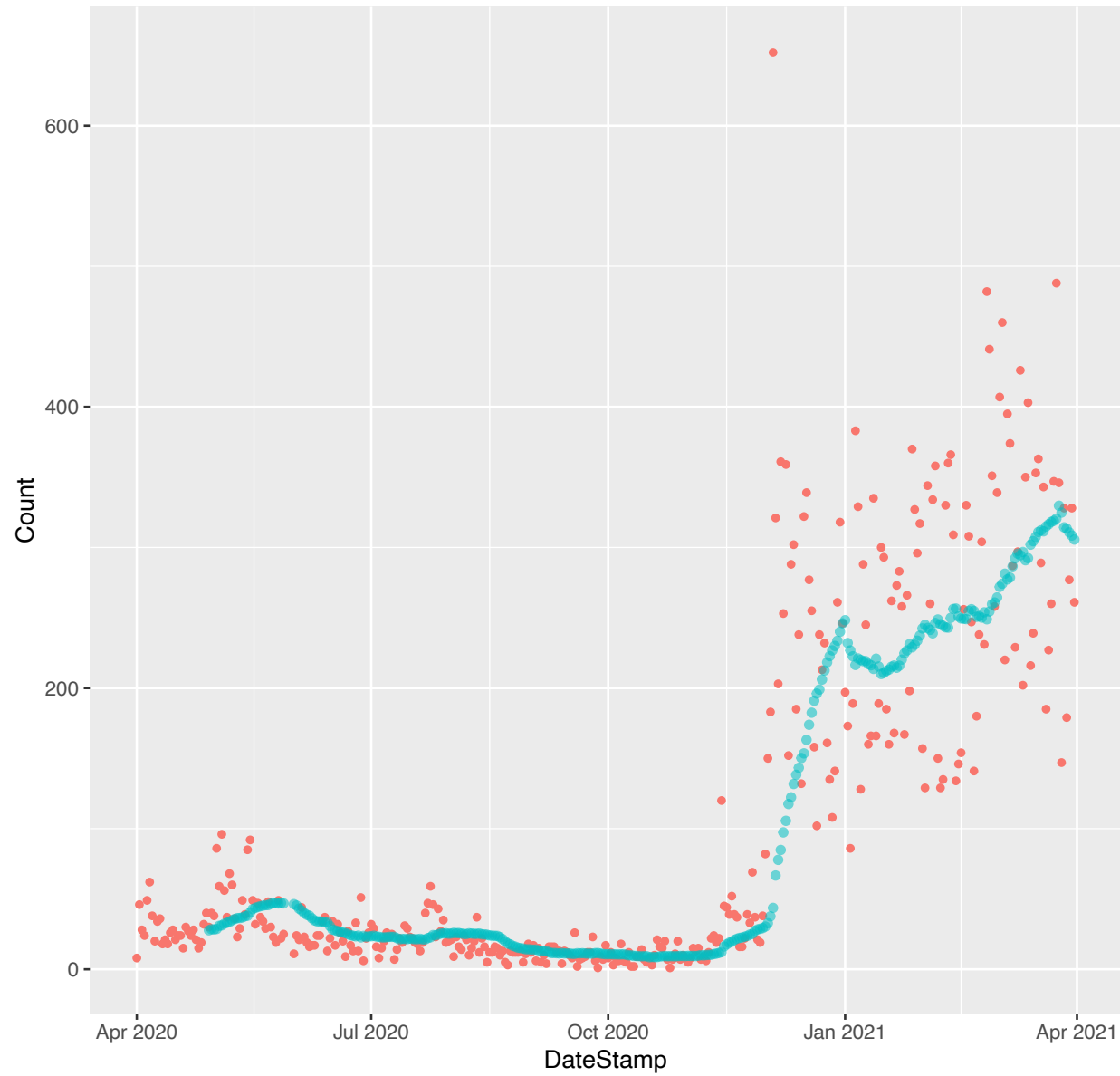


14. coronavirus.ohio.gov: ↗

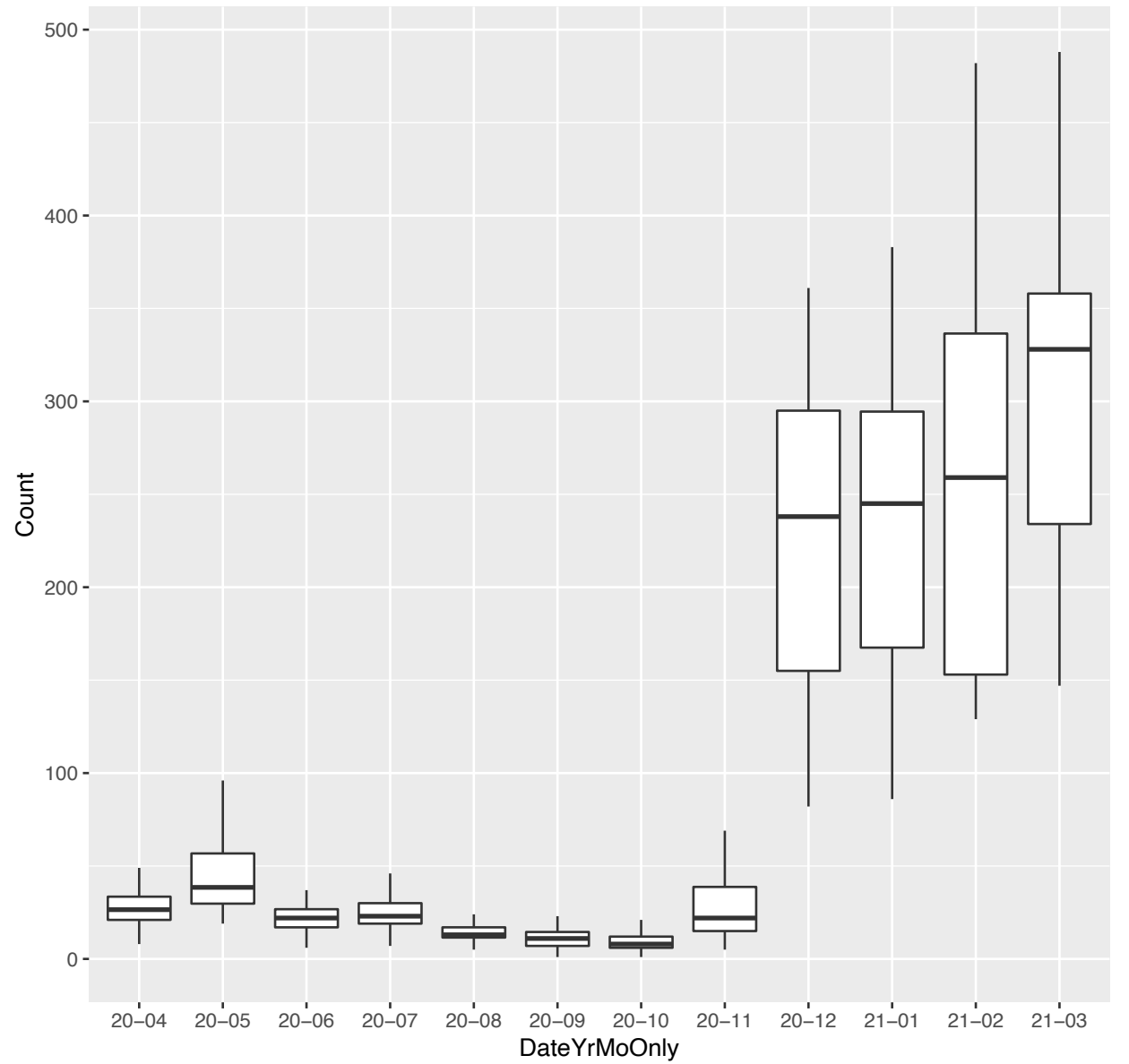


15. coronavirus.oregon.gov: ↗

coronavirus.oregon.gov (day-by-day counts and 28 day moving average)

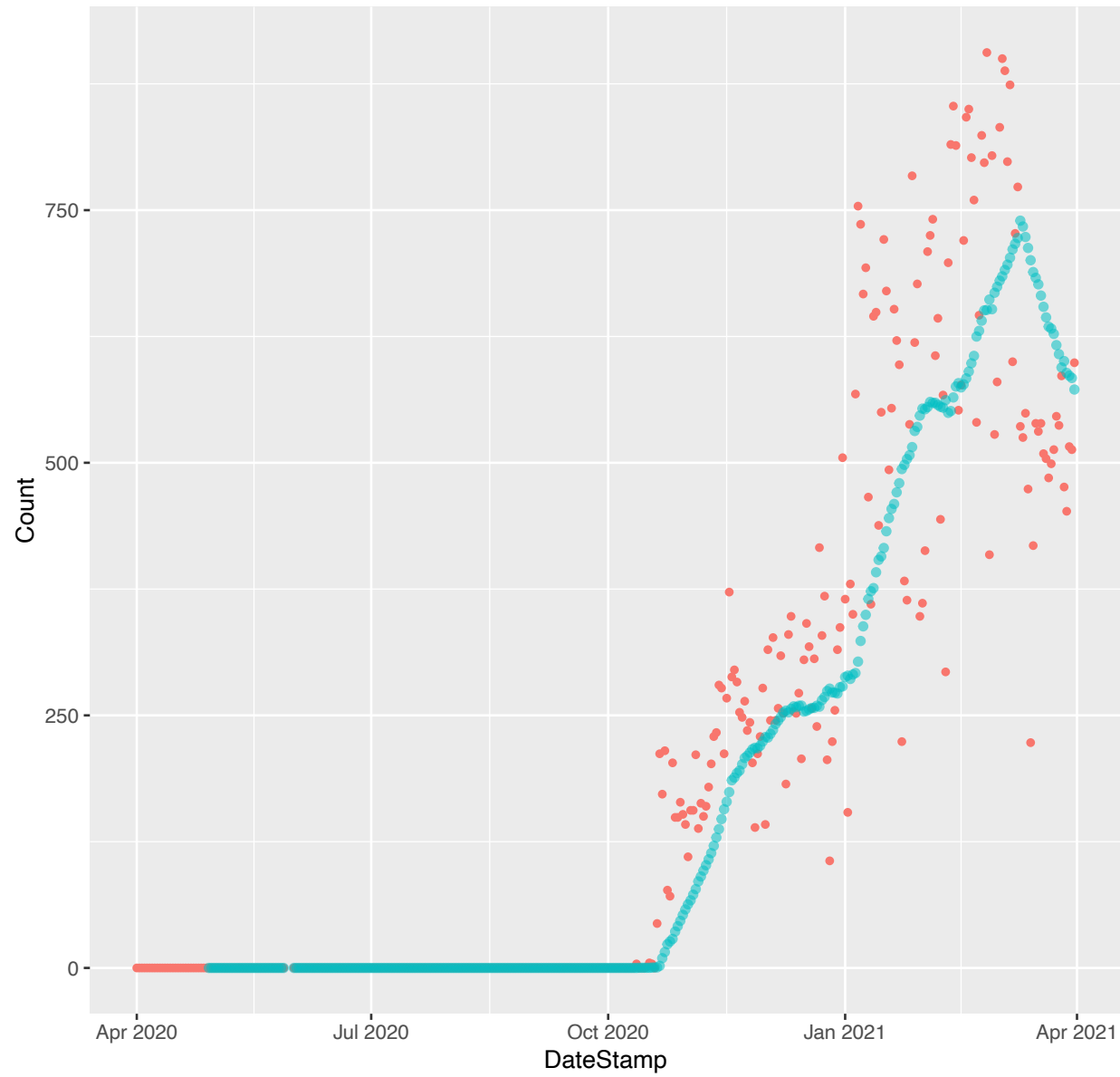


coronavirus.oregon.gov (monthly boxplots (outliers trimmed))

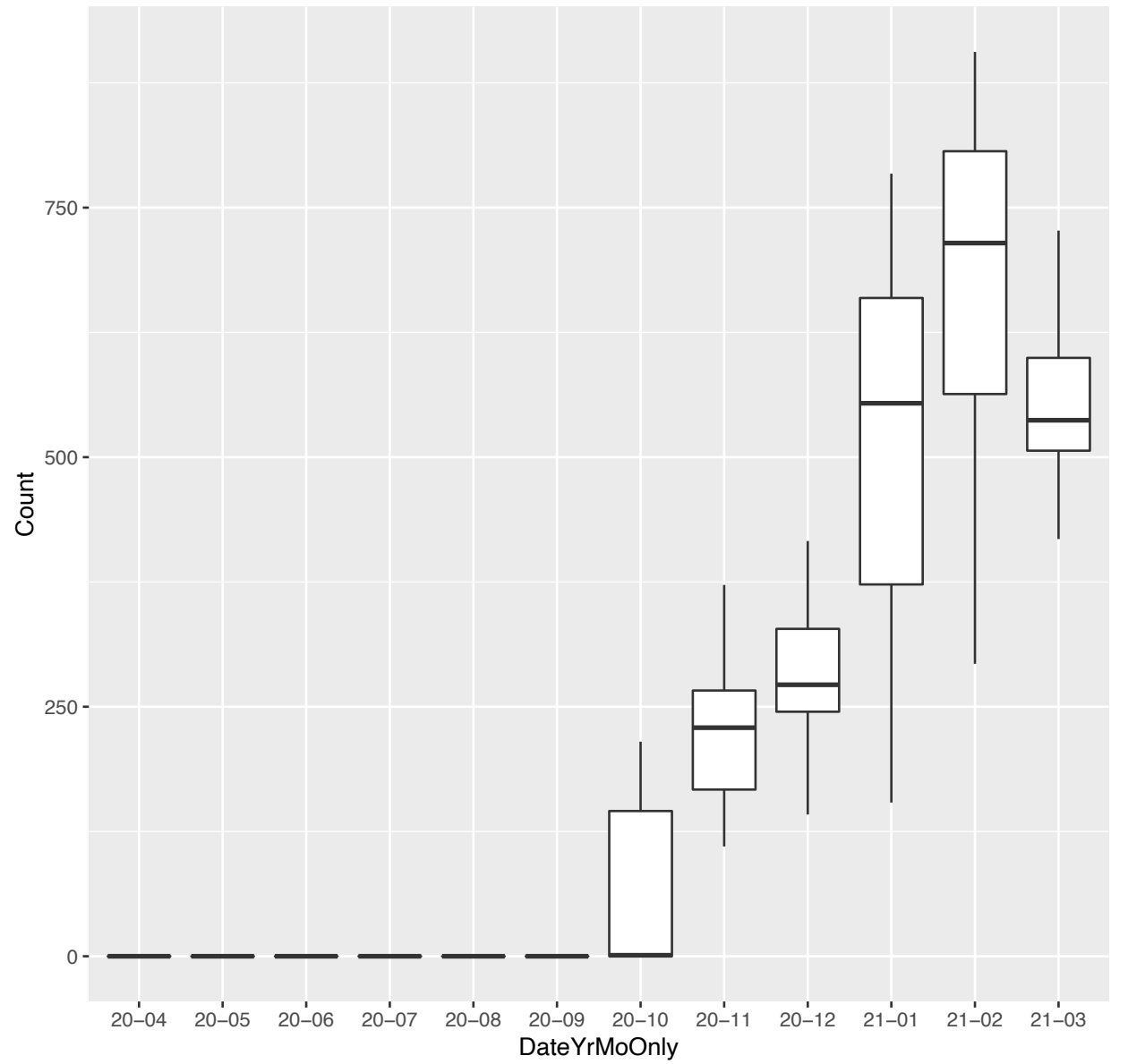


16. covid19.tn.gov: ↗

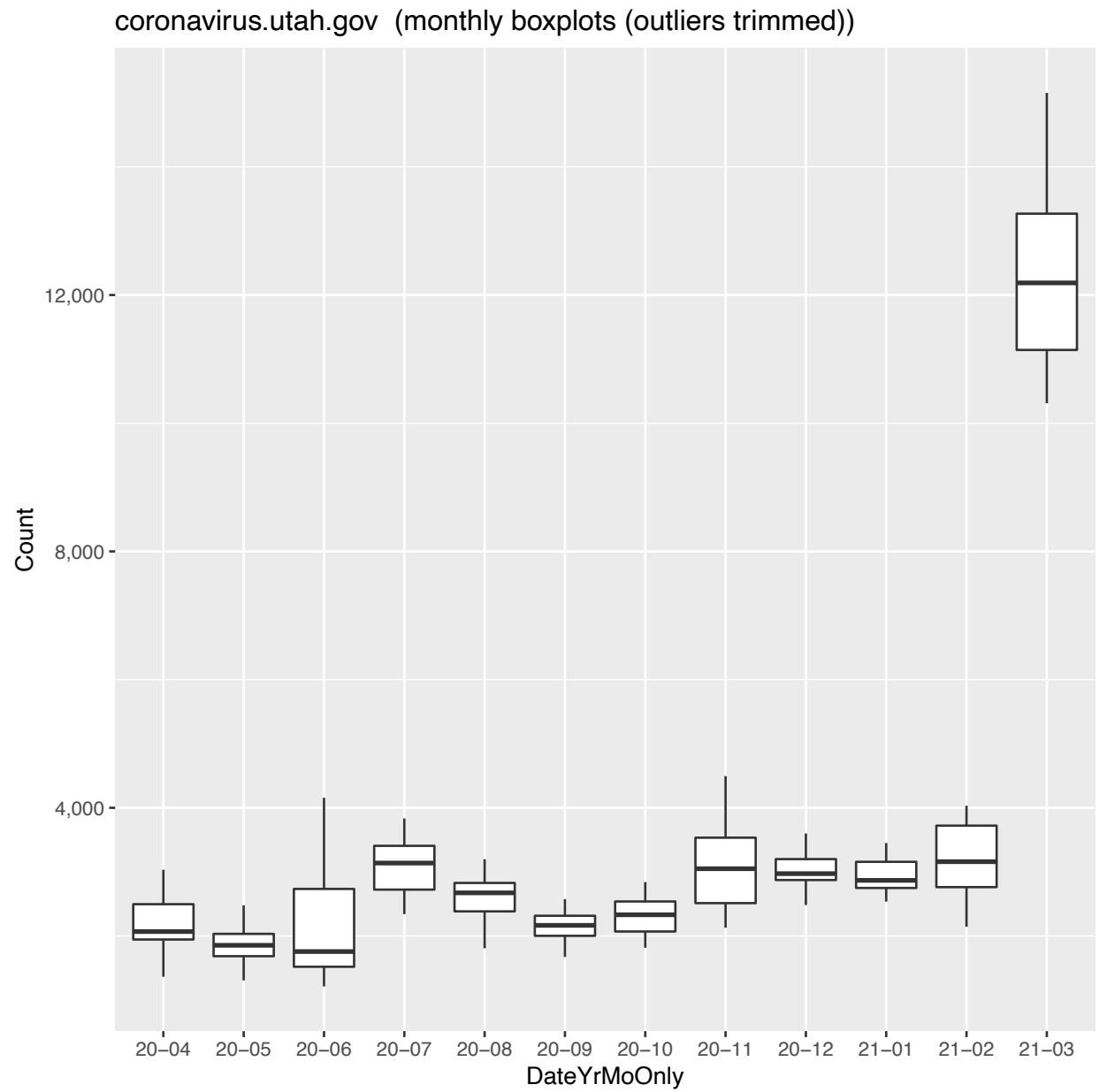
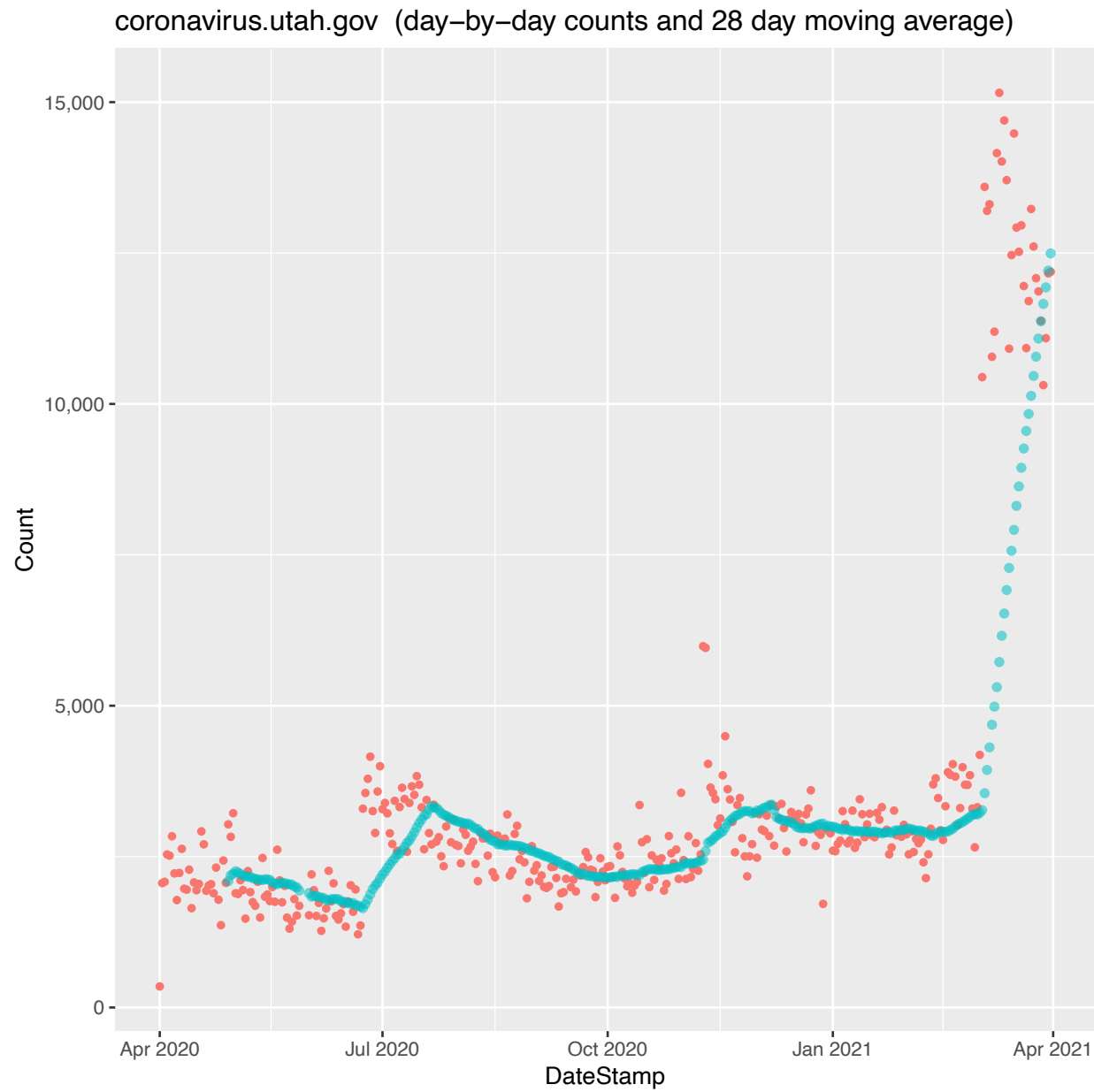
covid19.tn.gov (day-by-day counts and 28 day moving average)



covid19.tn.gov (monthly boxplots (outliers trimmed))



17. coronavirus.utah.gov: ↗



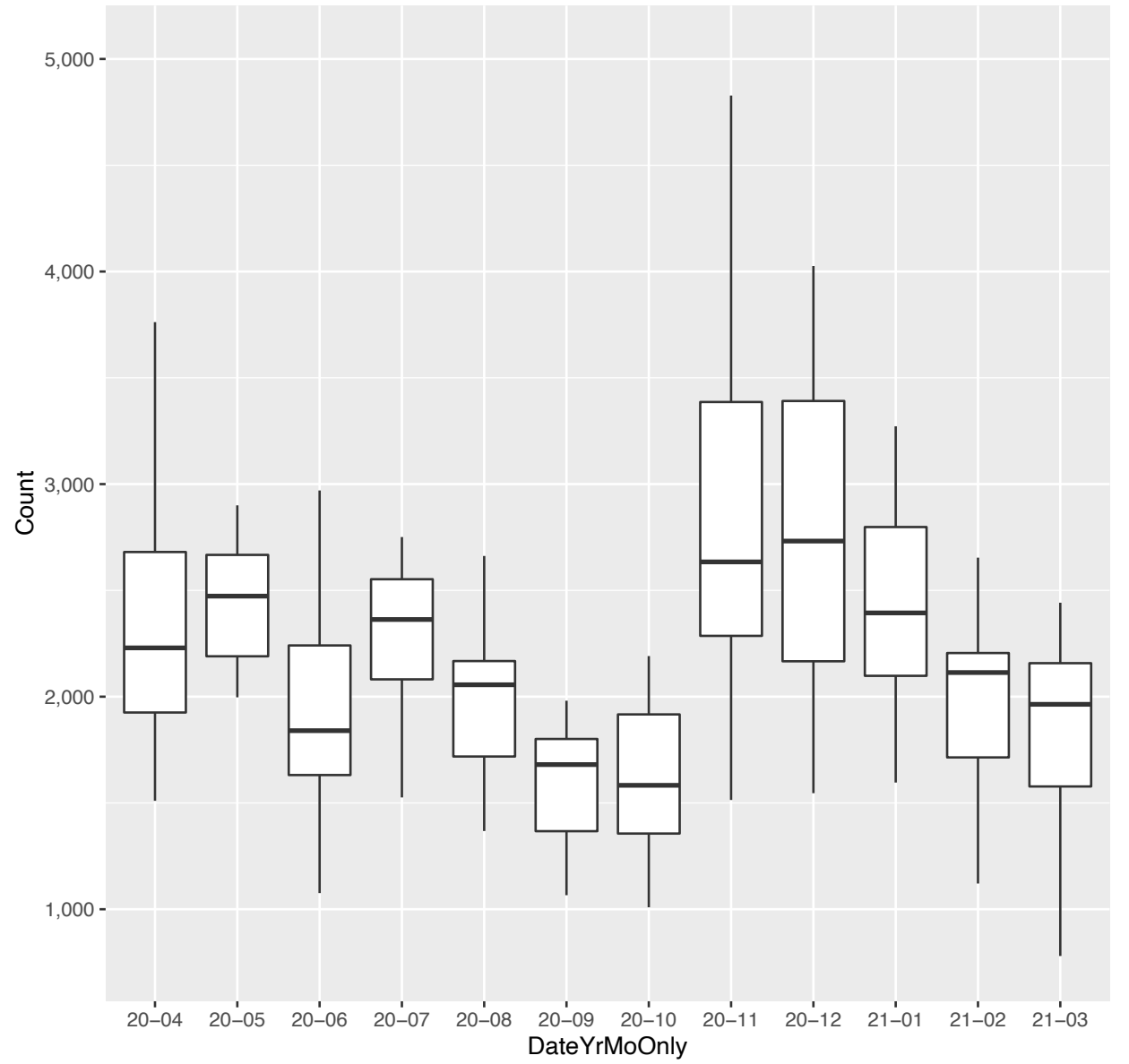
18. coronavirus.wa.gov:

~

coronavirus.wa.gov (day-by-day counts and 28 day moving average)



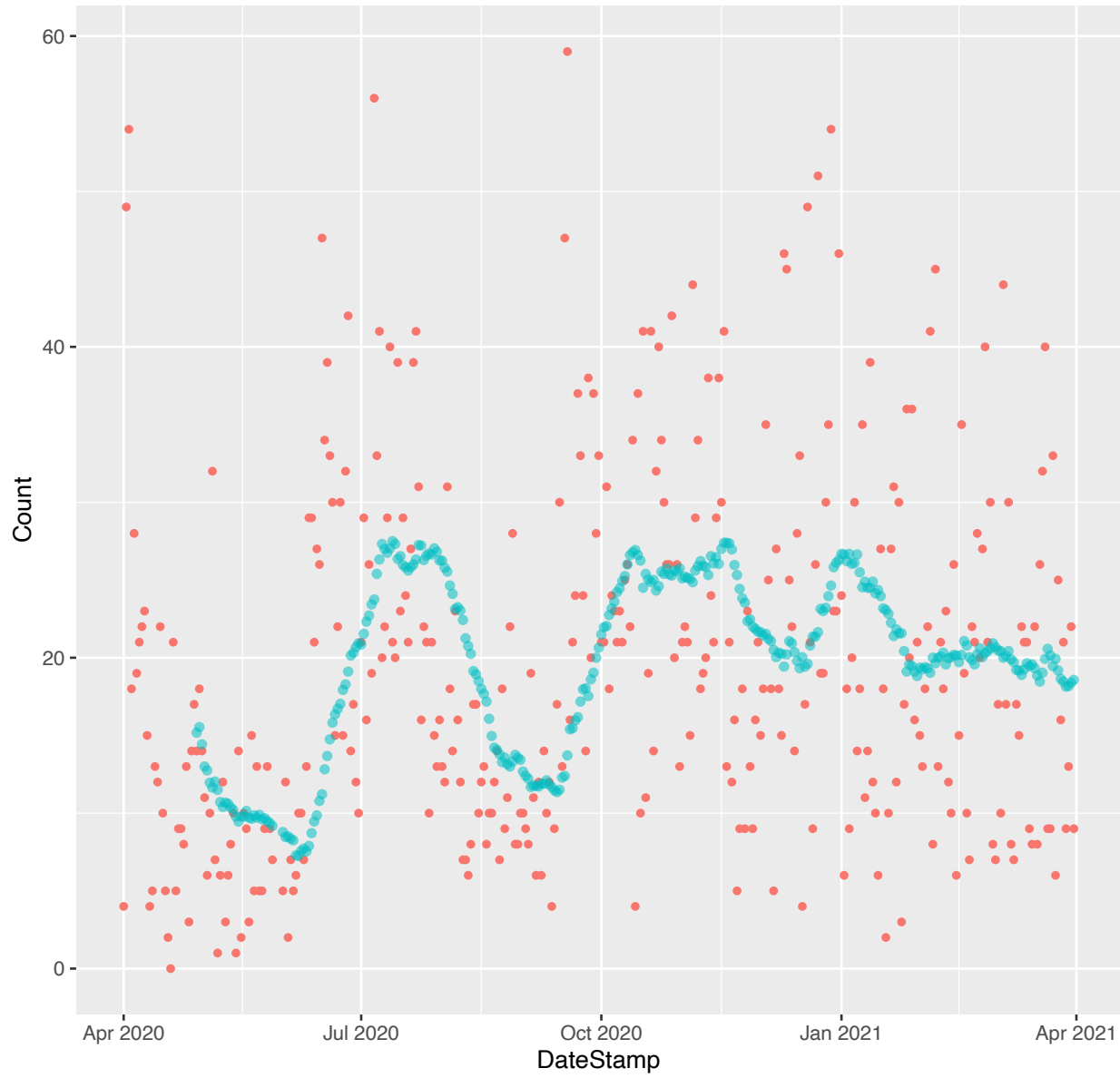
coronavirus.wa.gov (monthly boxplots (outliers trimmed))



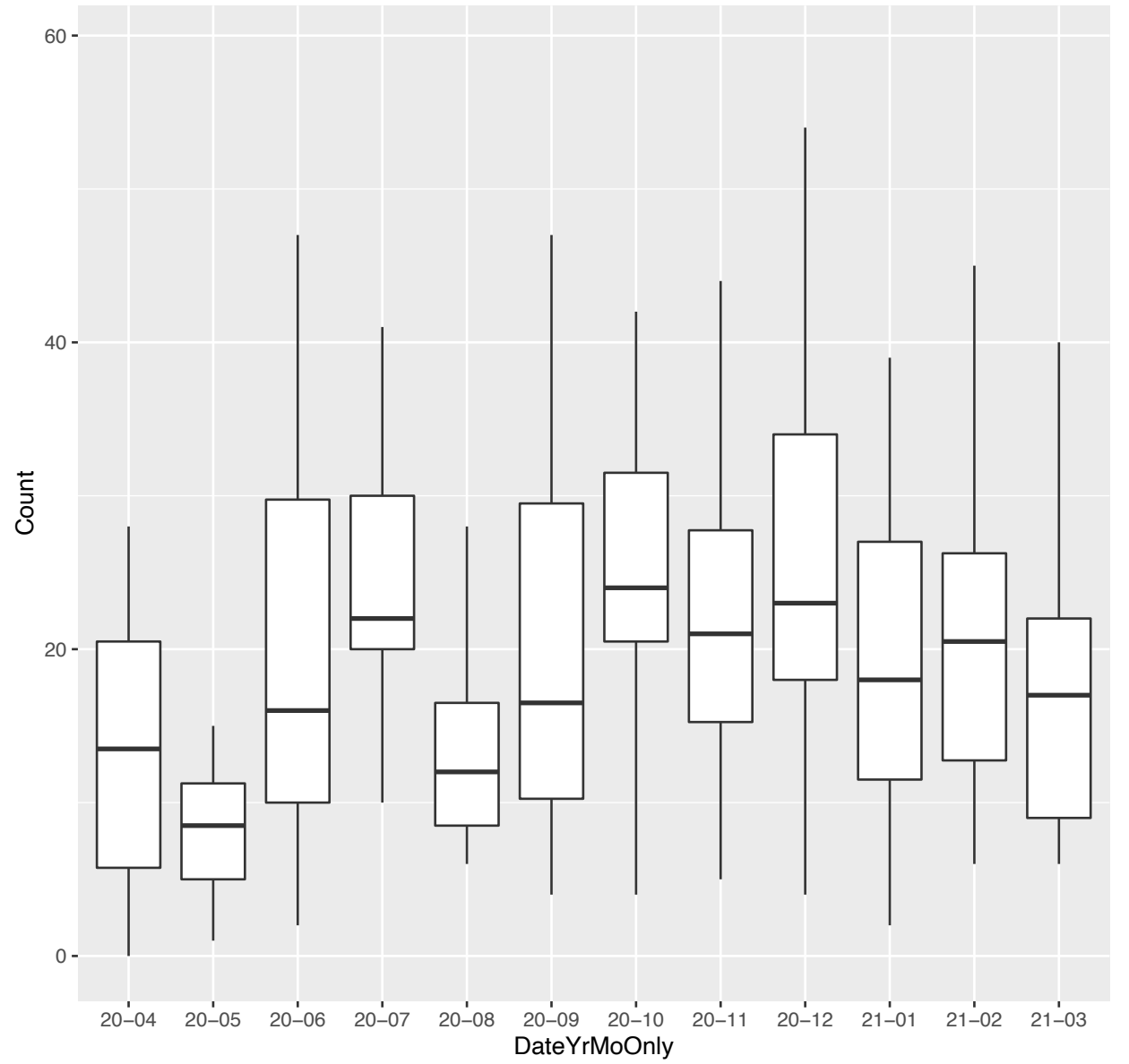
19. coronavirus.wv.gov:

~

coronavirus.wv.gov (day-by-day counts and 28 day moving average)



coronavirus.wv.gov (monthly boxplots (outliers trimmed))



VII. News And Opinion Sites

[\[back to TOC\]](#)

a) [Liberal/Left-Leaning News and Opinion Sites](#)

b) [More-or-less Balanced News and Opinion Sites](#)

c) [Conservative/Right-Leaning News and Opinion Sites](#)

The year long period covered by this study was notable for the pandemic, but it was also election time in the United States, with recording-breaking electoral turnout⁶. American financial markets have also been enjoying a record-breaking run.⁷ Unfortunately, we can't tease apart traffic from readers who may have visited a news site with an interest in pandemic news items from those who may have been closely watching the election or the financial markets or other major story areas. Looking at this section, we will say that we find cbsnews.com, dailymail.co.uk, forbes.com, nytimes.com and zerohedge.com (among others) all exhibit notable increases. BBC.co.uk and Foxnews.com, on the other hand, seems to have experienced a significant decline, which is somewhat surprising given the traditional leadership roles those sites play with international and conservative audiences, respectively. (Naturally, we can't rule out the possibility that apparent volumetric changes -- up OR down -- are solely due to TTL changes, adoption or discontinuation of link-rich advertising programs, or other non-audience-related factors).

⁶ "2020 turnout is the highest in over a century," <https://www.washingtonpost.com/graphics/2020/elections/voter-turnout/>

⁷ "The stock market is ending 2020 at record highs, even as the virus surges and millions go hungry," <https://www.washingtonpost.com/business/2020/12/31/stock-market-record-2020/>

a) Liberal/Left-Leaning News and Opinion Sites

[\[back to all News Sites\]](#)

[\[back to TOC\]](#)

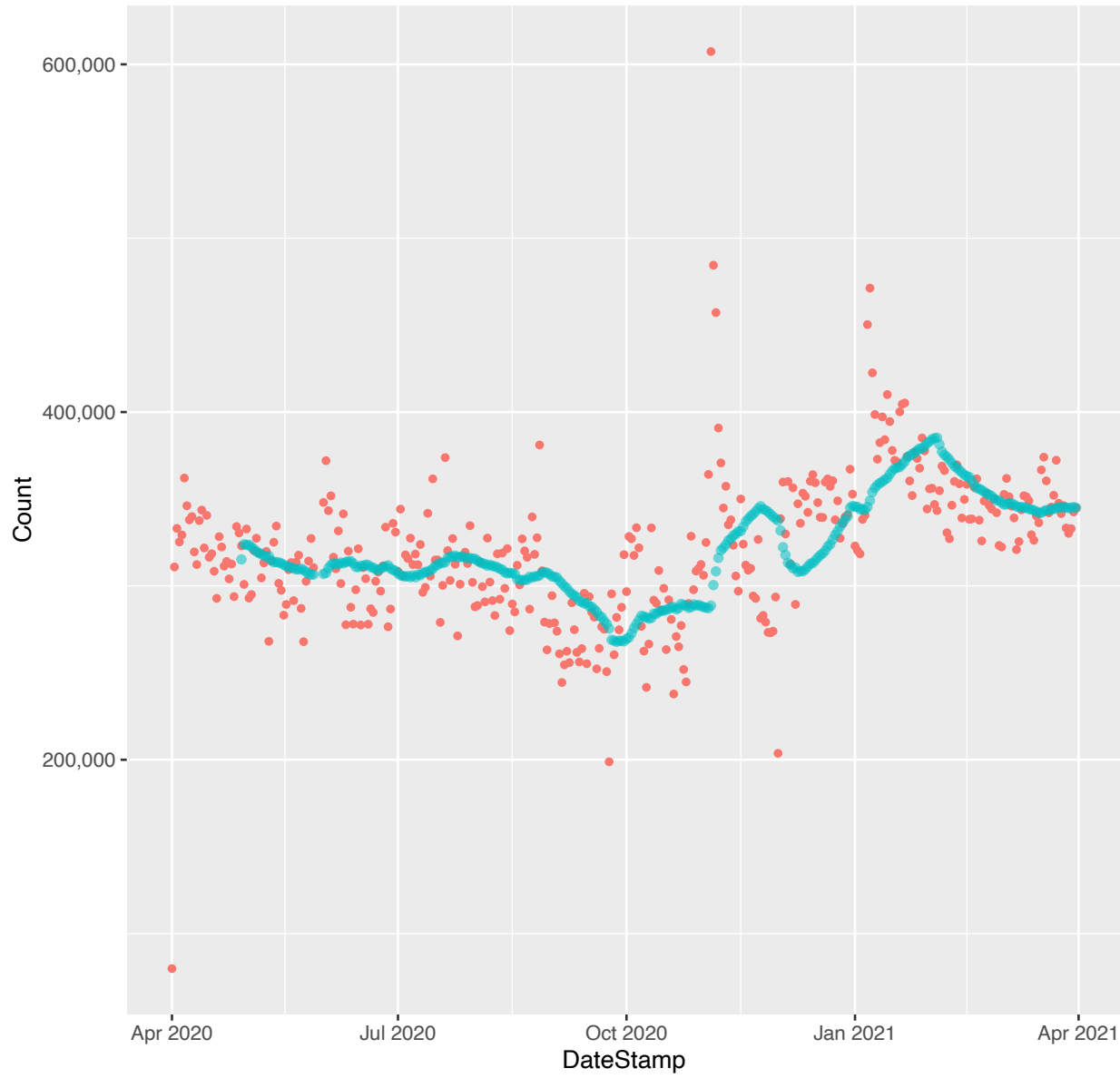
- 1 *.abcnews.com ~
- 2 *.bbc.co.uk ∪ shaped (ending lower) **M**
- 3 *.bloomberg.com * ↗ **M**
- 4 *.cbsnews.com * ∩ shaped **M**
- 5 *.cnbc.com ∪ shaped **M**
- 6 *.cnn.com * ∪ shaped **M**
- 7 *.dailymail.co.uk ↗ **M**
- 8 *.huffpost.com * ↗
- 9 *.msnbc.com ~
- 10 *.nbcnews.com * ∩ shaped
- 11 *.nytimes.com * ∩ shaped **M**

- 12 *.pbs.org ~ **M**
- 13 *.politico.com * ~
- 14 *.rollingstone.com ↗
- 15 *.salon.com ↗
- 16 *.slate.com ↗
- 17 *.telgraph.co.uk ~
- 18 *.thehill.com ∪ shaped
- 19 *.usatoday.com ~
- 20 *.usnews.com ∪ shaped (ending higher)
- 21 *.washingtonpost.com ~

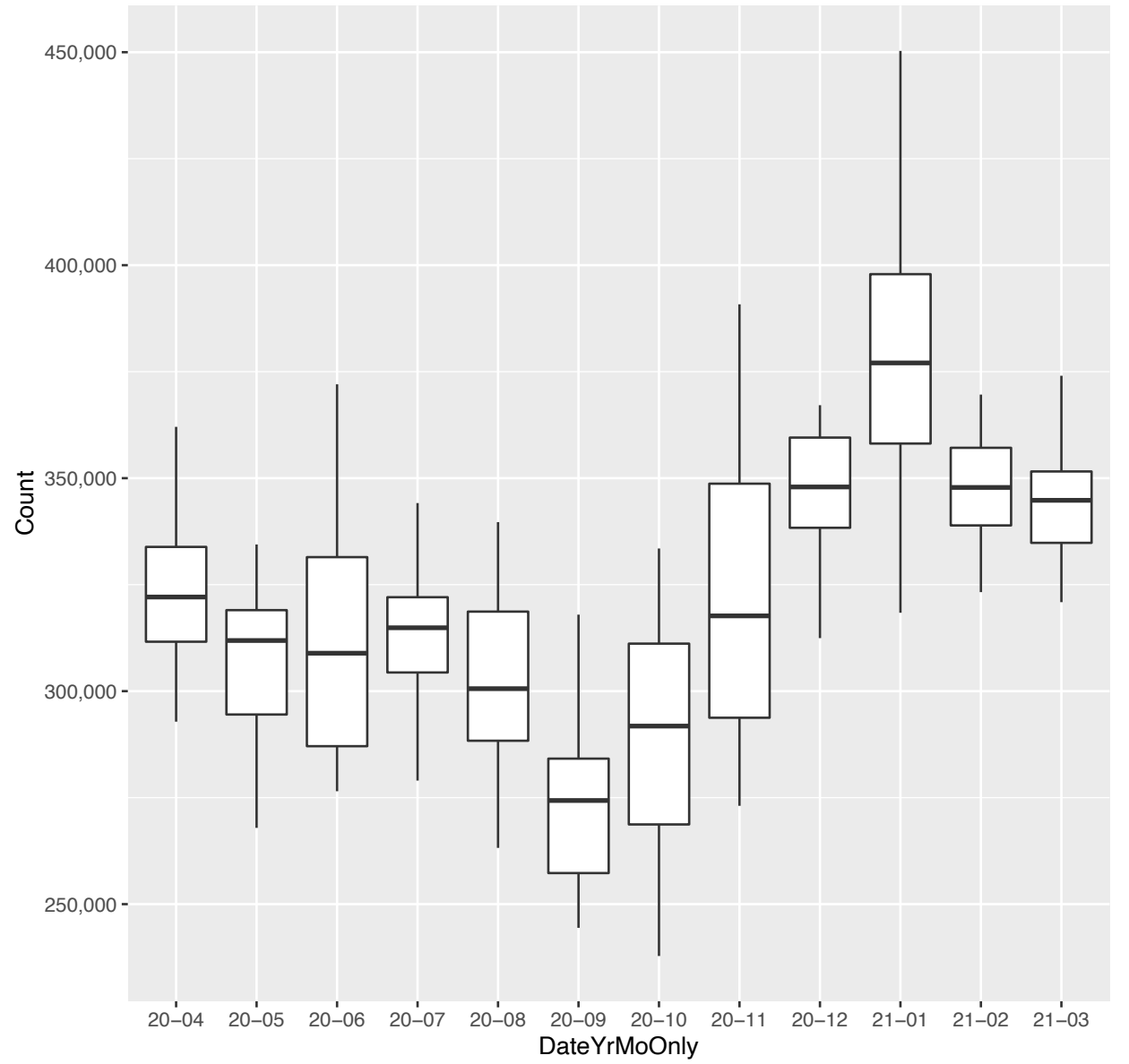
1. abcnews.com:

~

*. abcnews.com (day-by-day counts and 28 day moving average)



*. abcnews.com (monthly boxplots (outliers trimmed))



2. **bbc.co.uk:**

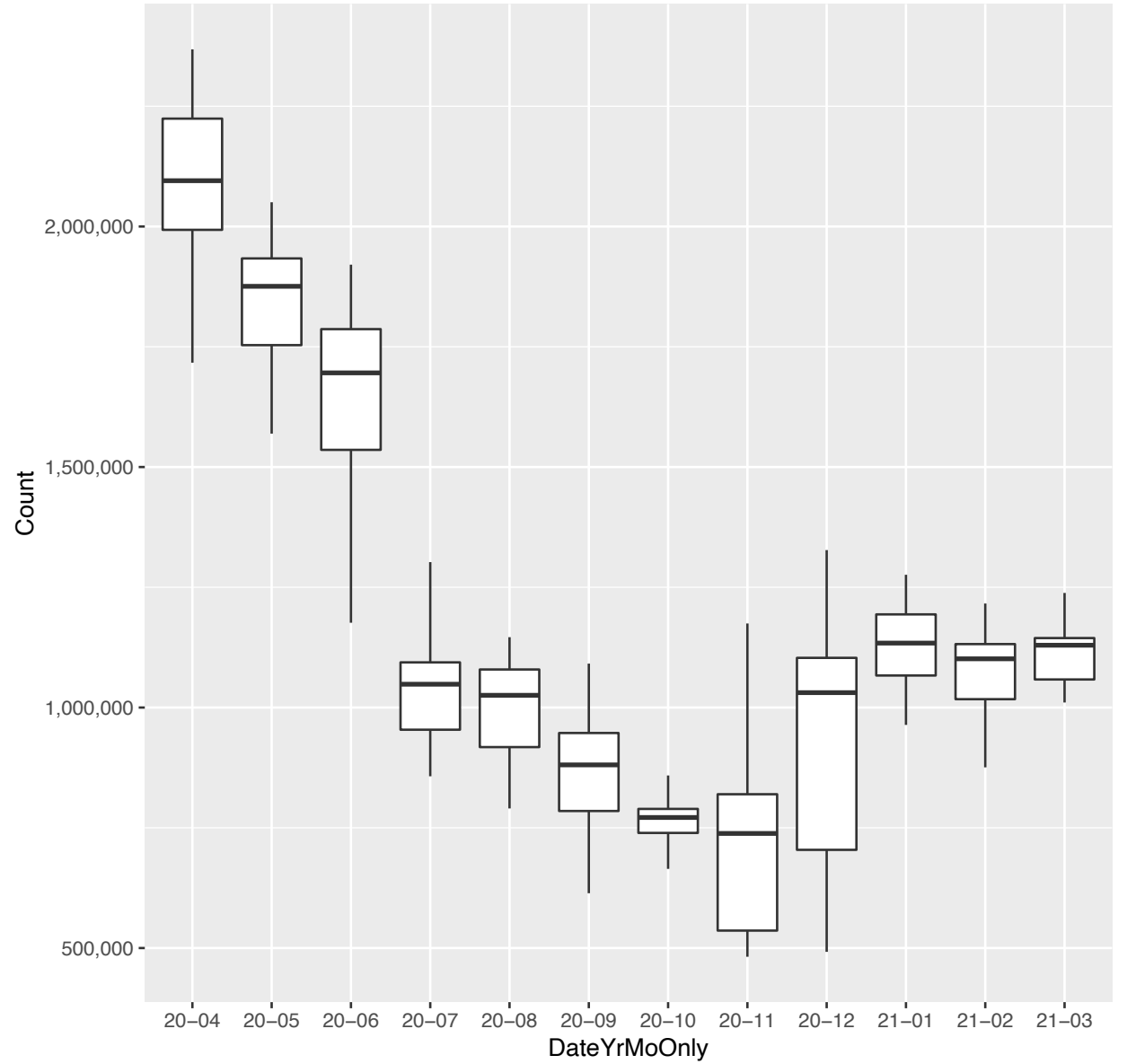
✱ ○ shaped (ending lower) M

M

*. **bbc.co.uk** (day-by-day counts and 28 day moving average)



*. **bbc.co.uk** (monthly boxplots (outliers trimmed))

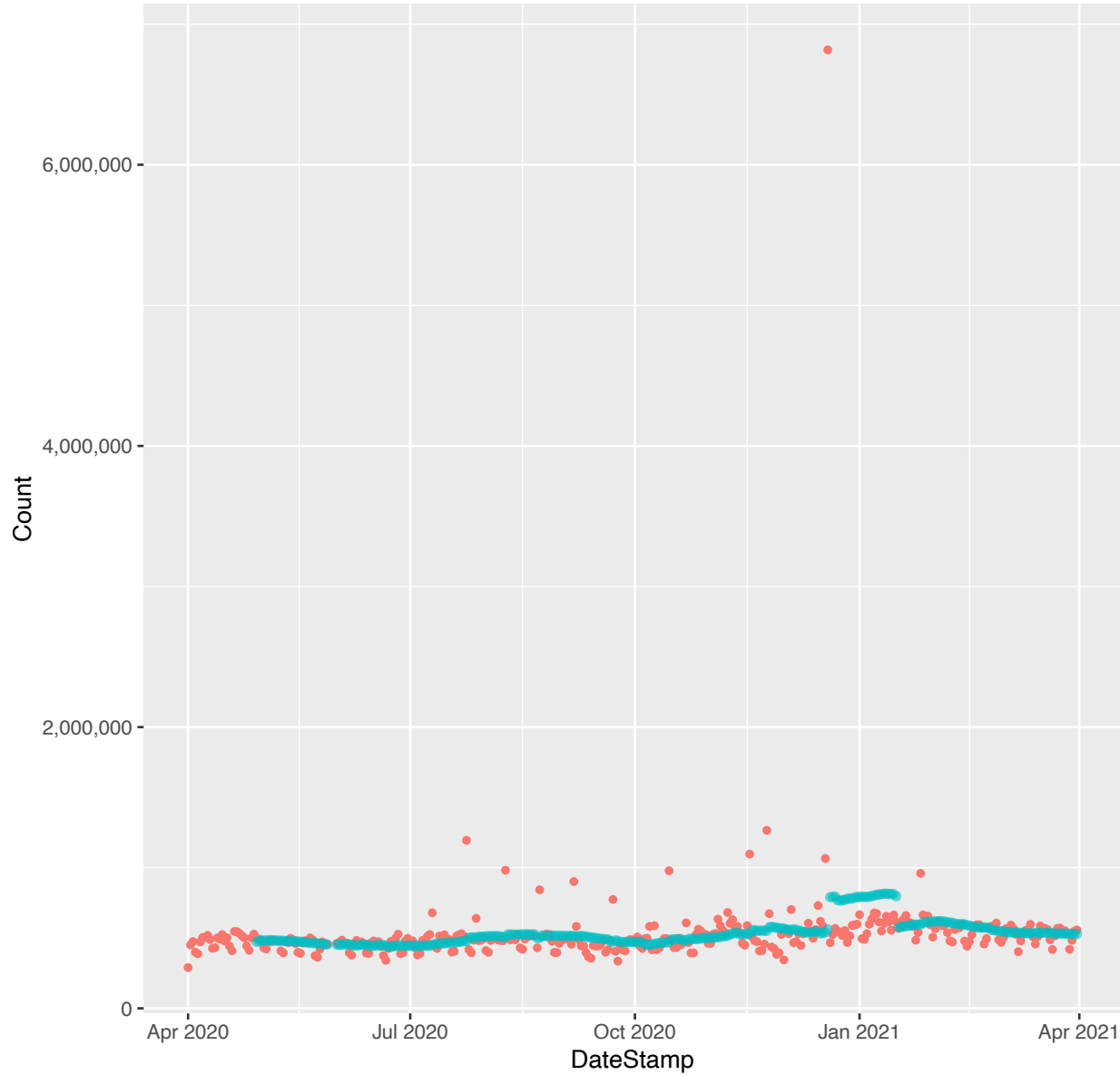


3. bloomberg.com:

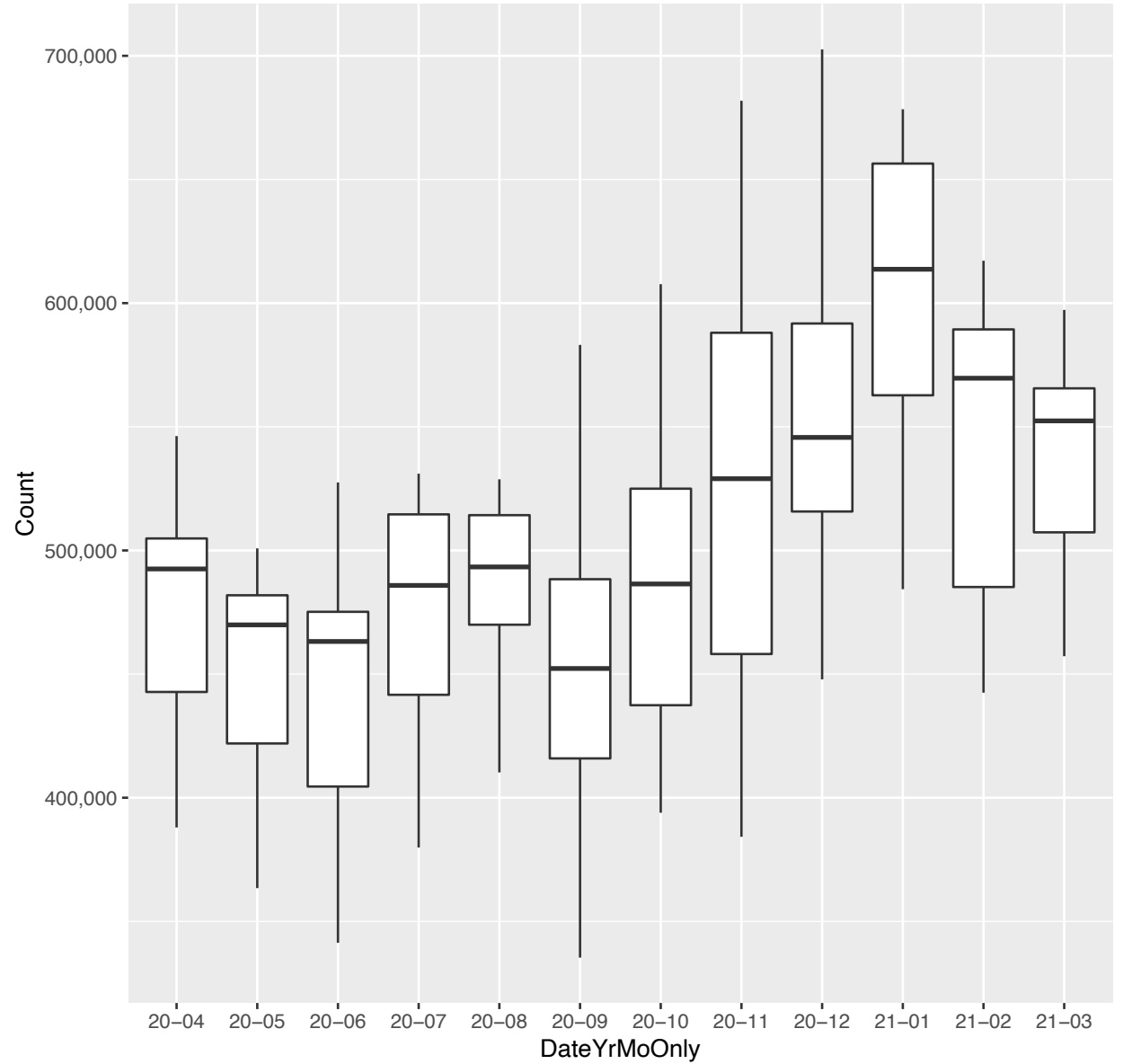


M

*. bloomberg.com (day-by-day counts and 28 day moving average)



*. bloomberg.com (monthly boxplots (outliers trimmed))

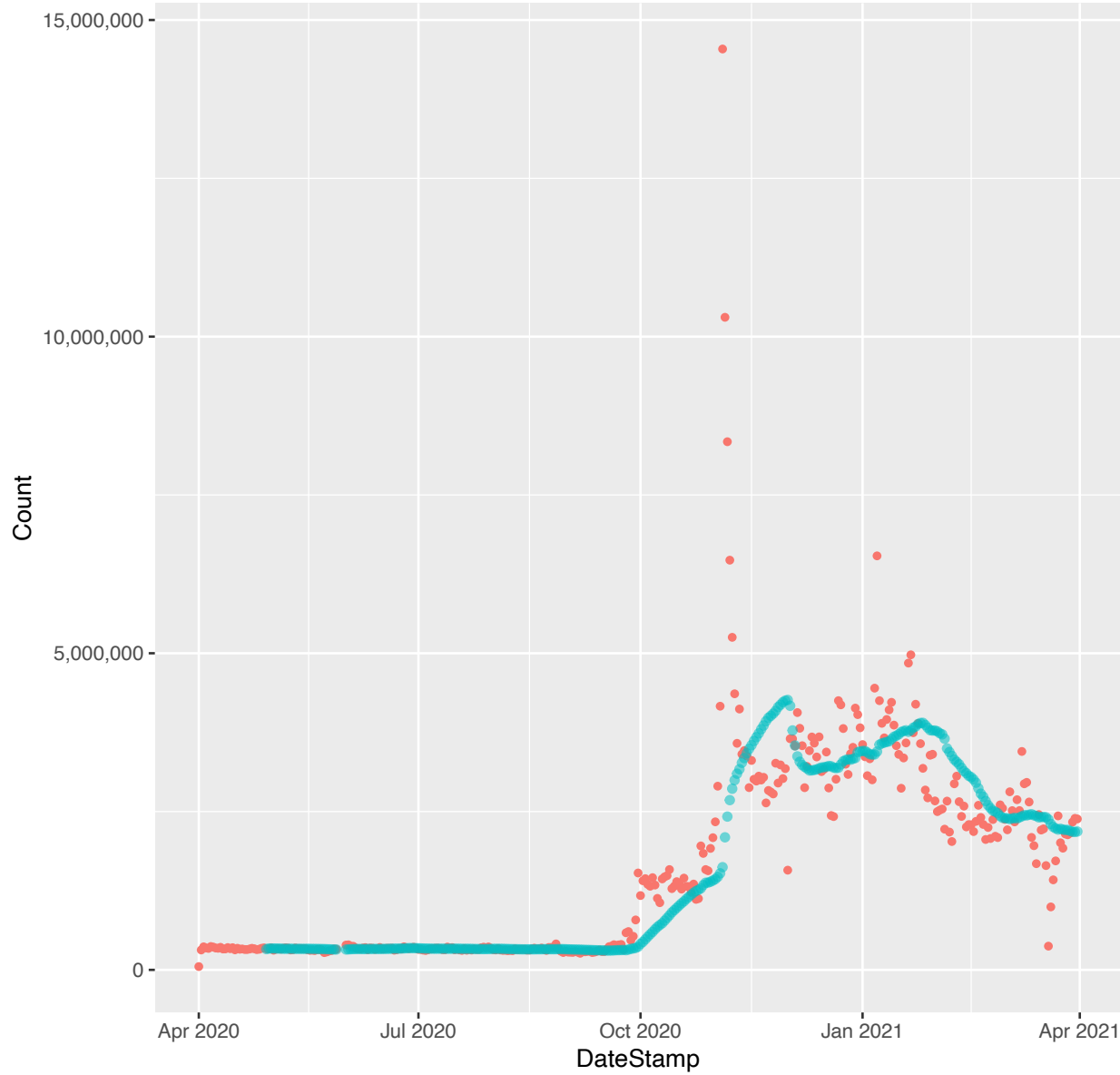


4. cbsnews.com:

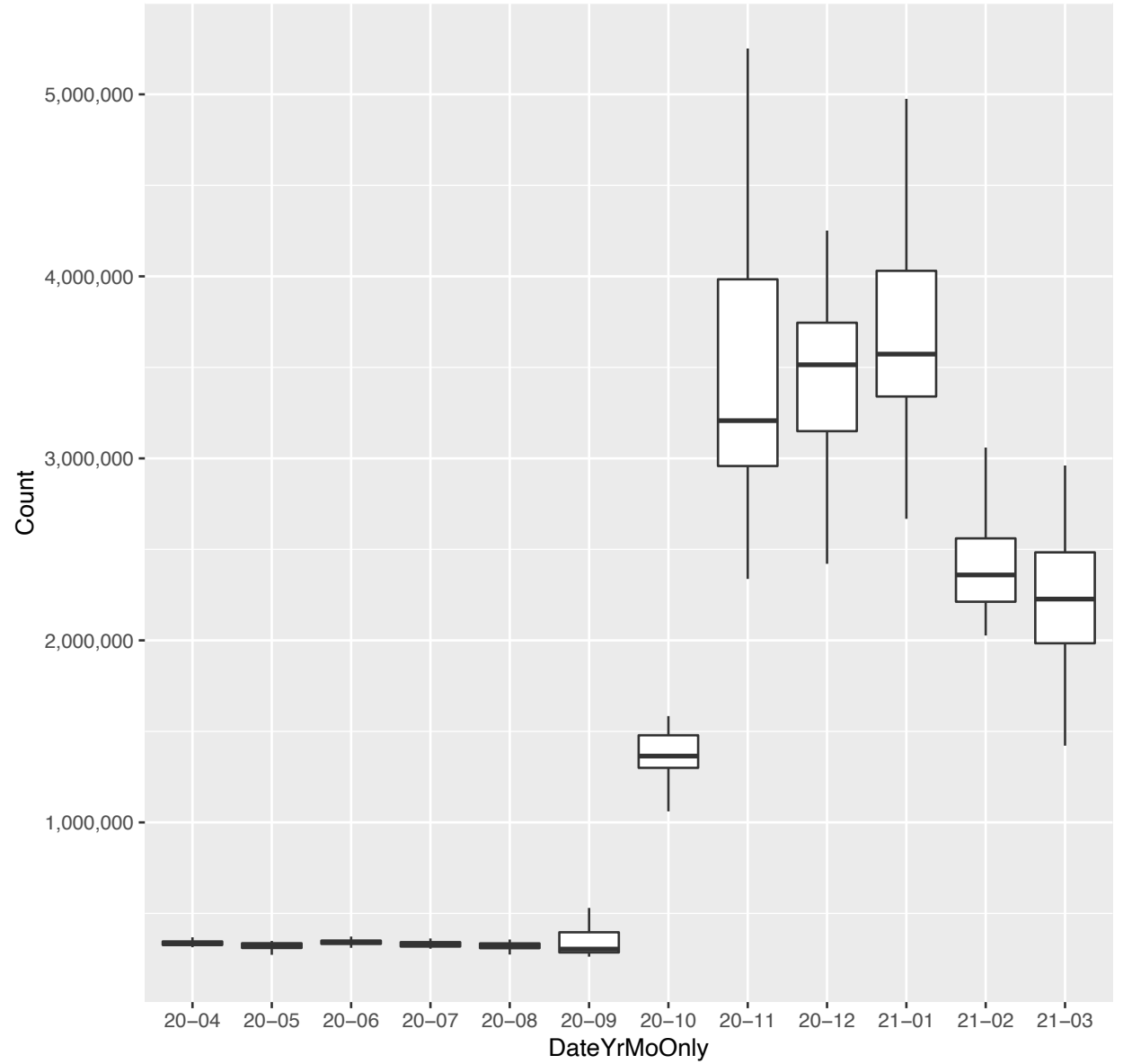
★ ○ shaped

M

*. cbsnews.com (day-by-day counts and 28 day moving average)



*. cbsnews.com (monthly boxplots (outliers trimmed))



5. cnbc.com

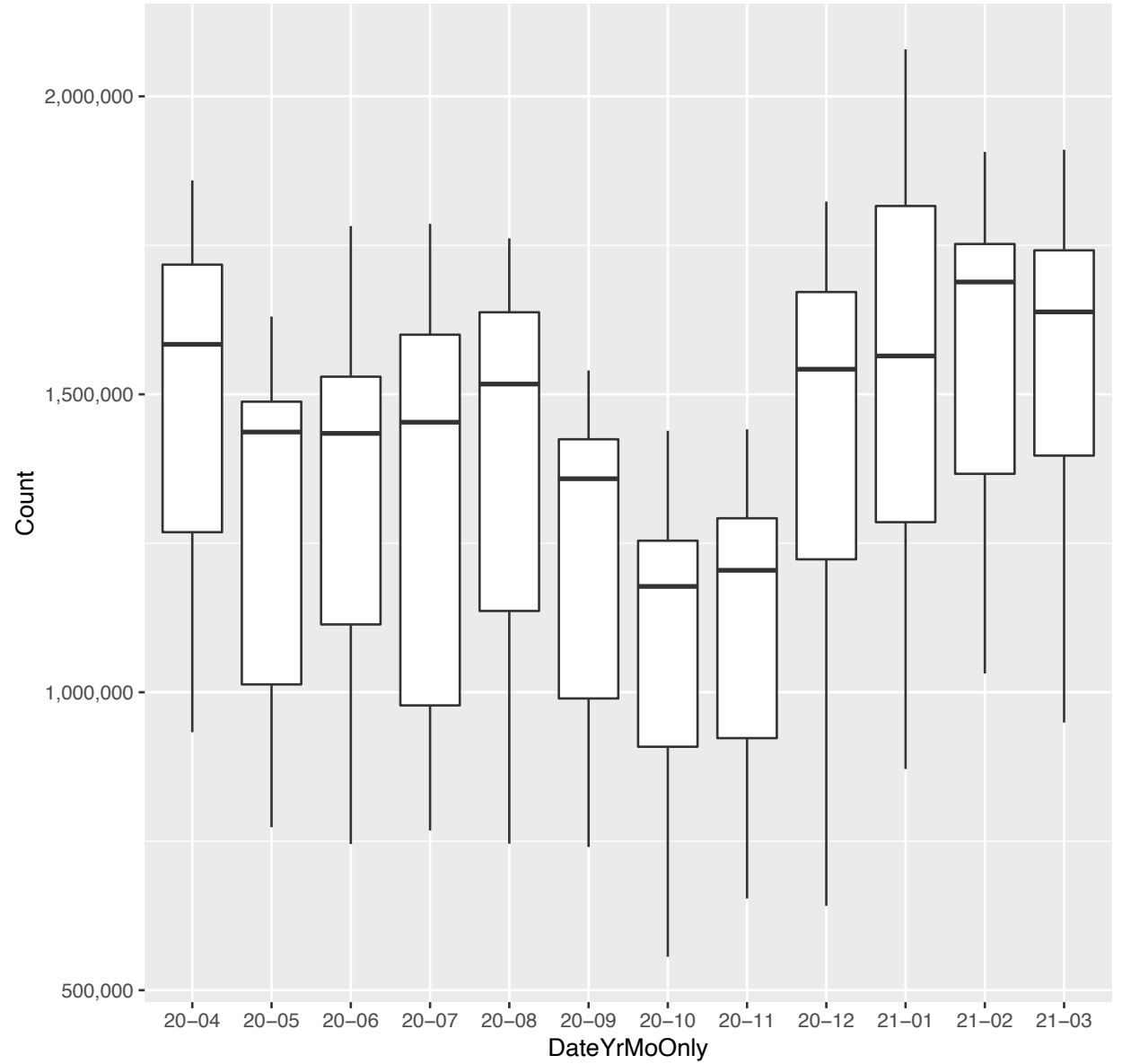
U shaped

M

*. cnbc.com (day-by-day counts and 28 day moving average)



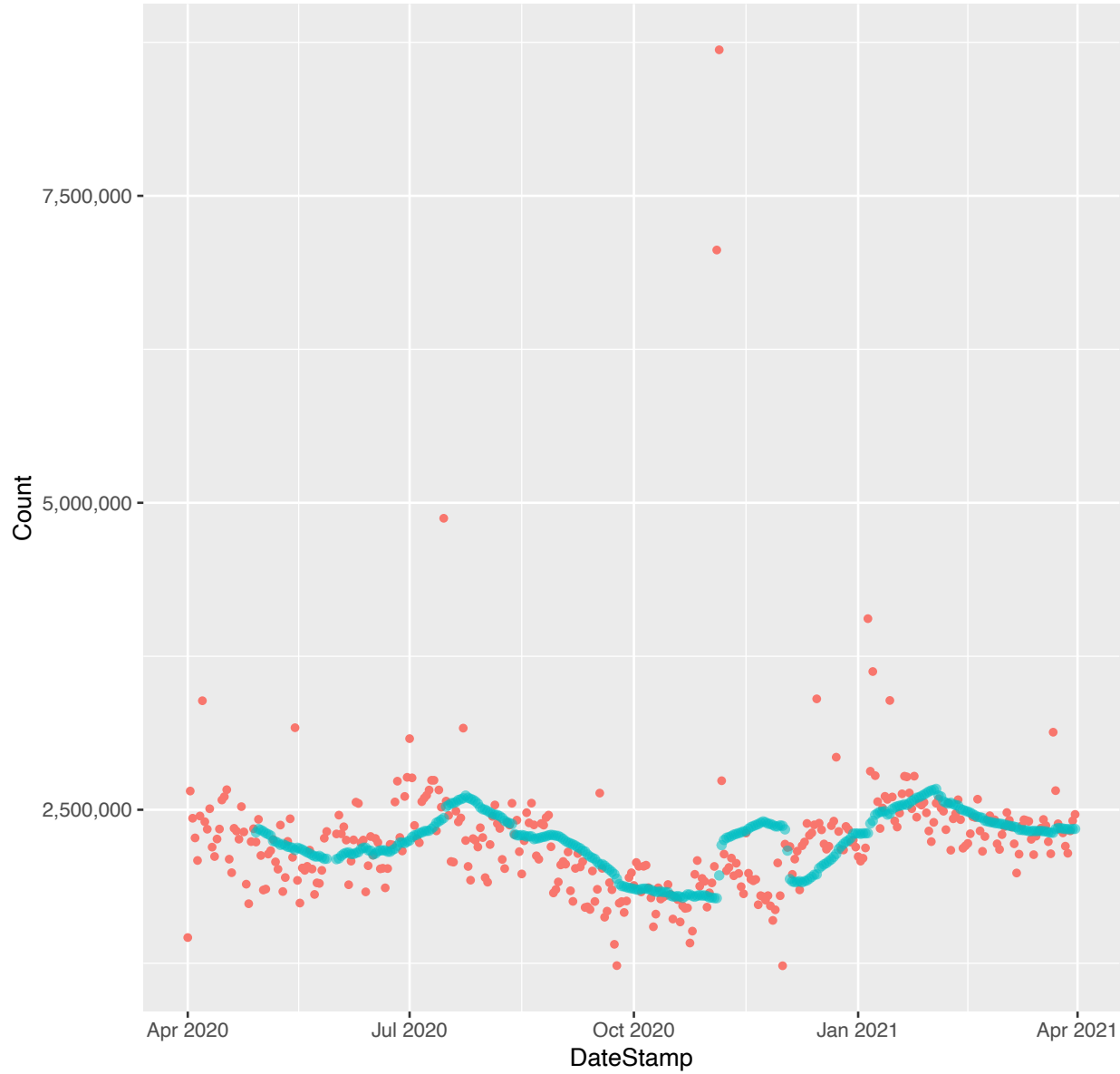
*. cnbc.com (monthly boxplots (outliers trimmed))



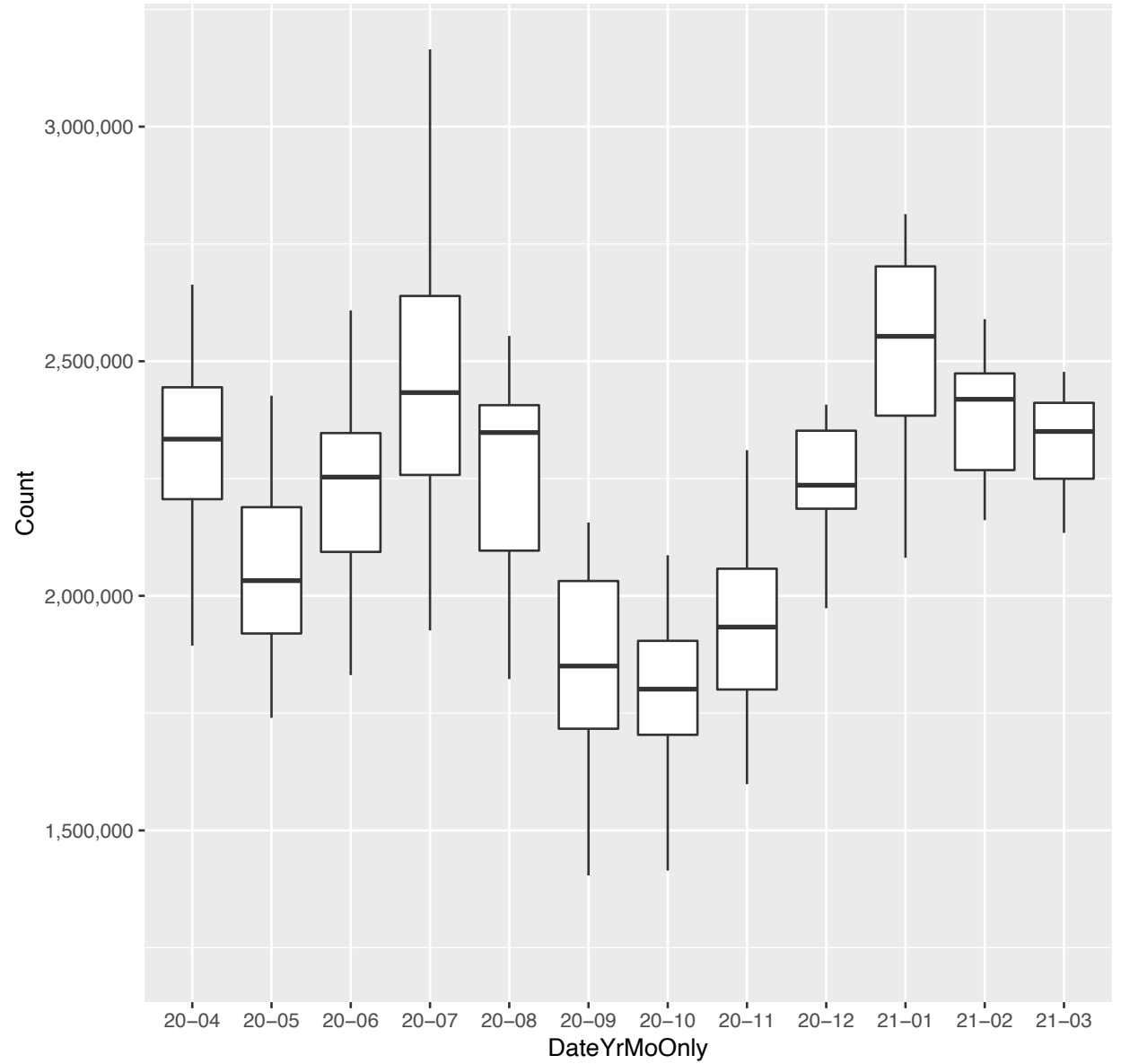
6. cnn.com:

⬤ U shaped

*. cnn.com (day-by-day counts and 28 day moving average)



*. cnn.com (monthly boxplots (outliers trimmed))

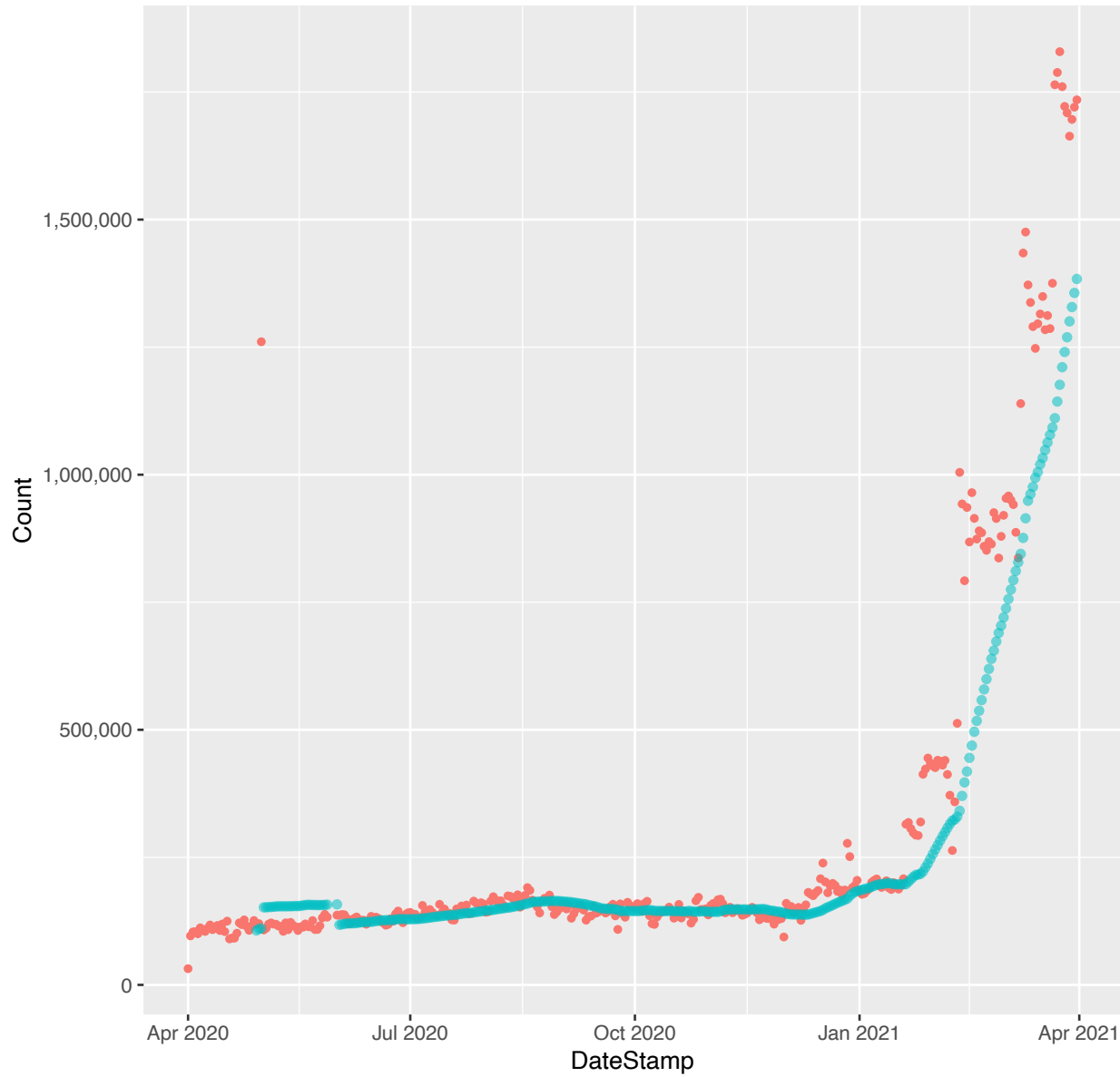


7. dailymail.co.uk:

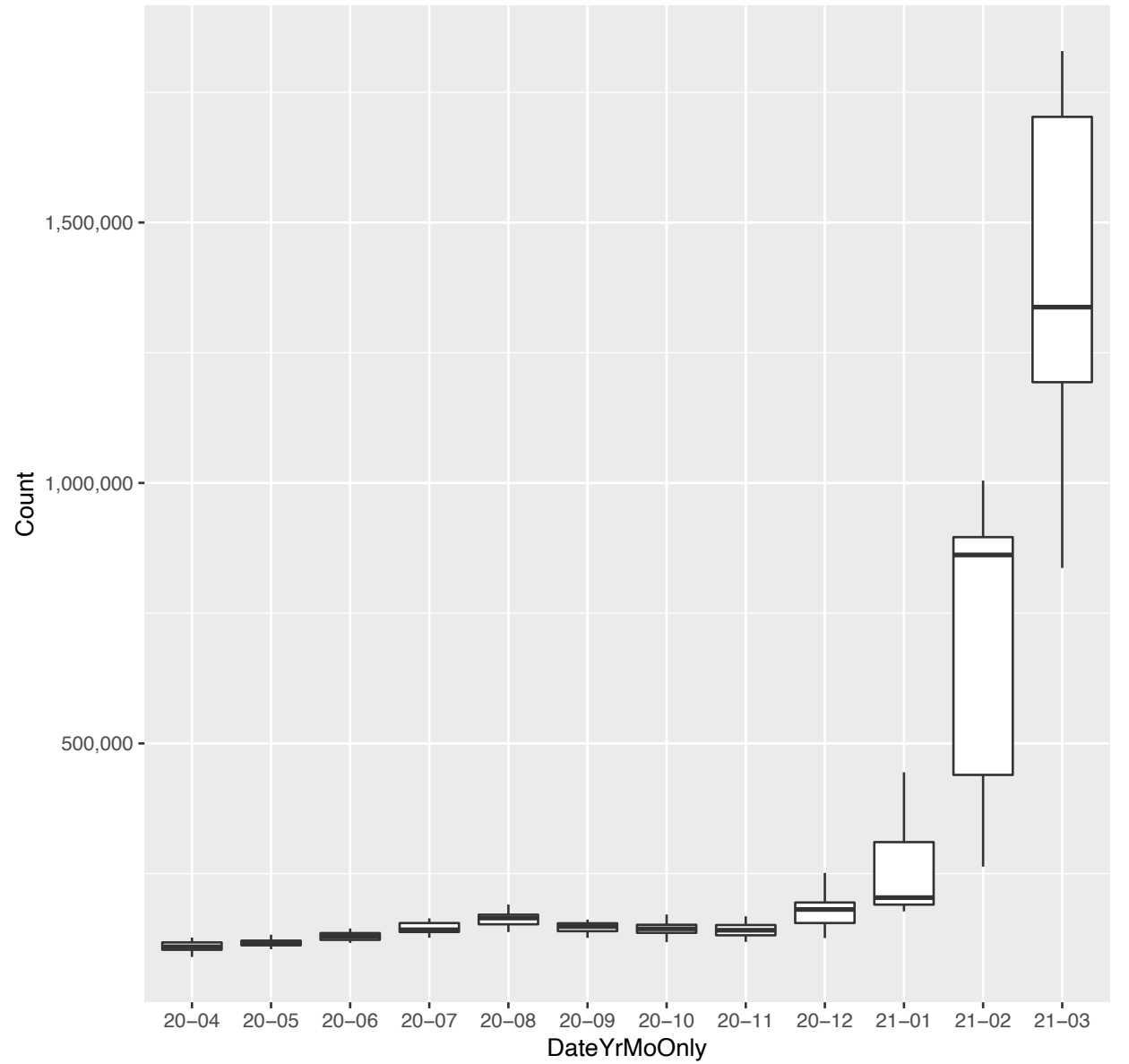


M

*. dailymail.co.uk (day-by-day counts and 28 day moving average)



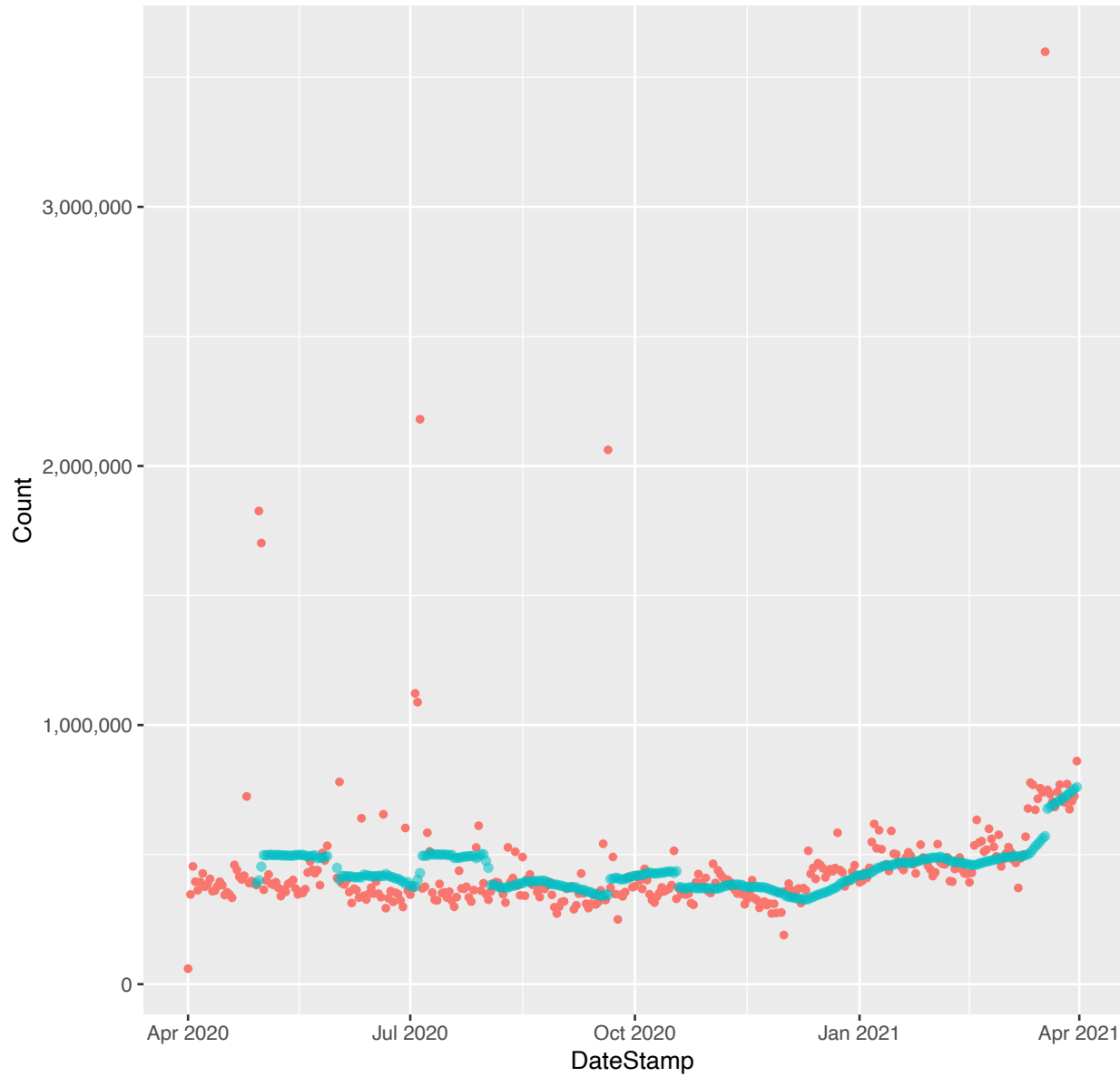
*. dailymail.co.uk (monthly boxplots (outliers trimmed))



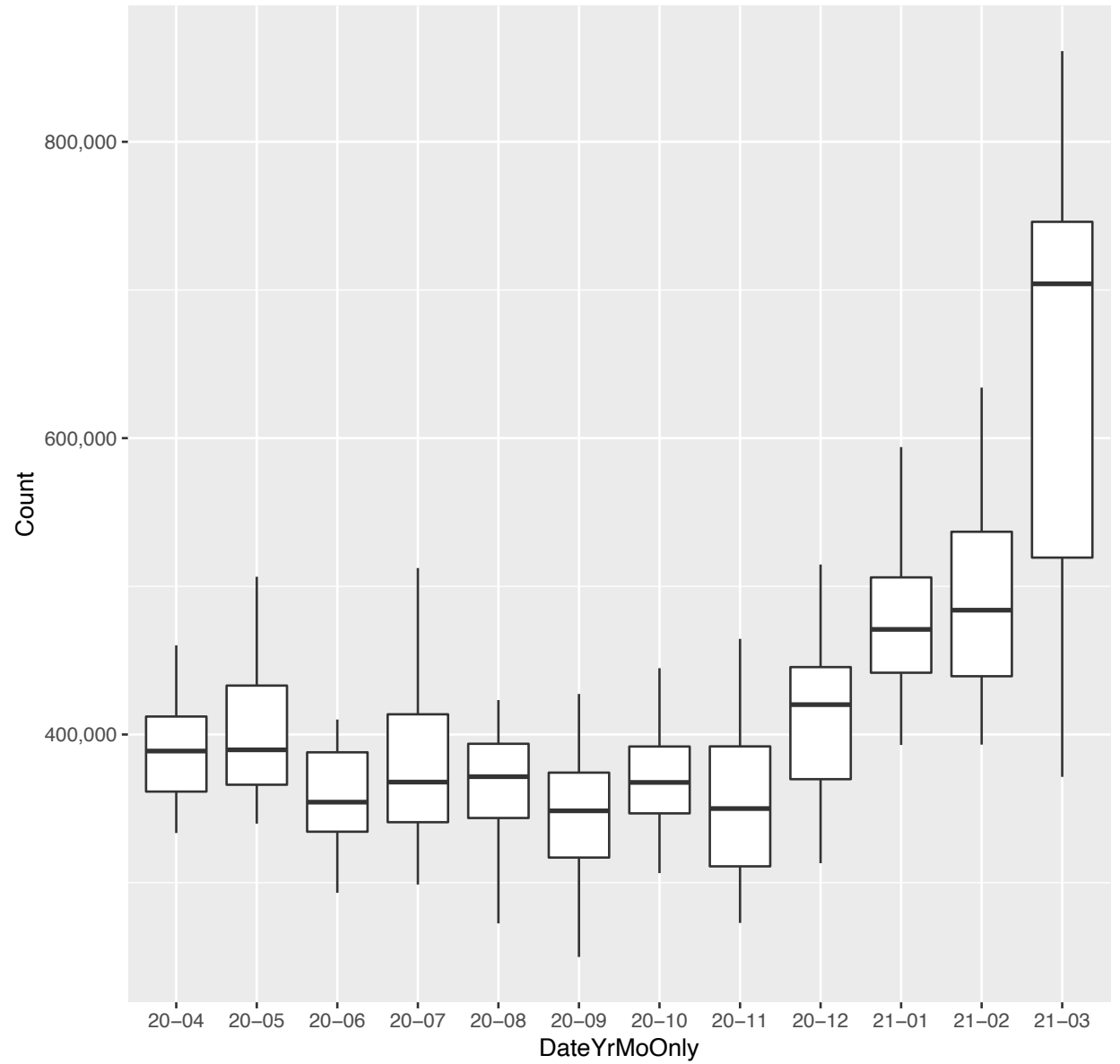
8. huffpost.com:



huffpost.com (day-by-day counts and 28 day moving average)

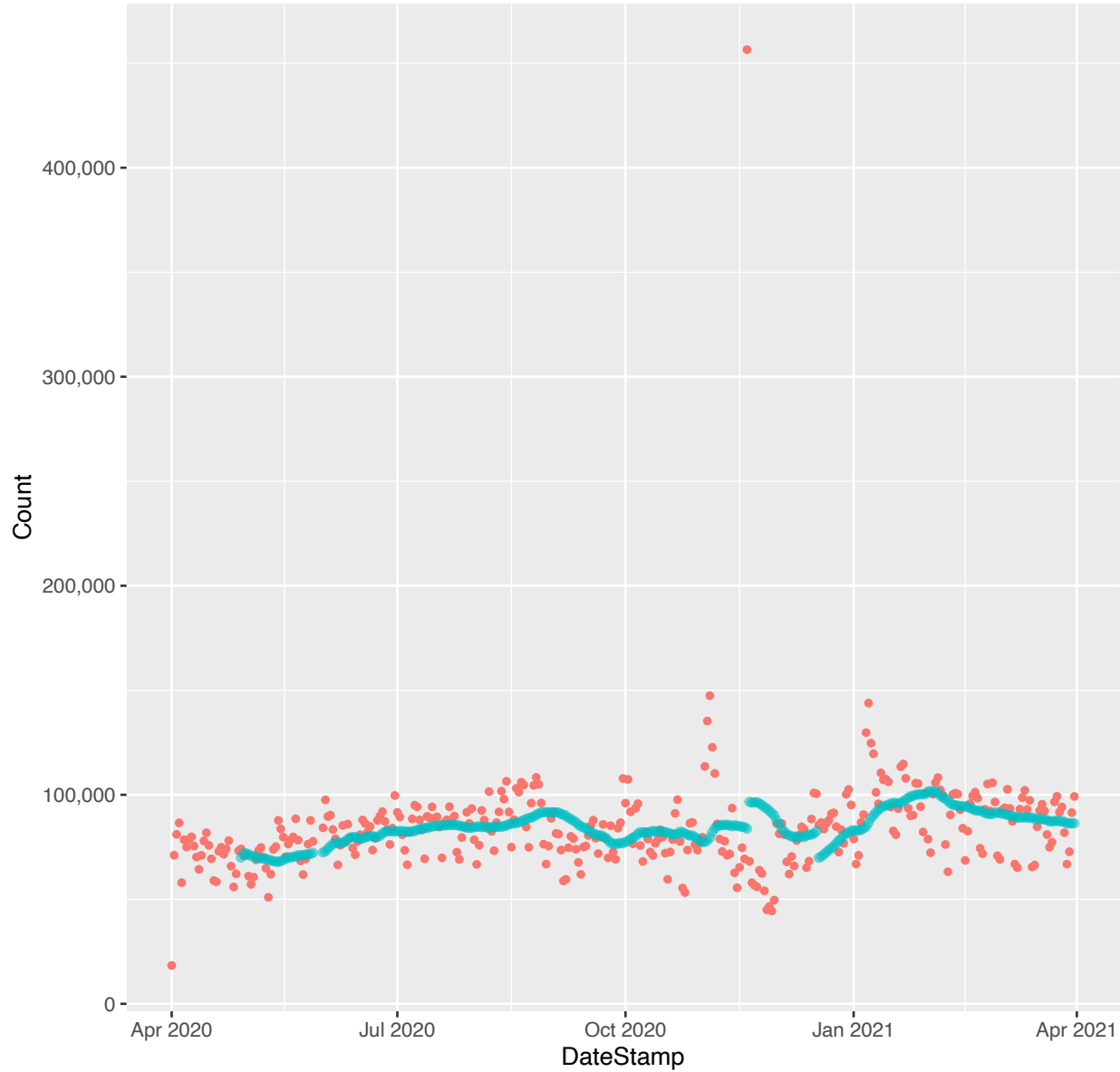


huffpost.com (monthly boxplots (outliers trimmed))

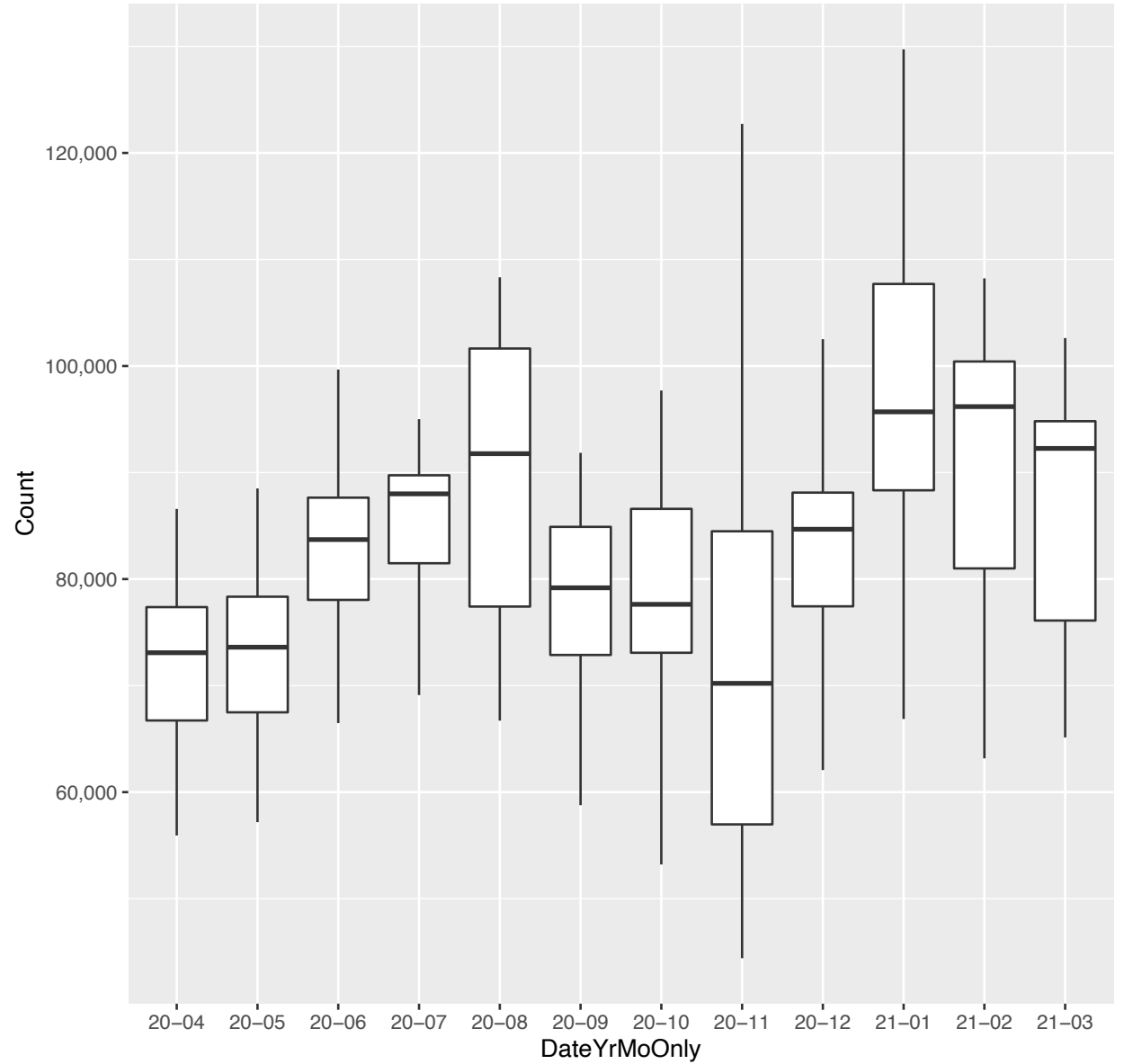


9. msnbc.com: ~

*. msnbc.com (day-by-day counts and 28 day moving average)

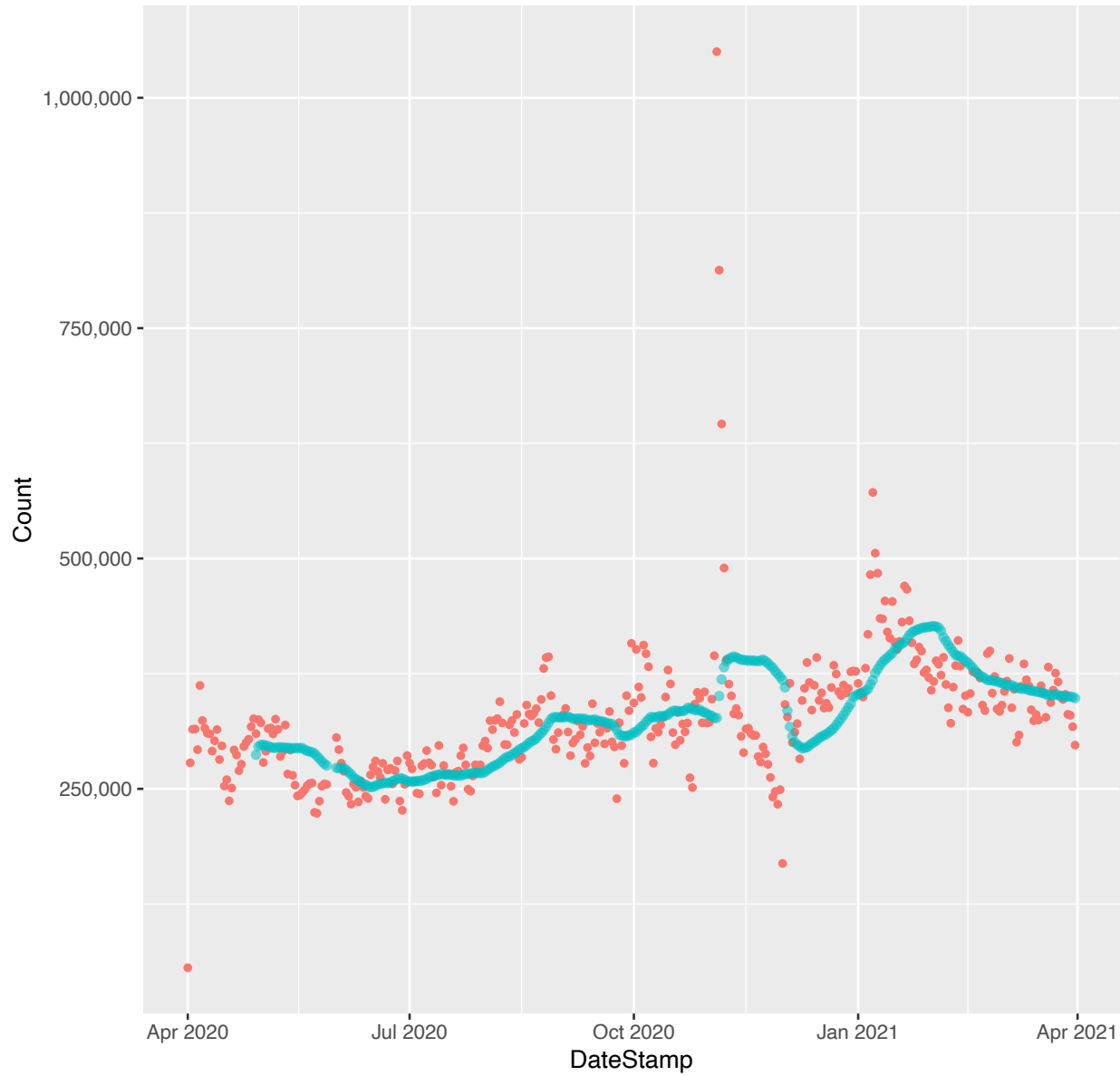


*. msnbc.com (monthly boxplots (outliers trimmed))

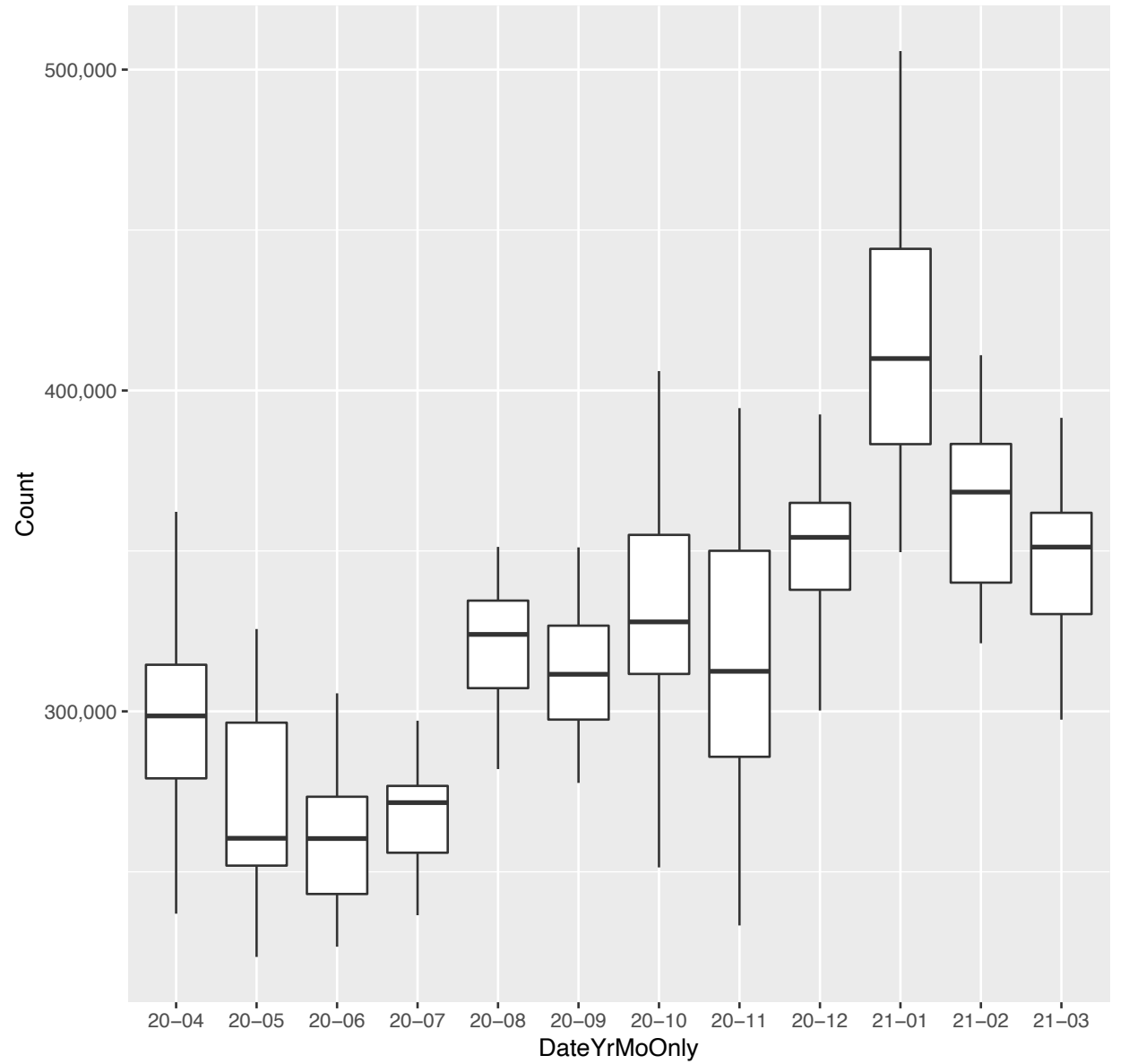


10. nbcnews.com: * ○ shaped

*. nbcnews.com (day-by-day counts and 28 day moving average)



*. nbcnews.com (monthly boxplots (outliers trimmed))

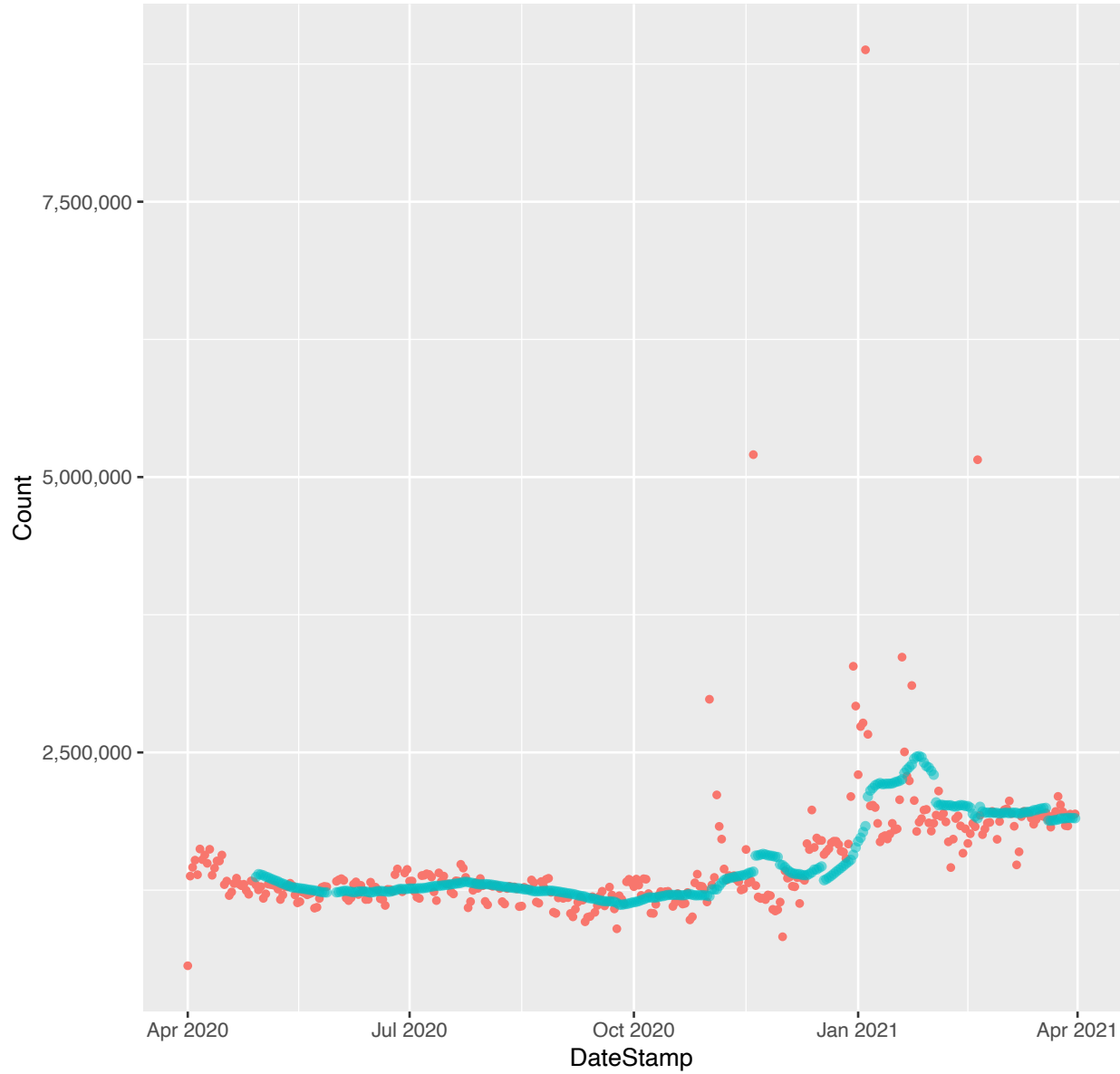


11. nytimes.com:

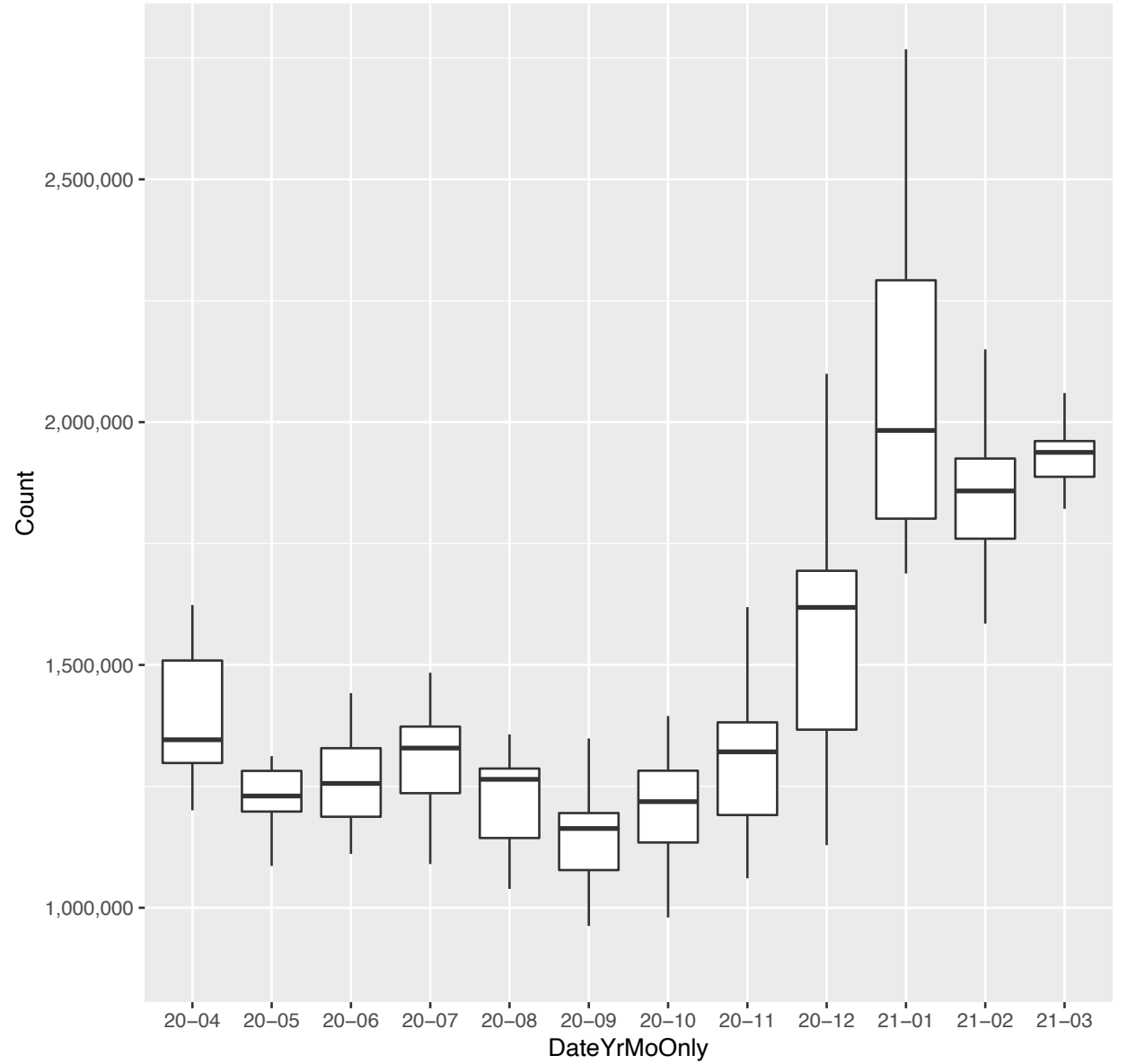
★ ○ shaped

M

*. nytimes.com (day-by-day counts and 28 day moving average)



*. nytimes.com (monthly boxplots (outliers trimmed))



12. pbs.org:

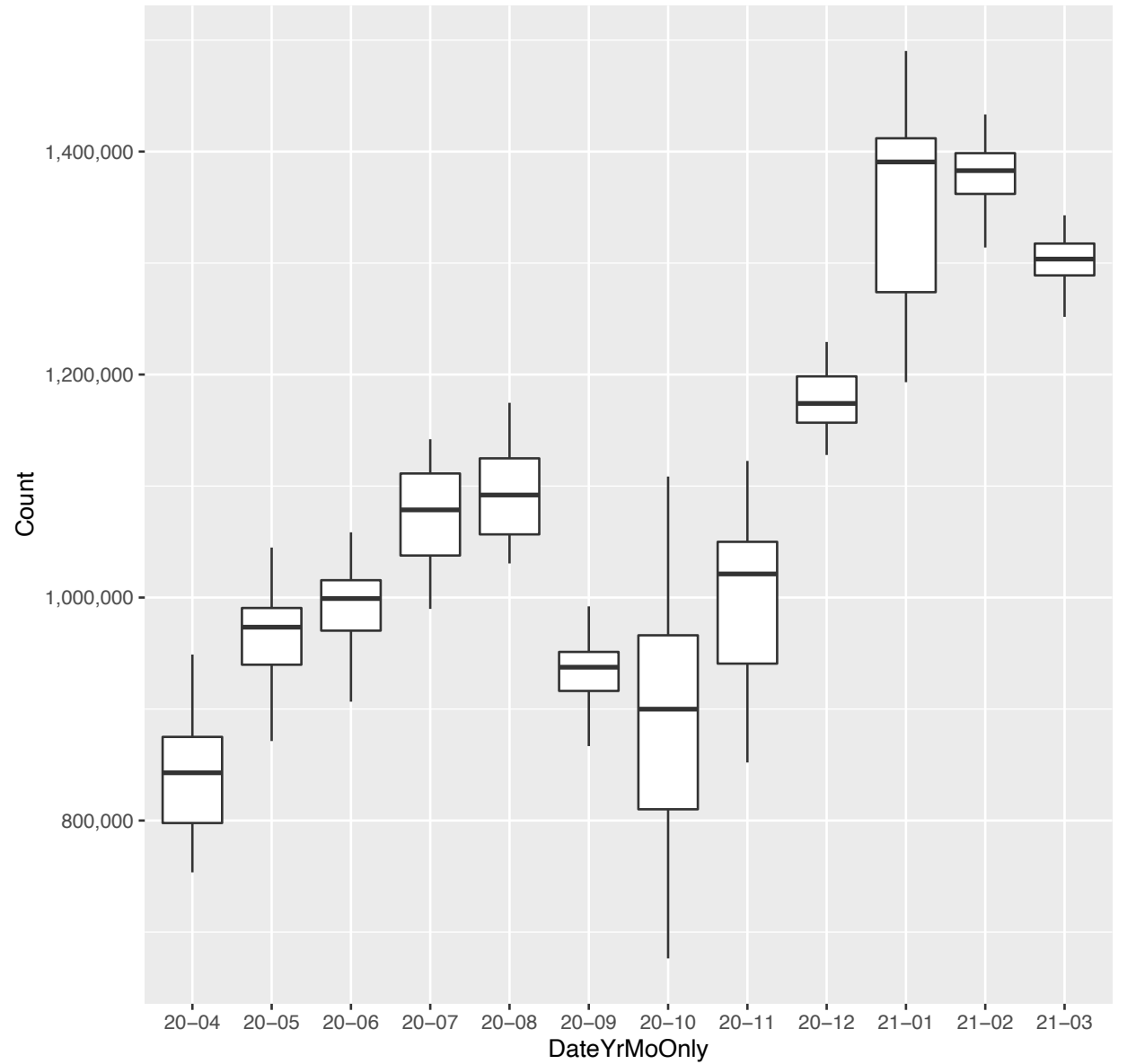
~

M

*. pbs.org (day-by-day counts and 28 day moving average)



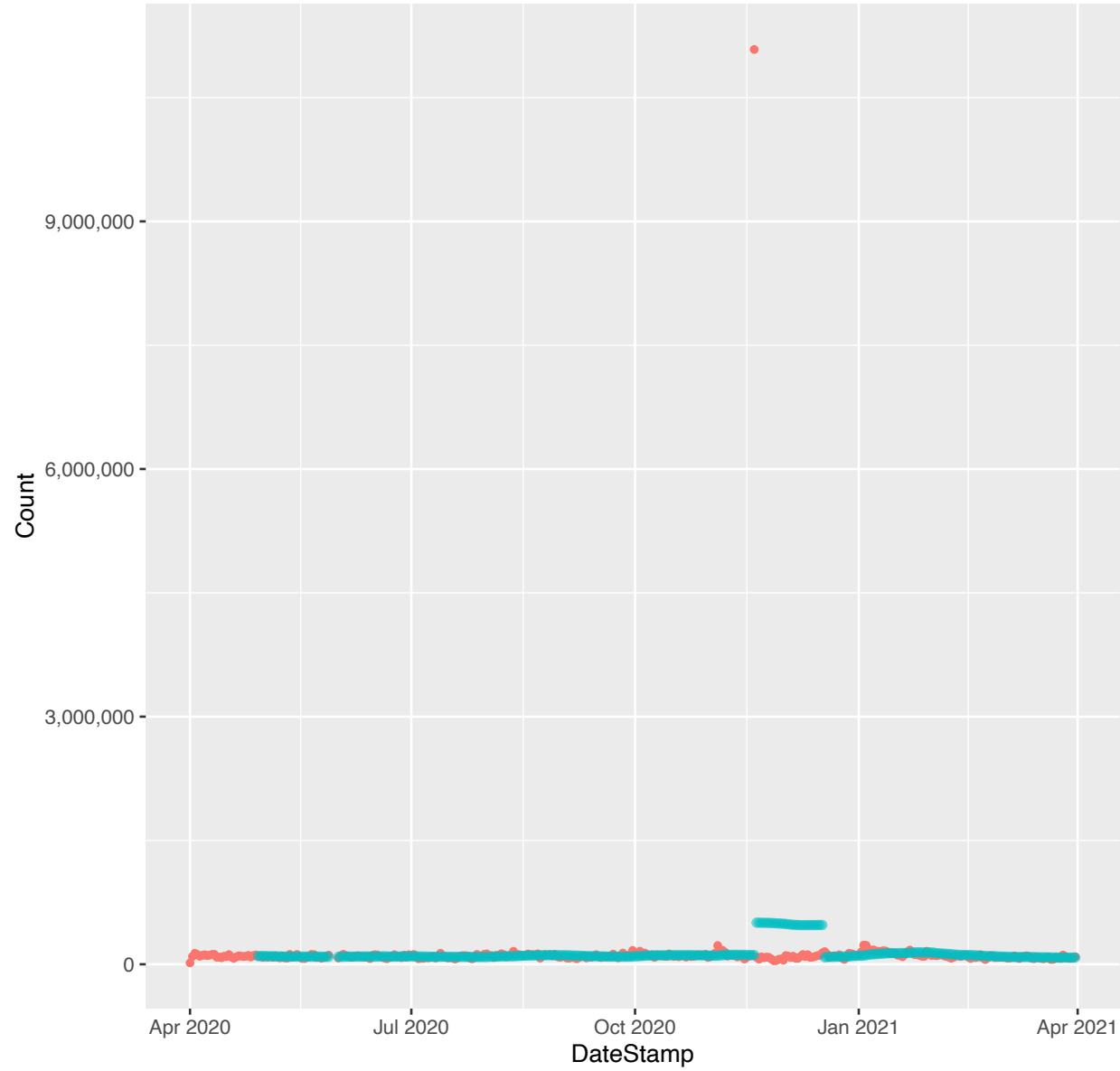
*. pbs.org (monthly boxplots (outliers trimmed))



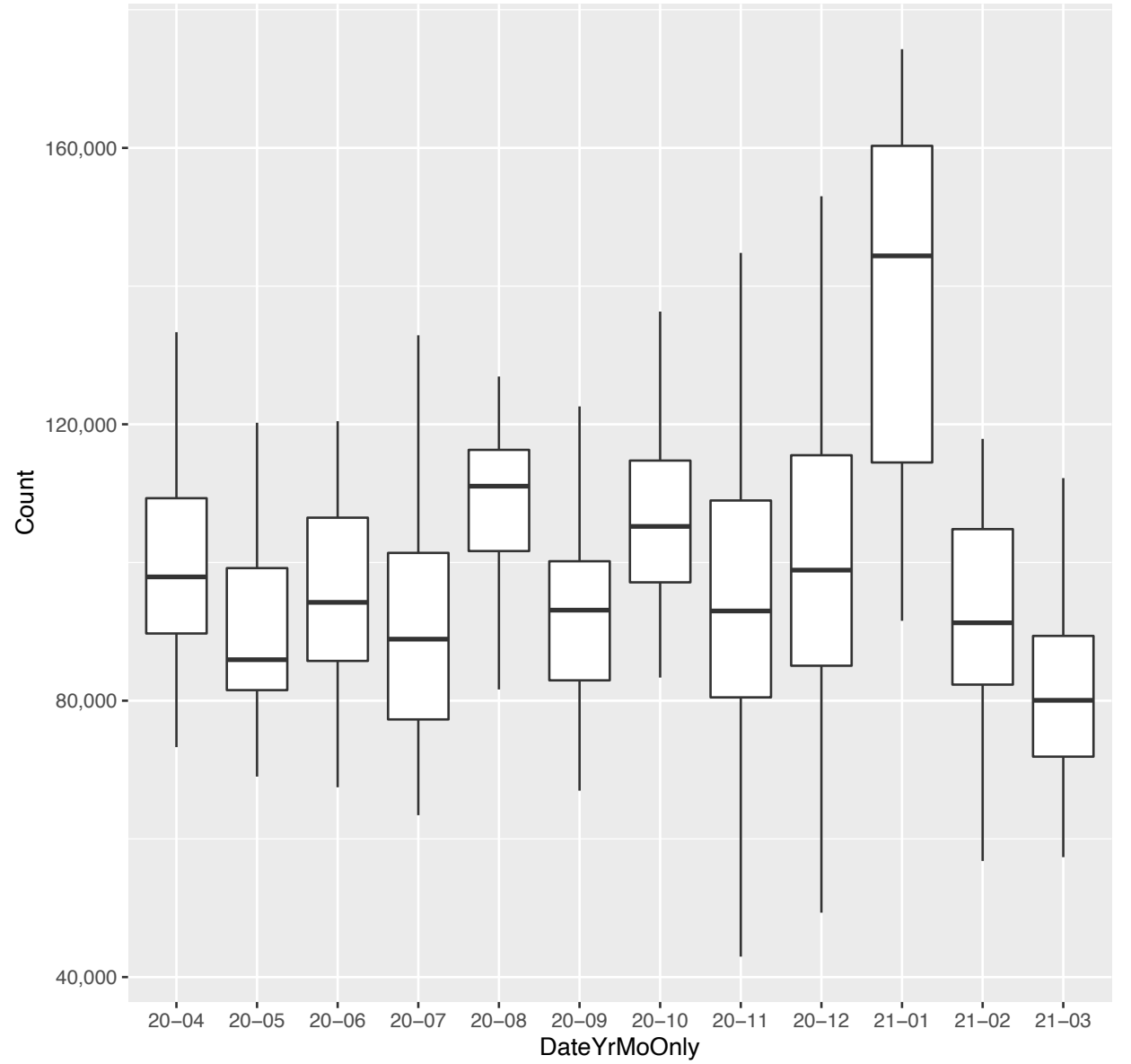
13. politico.com:



*. politico.com (day-by-day counts and 28 day moving average)



*. politico.com (monthly boxplots (outliers trimmed))

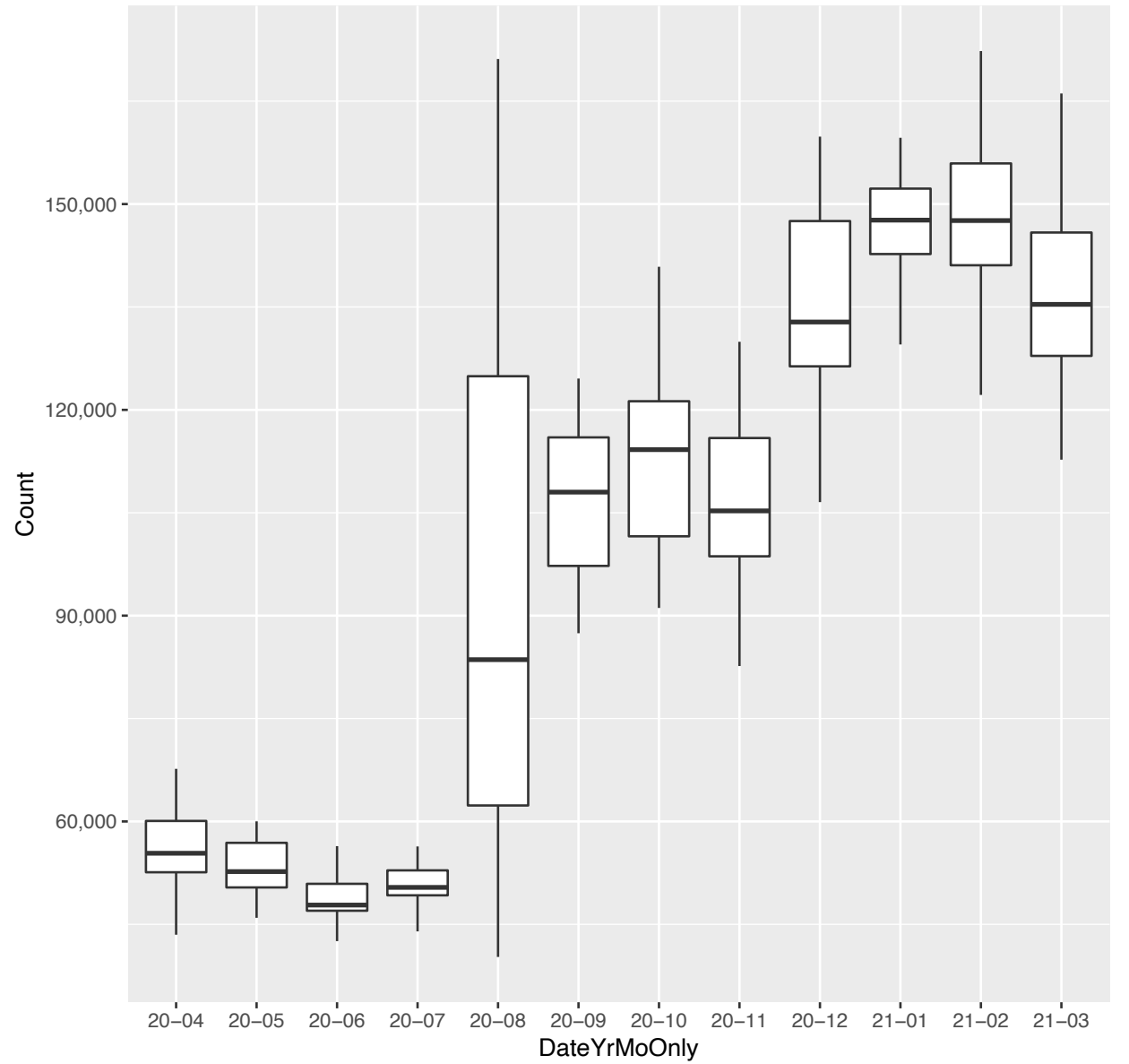


14. rollingstone.com: ↗

*. rollingstone.com (day-by-day counts and 28 day moving average)



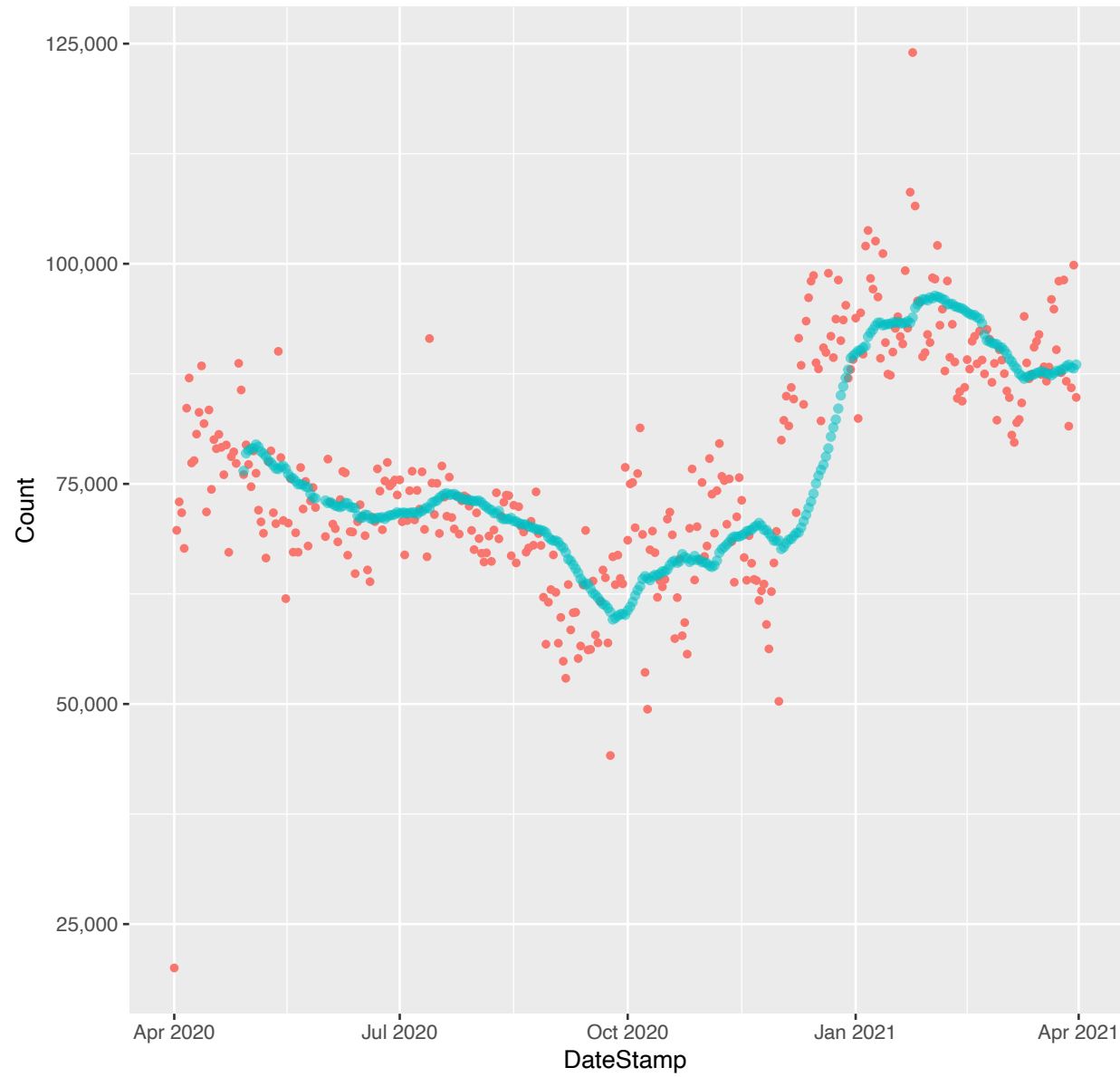
*. rollingstone.com (monthly boxplots (outliers trimmed))



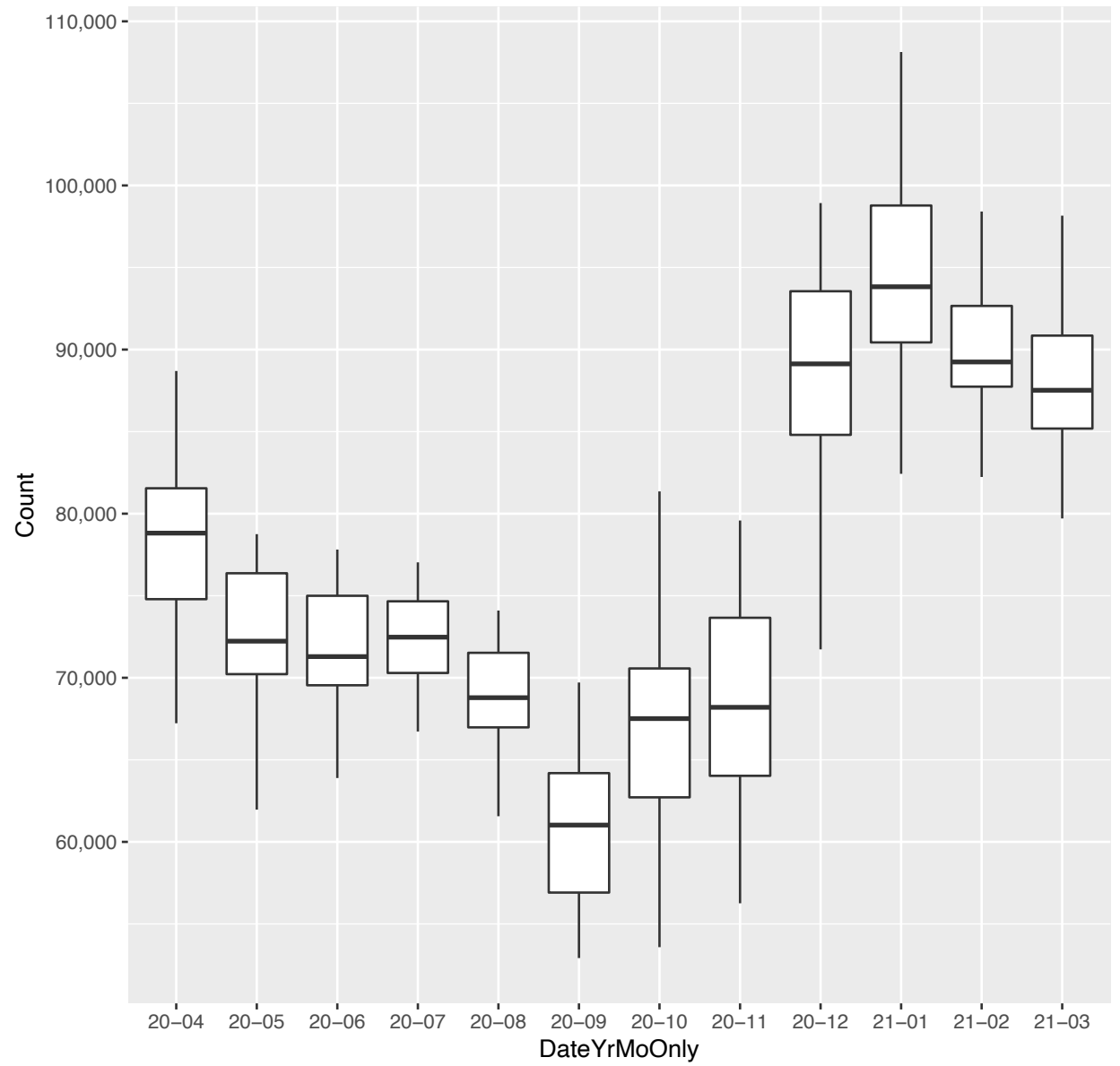
15. salon.com:



*. salon.com (day-by-day counts and 28 day moving average)



*. salon.com (monthly boxplots (outliers trimmed))



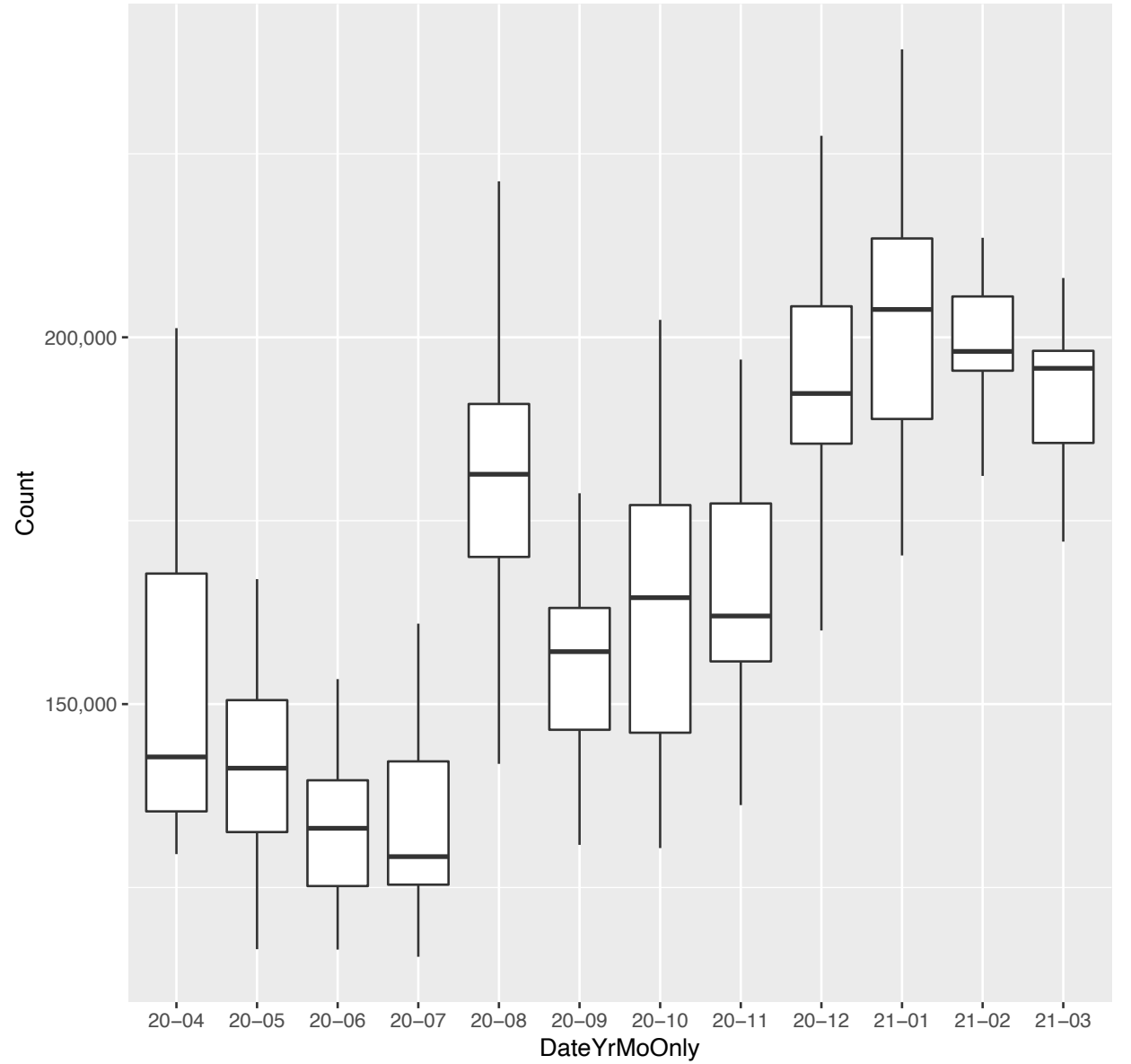
16. slate.com:



*. slate.com (day-by-day counts and 28 day moving average)

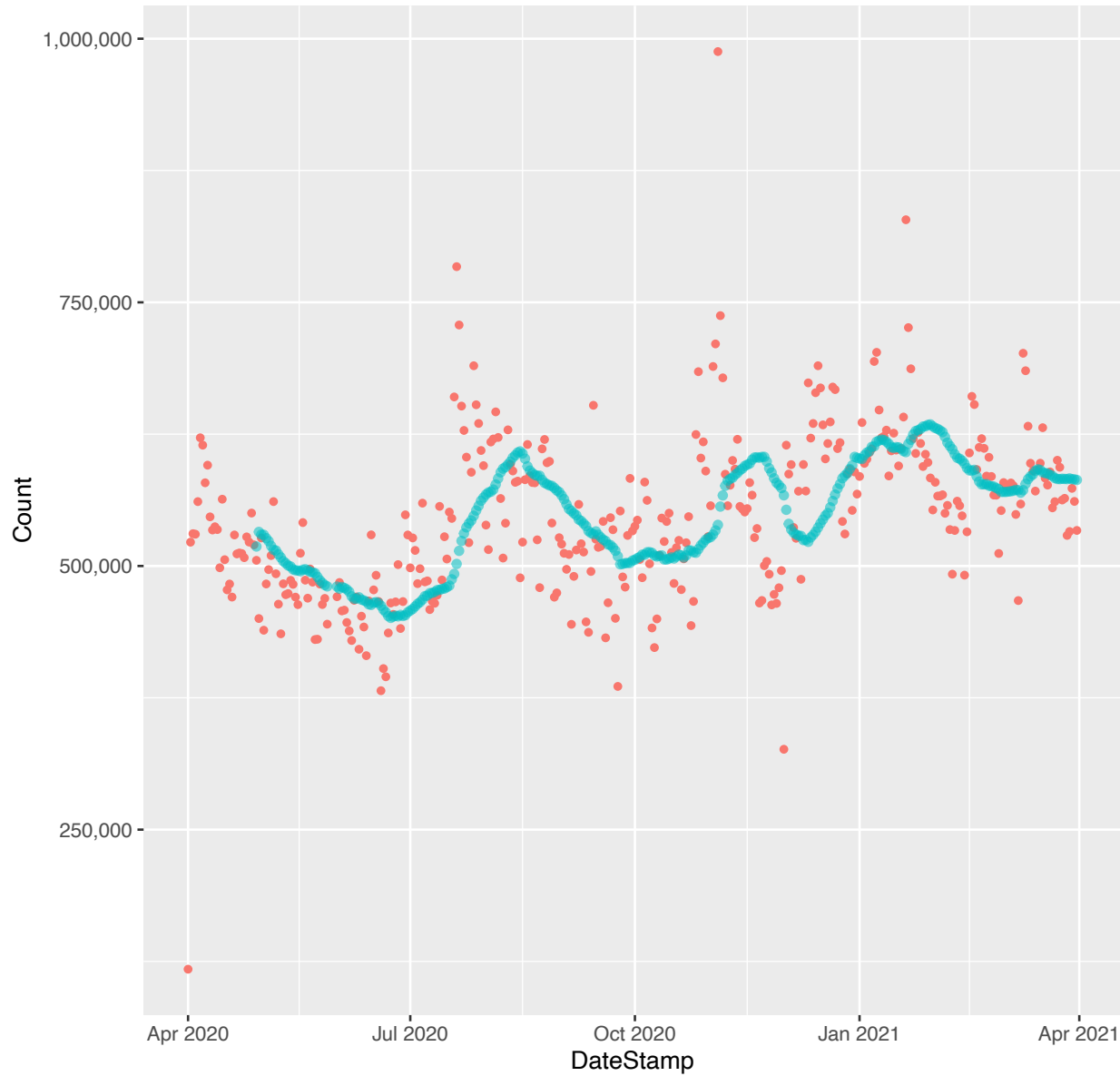


*. slate.com (monthly boxplots (outliers trimmed))

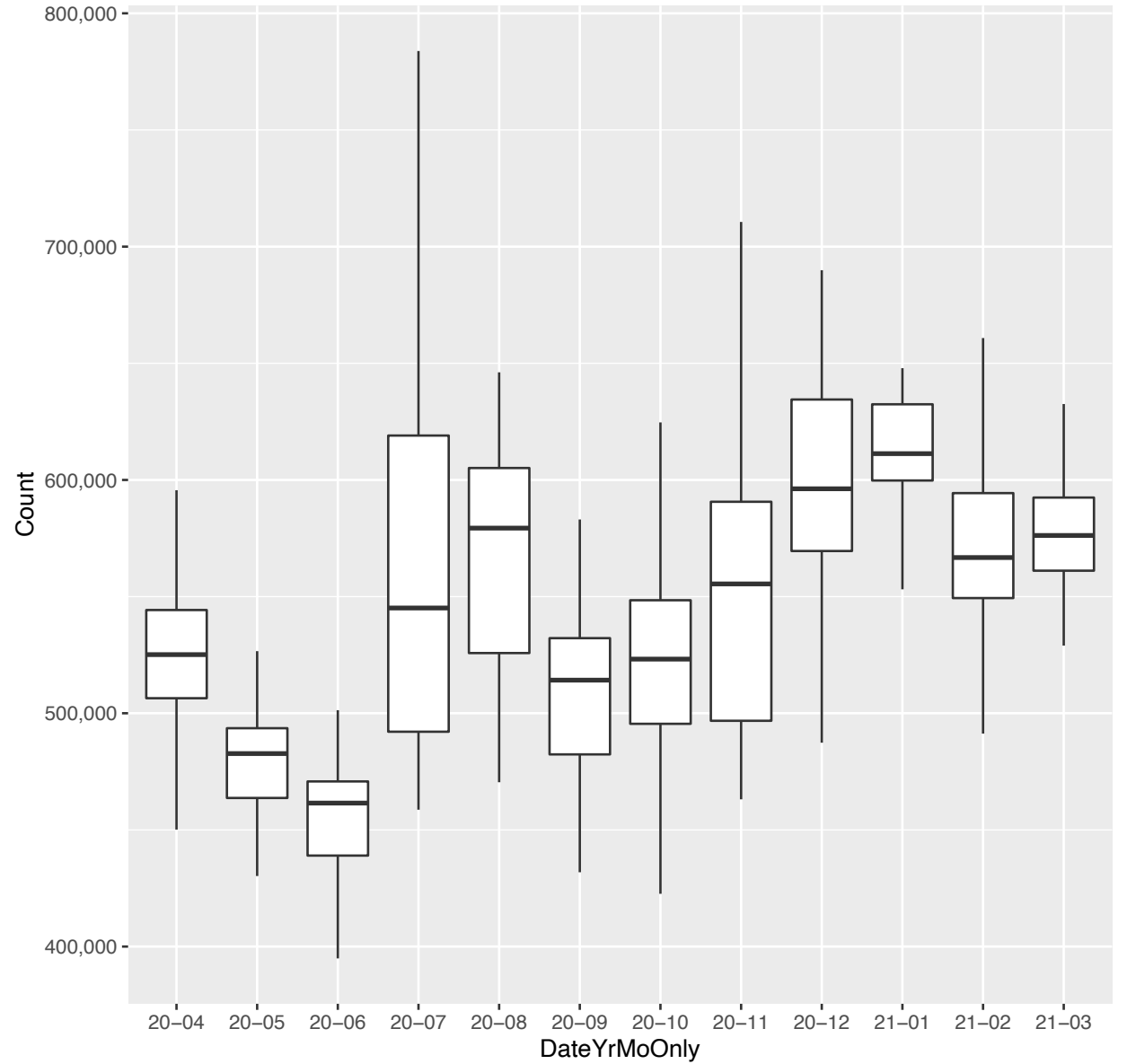


17. telegraph.co.uk: ~

*. telegraph.co.uk (day-by-day counts and 28 day moving average)



*. telegraph.co.uk (monthly boxplots (outliers trimmed))



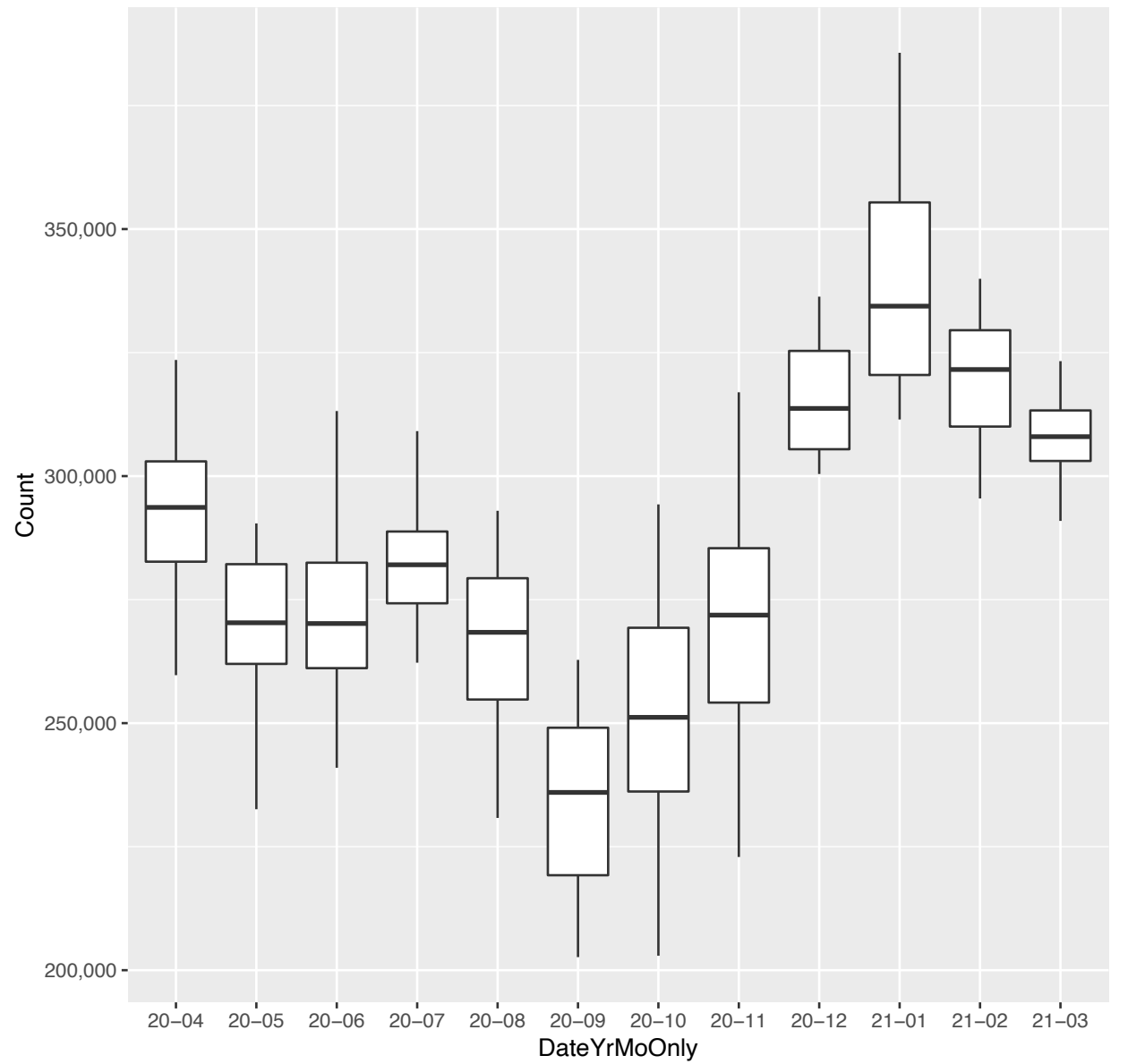
18. thehill.com:

U shaped

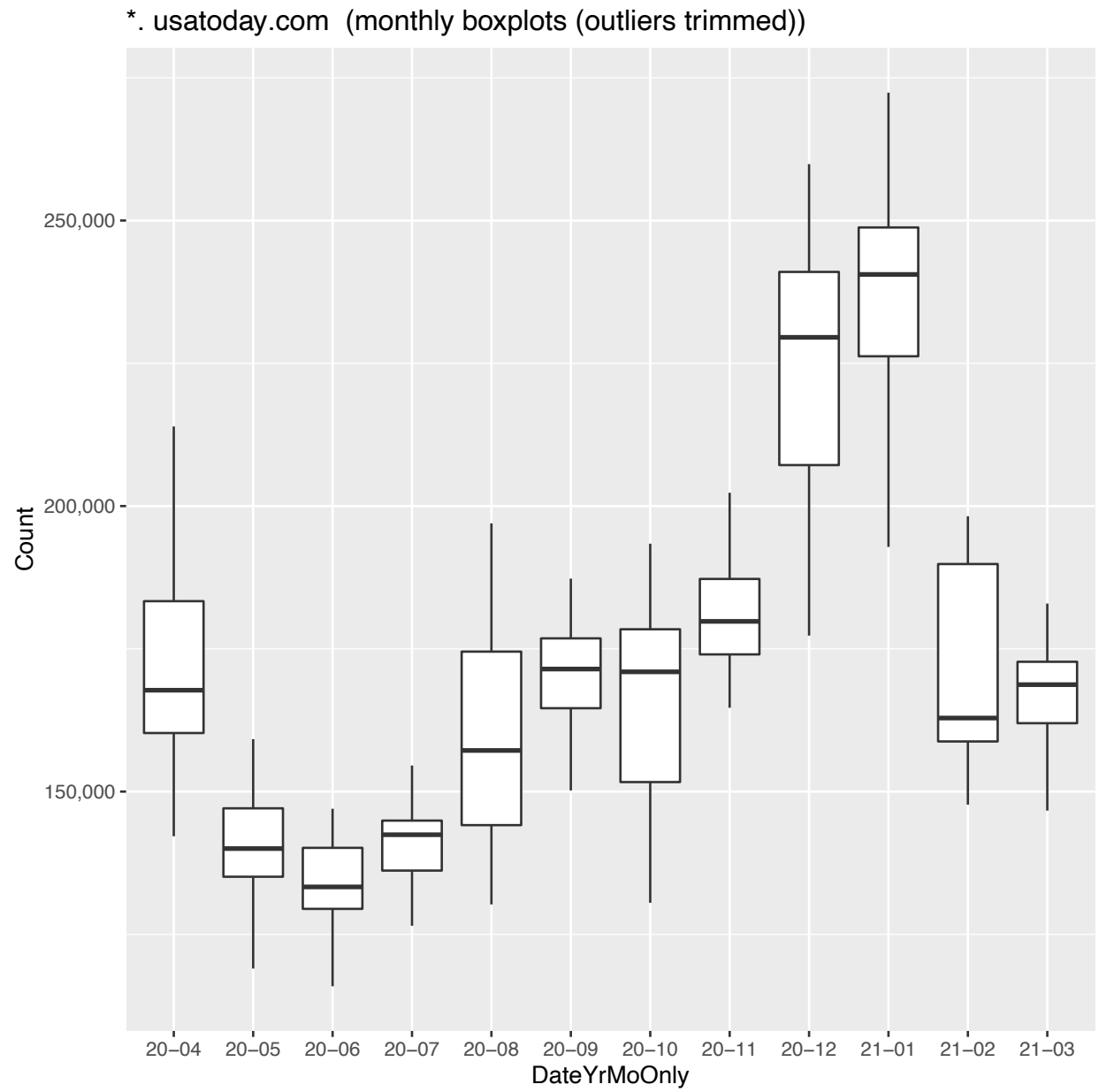
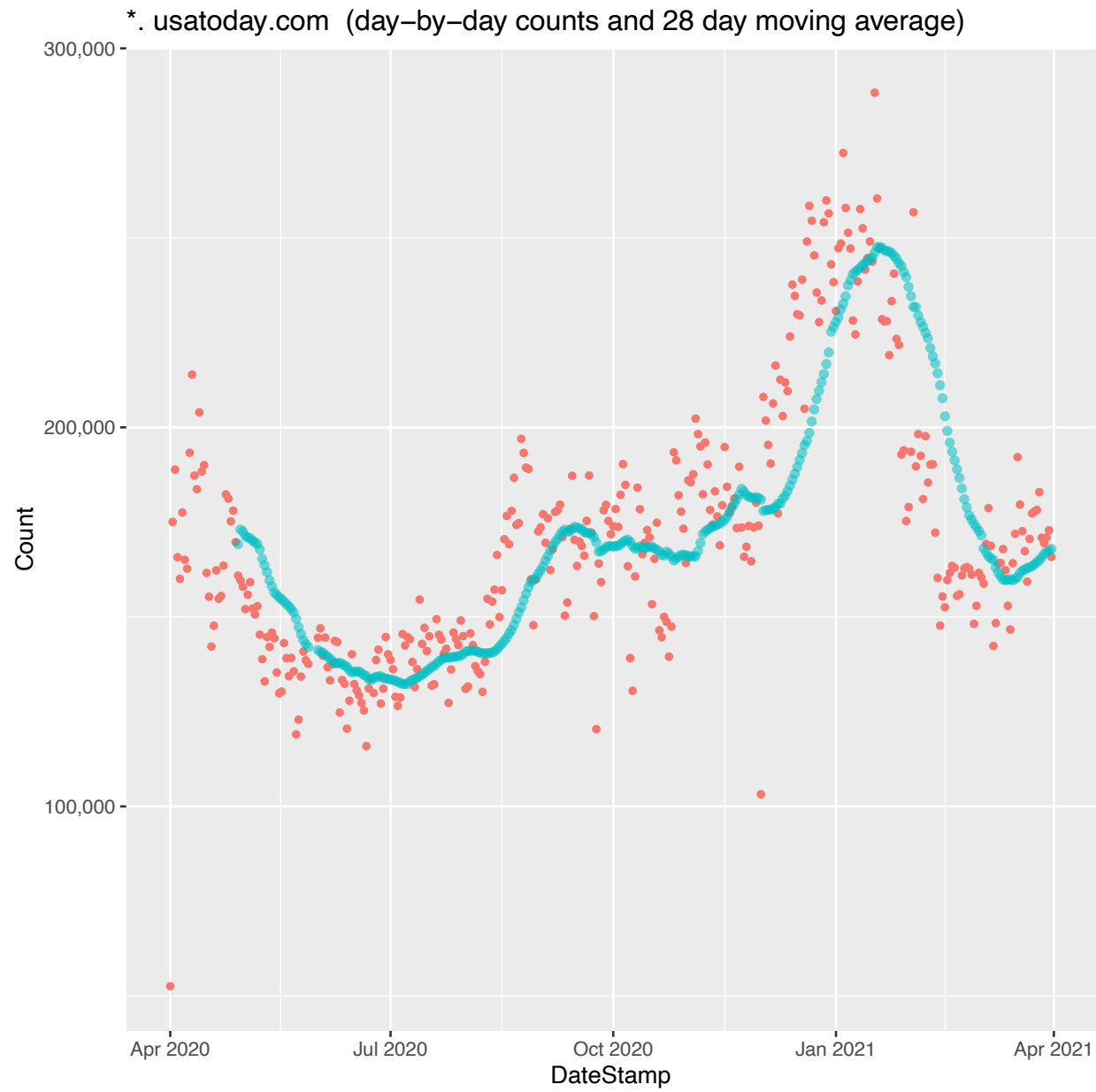
*. thehill.com (day-by-day counts and 28 day moving average)



*. thehill.com (monthly boxplots (outliers trimmed))

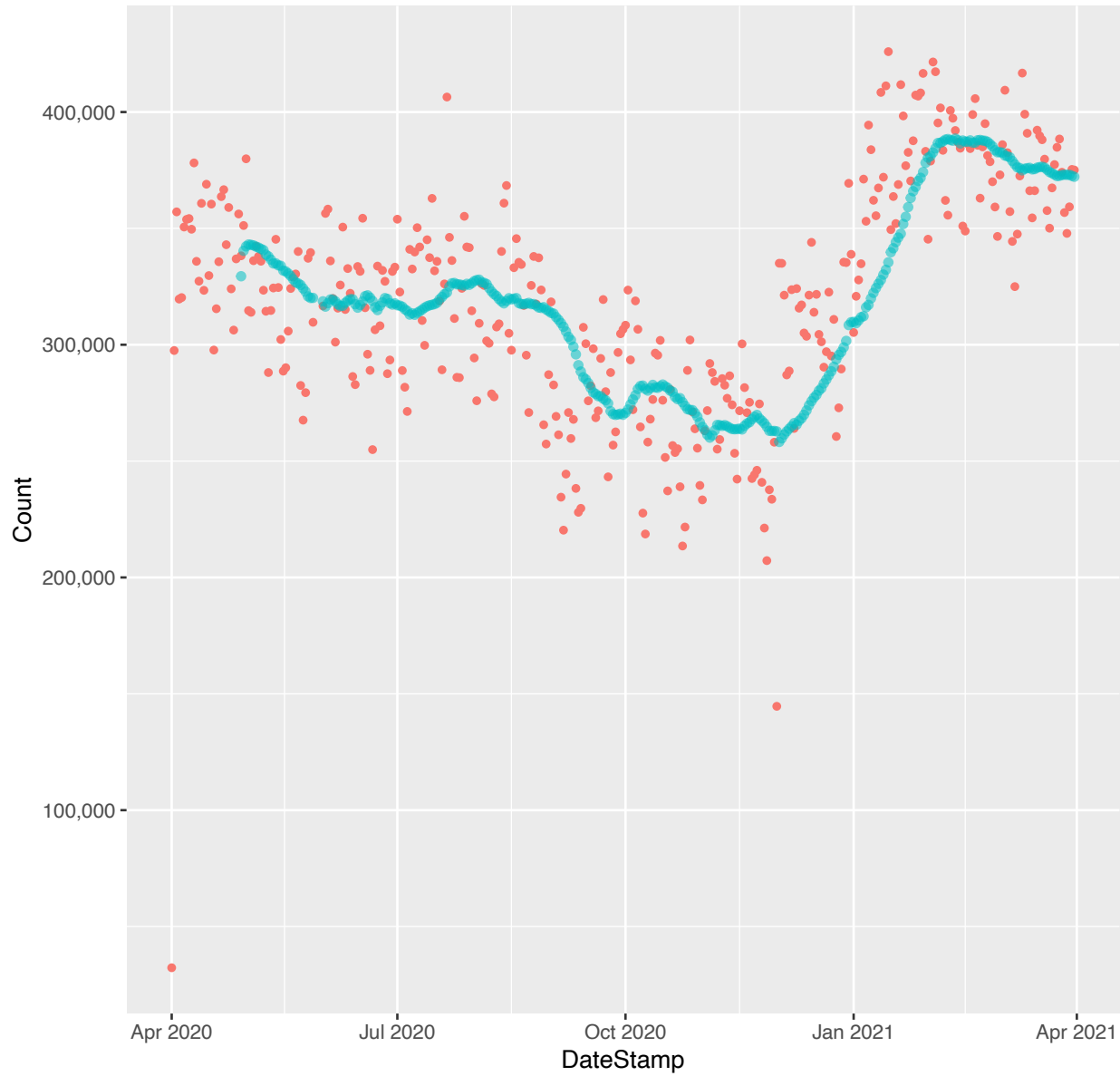


19. usatoday.com: ~

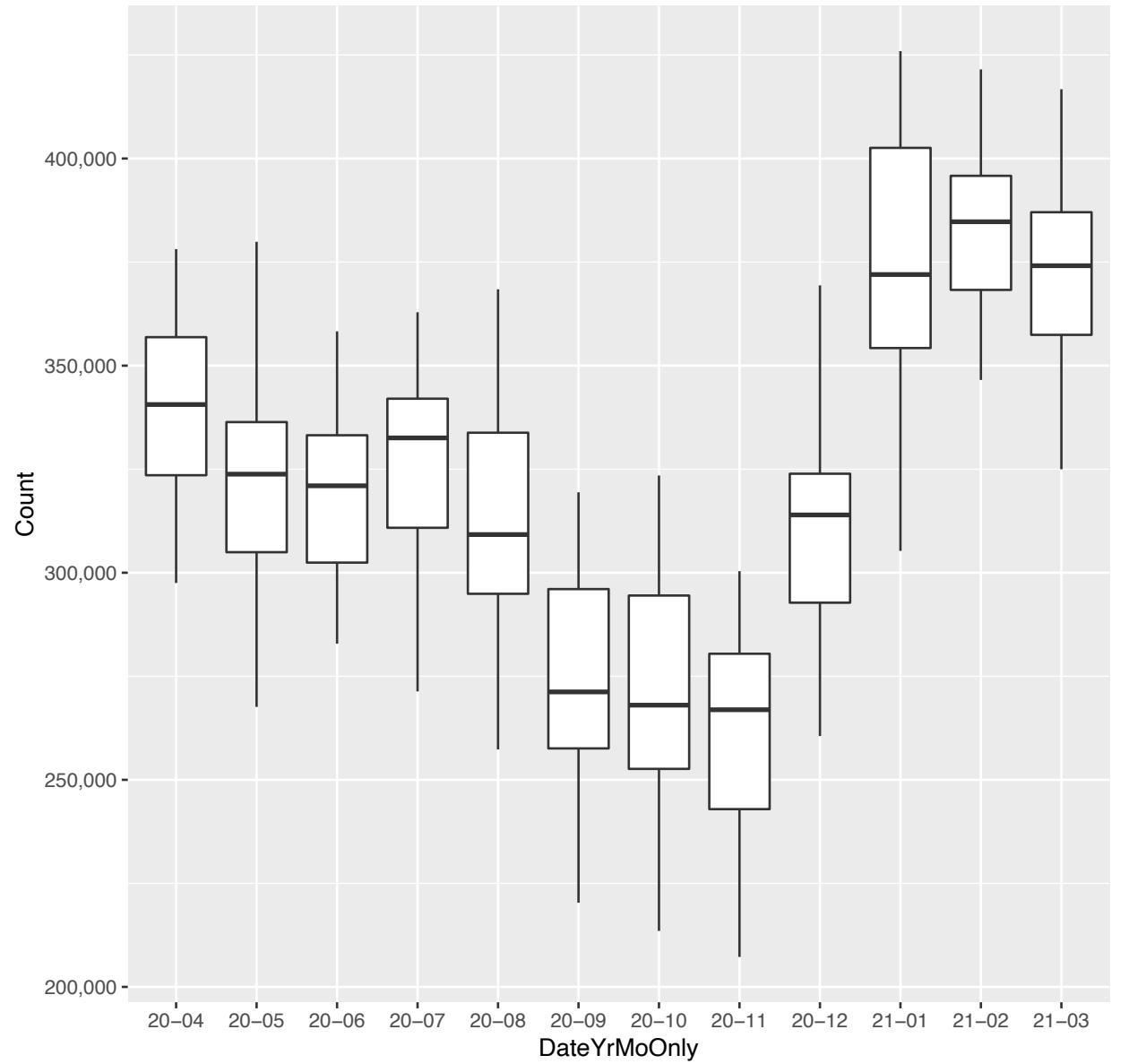


20. usnews.com: U shaped (ending higher)

*. usnews.com (day-by-day counts and 28 day moving average)



*. usnews.com (monthly boxplots (outliers trimmed))

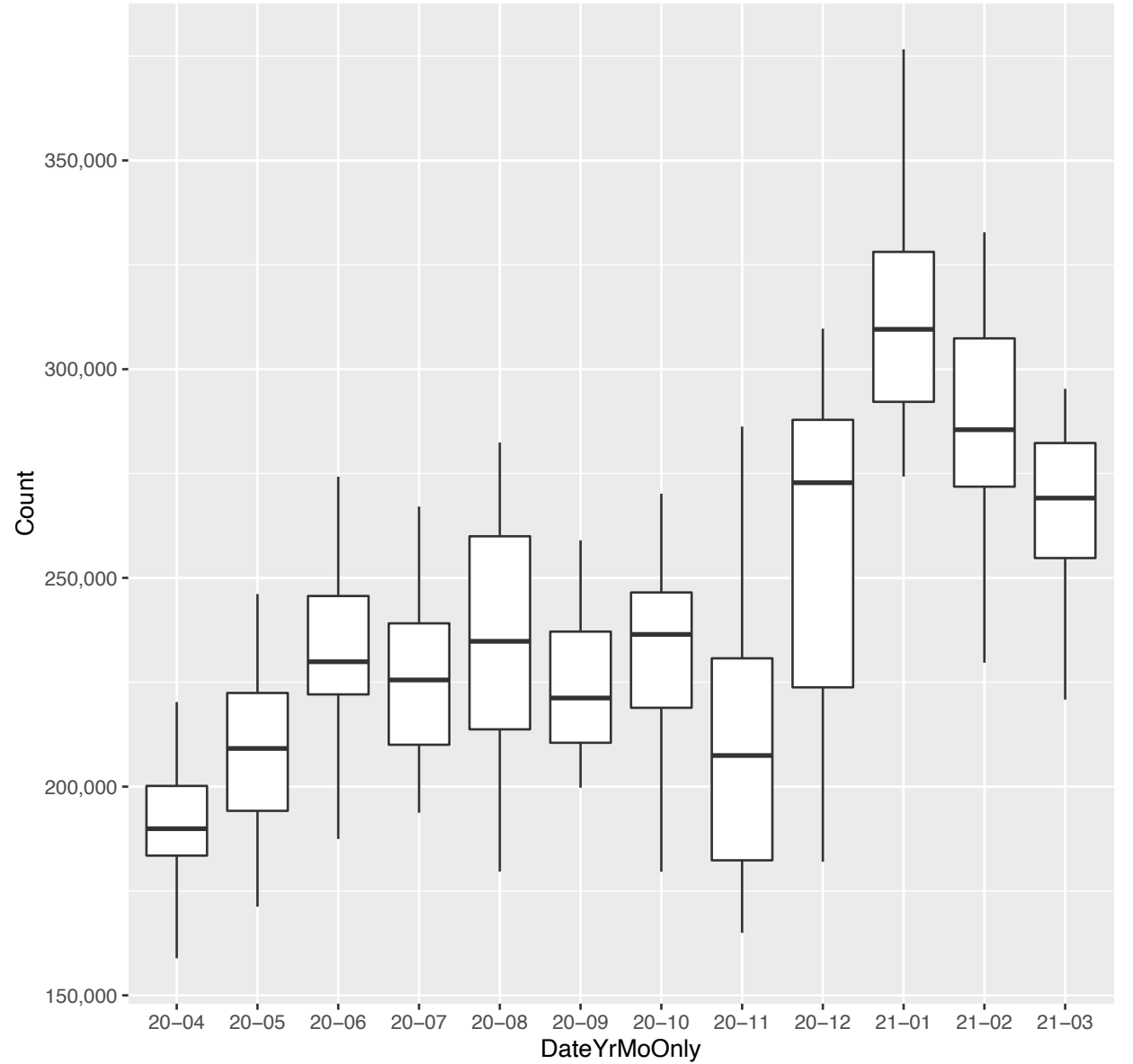


21. washingtonpost.com: ~

*. washingtonpost.com (day-by-day counts and 28 day moving average)



*. washingtonpost.com (monthly boxplots (outliers trimmed))



b) More-or-less Balanced News and Opinion Sites

[\[back to all News Sites\]](#)

[\[back to TOC\]](#)

22 aljazeera.com



23 latimes.com



24 reuters.com



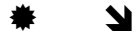
M

25 sky.com

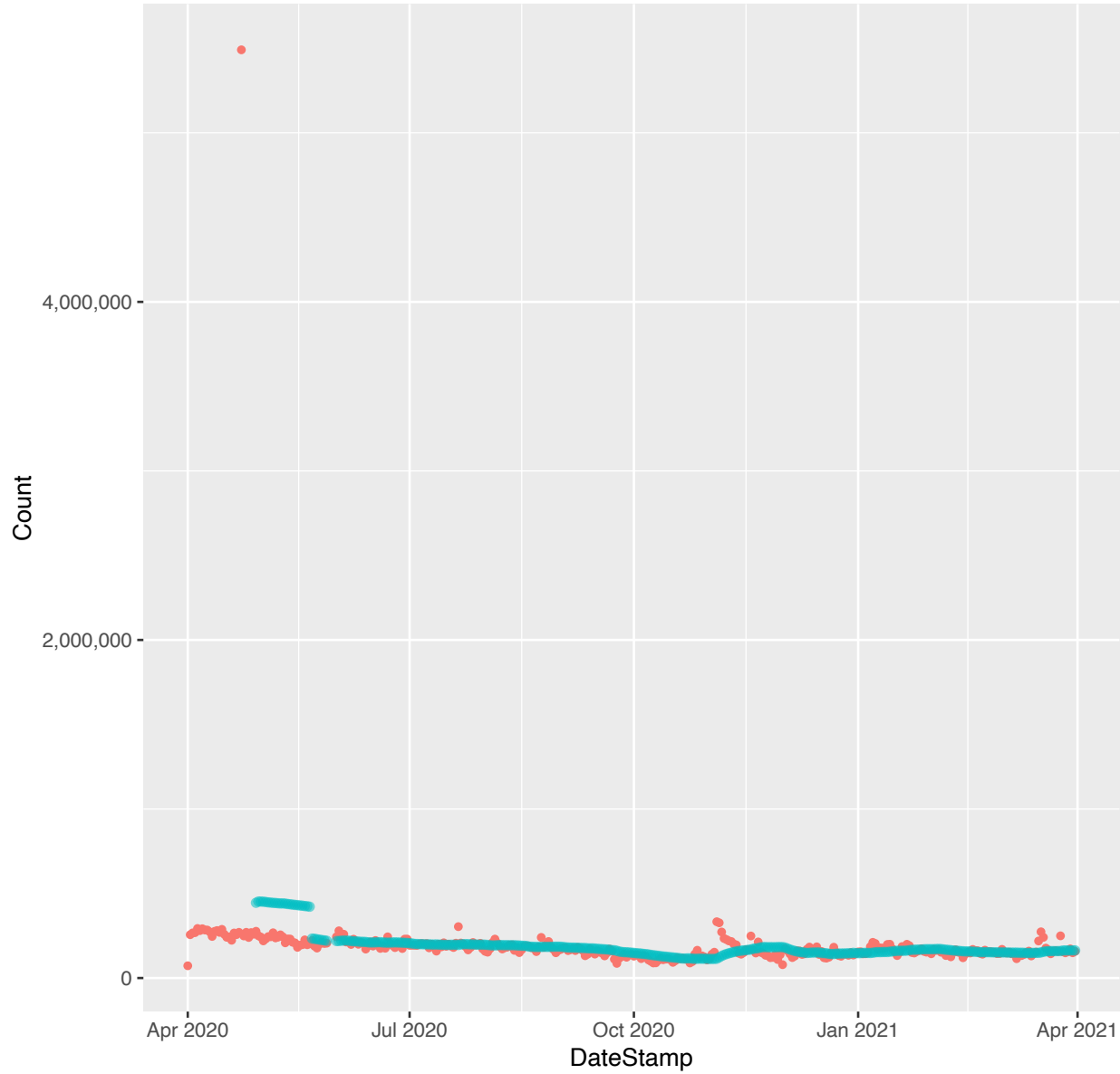


M

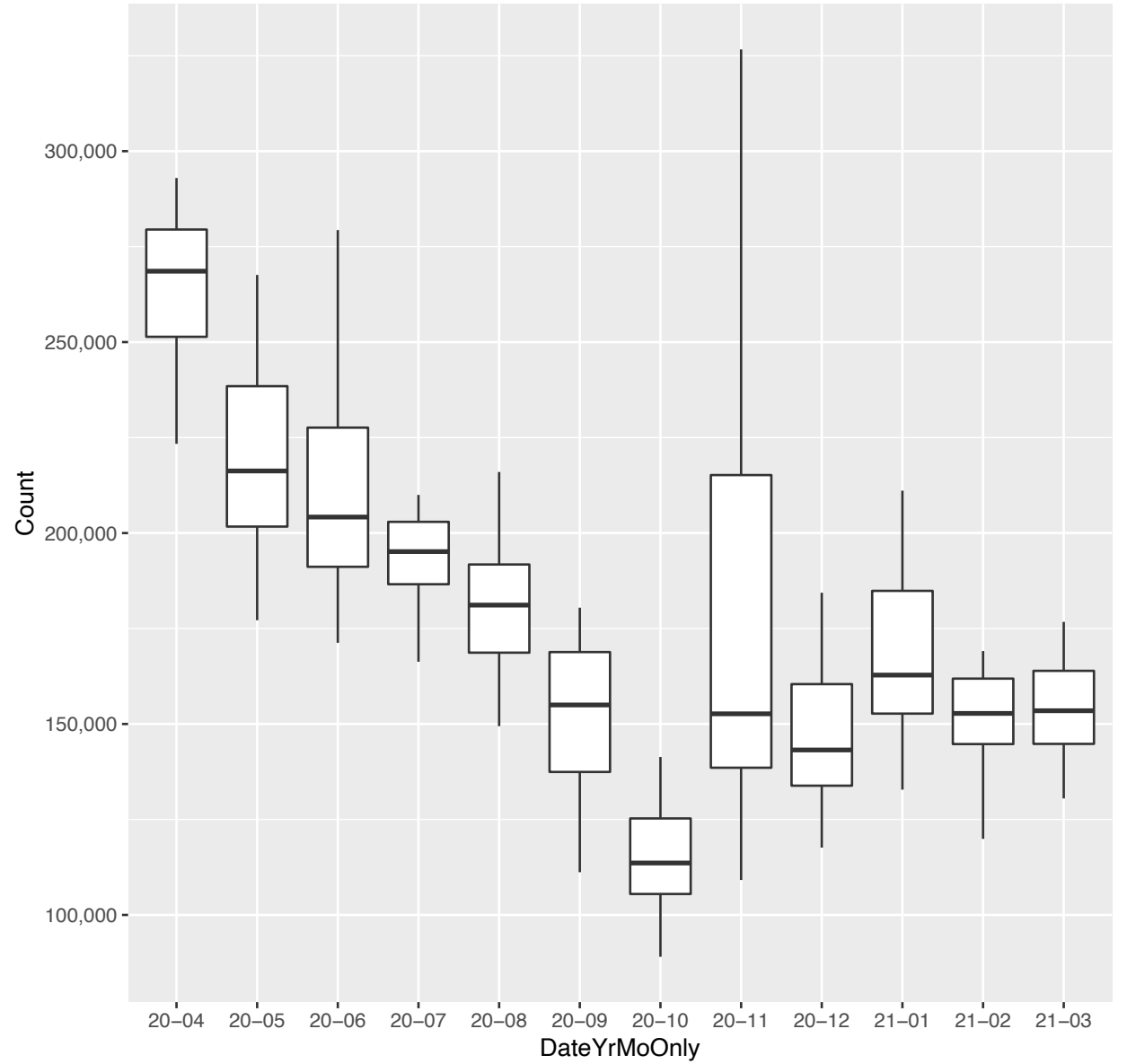
22. aljazeera.com:



*. aljazeera.com (day-by-day counts and 28 day moving average)



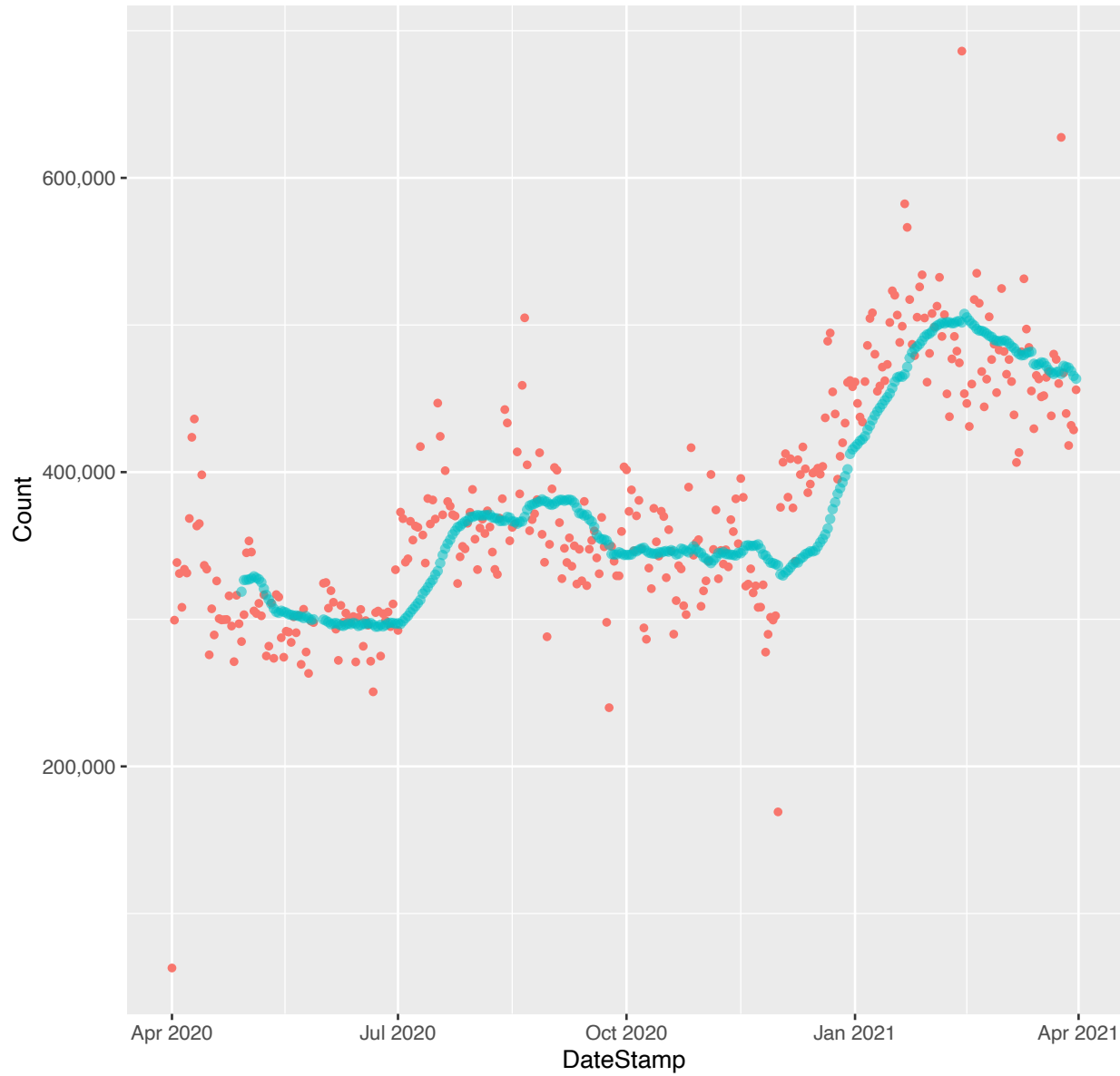
*. aljazeera.com (monthly boxplots (outliers trimmed))



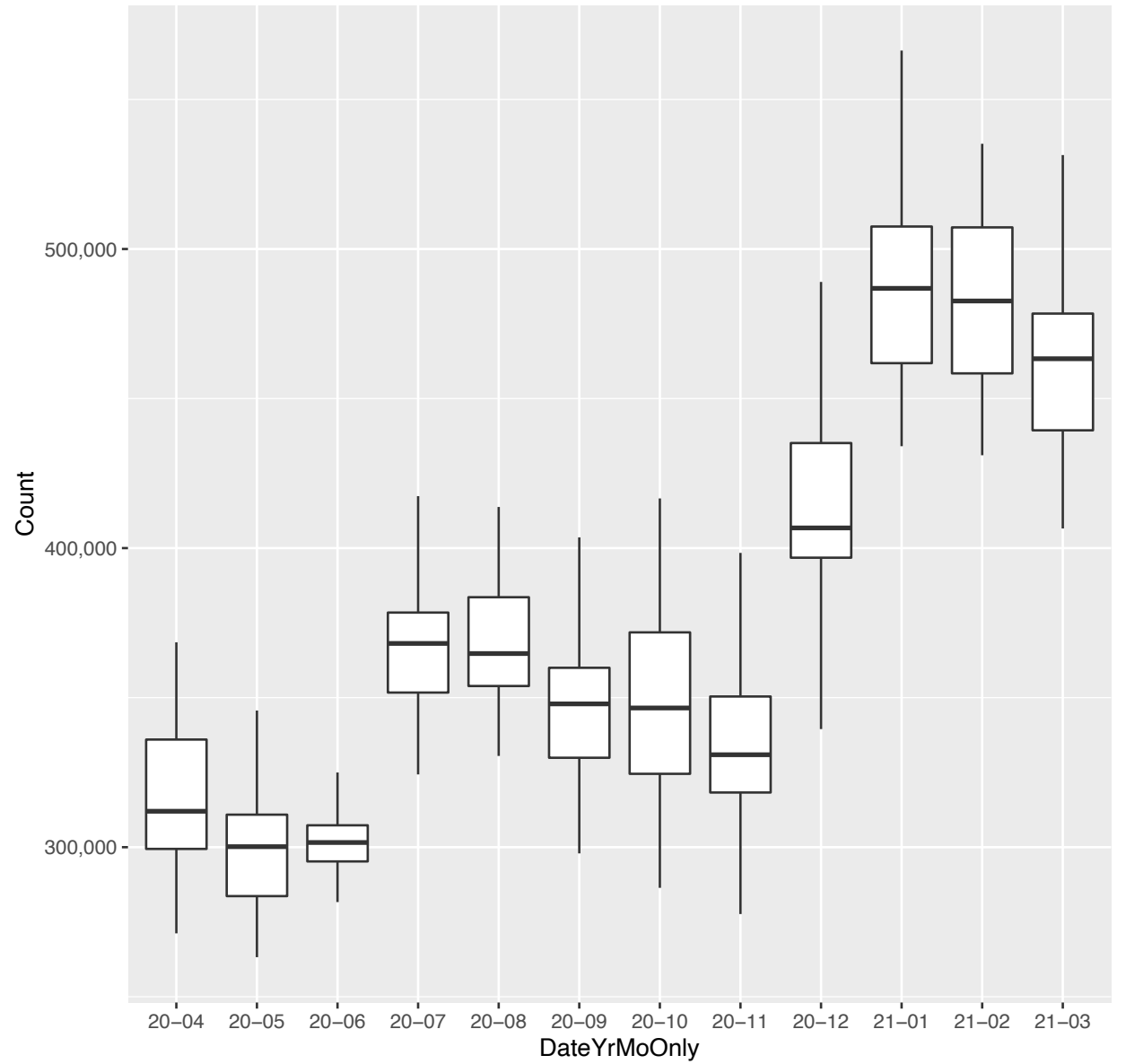
23. latimes.com:

~

*. latimes.com (day-by-day counts and 28 day moving average)



*. latimes.com (monthly boxplots (outliers trimmed))

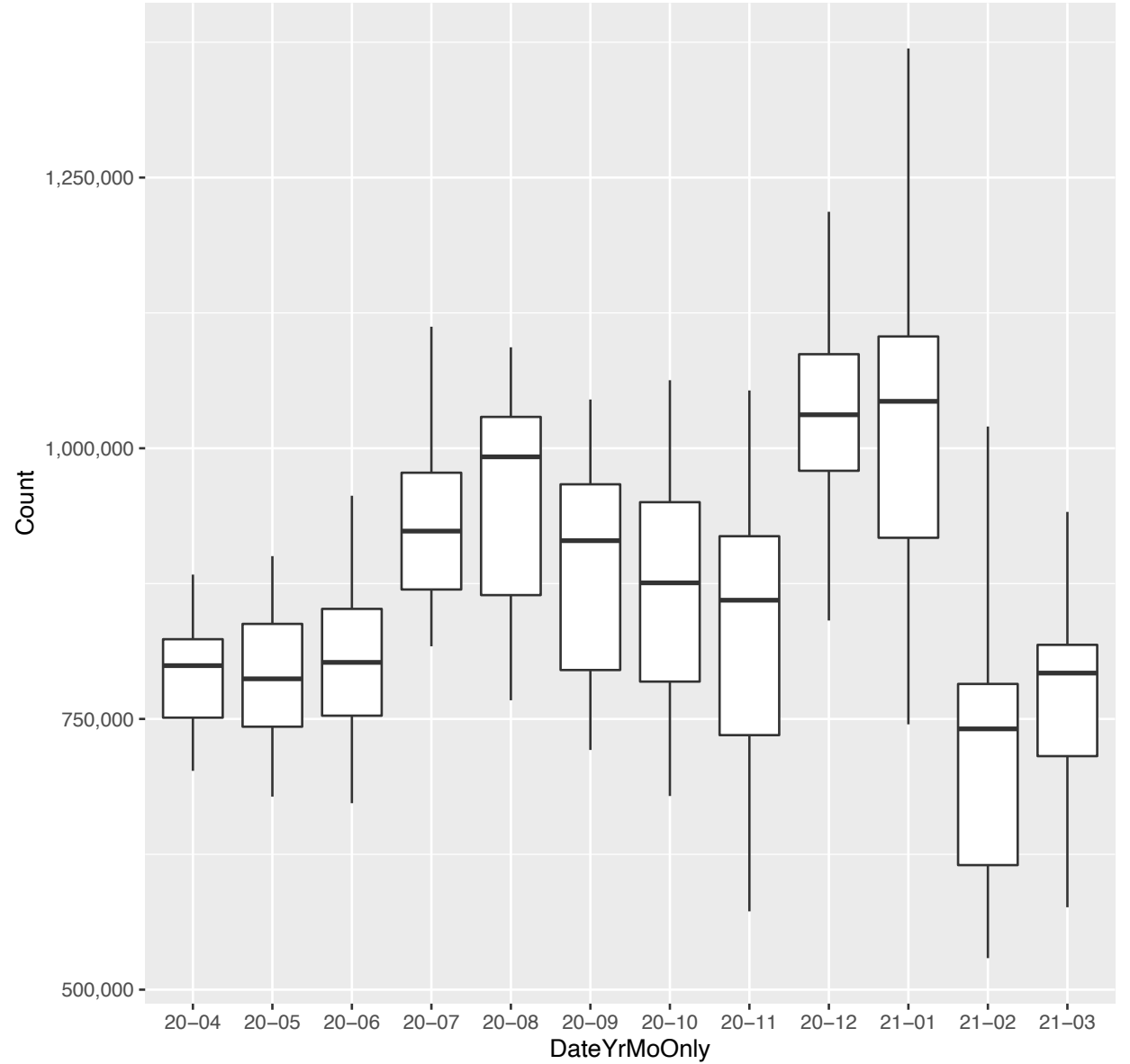


24. reuters.com: ~ M

*. reuters.com (day-by-day counts and 28 day moving average)



*. reuters.com (monthly boxplots (outliers trimmed))

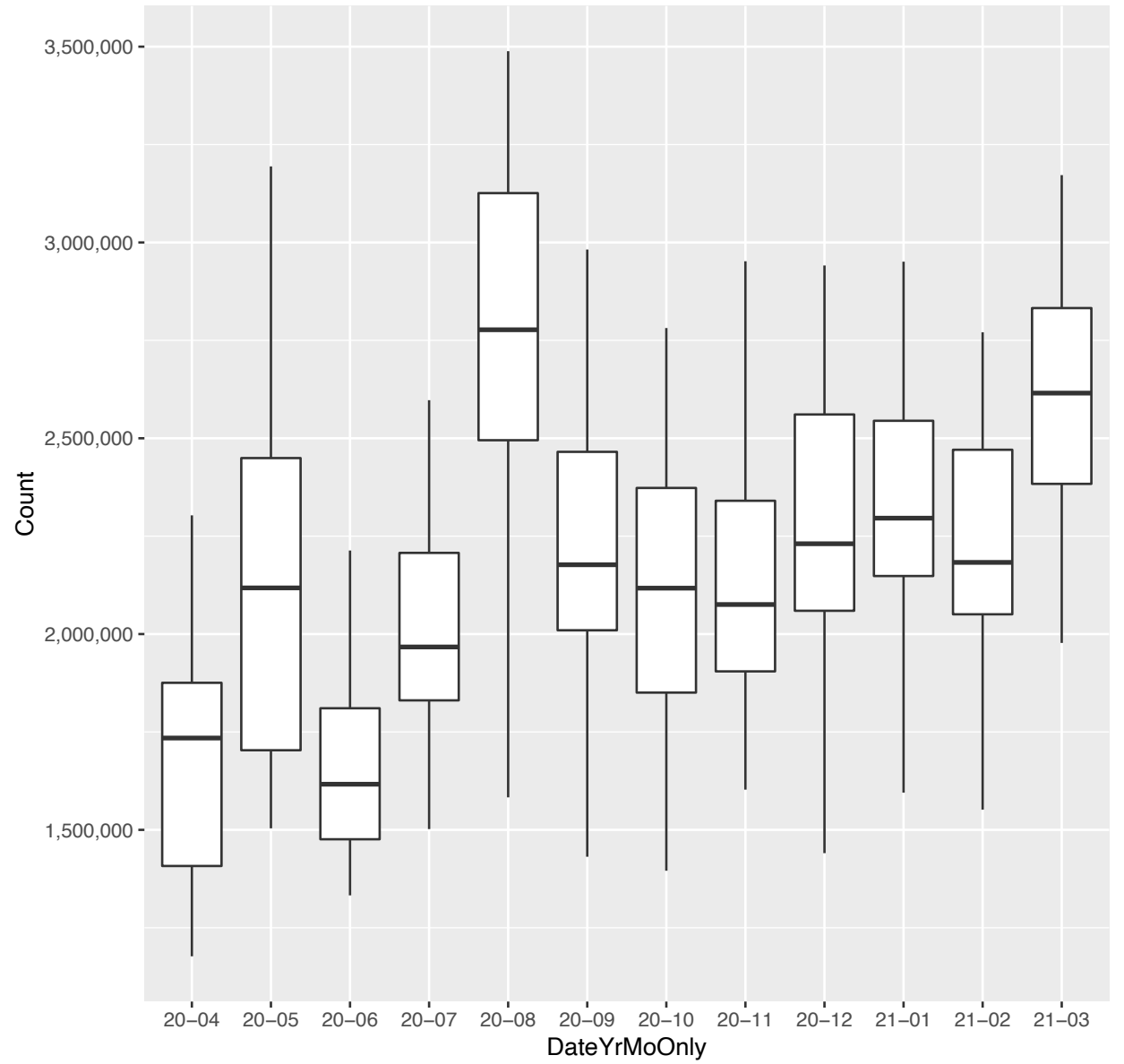




*. sky.com (day-by-day counts and 28 day moving average)



*. sky.com (monthly boxplots (outliers trimmed))



c) Conservative/Right-Leaning News and Opinion Sites

[\[back to all News Sites\]](#)

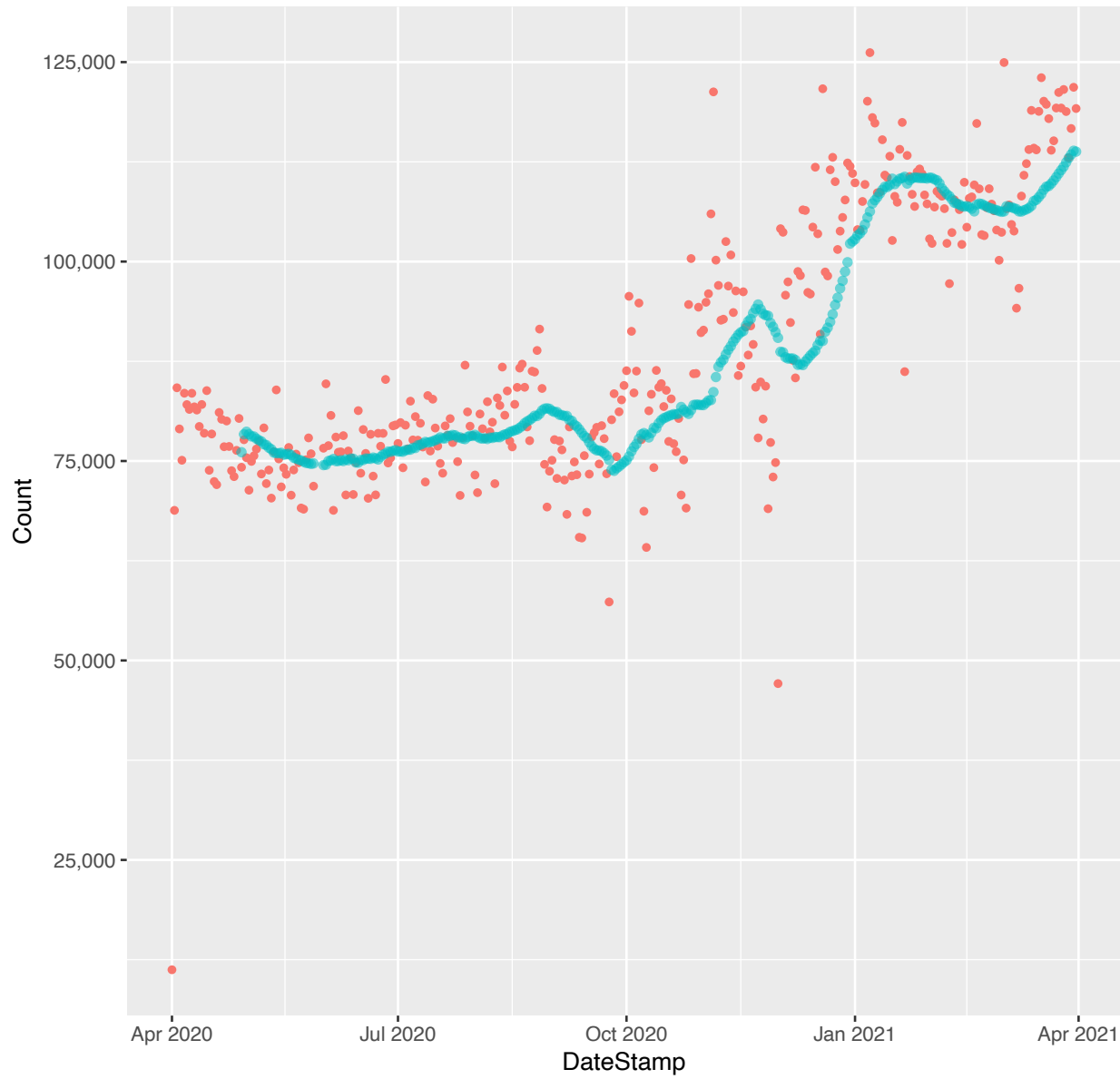
[\[back to TOC\]](#)

- 26 *.breitbart.com ↗
- 27 *.dailycaller.com ↗
- 28 *.drudgereport.com ∪ shaped (ending higher)
- 29 *.forbes.com ~
- 30 *.foxnews.com ↘
- 31 *.nationalreview.com ↗
- 32 *.nypost.com ↗ M
- 33 *.thegatewaypundit.com ↗
- 34 *.thesun.co.uk ↗
- 35 *.washingtontimes.com ↗
- 36 *.wsj.com * ~
- 37 *.zerohedge.com ↗

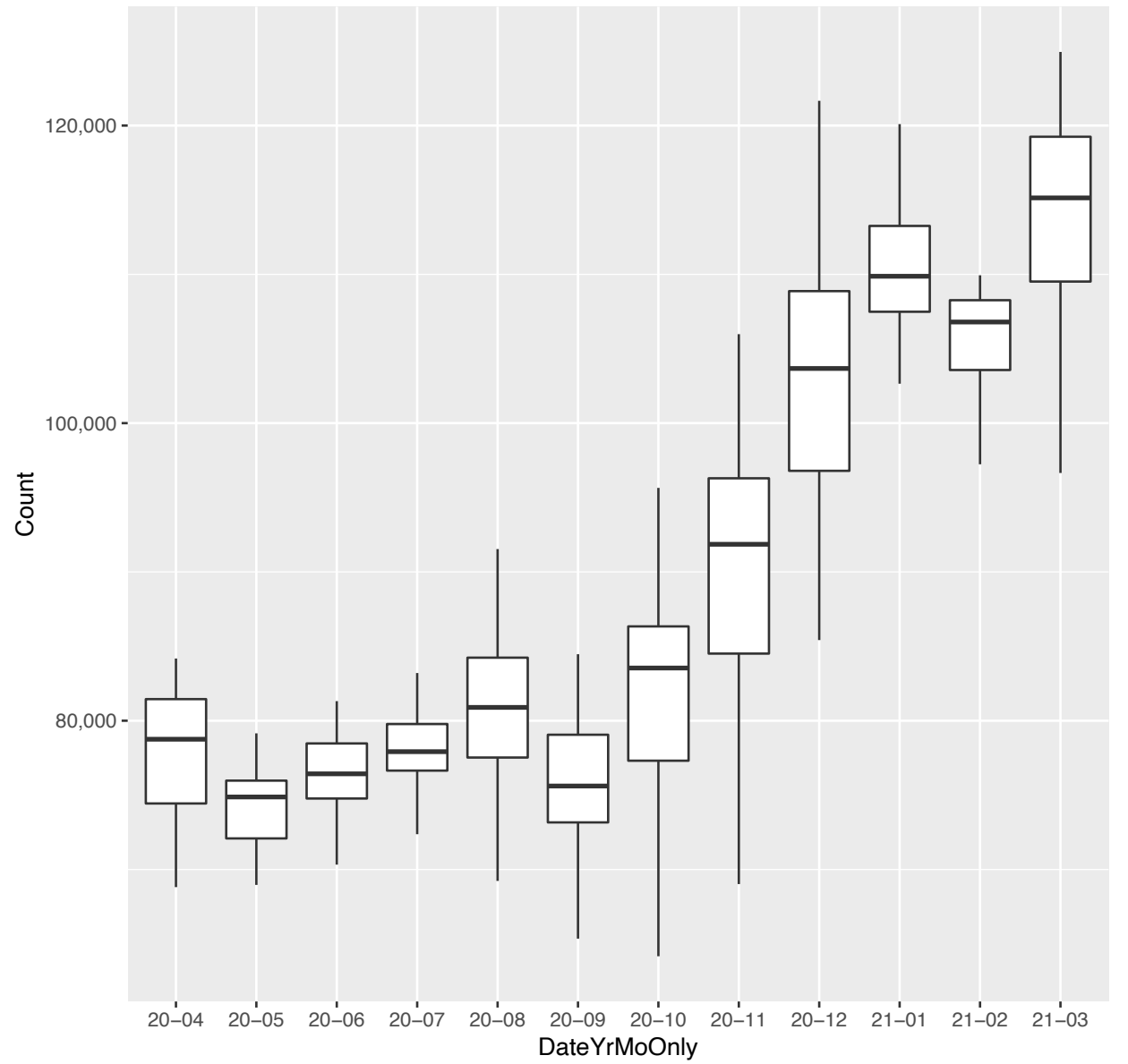
26. breitbart.com:



*. breitbart.com (day-by-day counts and 28 day moving average)

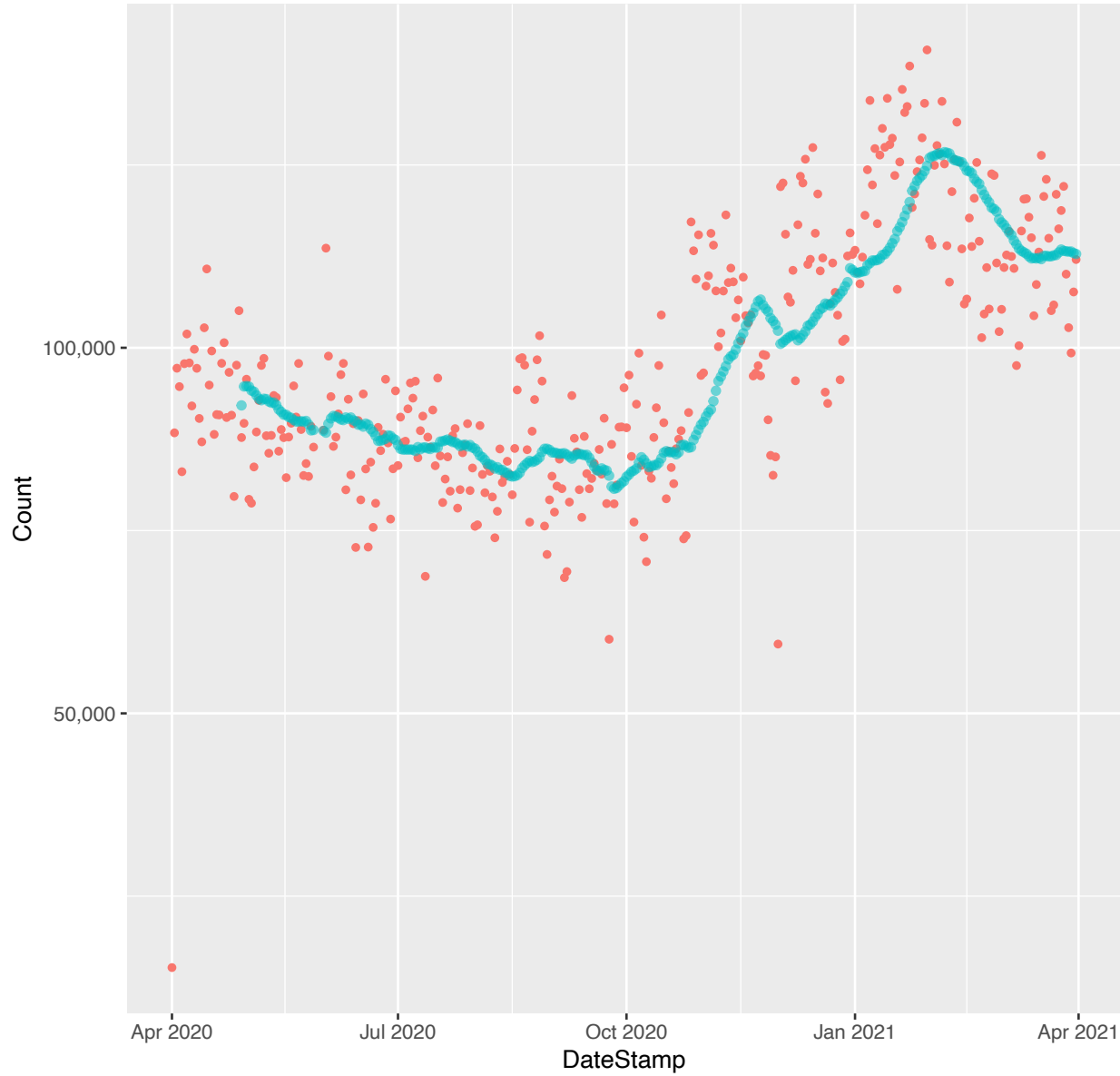


*. breitbart.com (monthly boxplots (outliers trimmed))

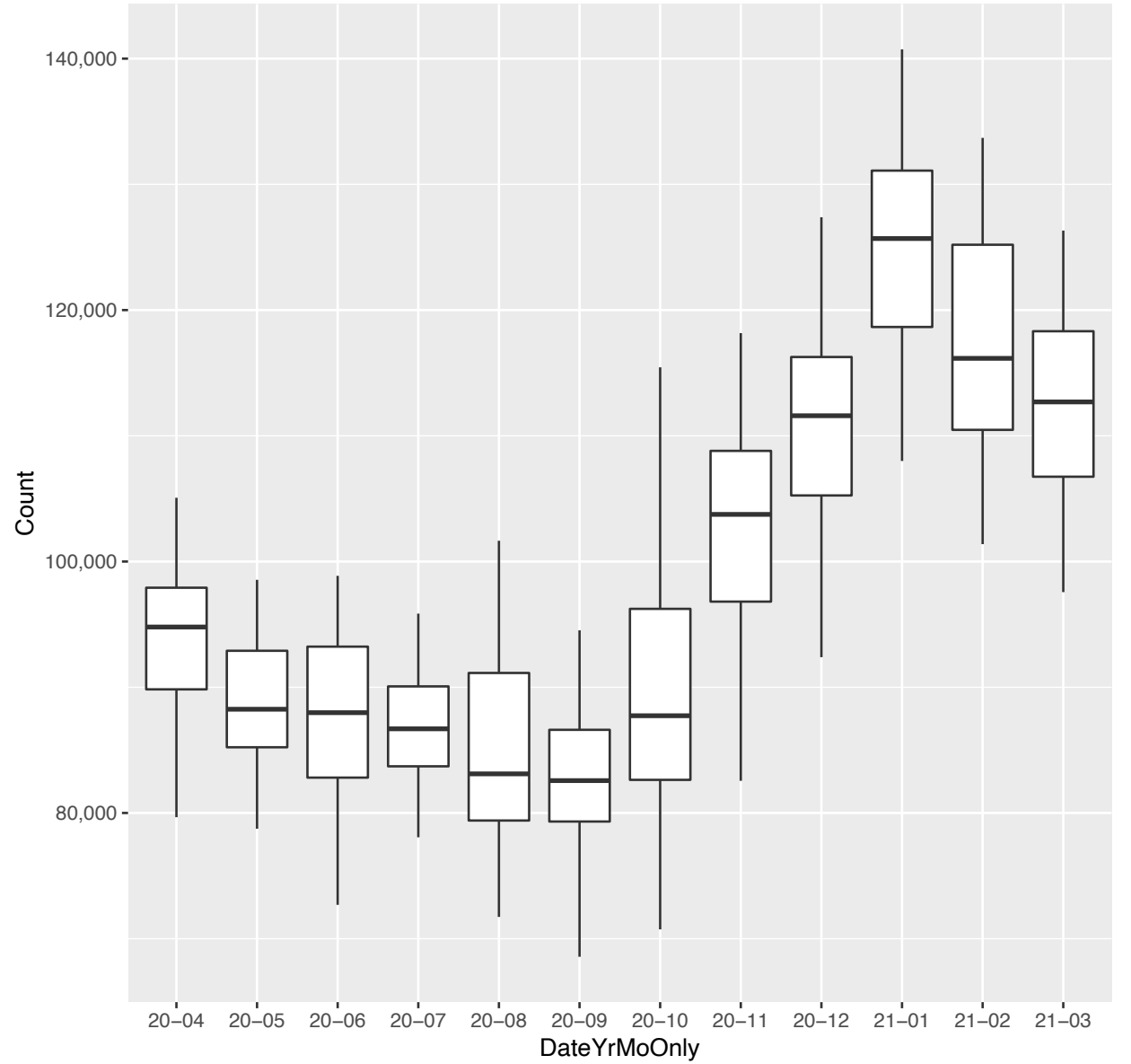


27. dailycaller.com: ↗

*. dailycaller.com (day-by-day counts and 28 day moving average)



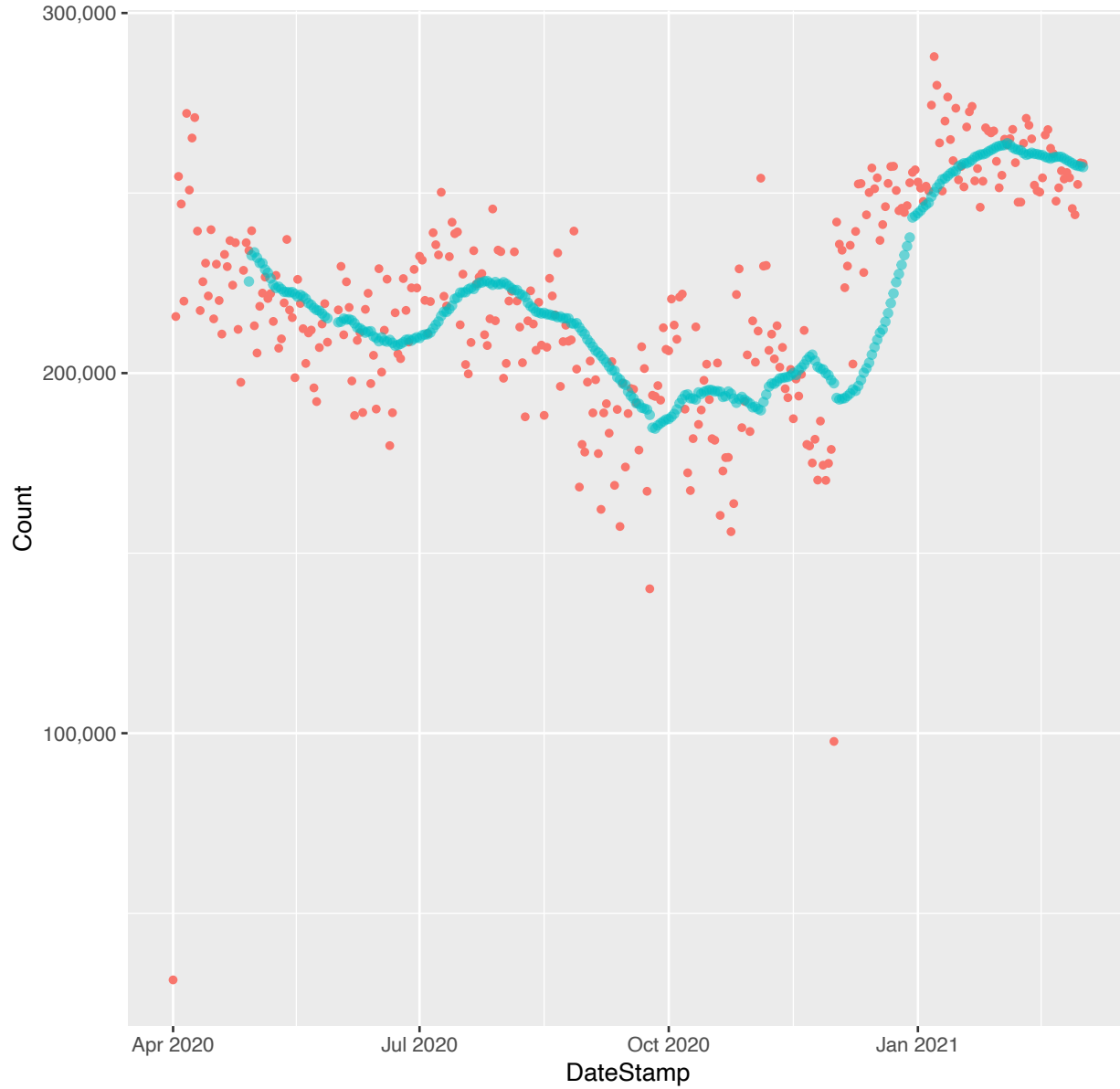
*. dailycaller.com (monthly boxplots (outliers trimmed))



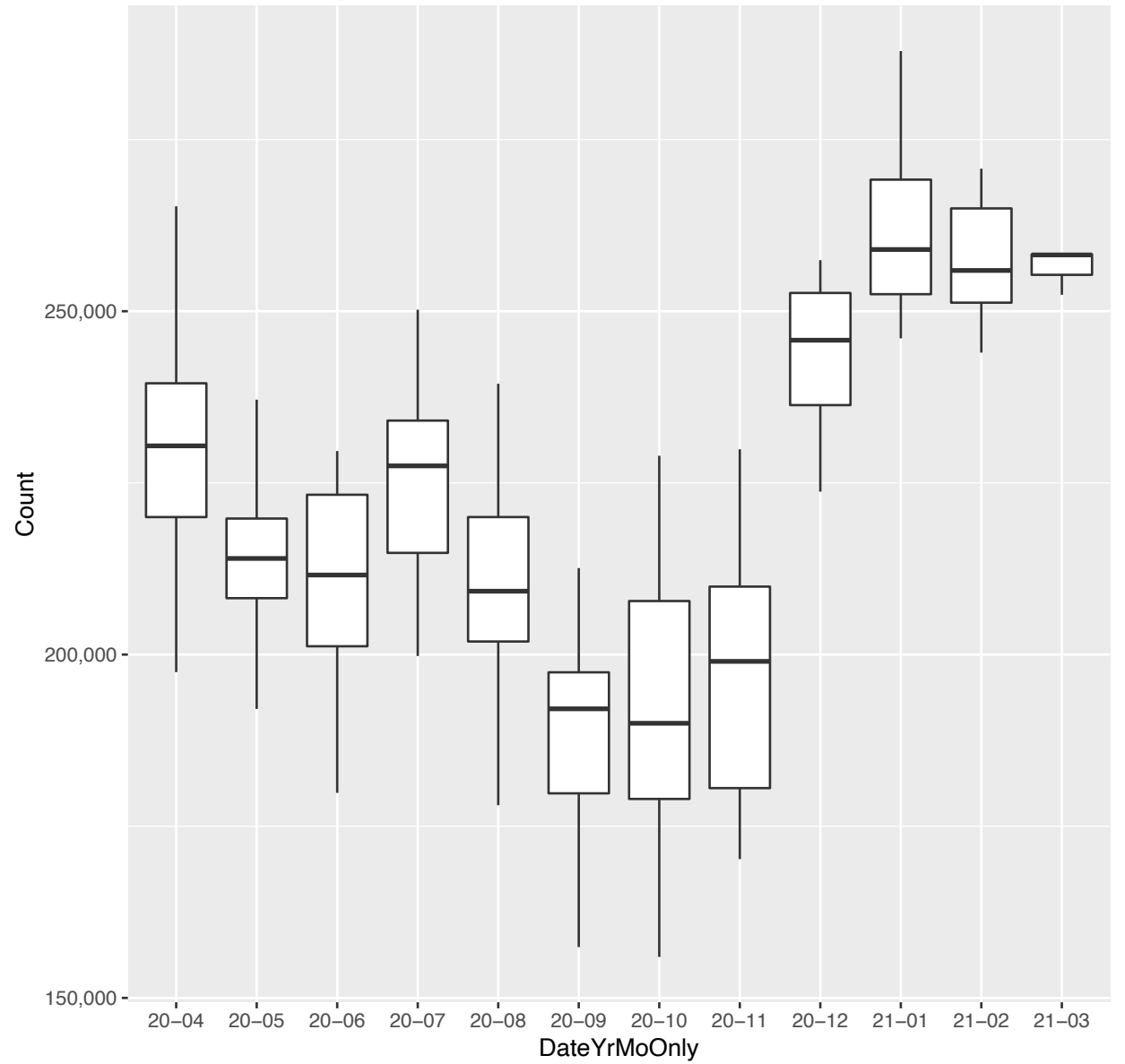
28. drudgereport.com:

U shaped (ending higher)

*. drudgereport.com (day-by-day counts and 28 day moving average)



*. drudgereport.com (monthly boxplots (outliers trimmed))



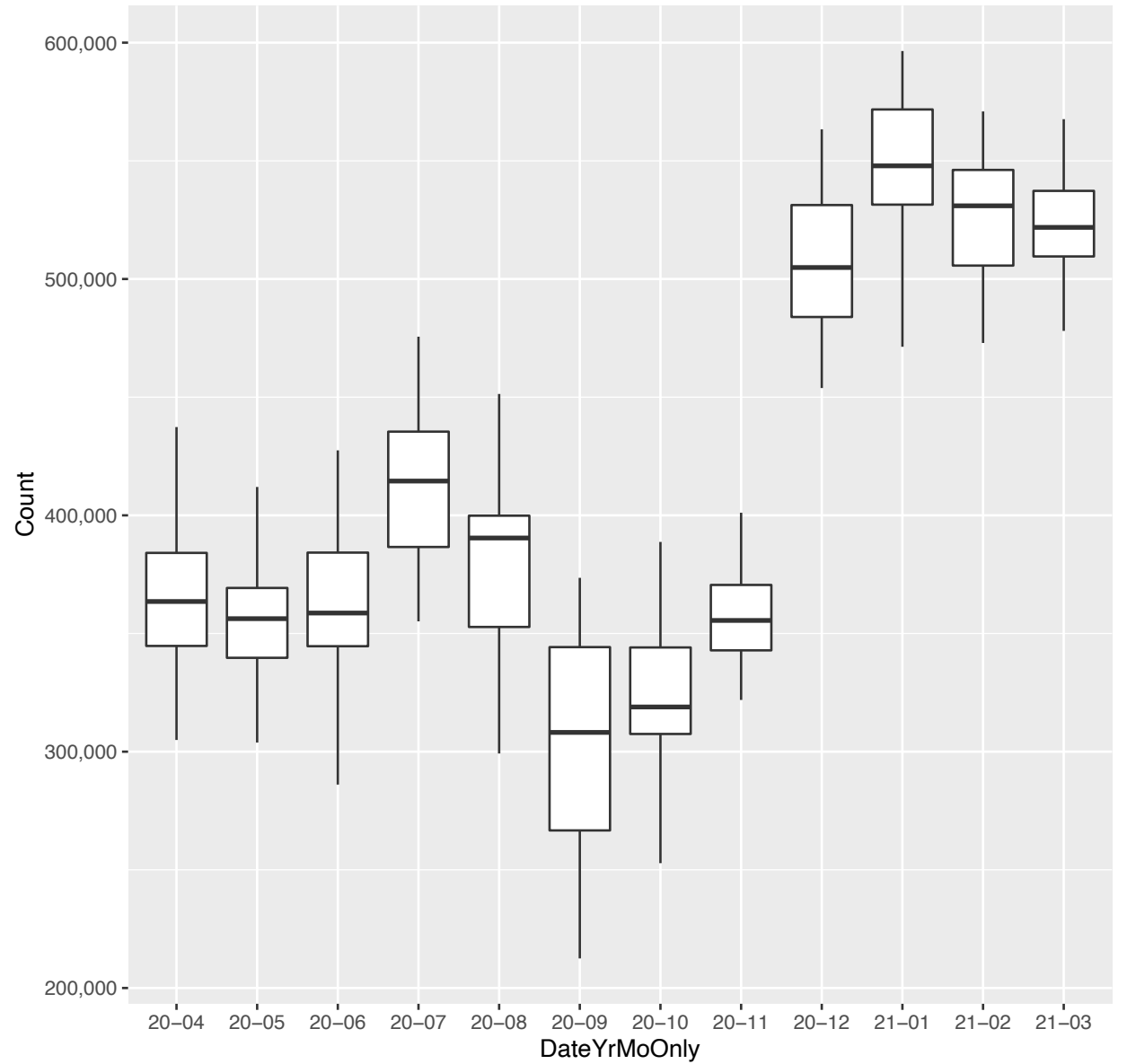
29. forbes.com:

~

*. forbes.com (day-by-day counts and 28 day moving average)



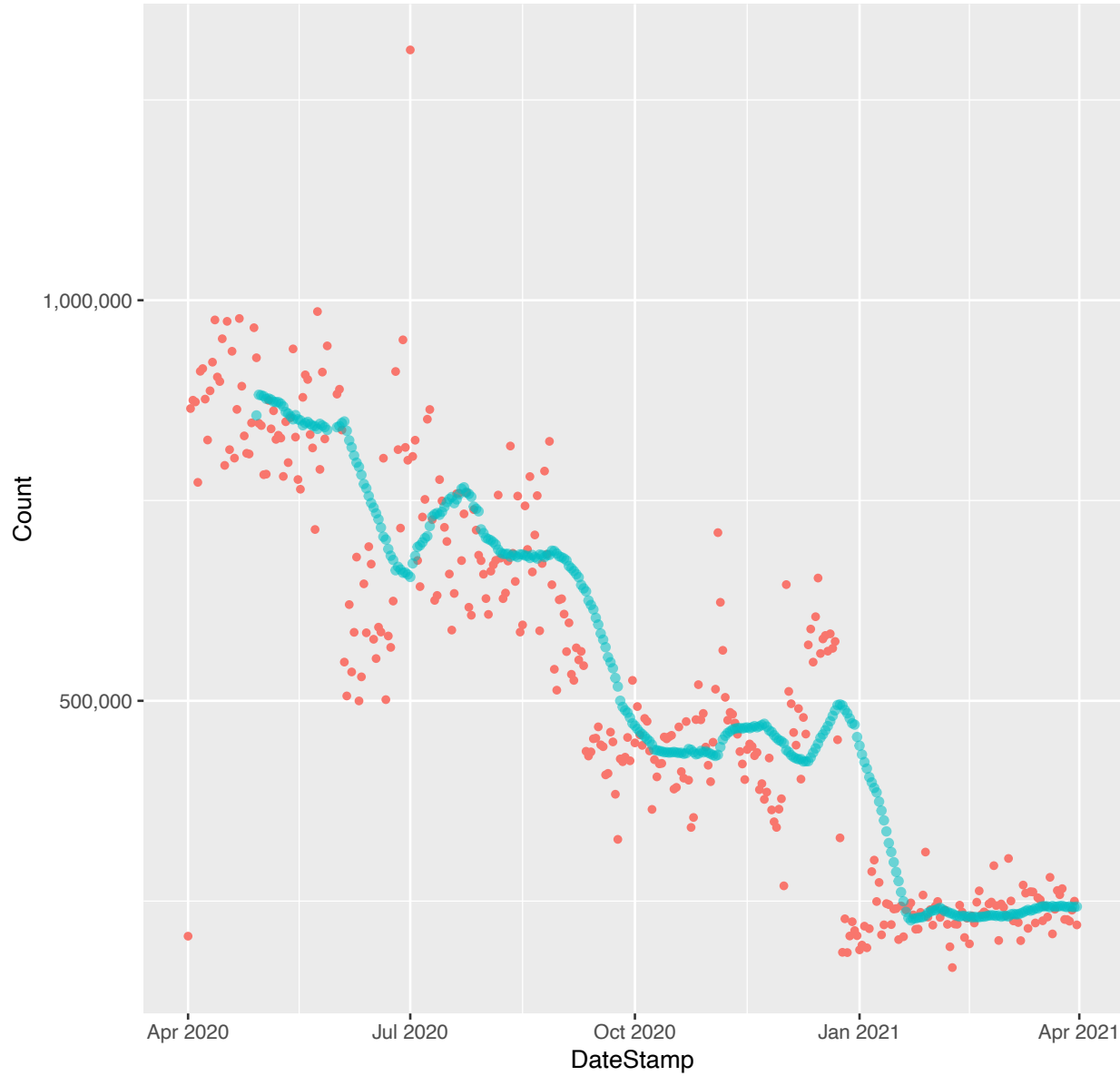
*. forbes.com (monthly boxplots (outliers trimmed))



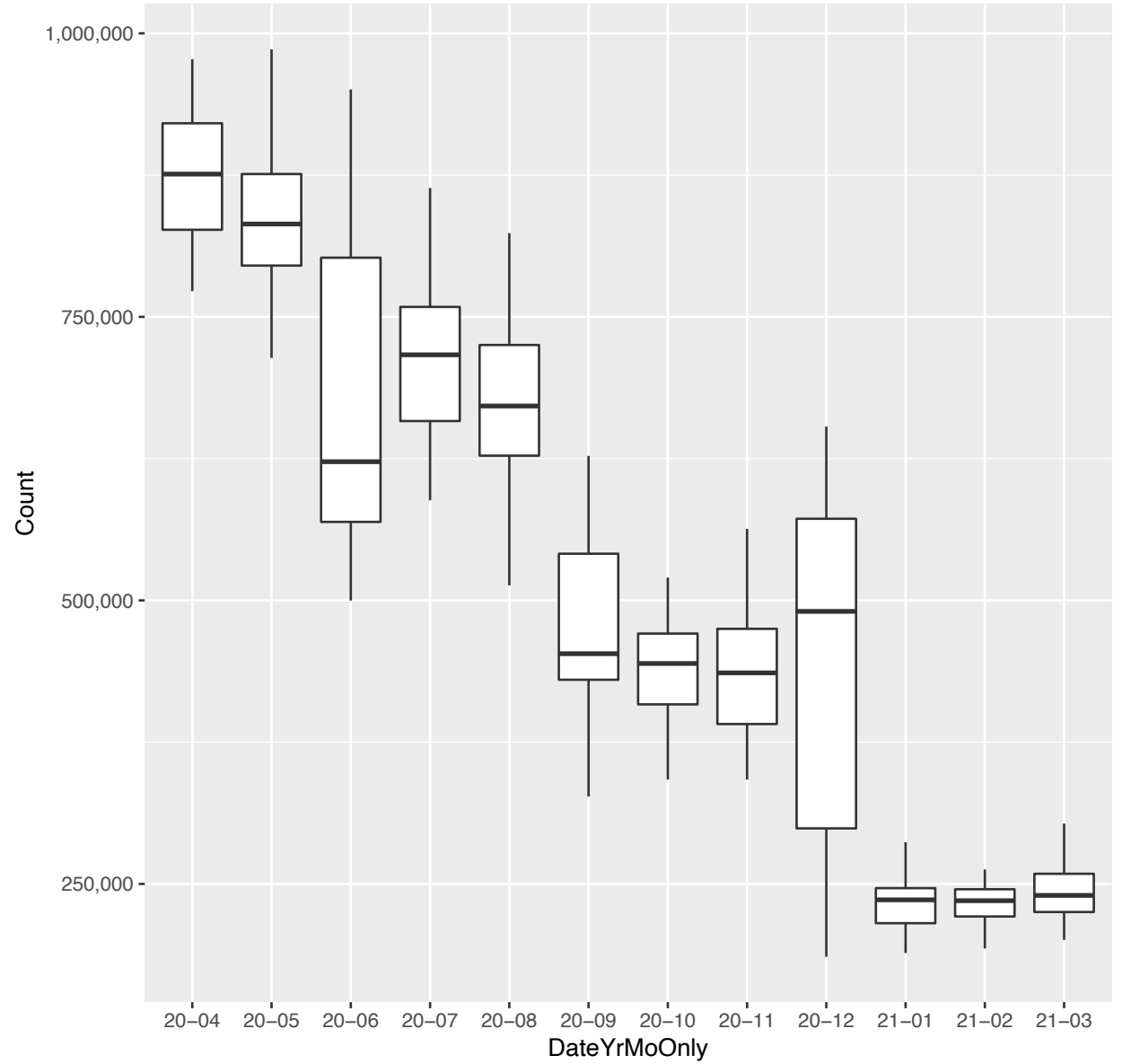
30. foxnews.com:



*. foxnews.com (day-by-day counts and 28 day moving average)



*. foxnews.com (monthly boxplots (outliers trimmed))

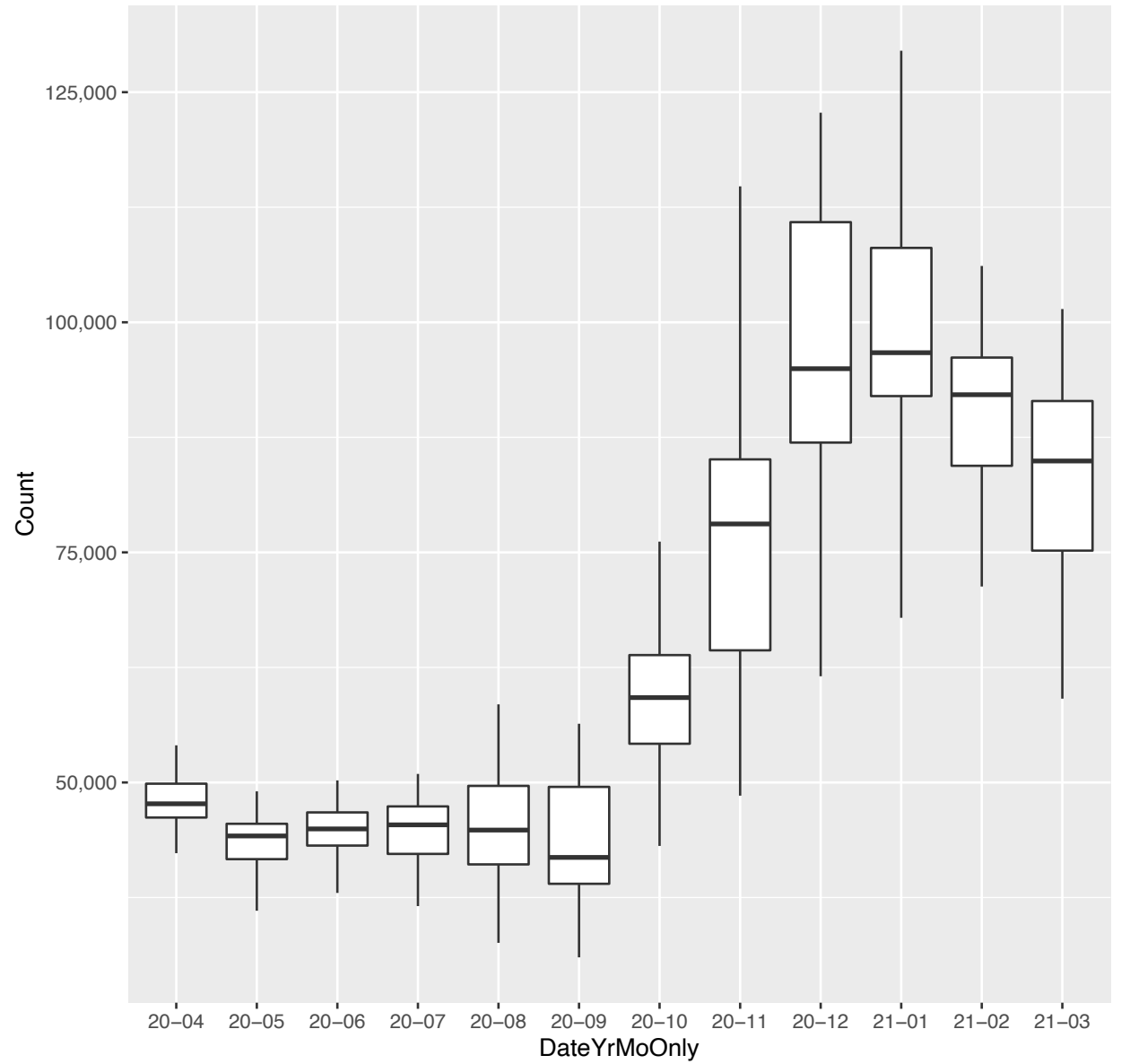


31. nationalreview.com: ↗

*. nationalreview.com (day-by-day counts and 28 day moving average)



*. nationalreview.com (monthly boxplots (outliers trimmed))

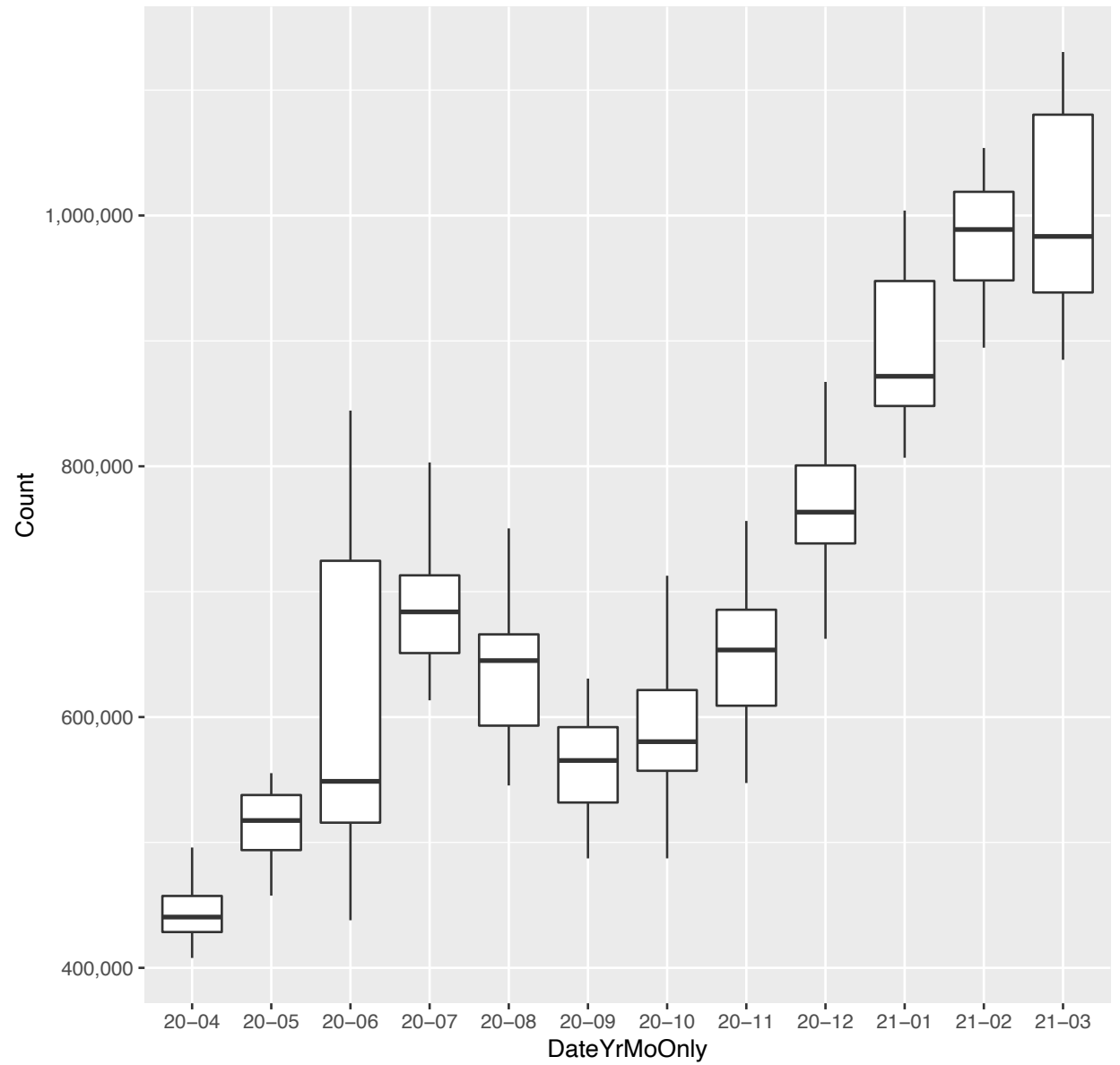




*. nyost.com (day-by-day counts and 28 day moving average)



*. nyost.com (monthly boxplots (outliers trimmed))

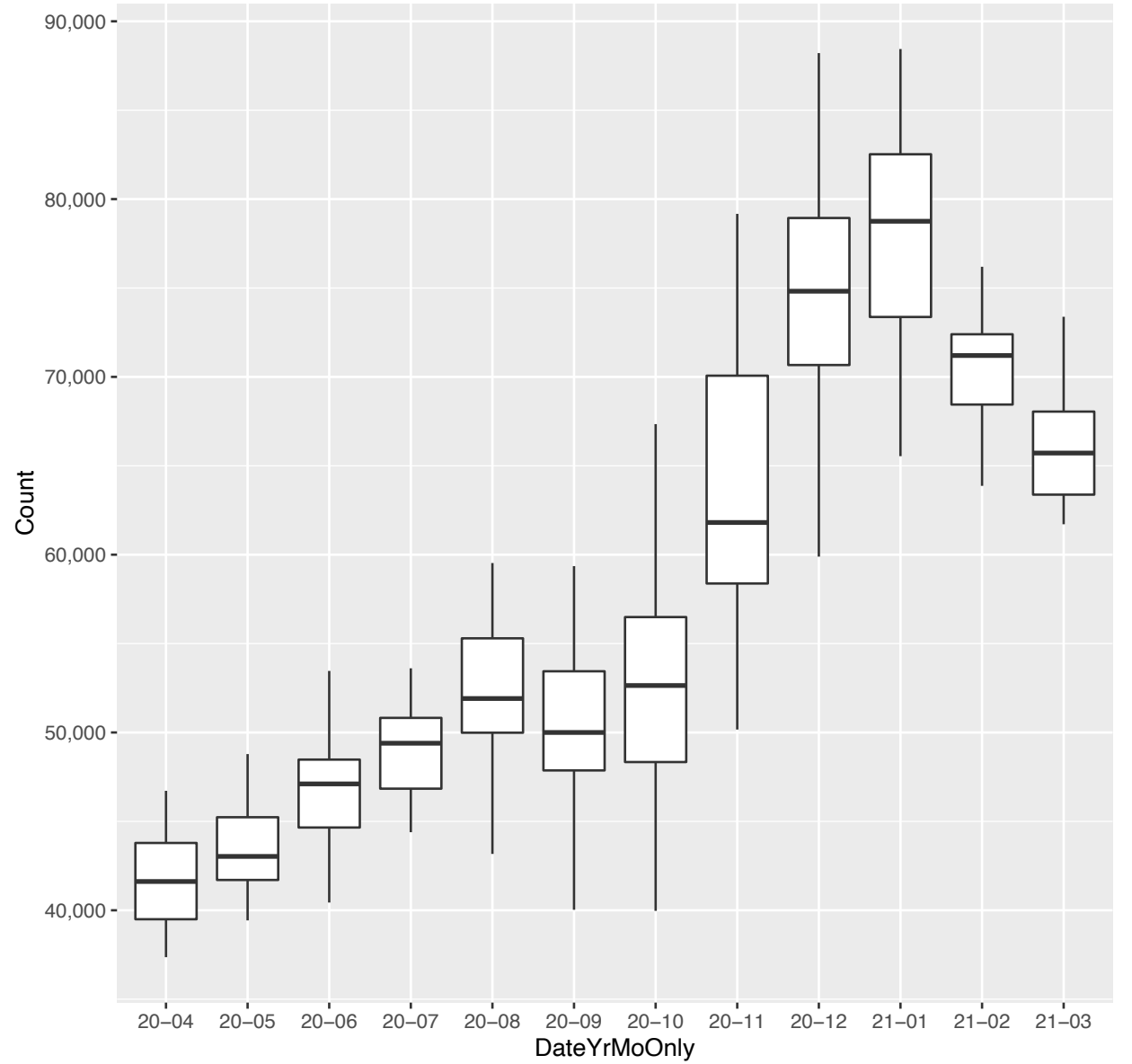


33. thegatewaypundit.com: ↗

*. thegatewaypundit.com (day-by-day counts and 28 day moving average)



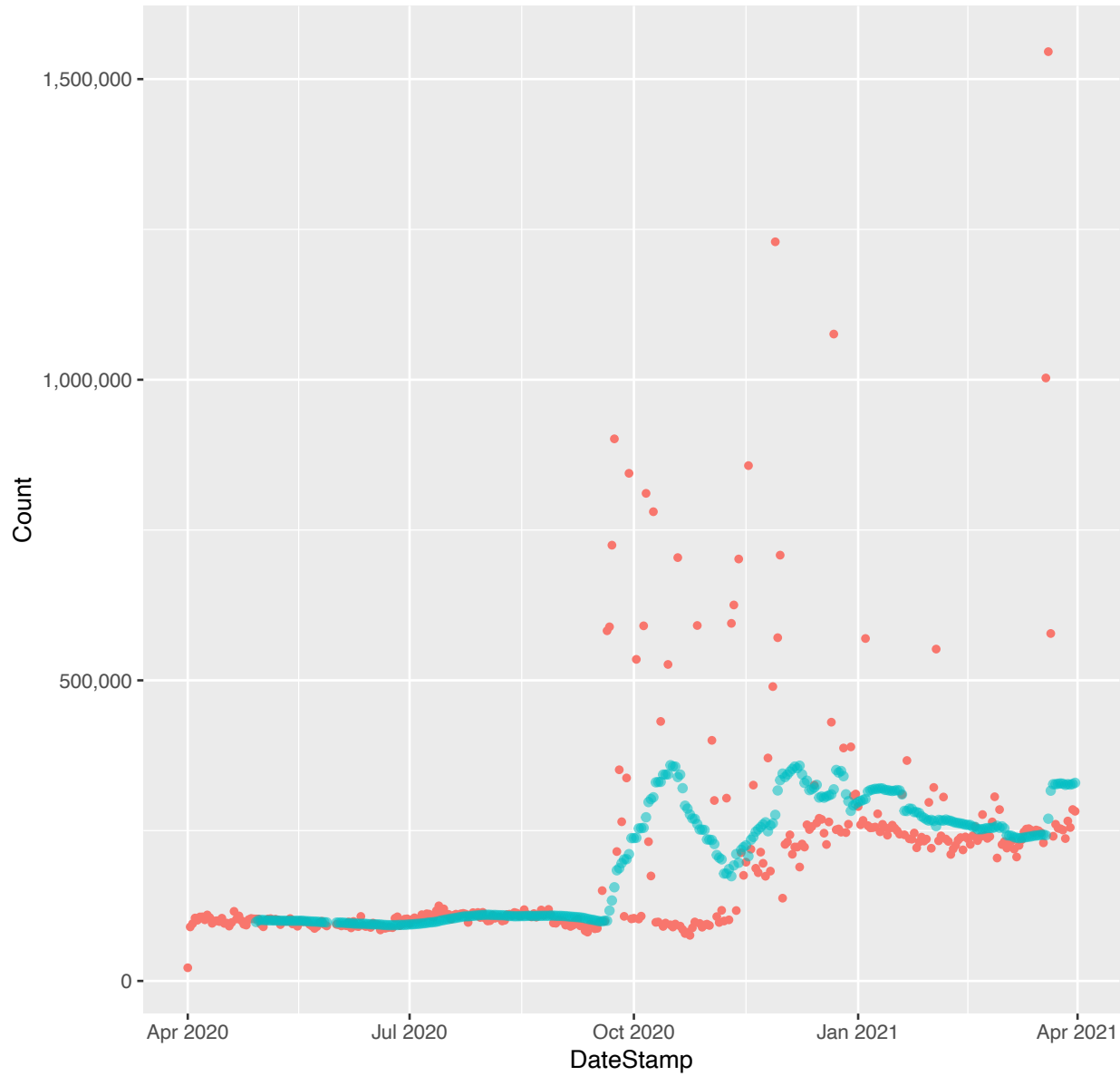
*. thegatewaypundit.com (monthly boxplots (outliers trimmed))



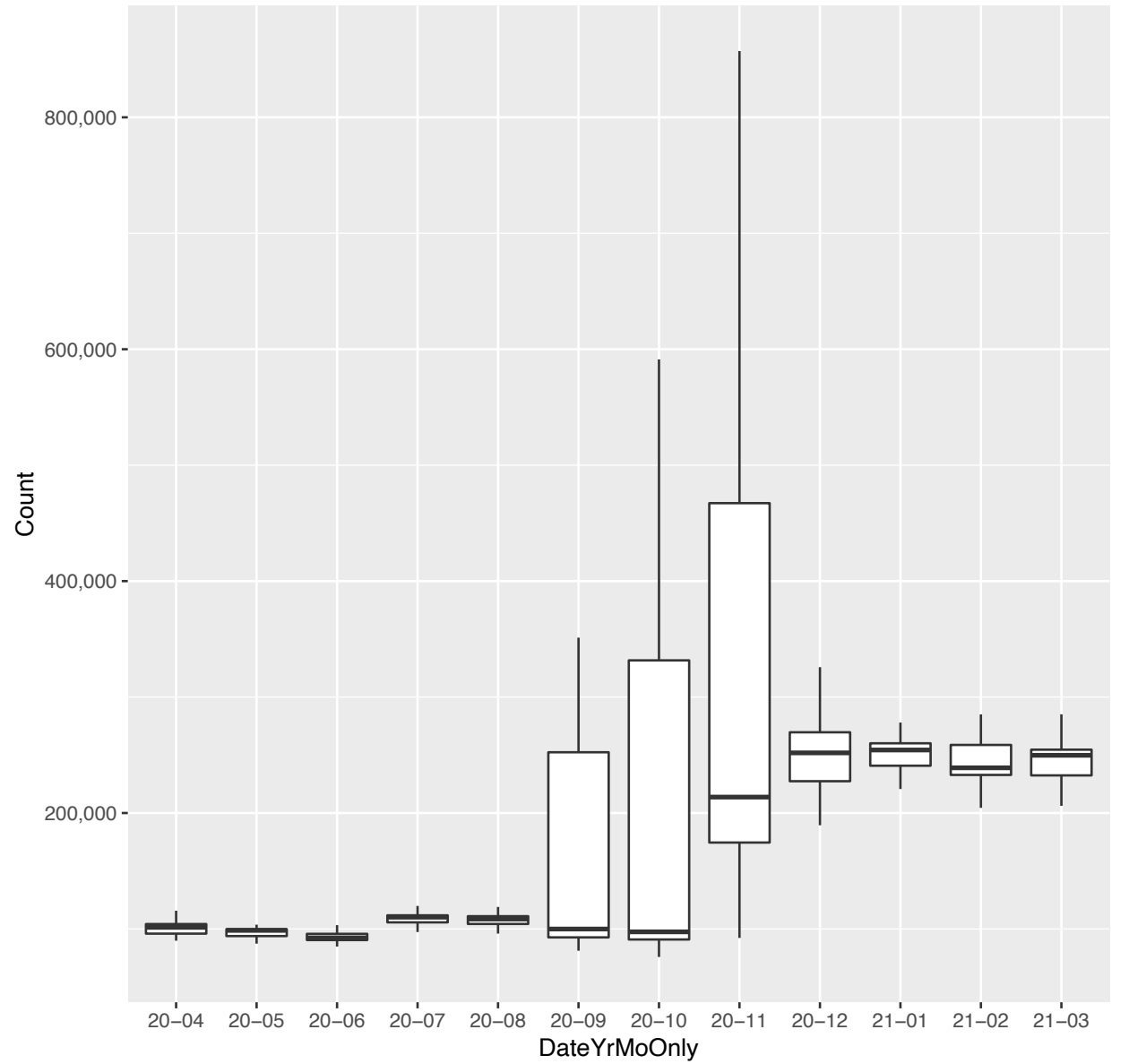
34. thesun.co.uk:



*. thesun.co.uk (day-by-day counts and 28 day moving average)

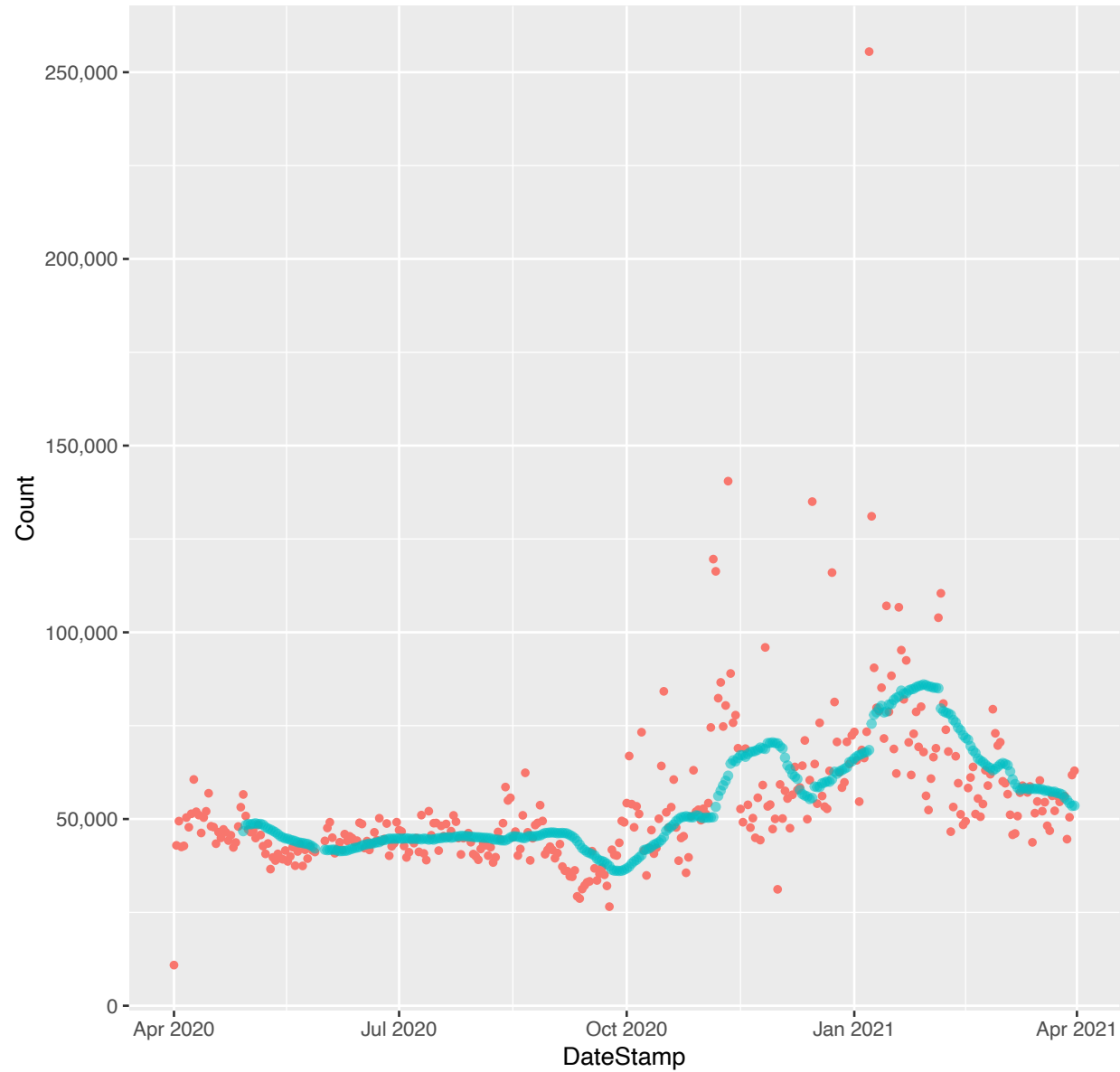


*. thesun.co.uk (monthly boxplots (outliers trimmed))

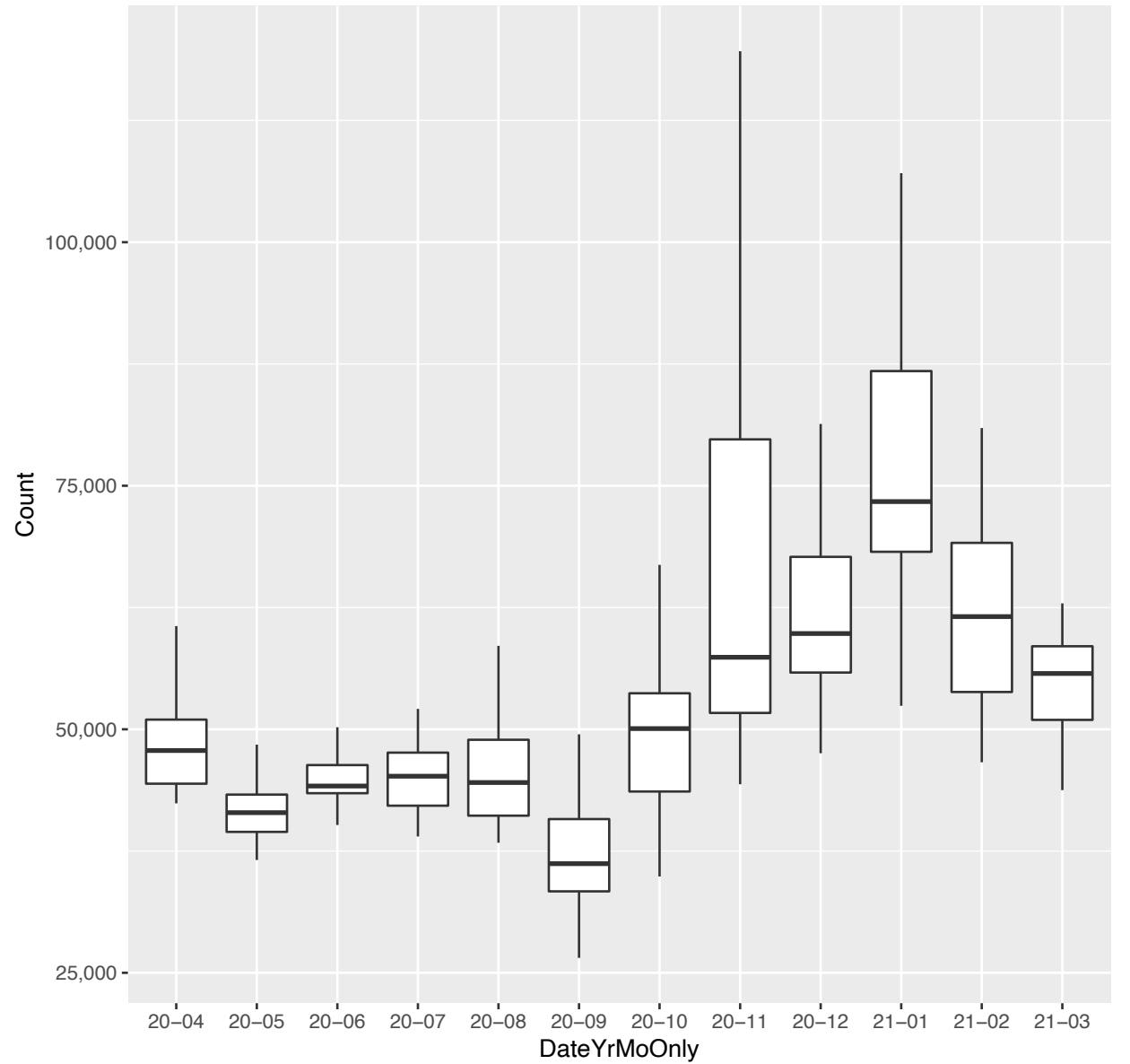


35. washingtontimes.com: ↗

*. washingtontimes.com (day-by-day counts and 28 day moving average)



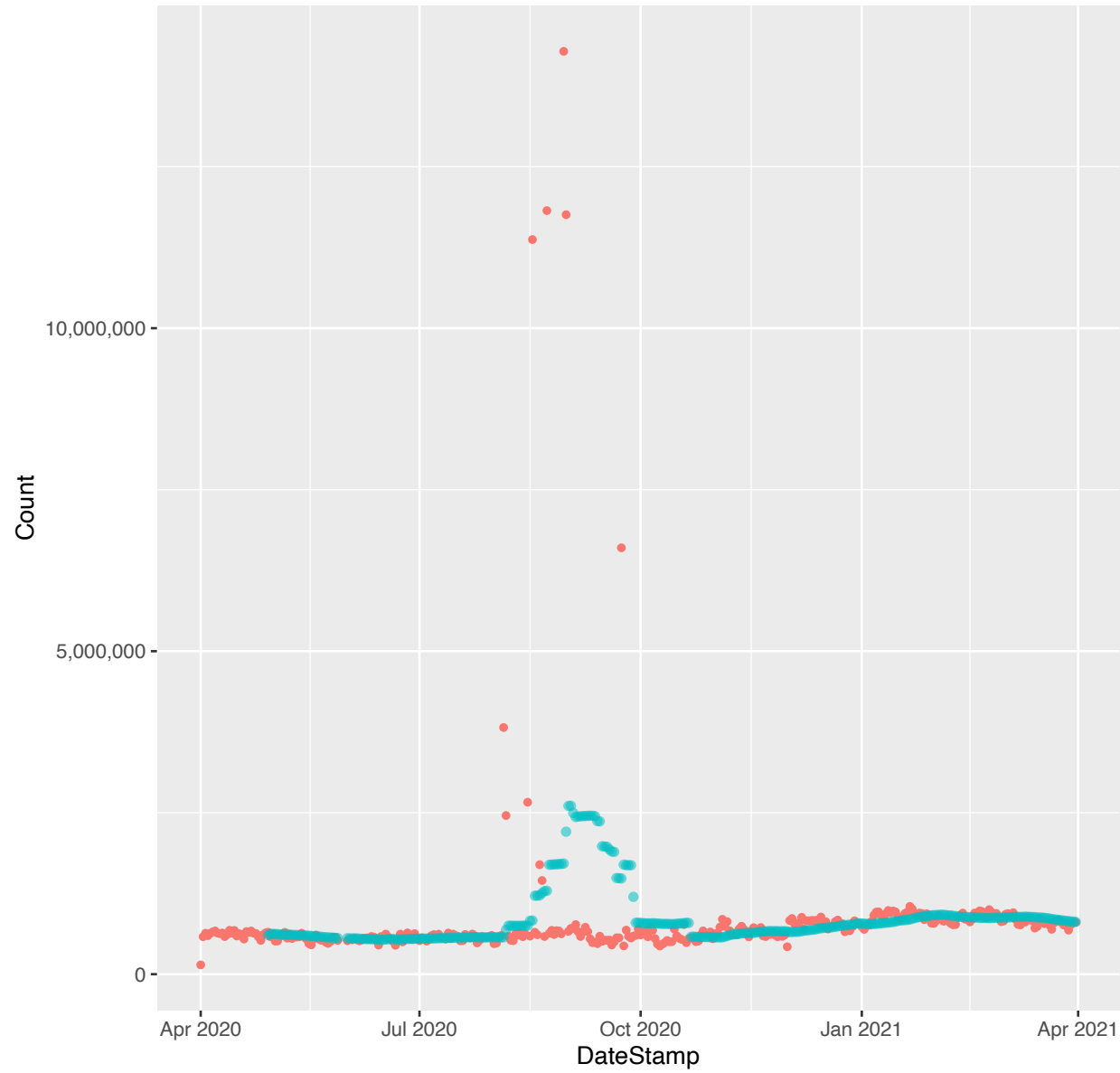
*. washingtontimes.com (monthly boxplots (outliers trimmed))



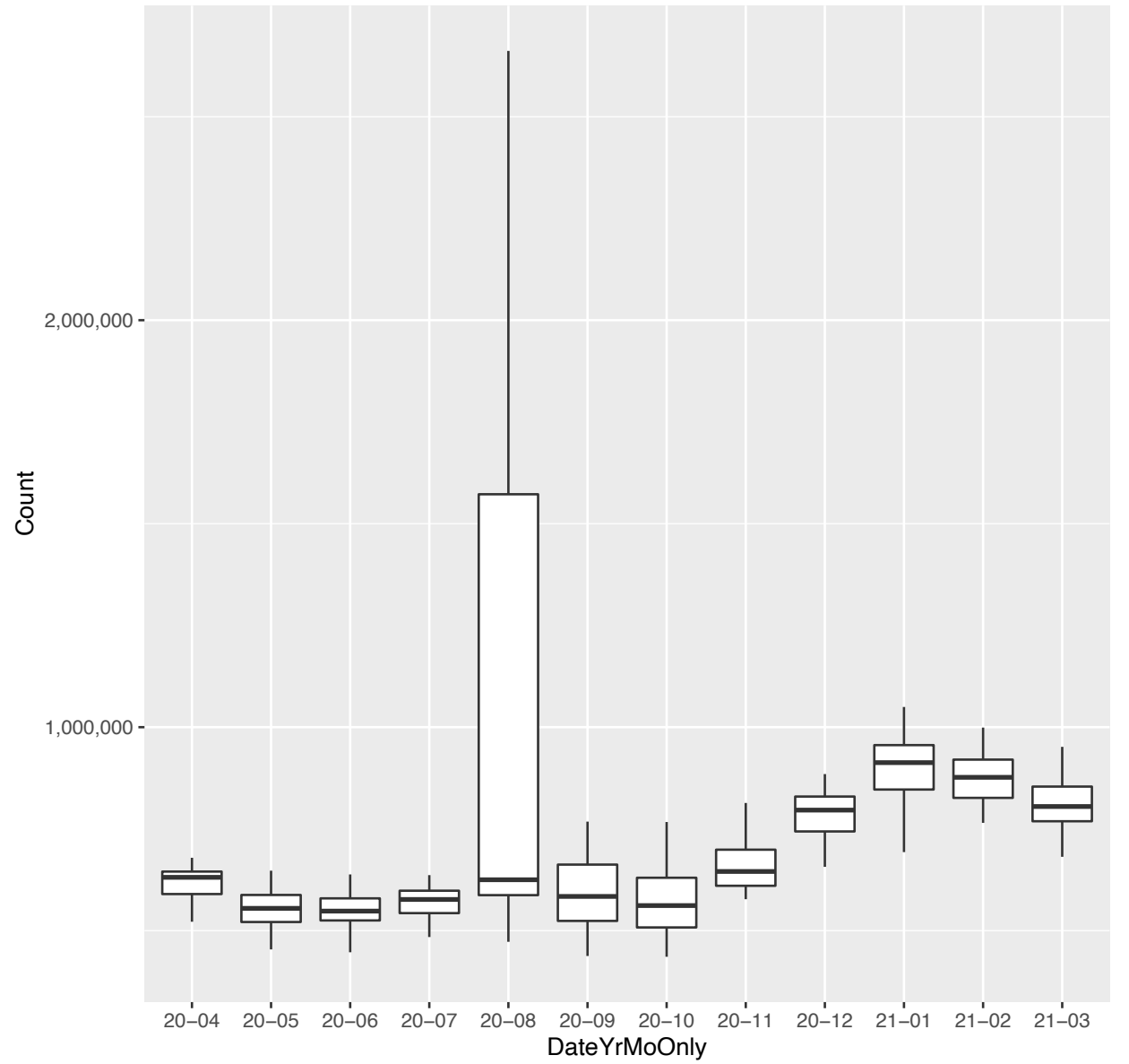
36. wsj.com:



*. wsj.com (day-by-day counts and 28 day moving average)

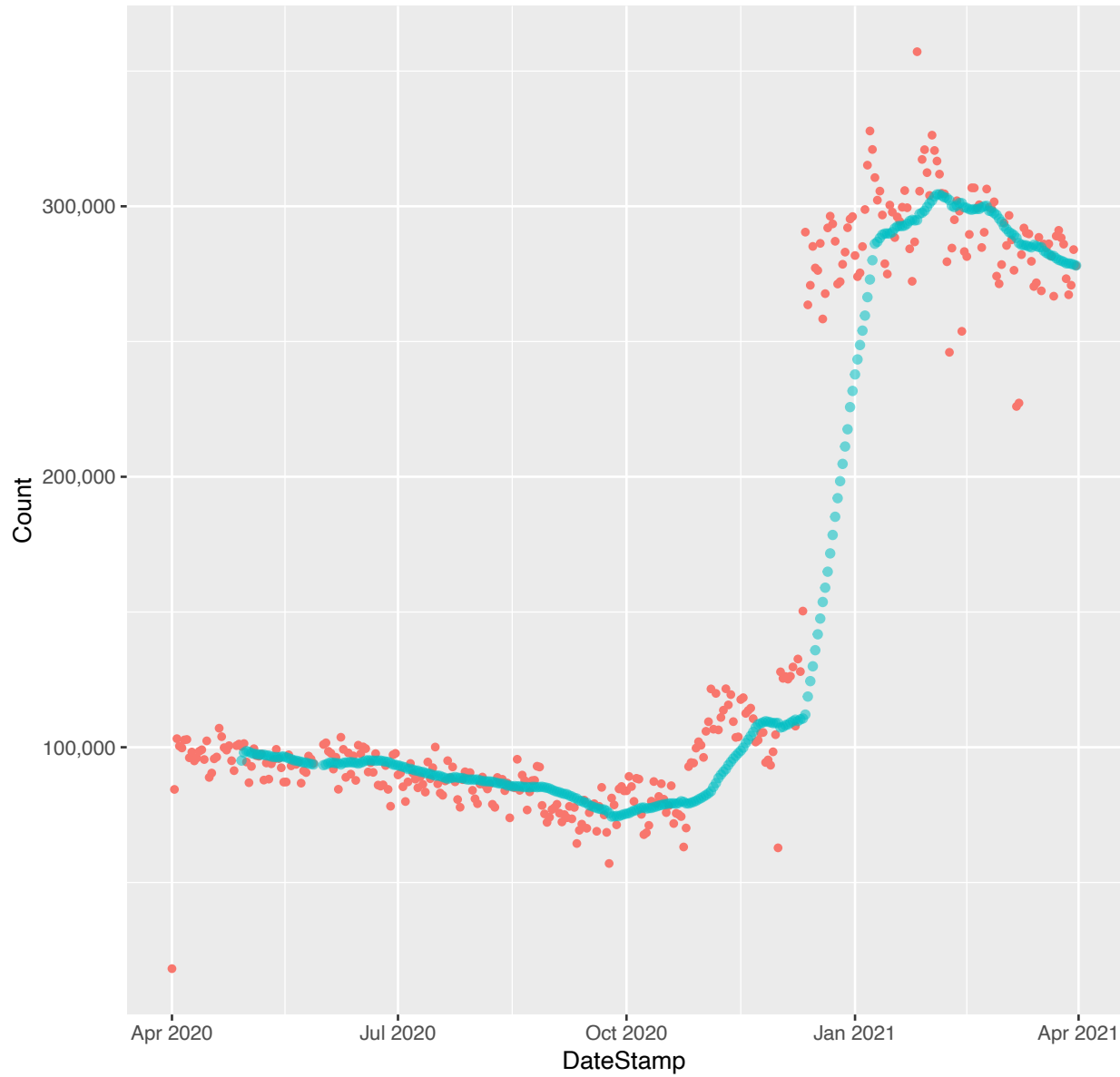


*. wsj.com (monthly boxplots (outliers trimmed))

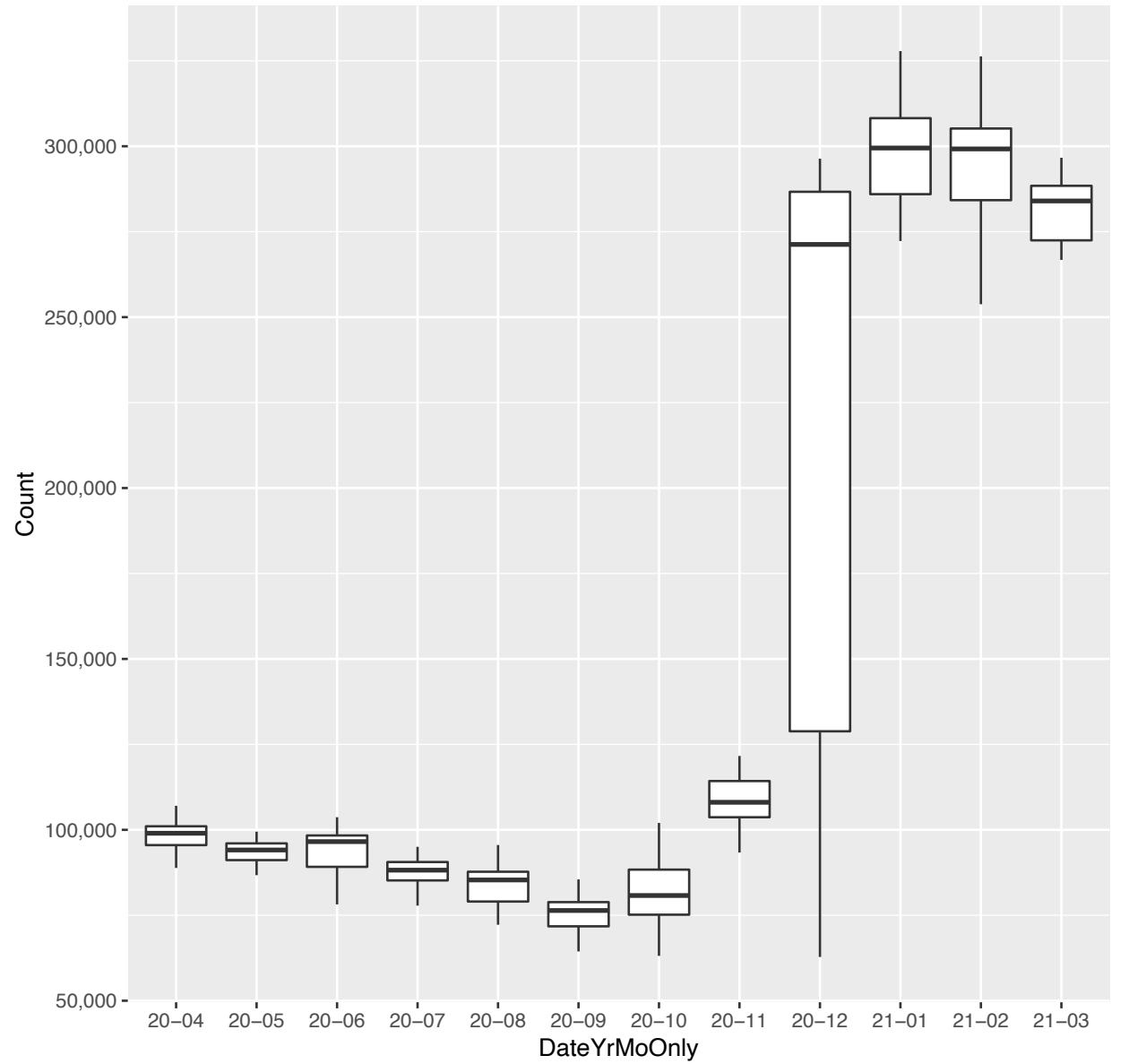


37. zerohedge.com: ↗

*. zerohedge.com (day-by-day counts and 28 day moving average)



*. zerohedge.com (monthly boxplots (outliers trimmed))



VIII. Retail Sites

[\[back to TOC\]](#)

- a) [Clothing and Department Stores \(1-14\)](#)
- b) [Consumer Electronics \(15-20\)](#)
- c) [Convenience Stores \(21-22\)](#)
- d) [Dollar Stores \(23-25\)](#)
- e) [Drug Stores \(26-28\)](#)
- f) [Fast Food and Coffee \(29-46\)](#)
- g) [Food Delivery \(47-53\)](#)
- h) [Gas Stations \(54-60\)](#)
- i) [Grocery Stores \(61-69\)](#)
- j) [Home Improvements \(70-76\)](#)
- k) [Online Retailers \(77-84\)](#)
- l) [Pets \(85-87\)](#)
- m) [Warehouse Clubs \(88-89\)](#)
- n) [Weddings \(90\)](#)

Retail sites are among some of the most dramatically impacted sites of the Covid era. Check out [chewy.com](#), for example -- clearly their model is working well during lockdown, ditto for [Chick-Fil-A.com](#), [Costco.com](#), [Doordash.com](#), [Kroger.com](#), [Publix.com](#), and some of the others shown here. Some other brands have just "held steady," but during these challenging times, even that can be considered a significant accomplishment.

a) Clothing and Department Stores:

[\[back to Retail Sites\]](#)

[\[back to TOC\]](#)

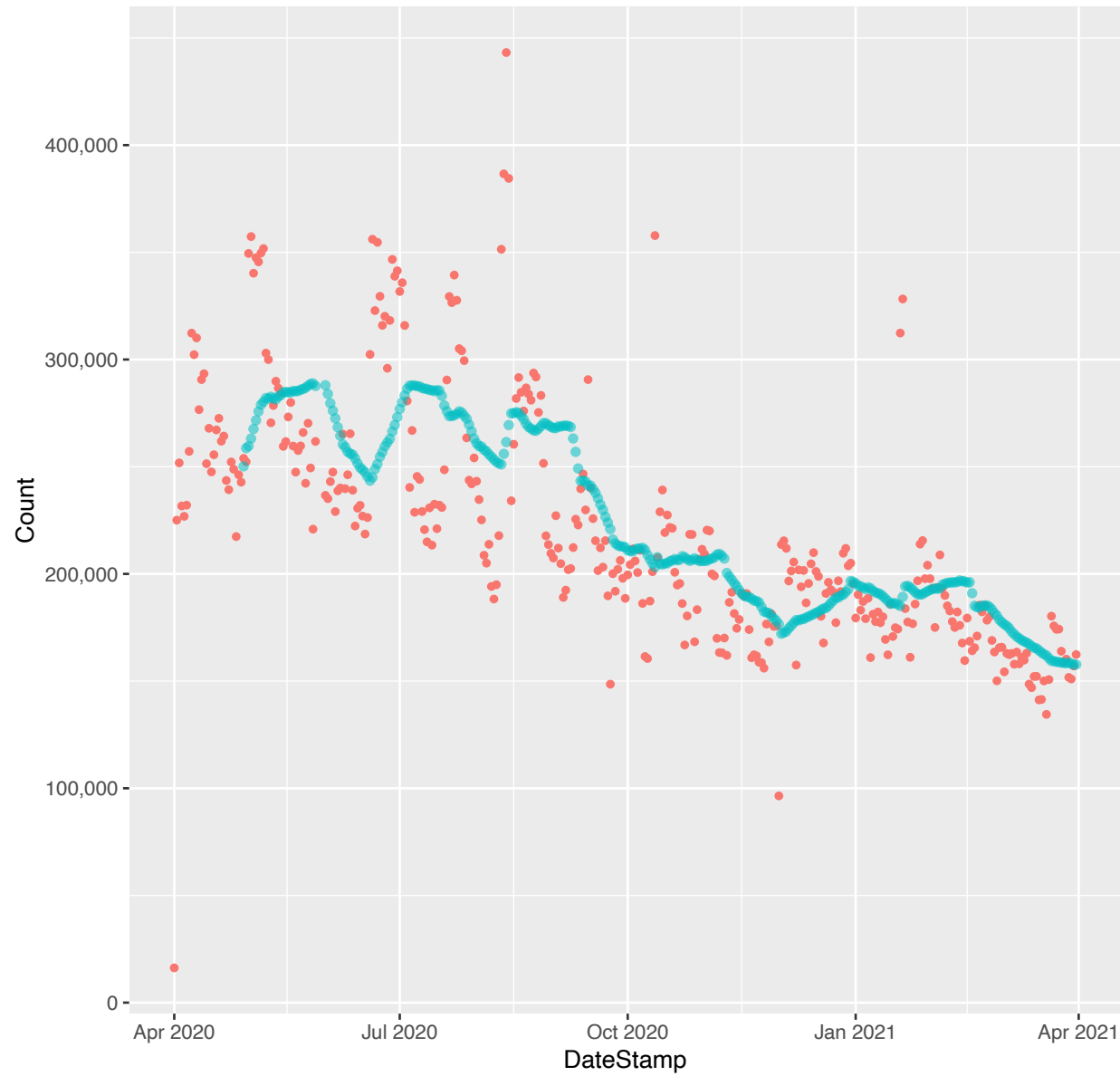
Clothing and Department Stores

1	*.bloomingdales.com		↘	
2	*.express.com		~	
3	*.gap.com	✱	↗	
4	*.hm.com	✱	↗	
5	*.jcpenney.com	✱	~	
6	*.kohls.com	✱	→	M
7	*.macys.com		~	
8	*.marshalls.com		↗	
9	*.neimanmarcus.com		U shaped (ending lower)	
10	*.nordstrom.com		~	M
11	*.saksfifthavenue.com		↗	
12	*.sears.com		↗	
13	*.target.com	✱	↗	
14	*.walmart.com	✱	~	M

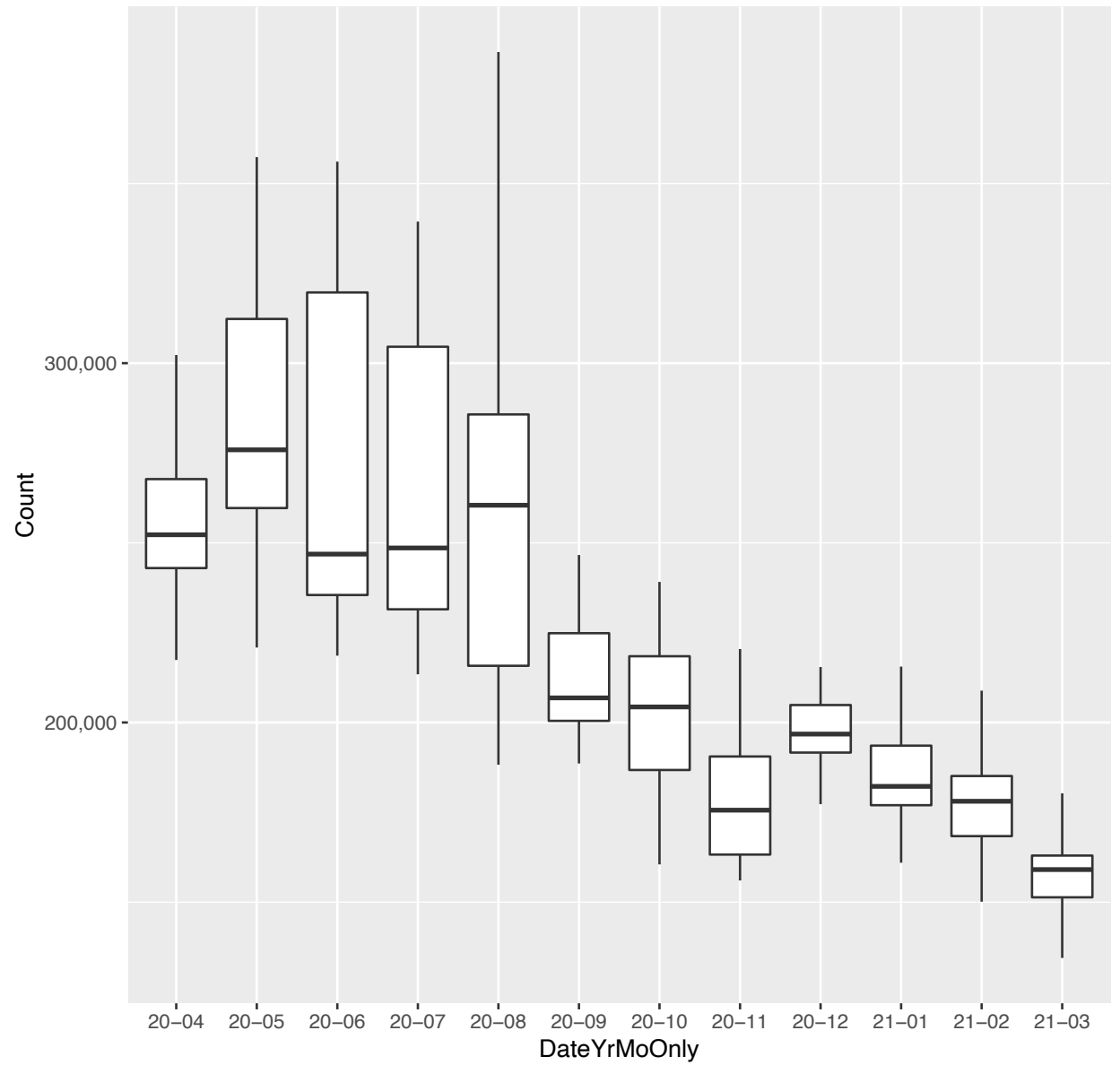
1. bloomingdales.com:



*. bloomingdales.com (day-by-day counts and 28 day moving average)



*. bloomingdales.com (monthly boxplots (outliers trimmed))



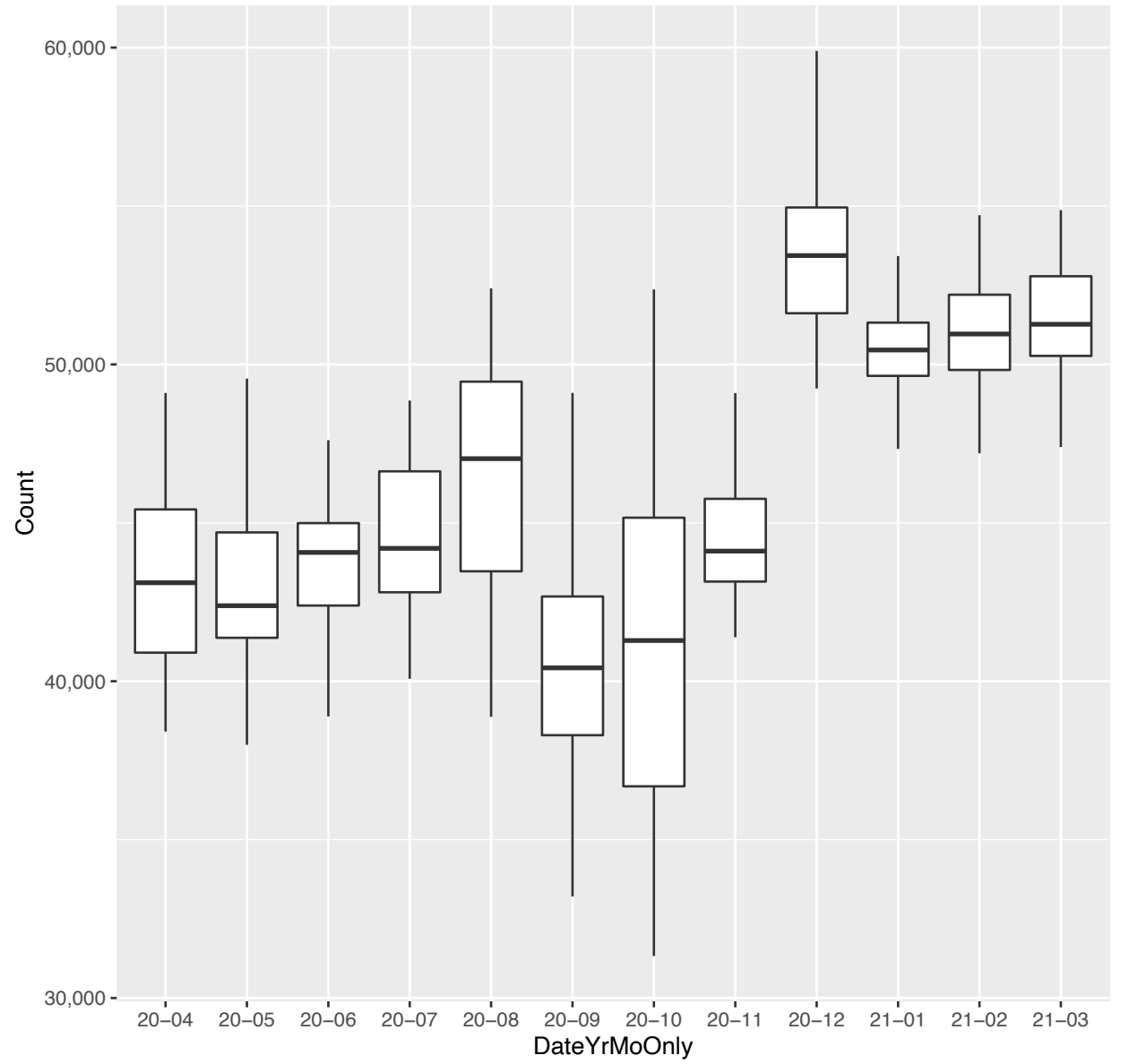
2. express.com:

~

*. express.com (day-by-day counts and 28 day moving average)



*. express.com (monthly boxplots (outliers trimmed))



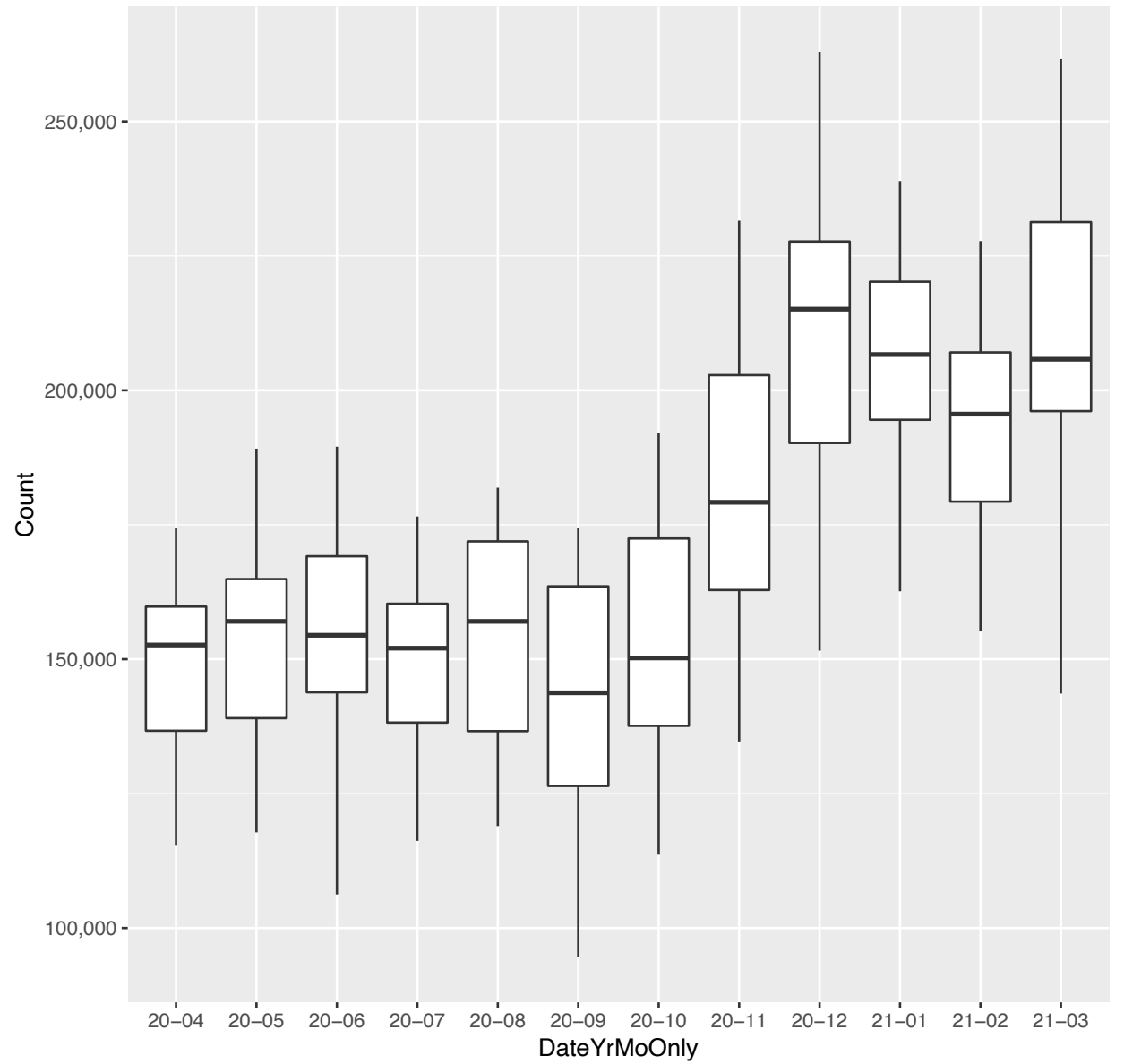
3. gap.com:



*. gap.com (day-by-day counts and 28 day moving average)



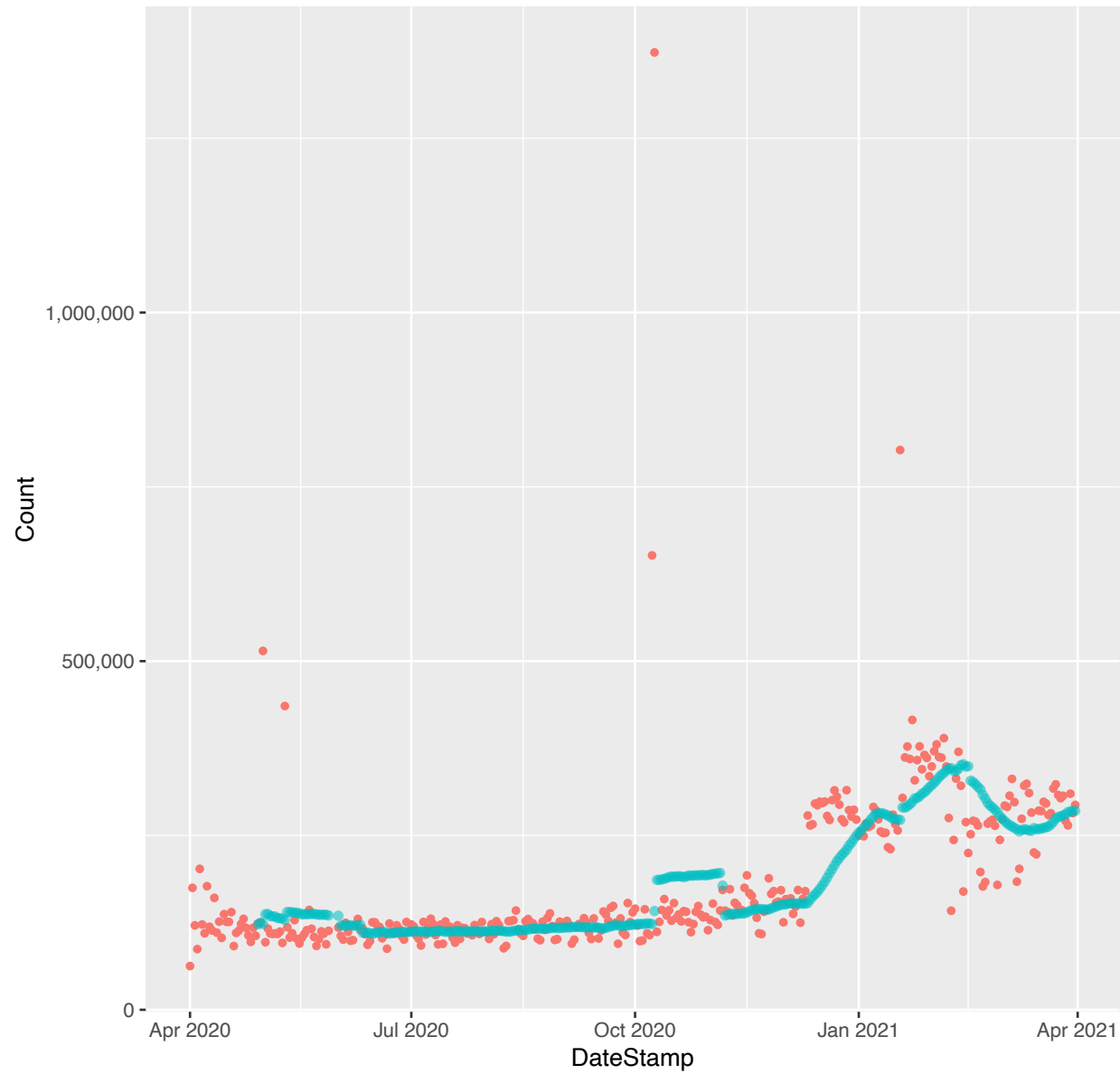
*. gap.com (monthly boxplots (outliers trimmed))



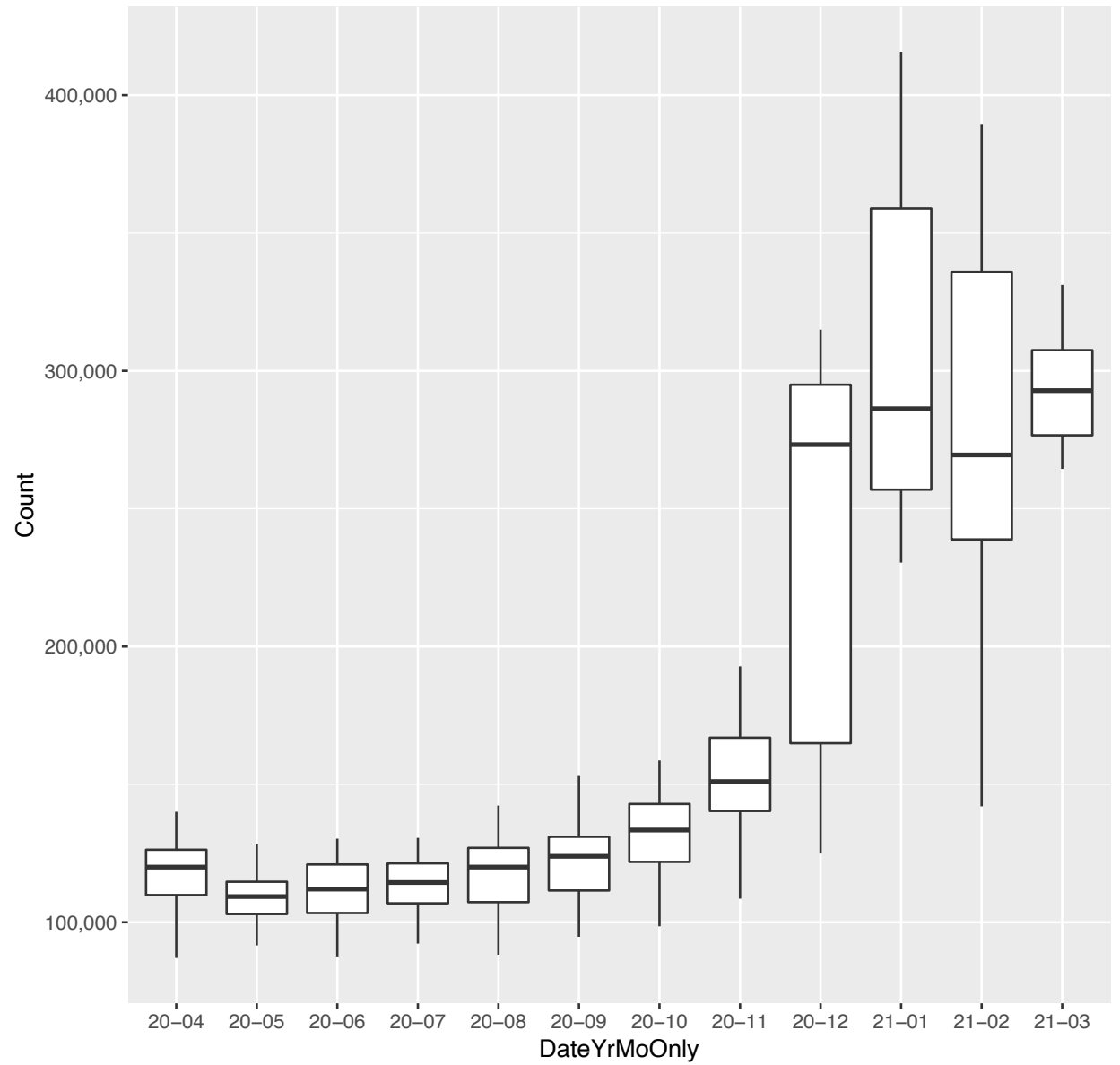
4. hm.com:



*. hm.com (day-by-day counts and 28 day moving average)



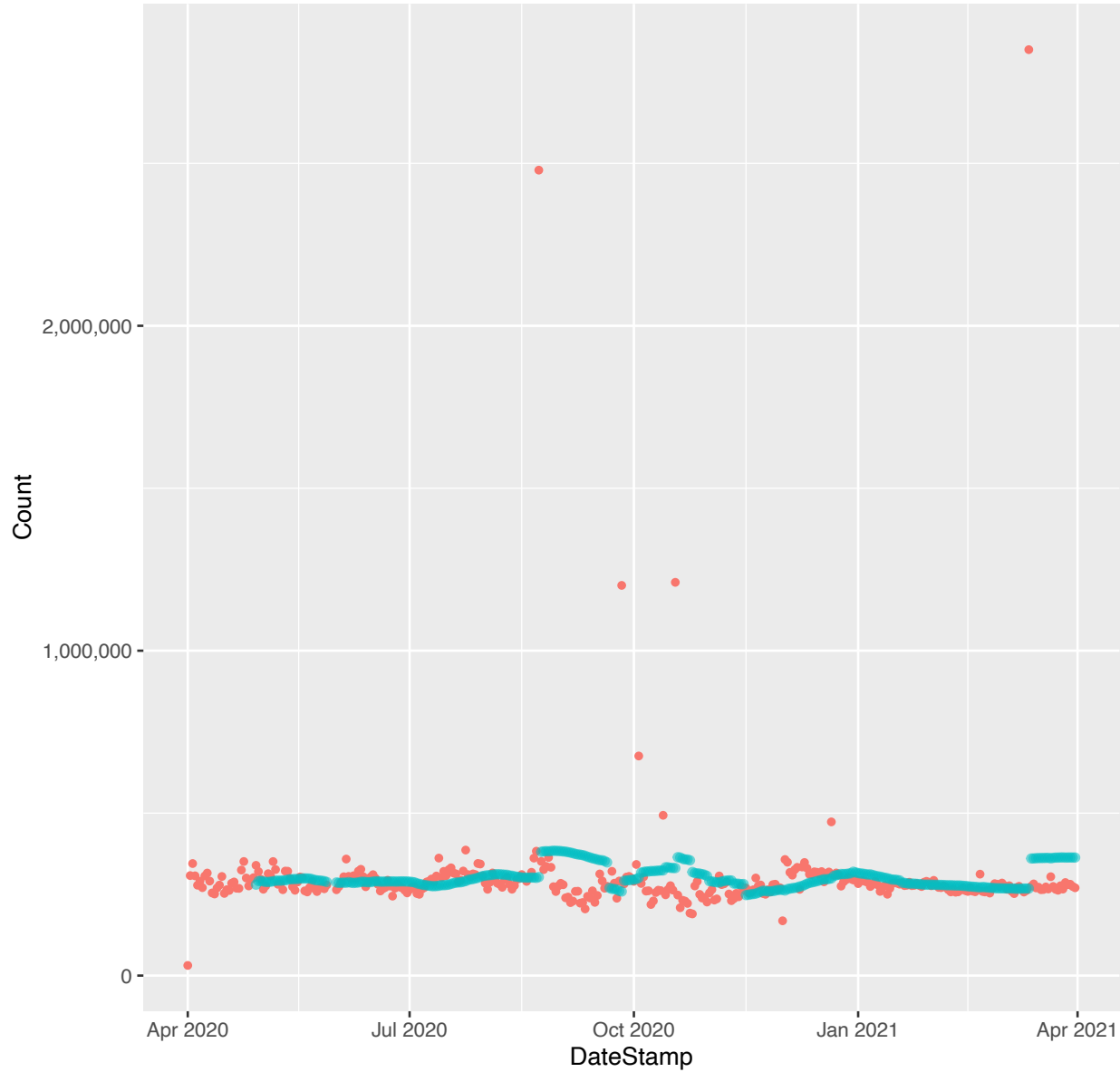
*. hm.com (monthly boxplots (outliers trimmed))



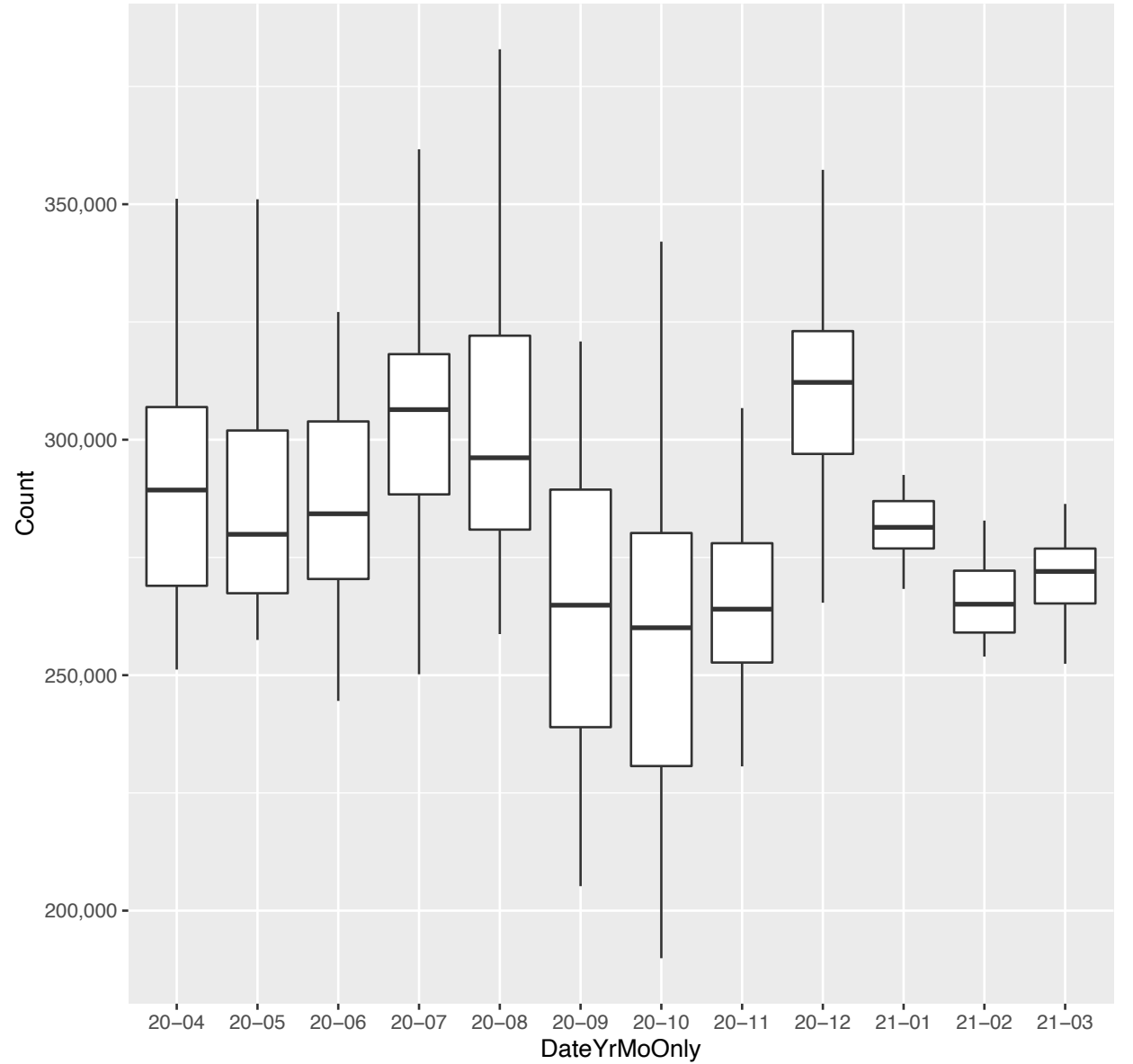
5. jcpenny.com:



*. jcpenny.com (day-by-day counts and 28 day moving average)



*. jcpenny.com (monthly boxplots (outliers trimmed))

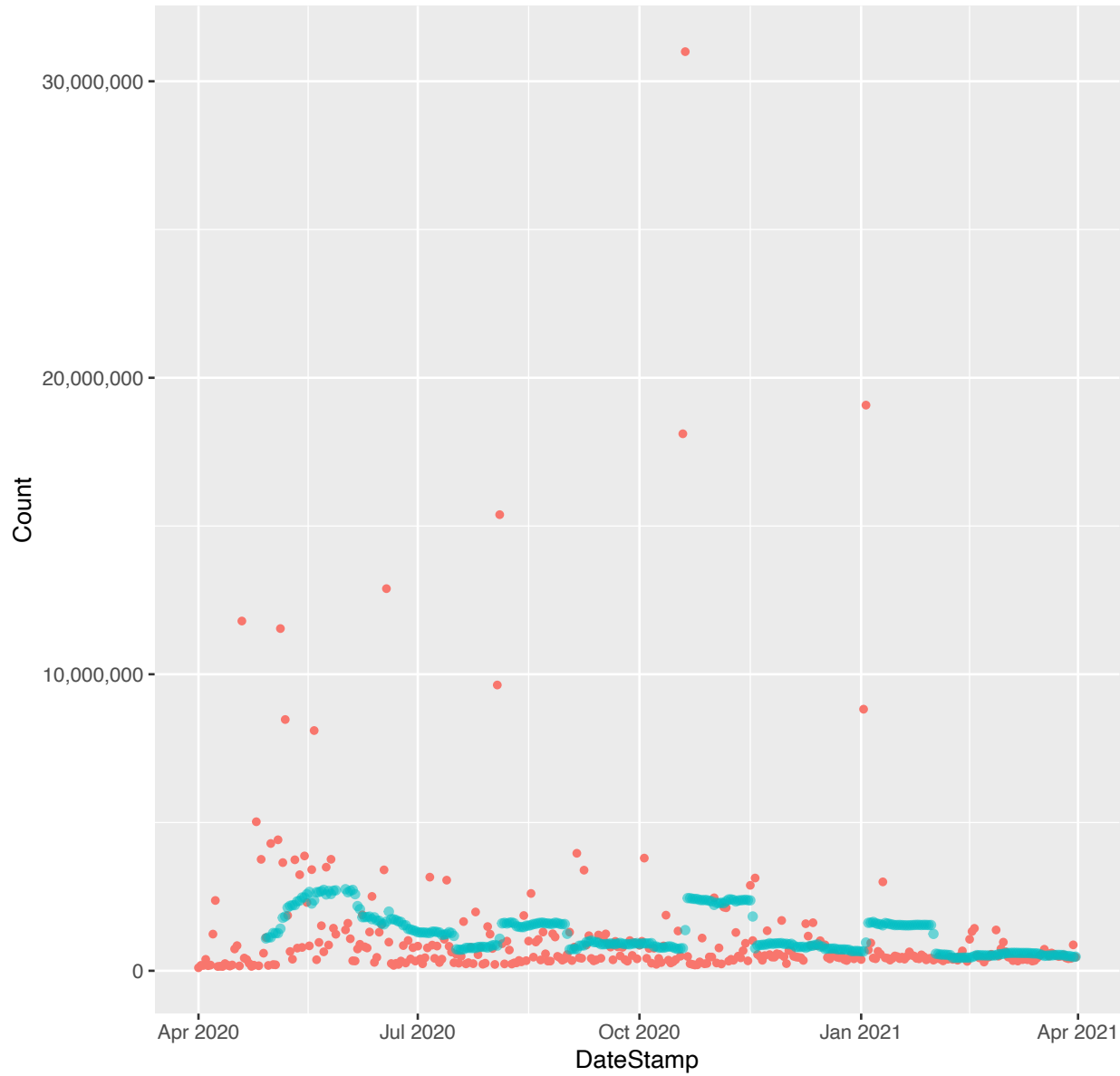


6. kohls.com:

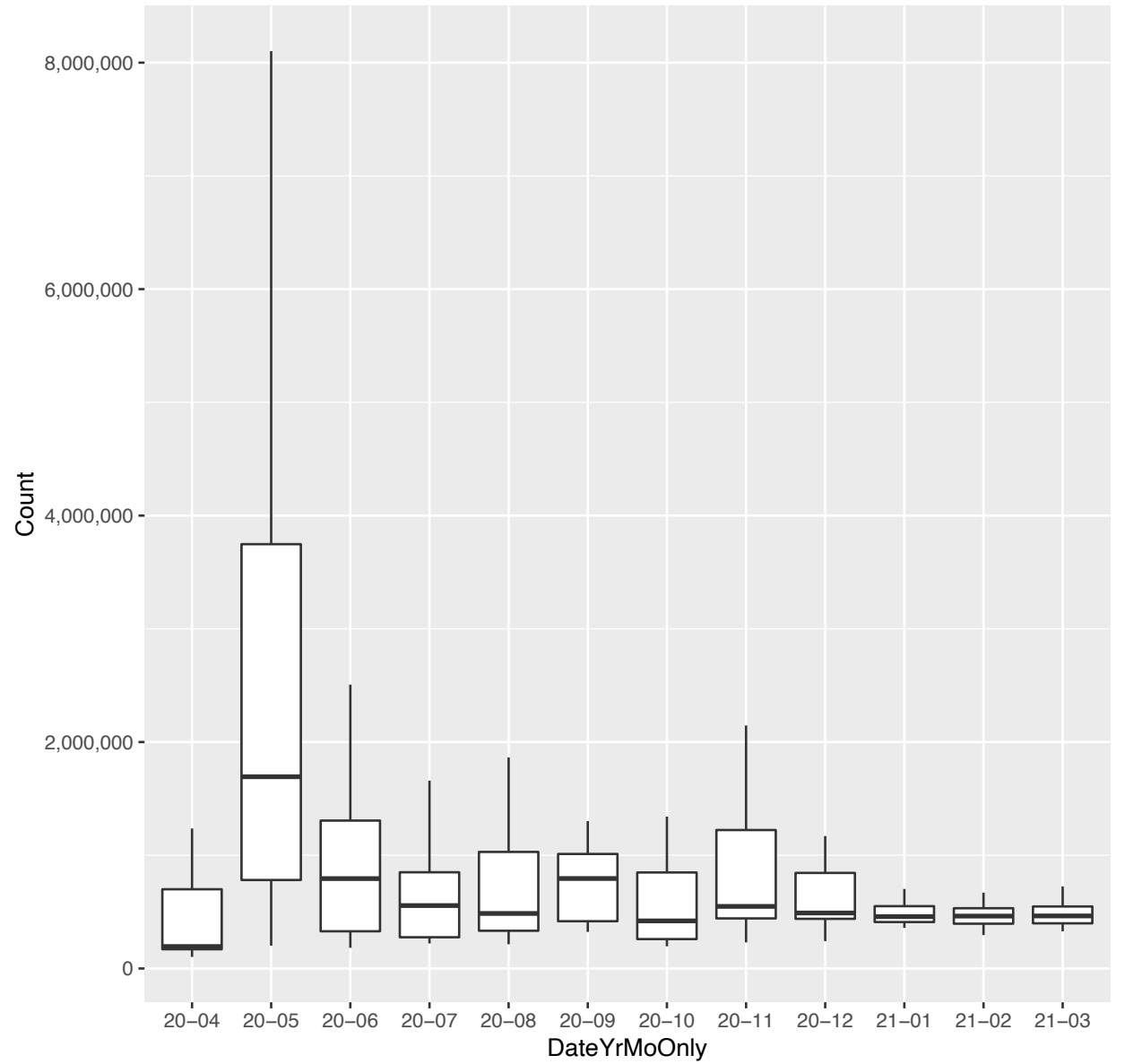


M

*. kohls.com (day-by-day counts and 28 day moving average)



*. kohls.com (monthly boxplots (outliers trimmed))



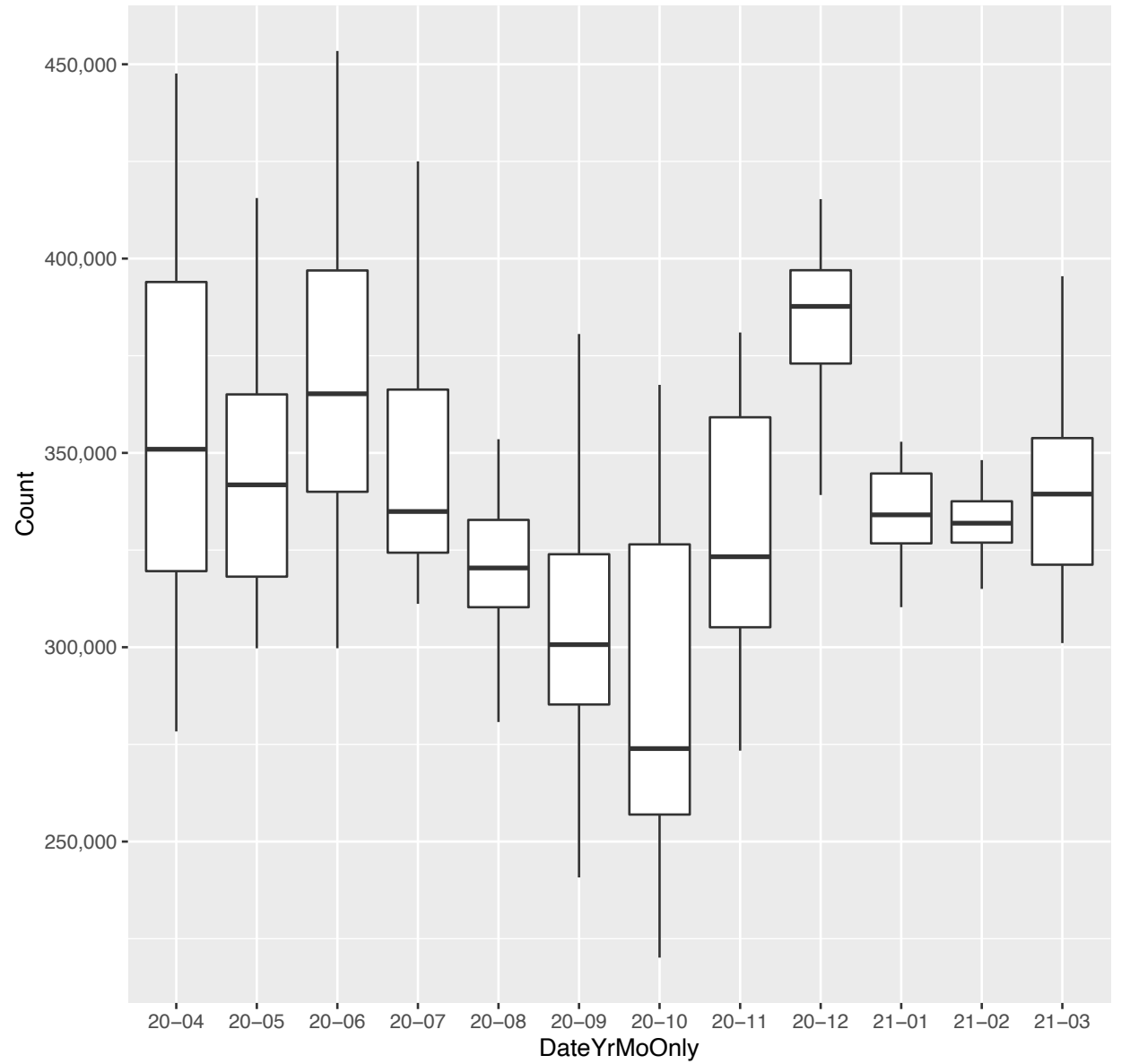
7. macys.com:

~

*. macys.com (day-by-day counts and 28 day moving average)



*. macys.com (monthly boxplots (outliers trimmed))



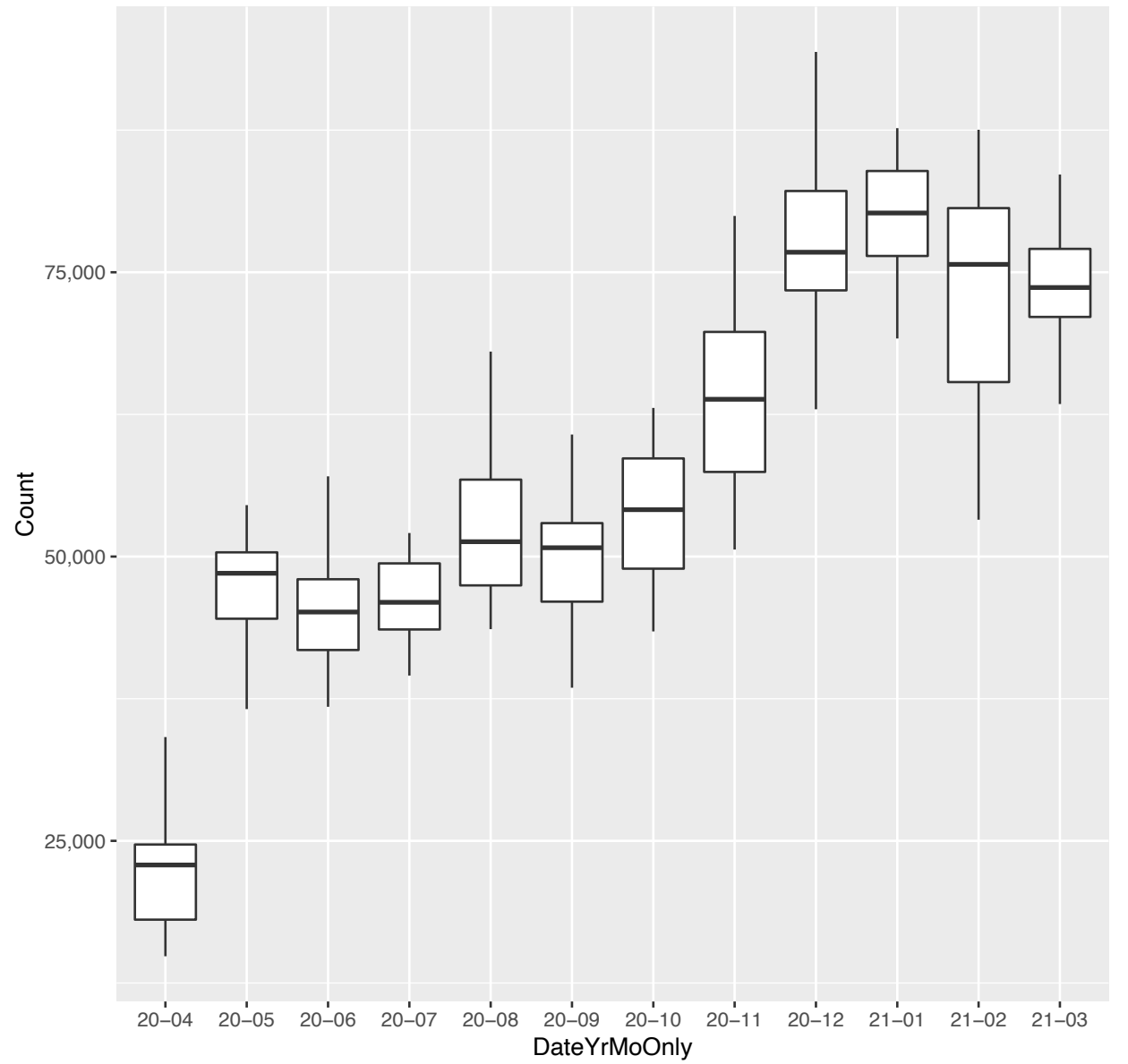
8. marshalls.com:



*. marshalls.com (day-by-day counts and 28 day moving average)



*. marshalls.com (monthly boxplots (outliers trimmed))



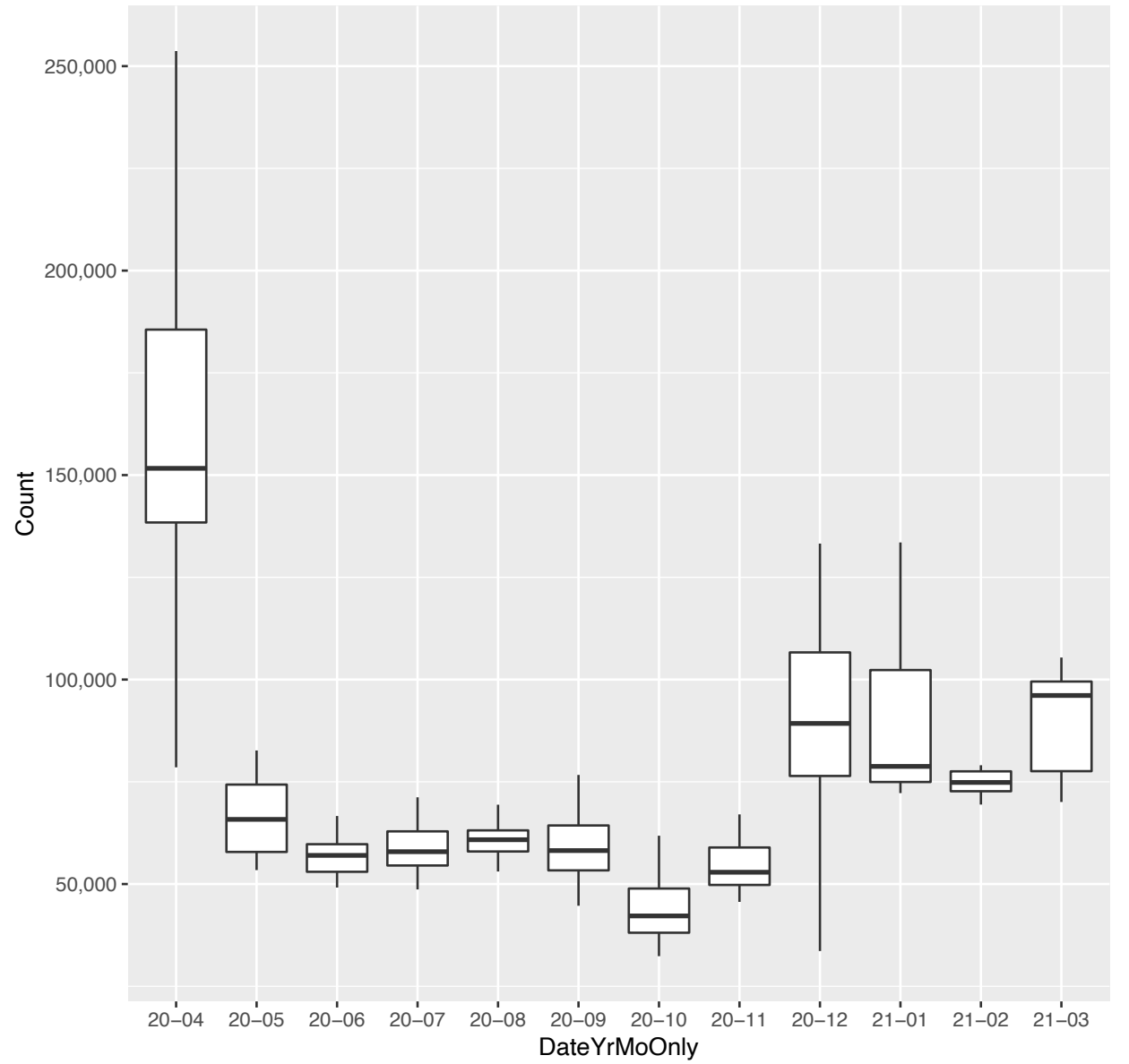
9. neimanmarcus.com:

U shaped (ending lower)

*. neimanmarcus.com (day-by-day counts and 28 day moving average)

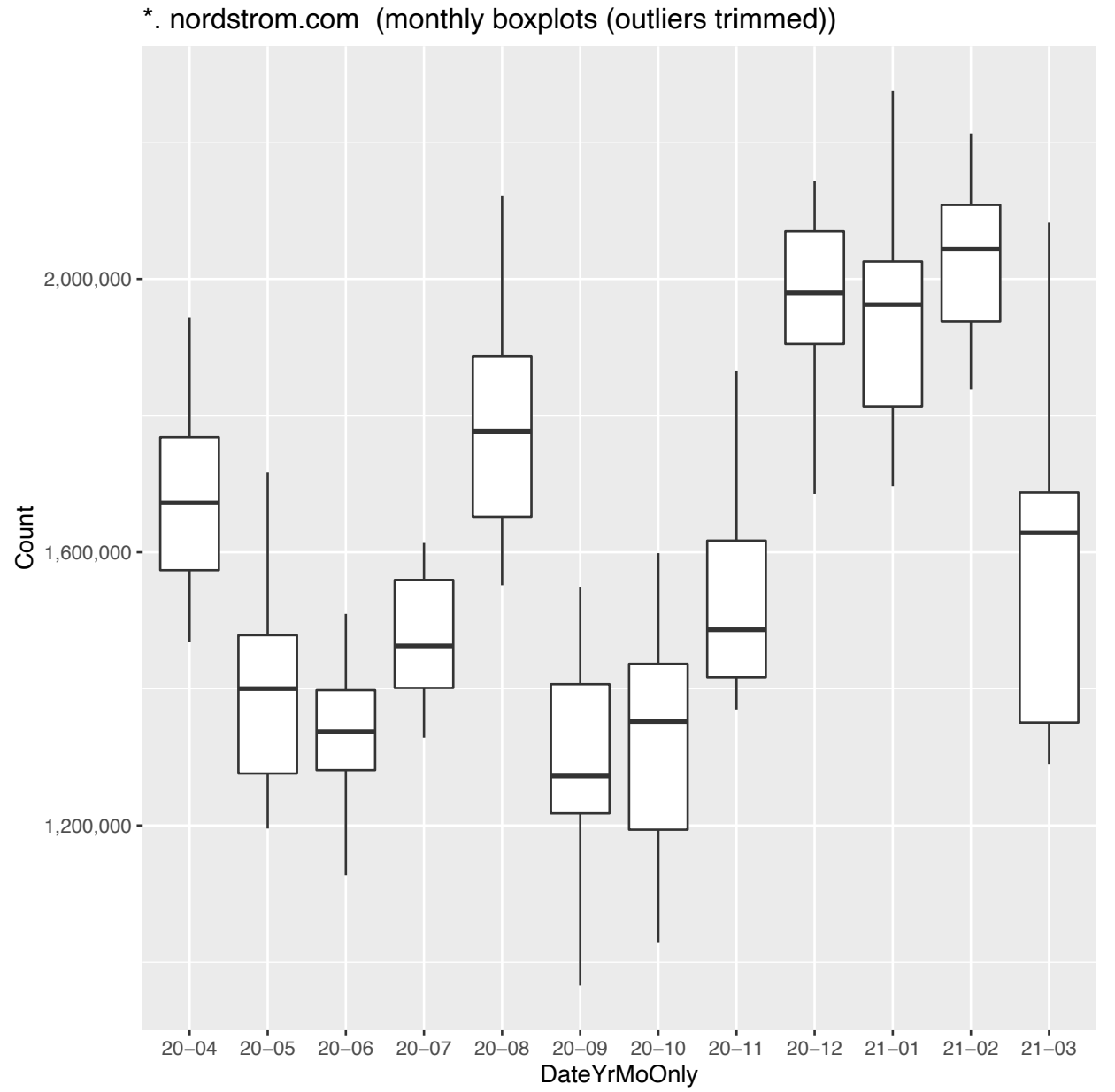
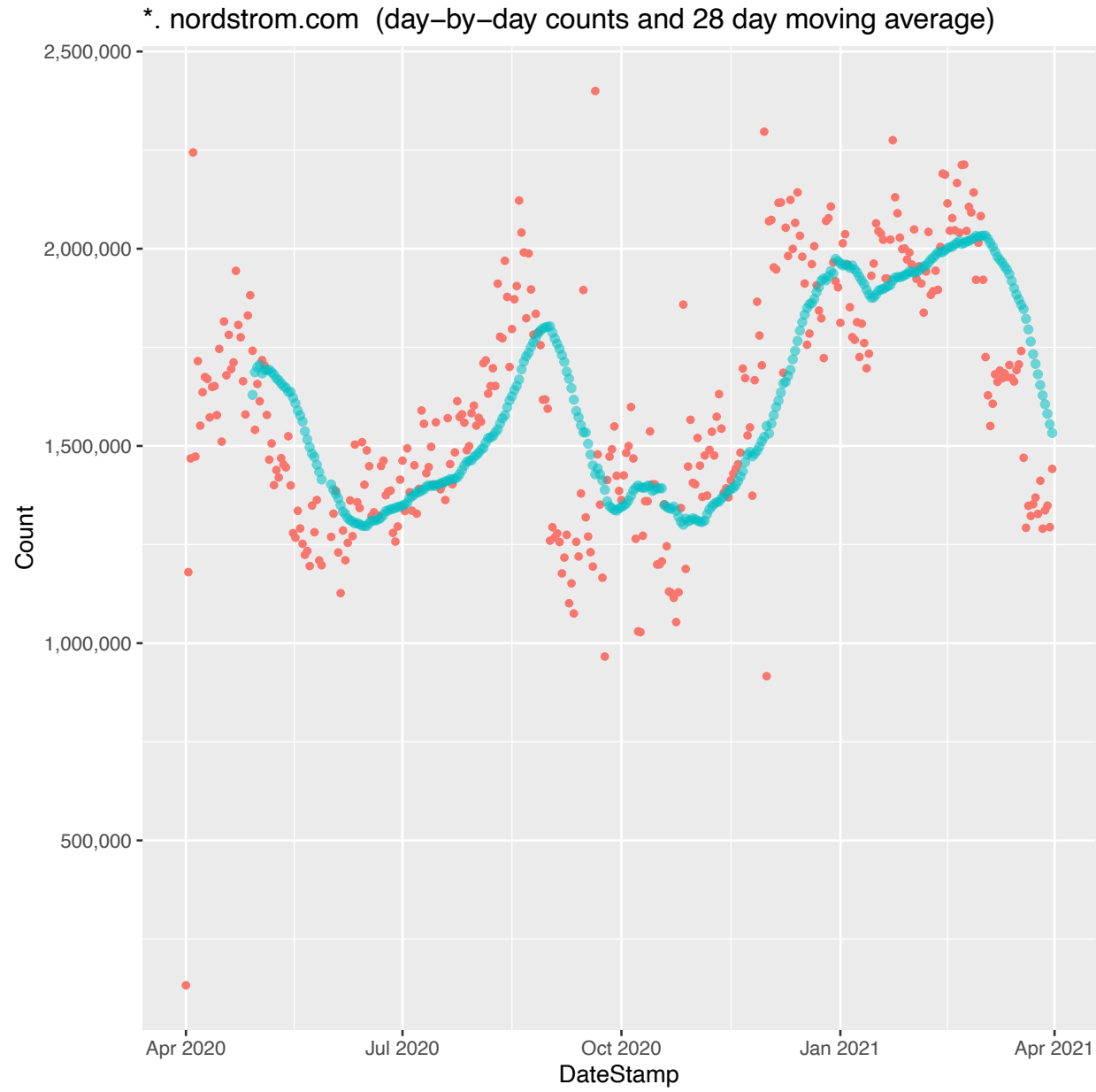


*. neimanmarcus.com (monthly boxplots (outliers trimmed))

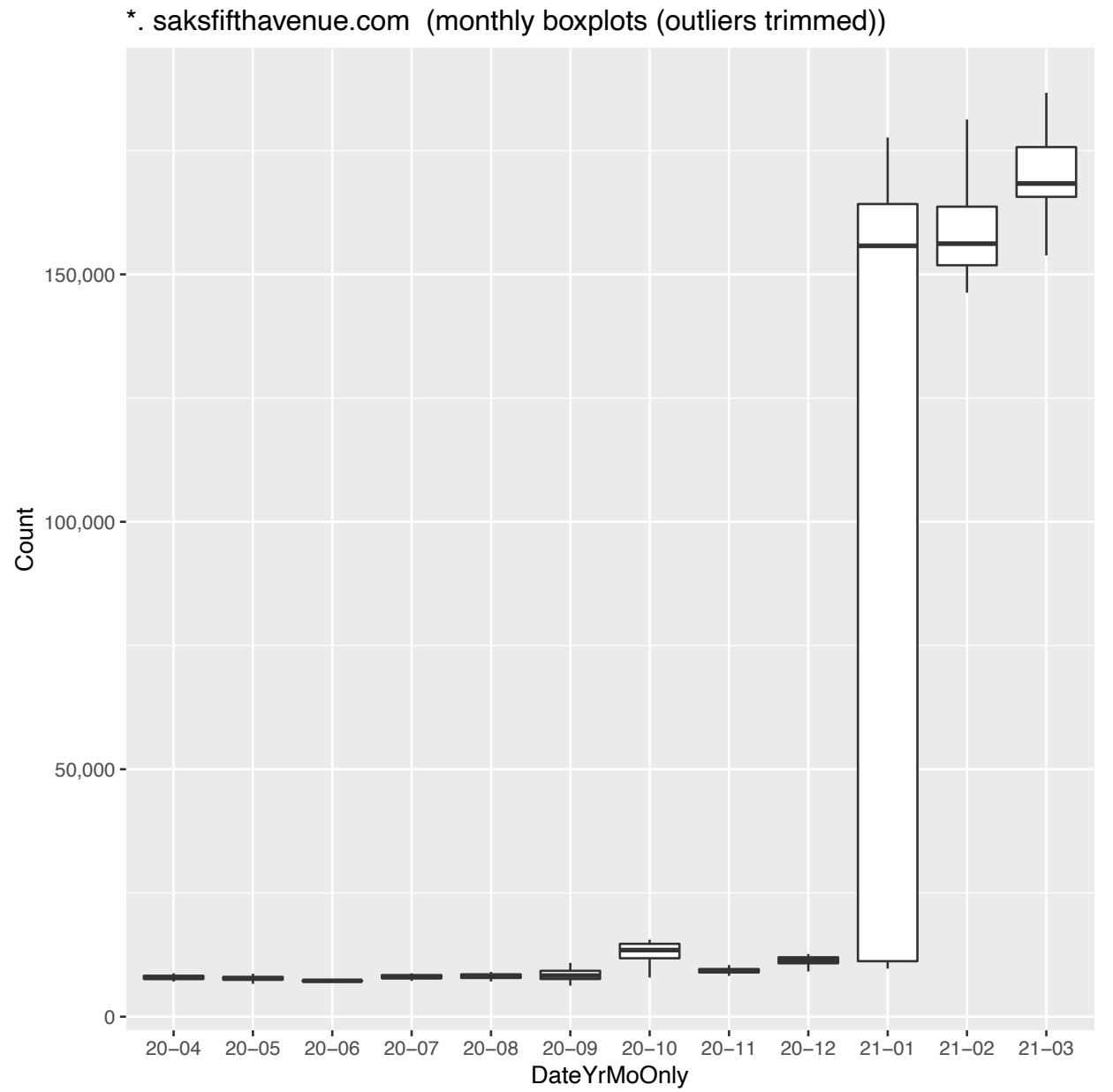
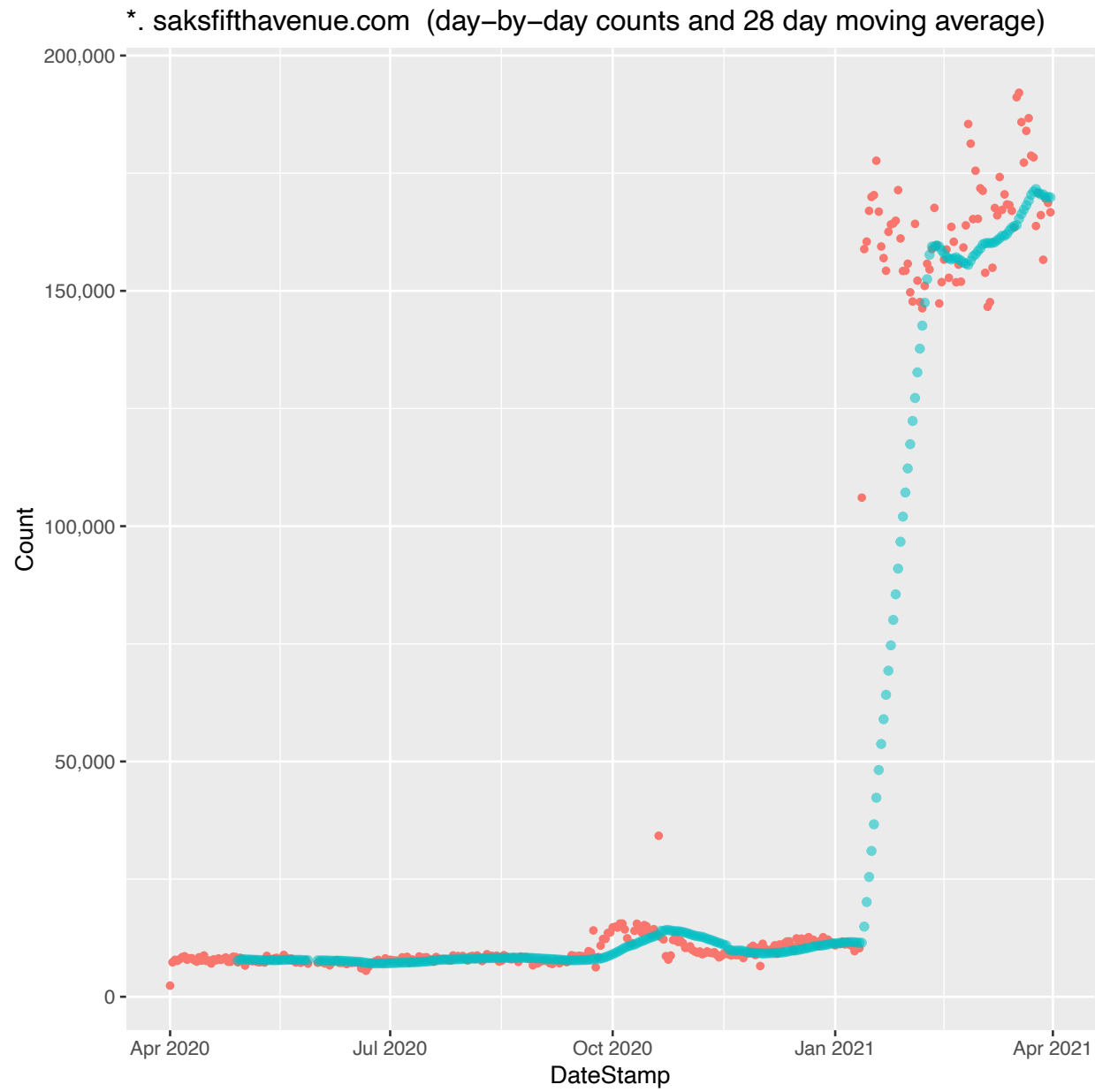


10. nordstrom.com:

~



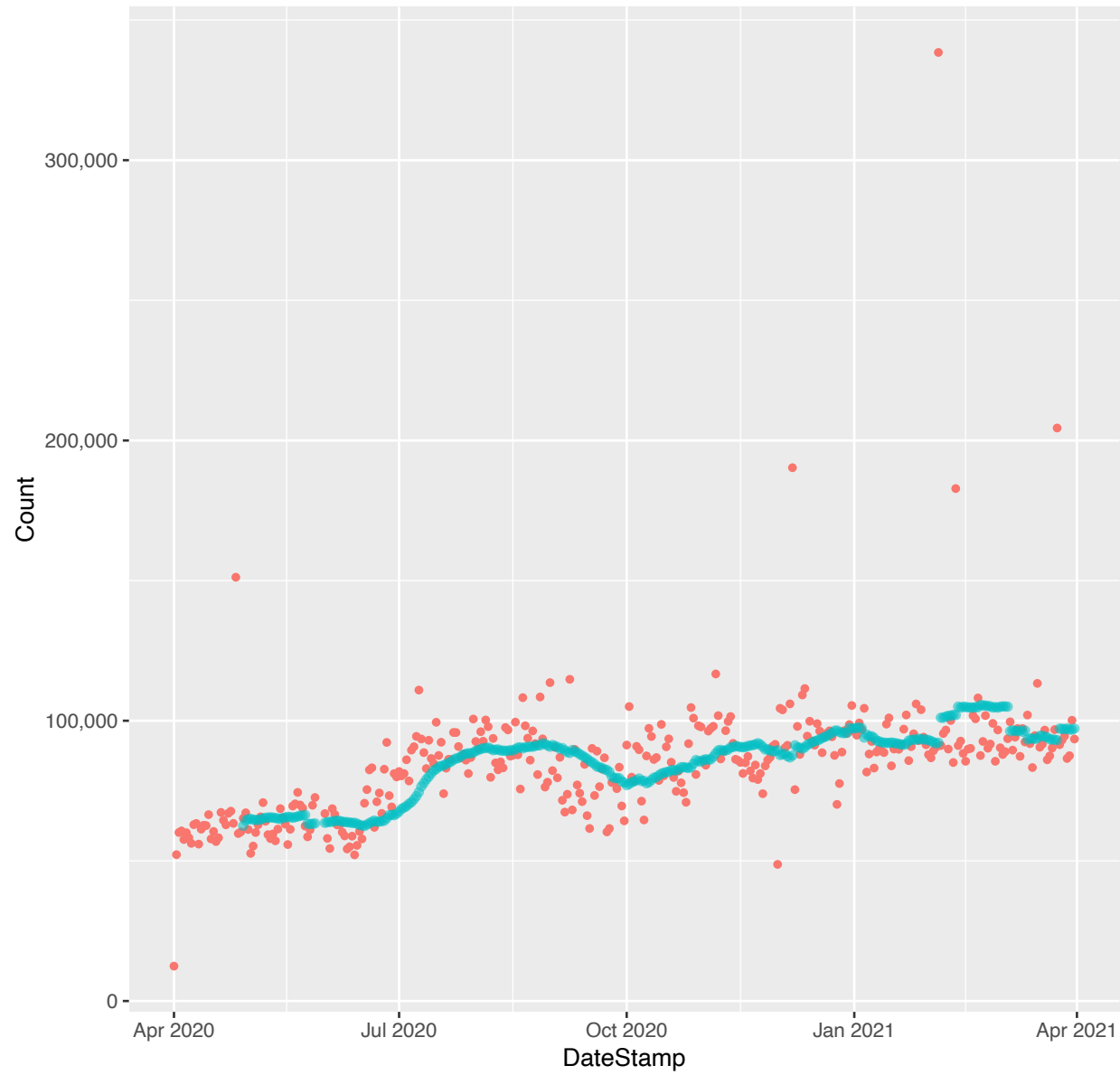
11. saksfifthavenue.com: ↗



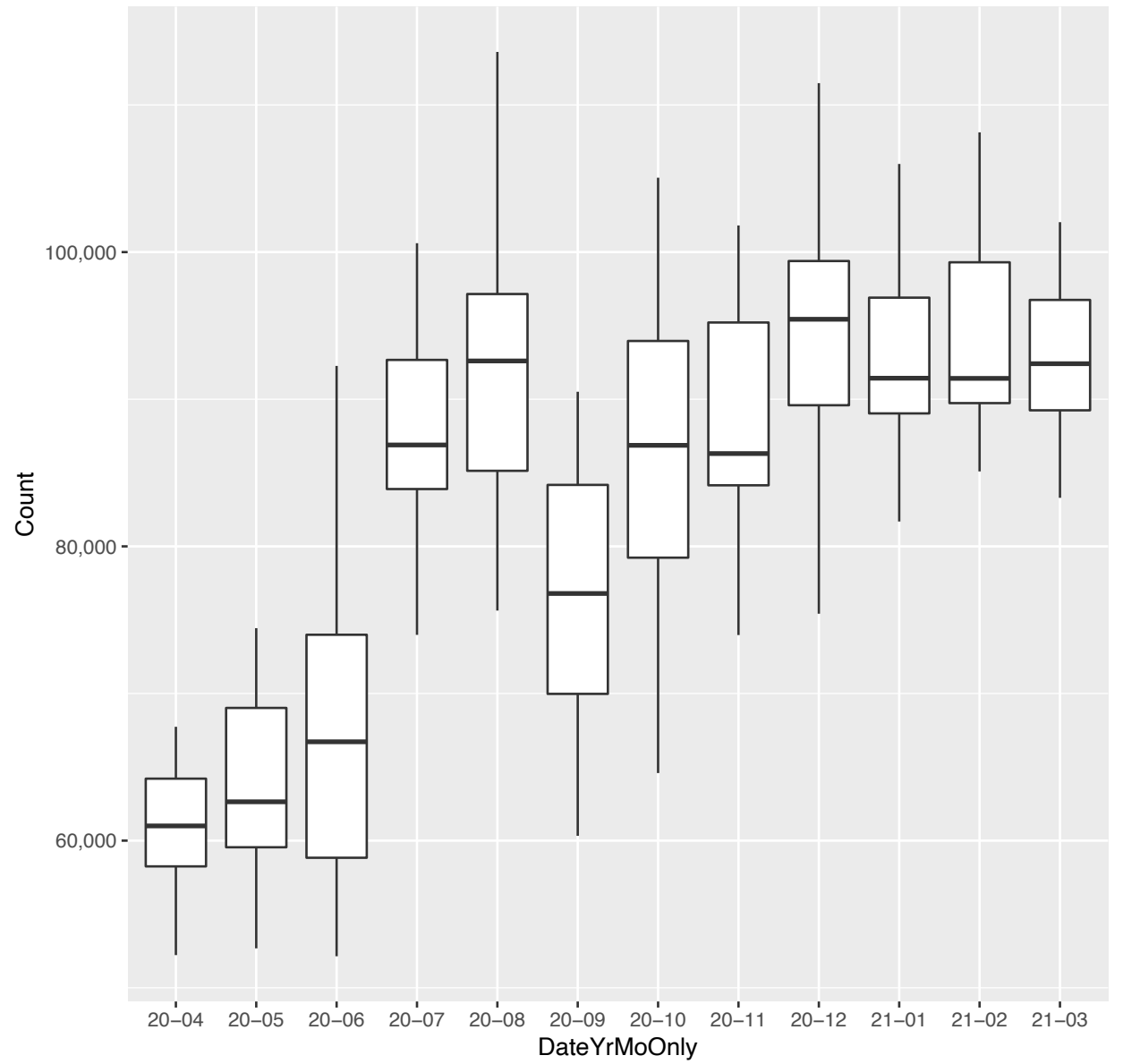
12. sears.com:



*. sears.com (day-by-day counts and 28 day moving average)



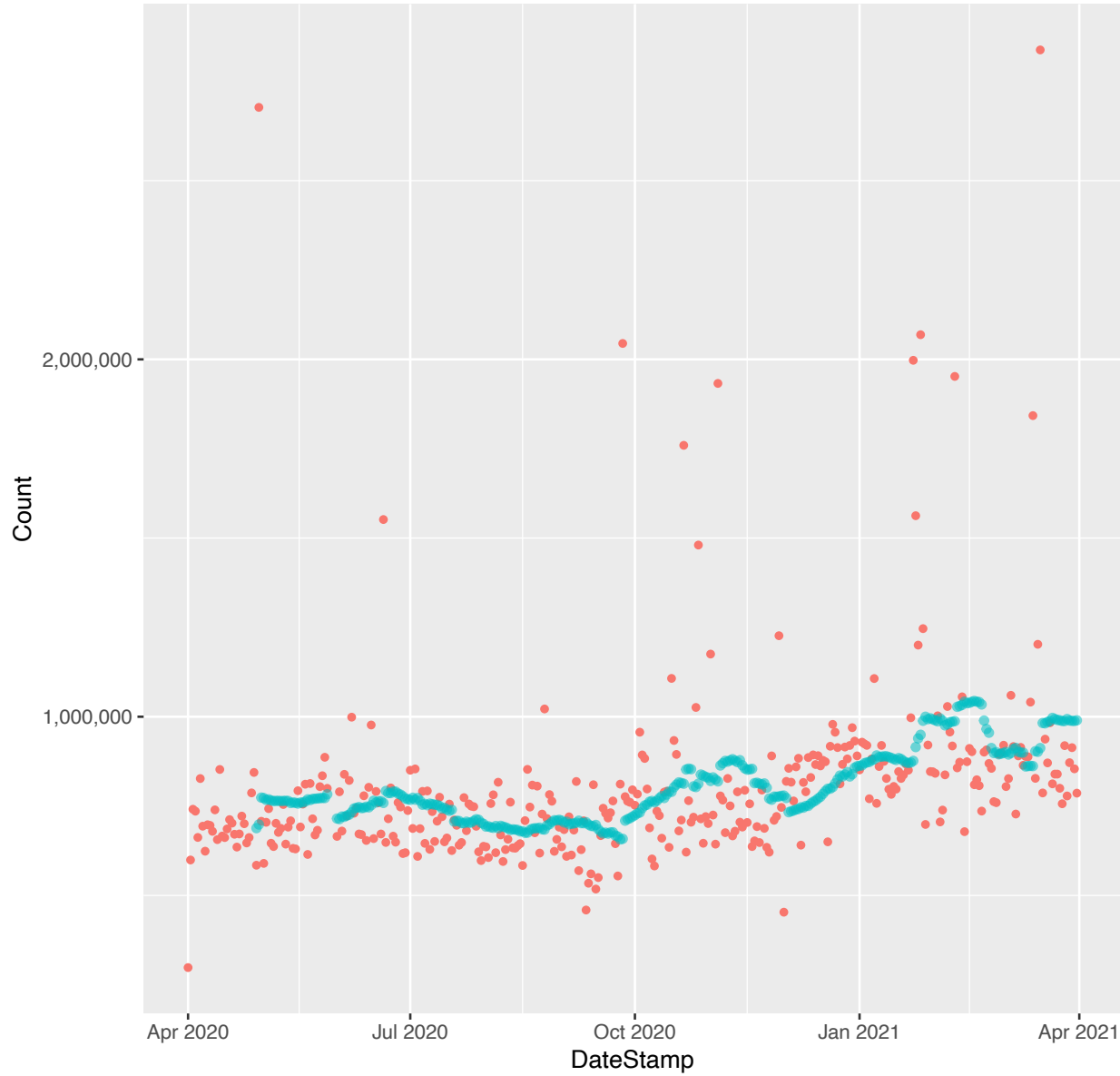
*. sears.com (monthly boxplots (outliers trimmed))



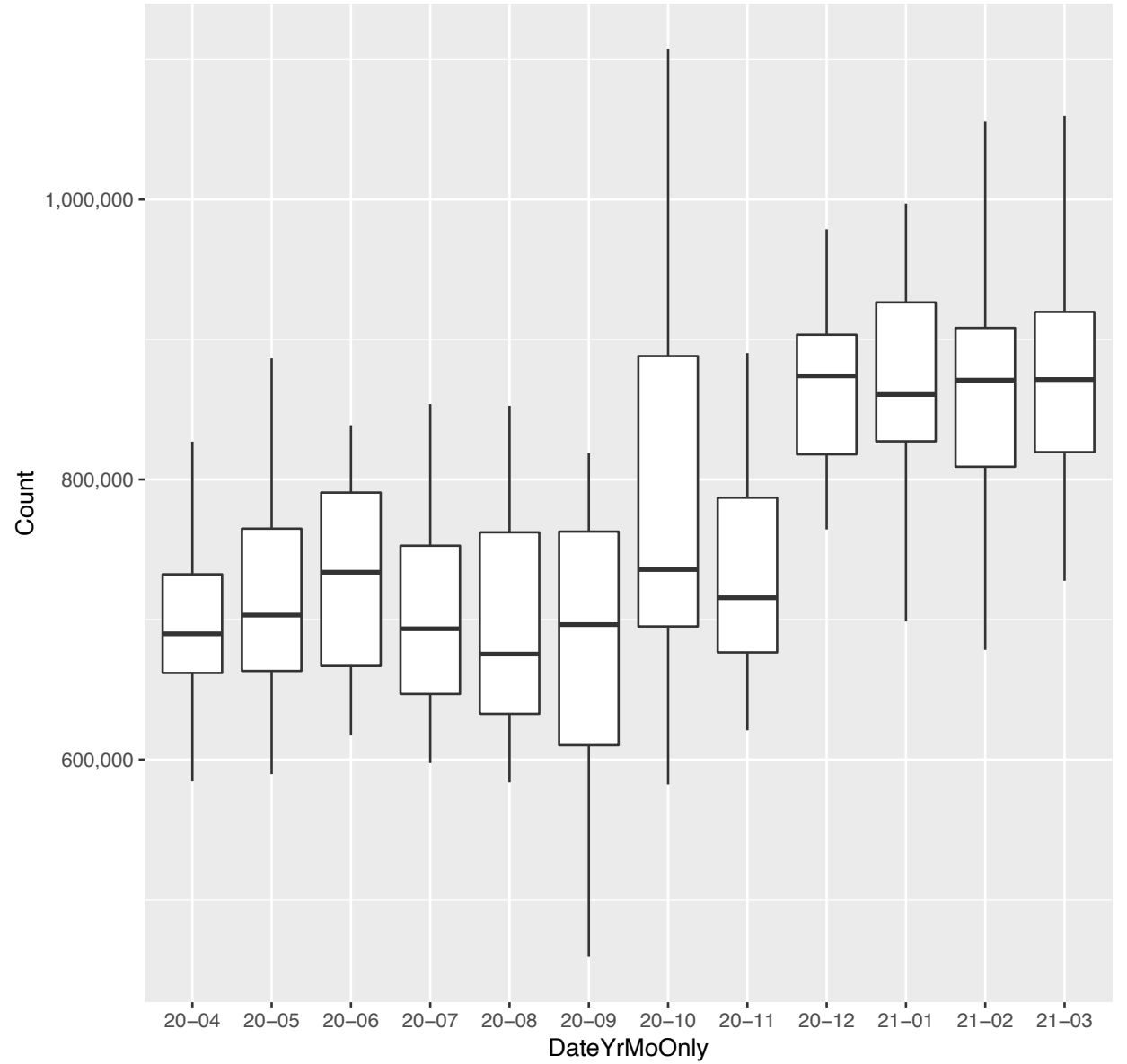
13. target.com:



*. target.com (day-by-day counts and 28 day moving average)



*. target.com (monthly boxplots (outliers trimmed))

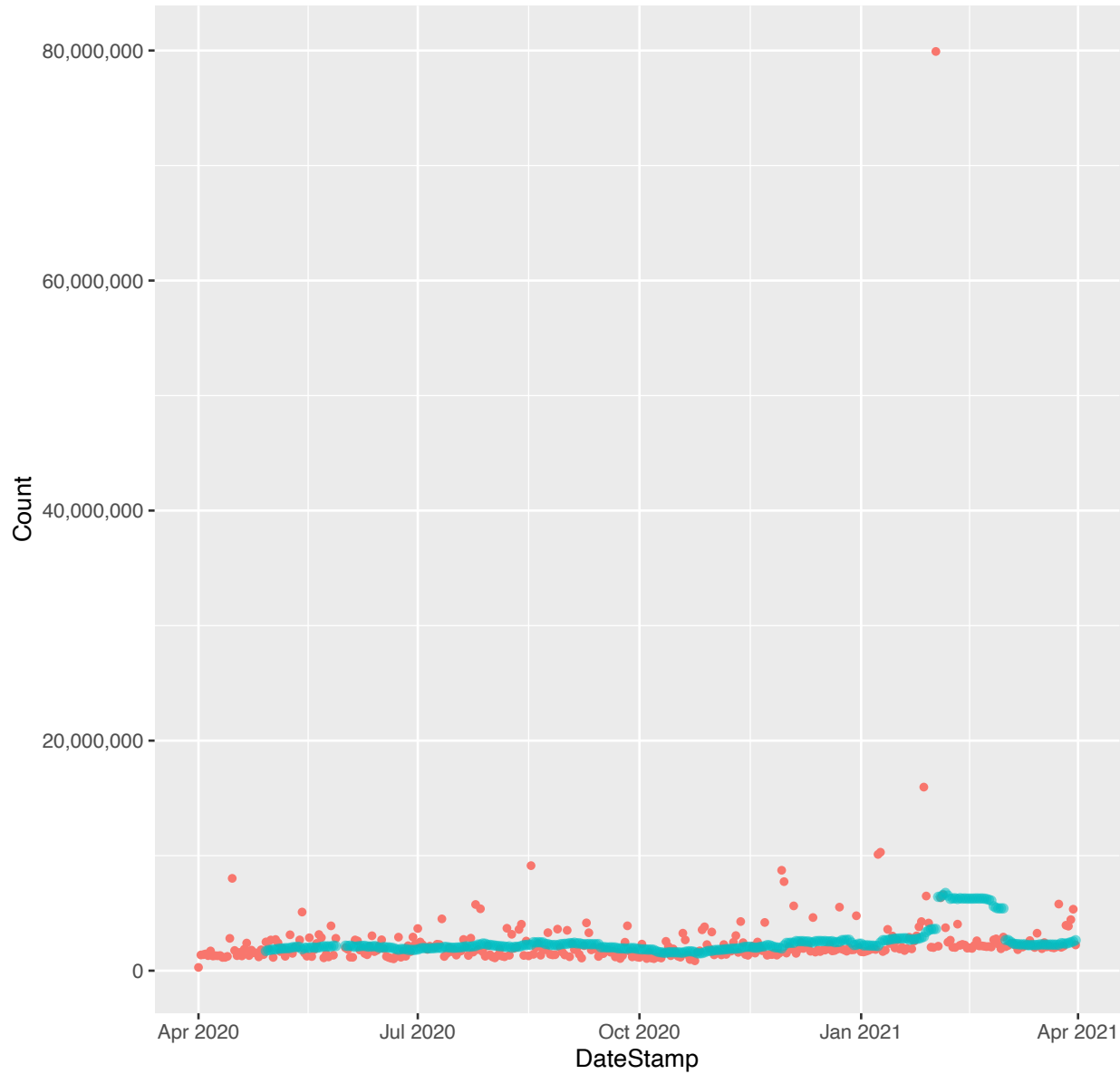


14. walmart.com:

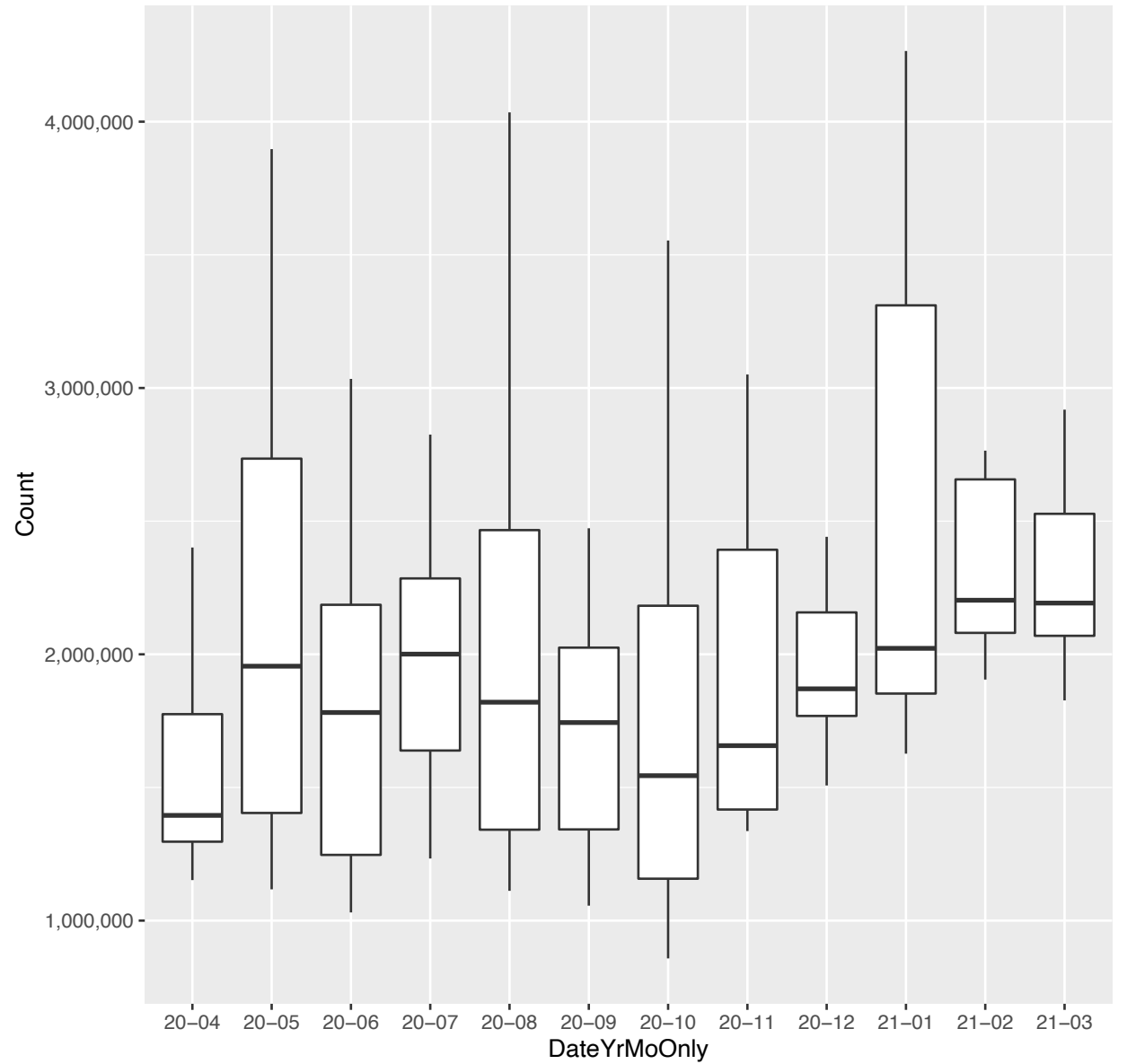


M

*. walmart.com (day-by-day counts and 28 day moving average)



*. walmart.com (monthly boxplots (outliers trimmed))



b) Consumer Electronics

[\[back to Retail Sites\]](#)

[\[back to TOC\]](#)

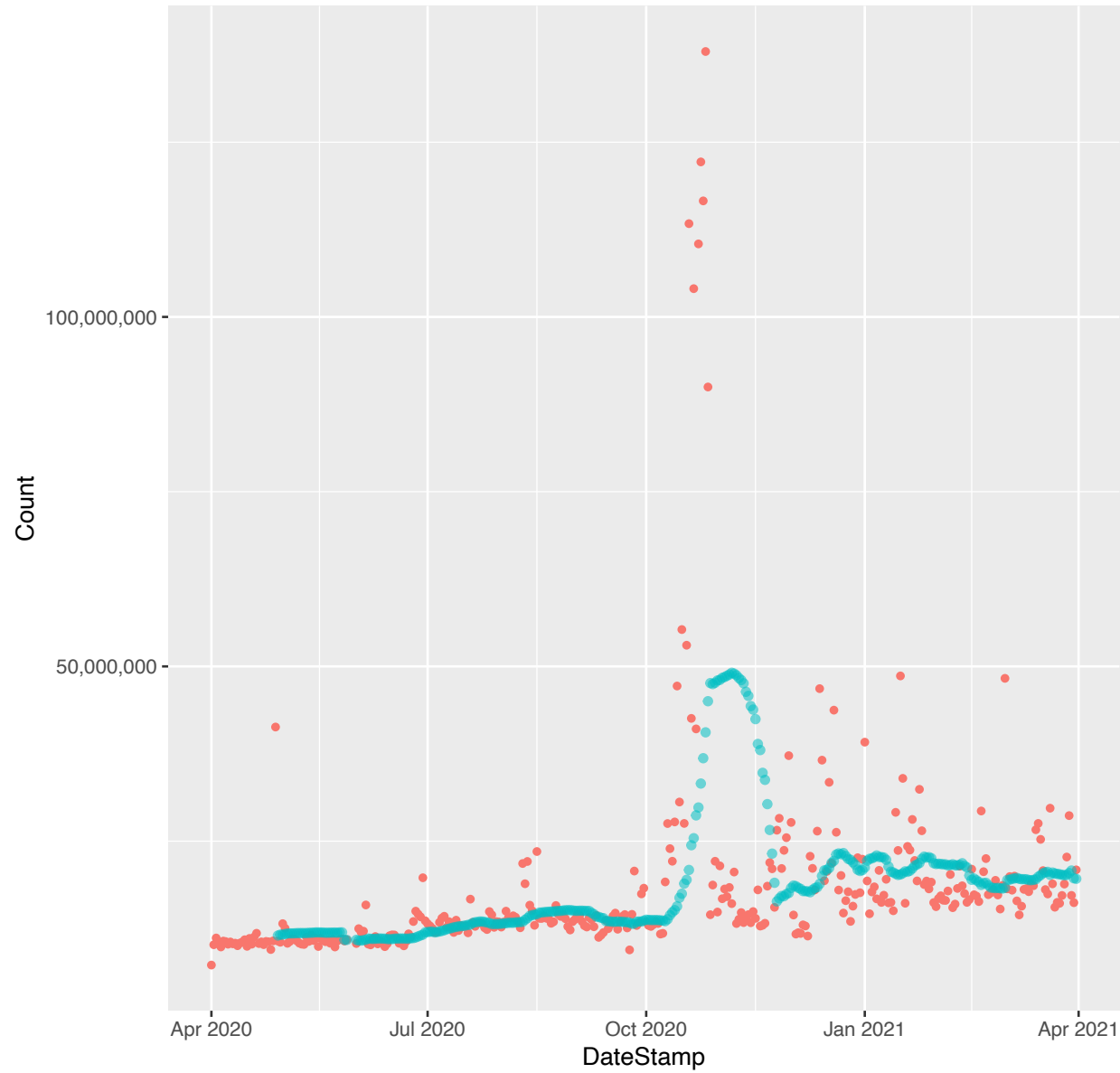
15	*.apple.com	☀	↗	MM
16	*.bestbuy.com	☀	→	M
17	*.bhphotovideo.com	☀	→	
18	*.dell.com	☀	~	MM
19	*.microsoft.com	☀	↗	MM
20	*.newegg.com	☀	~	

15. apple.com:

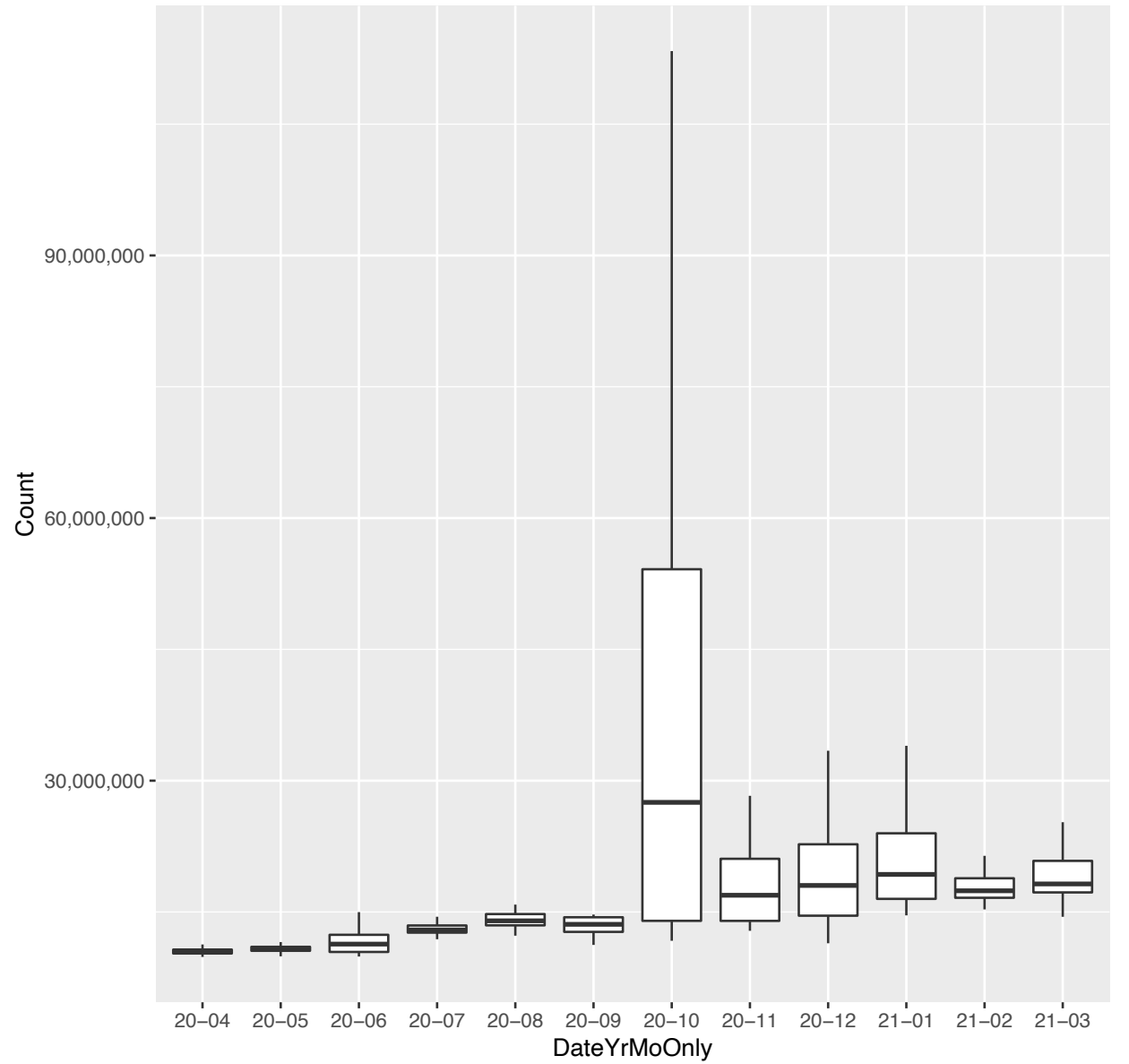


MM

*. apple.com (day-by-day counts and 28 day moving average)



*. apple.com (monthly boxplots (outliers trimmed))

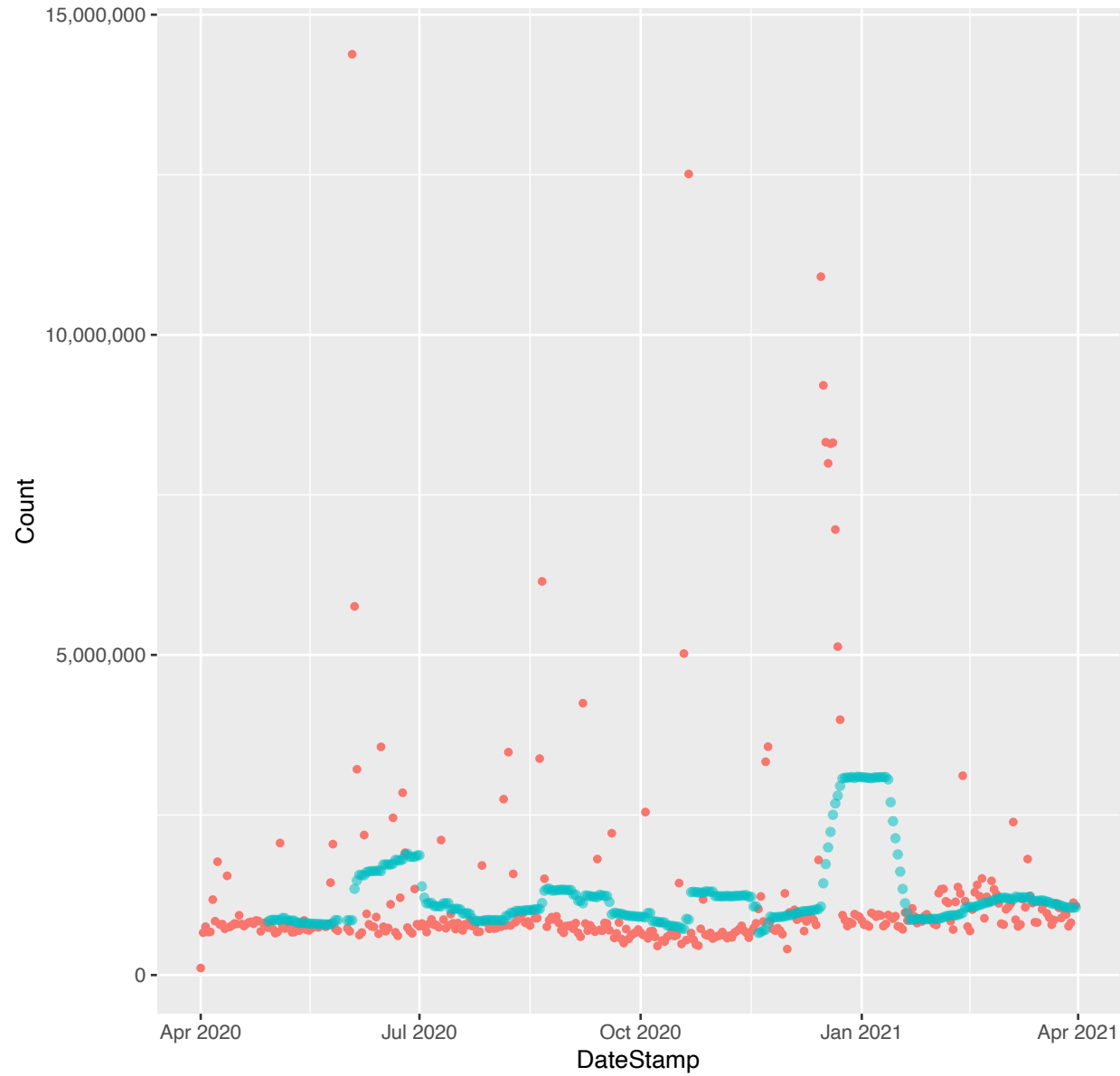


16. bestbuy.com:

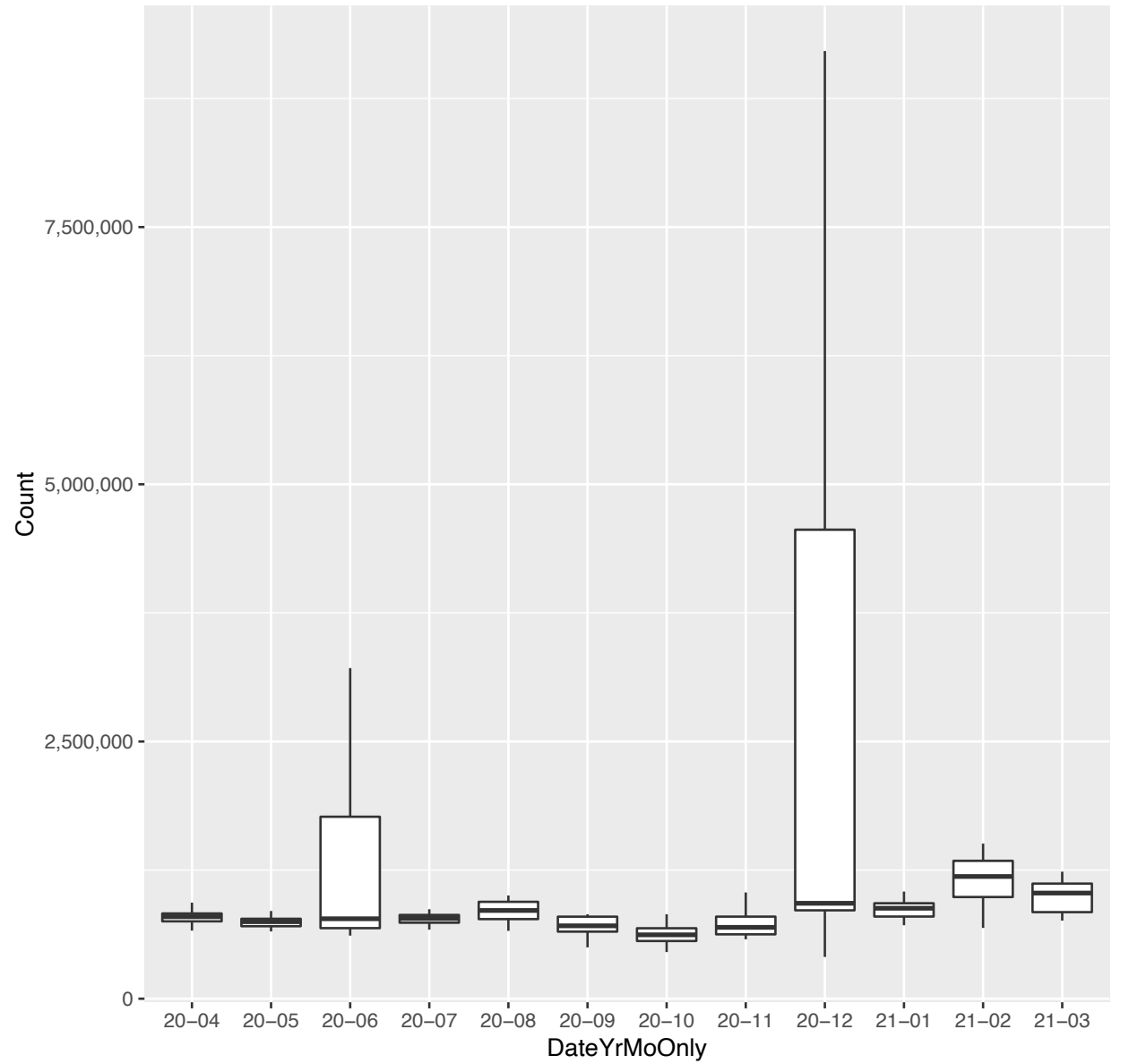


M

*. bestbuy.com (day-by-day counts and 28 day moving average)



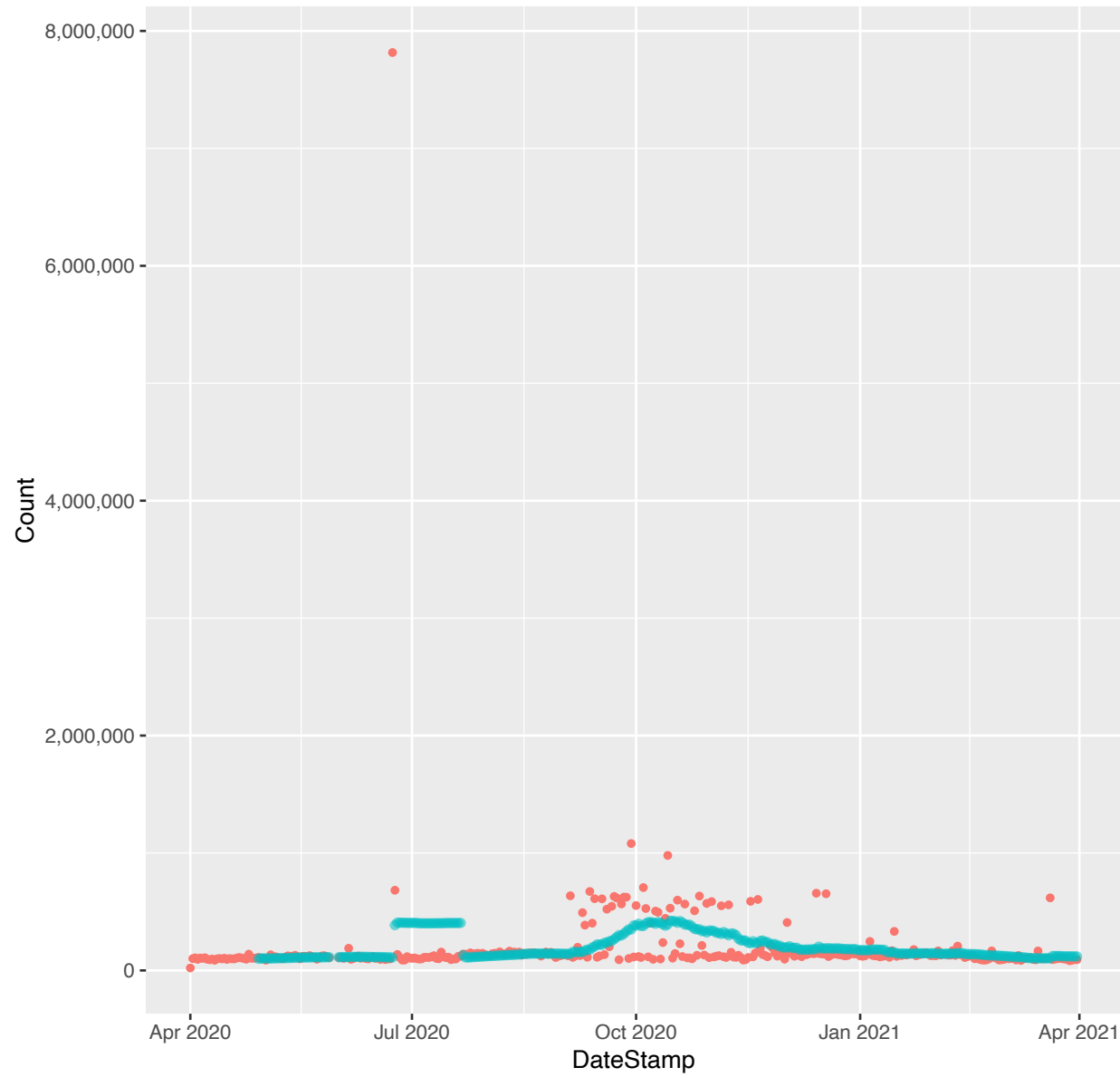
*. bestbuy.com (monthly boxplots (outliers trimmed))



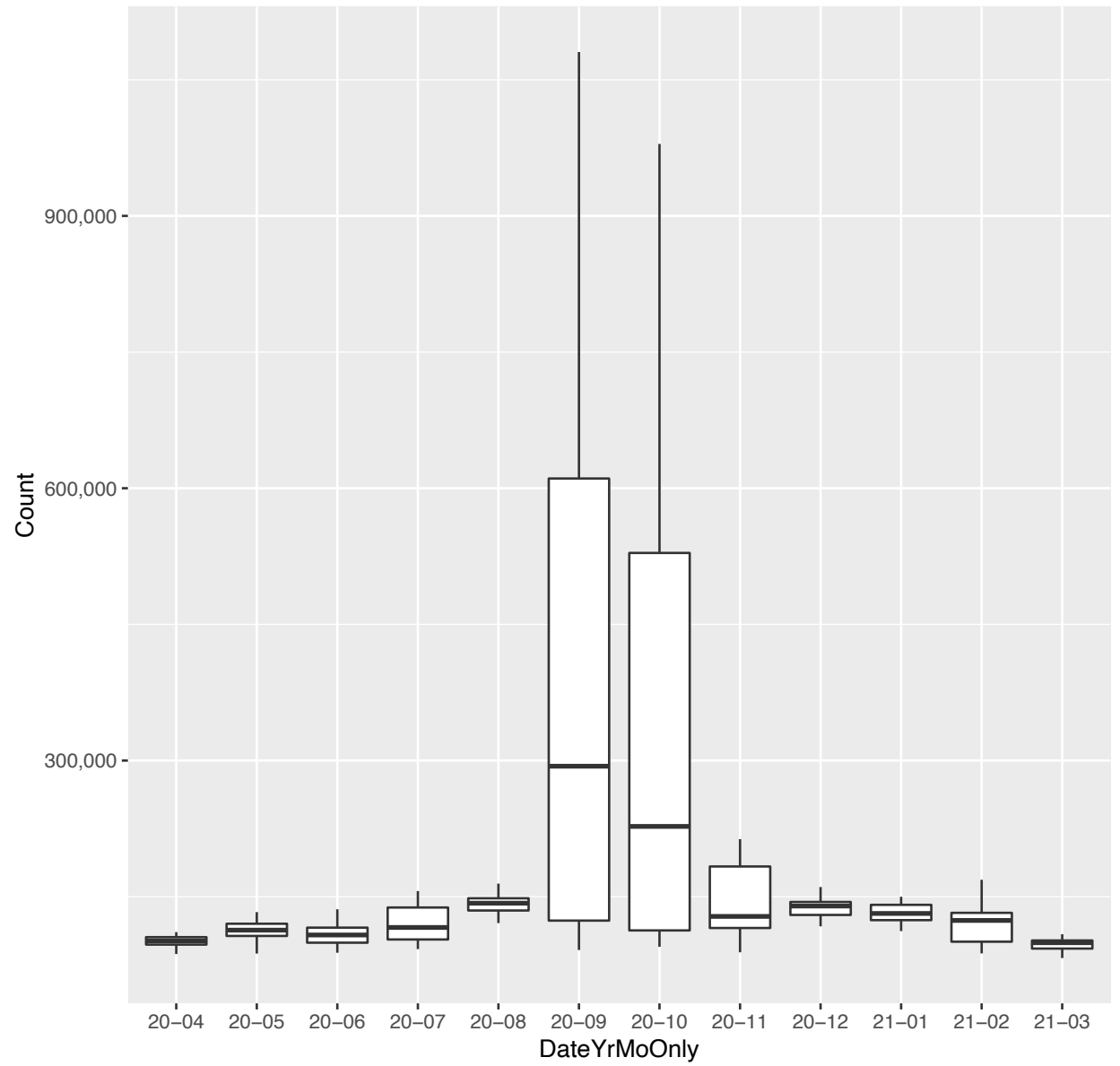
17. bhphotovideo.com:



*. bhphotovideo.com (day-by-day counts and 28 day moving average)



*. bhphotovideo.com (monthly boxplots (outliers trimmed))

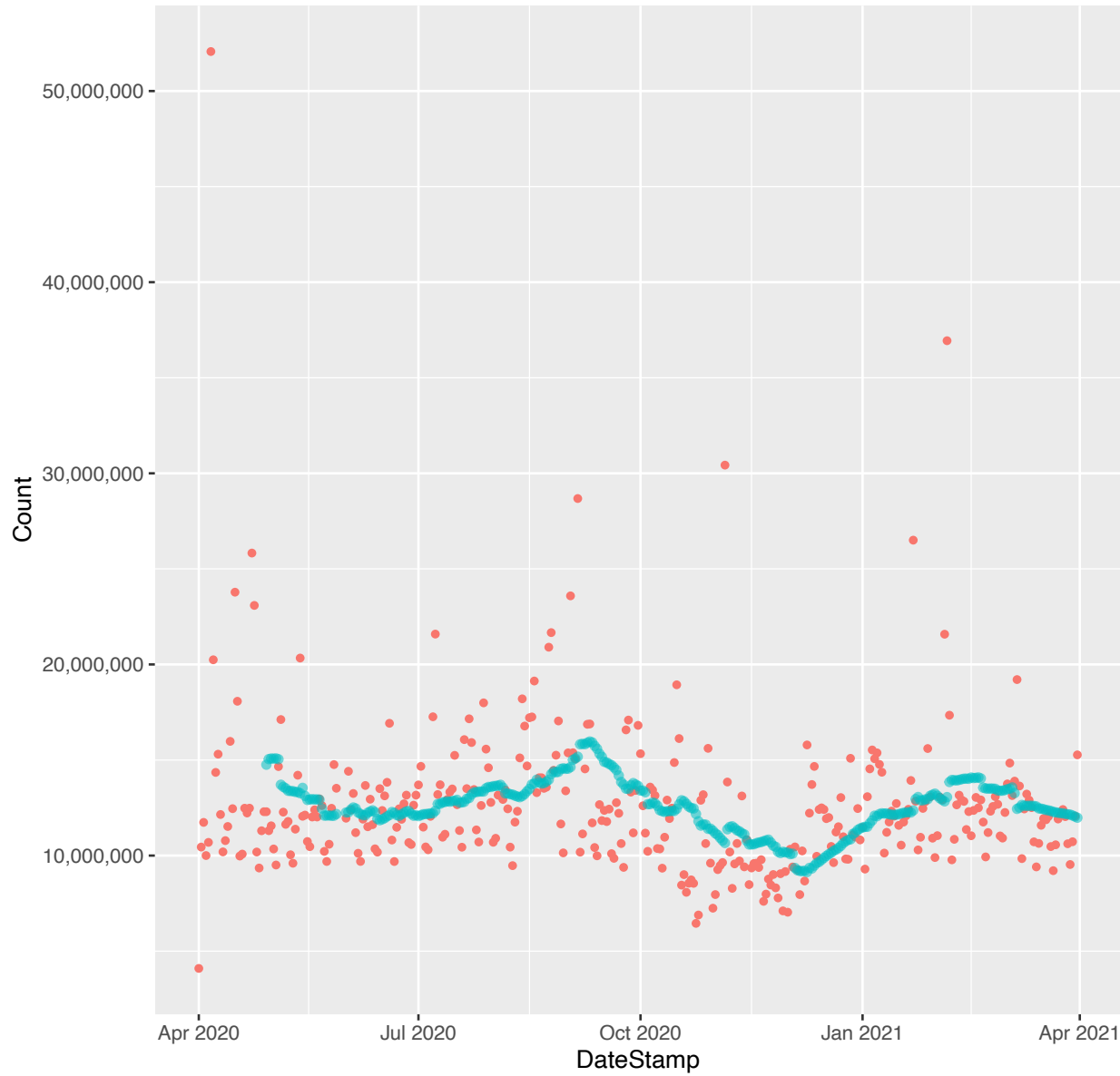


18. dell.com:

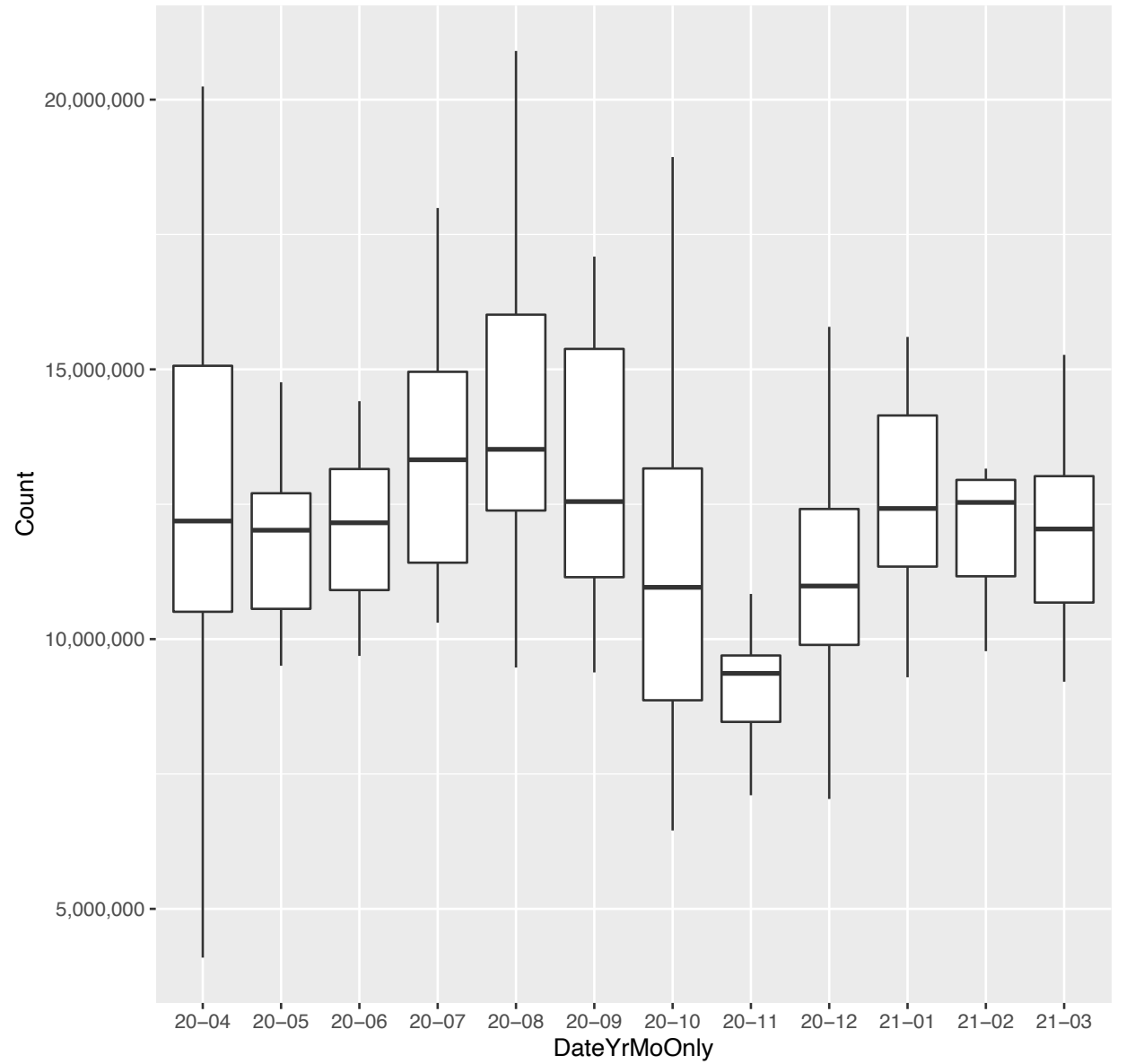


MM

*. dell.com (day-by-day counts and 28 day moving average)



*. dell.com (monthly boxplots (outliers trimmed))



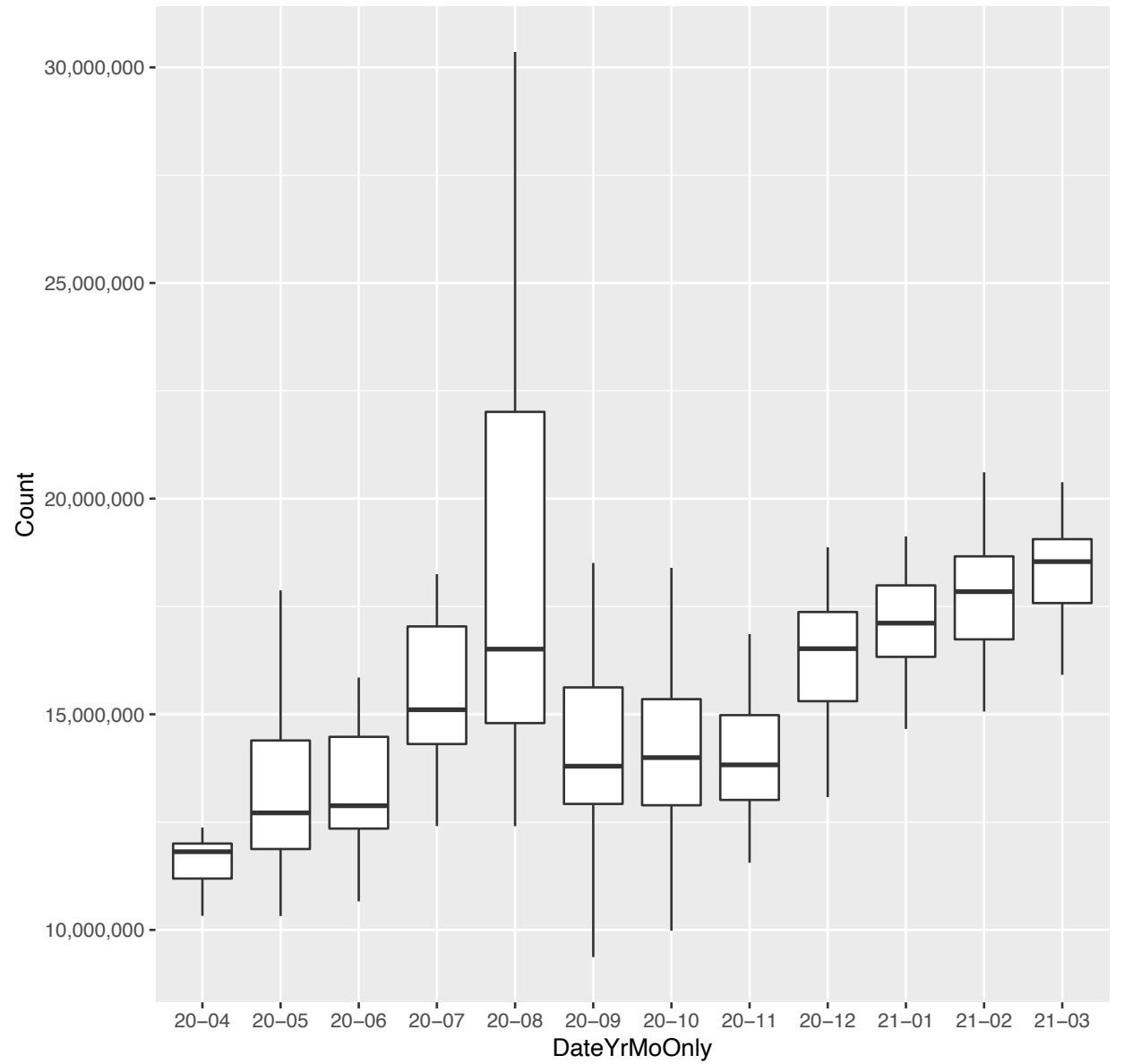
19. microsoft.com:



*. microsoft.com (day-by-day counts and 28 day moving average)



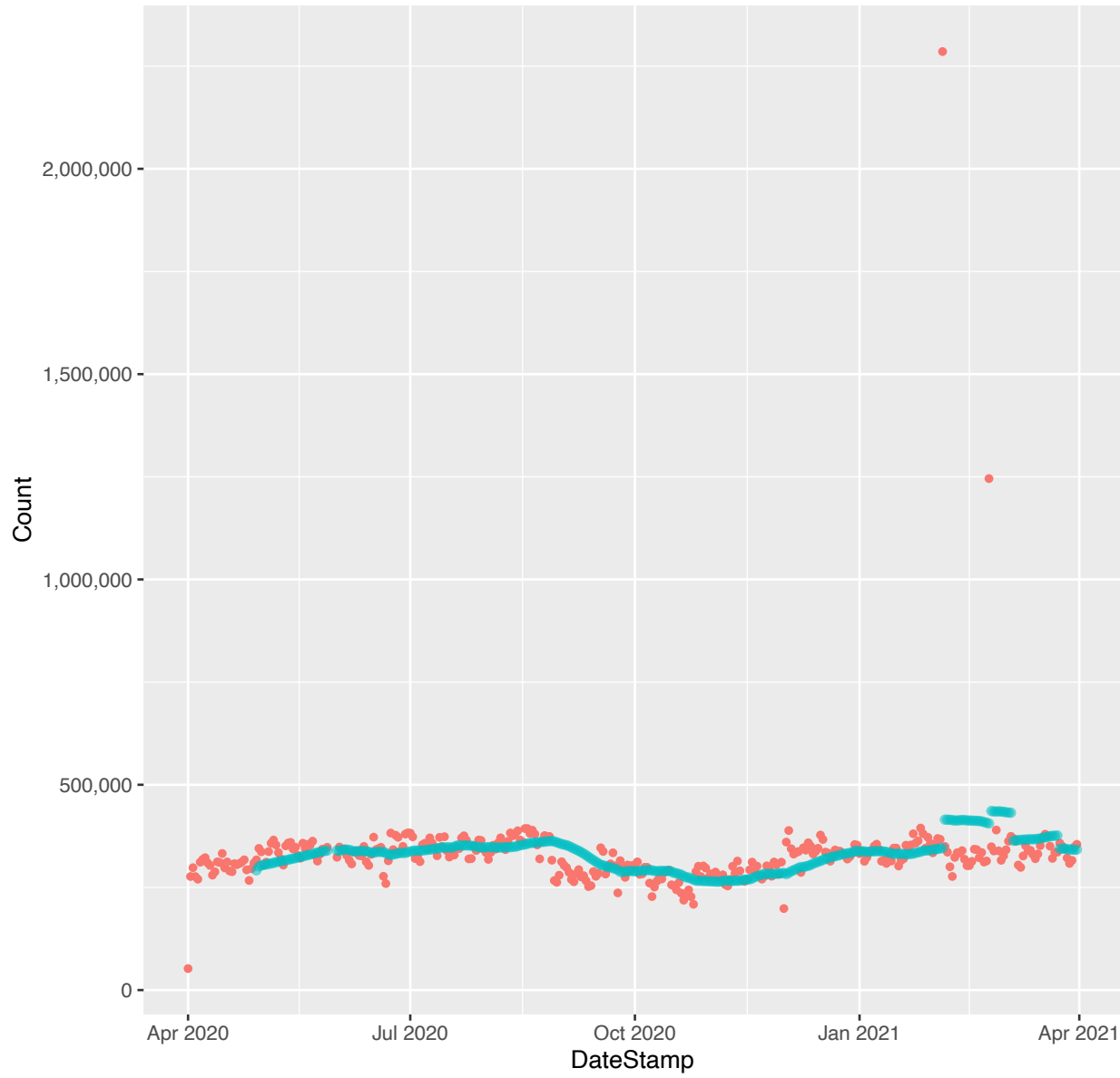
*. microsoft.com (monthly boxplots (outliers trimmed))



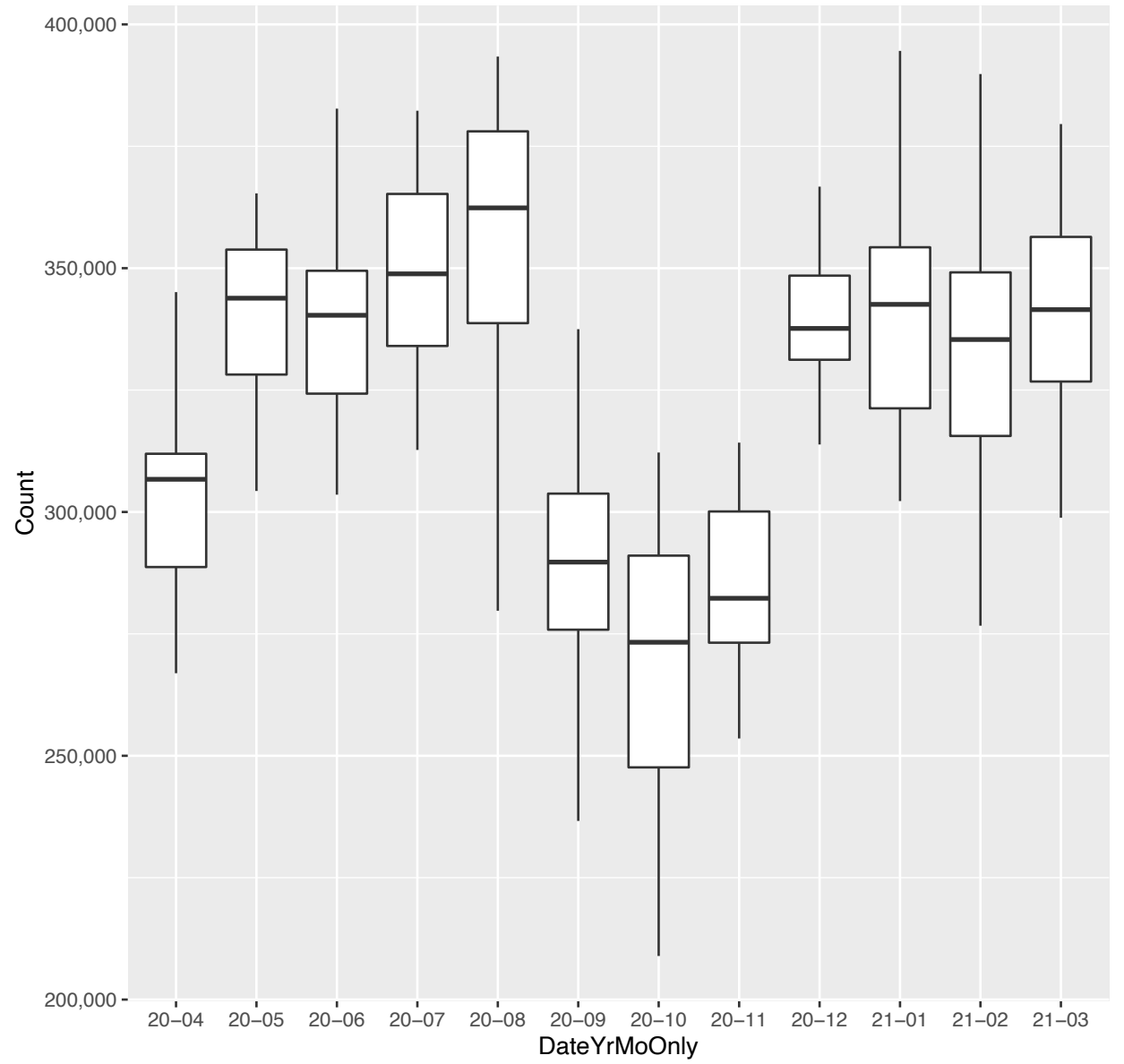
20. newegg.com:



*. newegg.com (day-by-day counts and 28 day moving average)



*. newegg.com (monthly boxplots (outliers trimmed))



c) Convenience Stores:

[\[back to Retail Sites\]](#)

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21 *.7-eleven.com



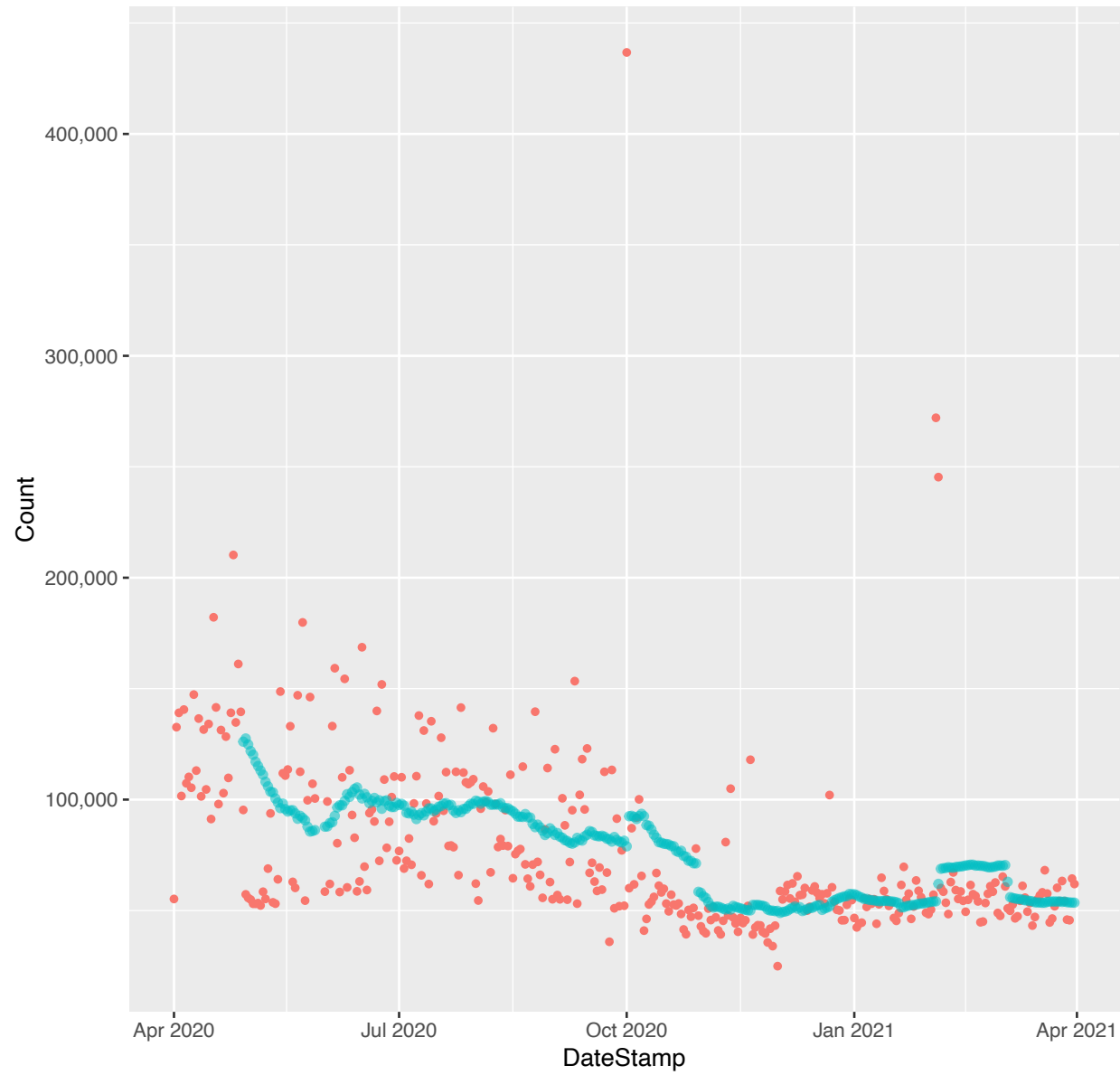
22 *.circlek.com



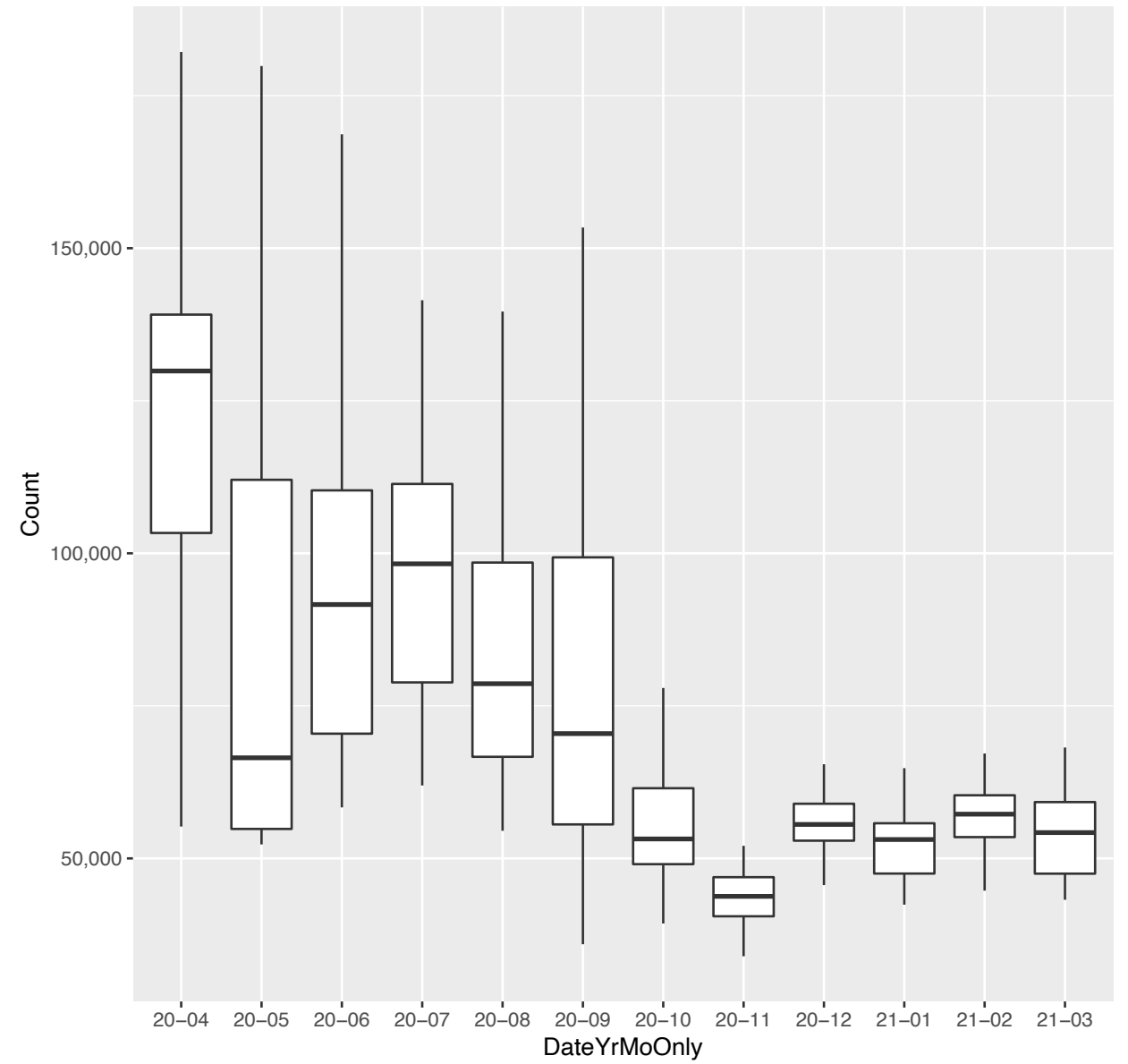
21. 7-eleven.com:



*. 7-eleven.com (day-by-day counts and 28 day moving average)



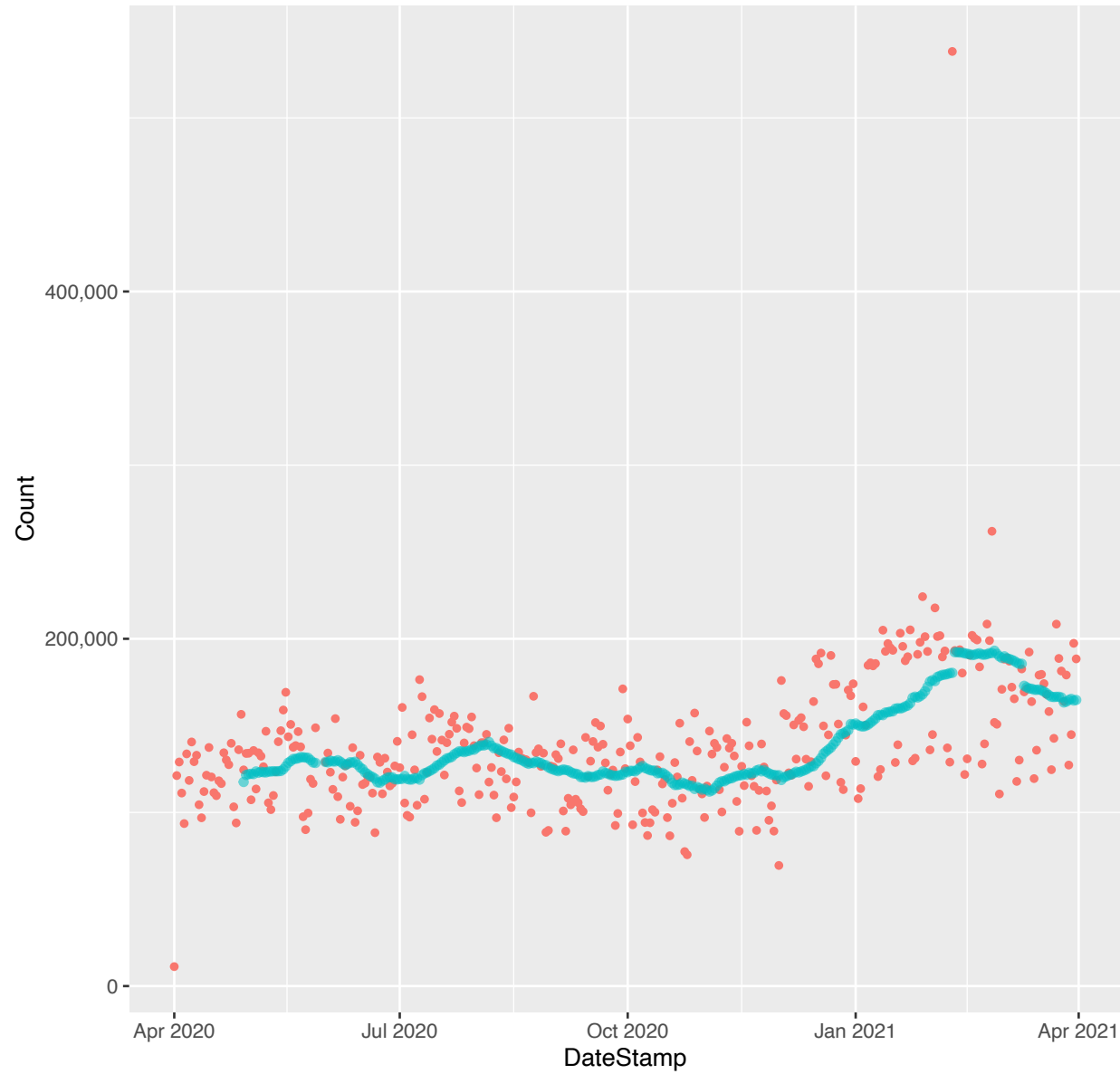
*. 7-eleven.com (monthly boxplots (outliers trimmed))



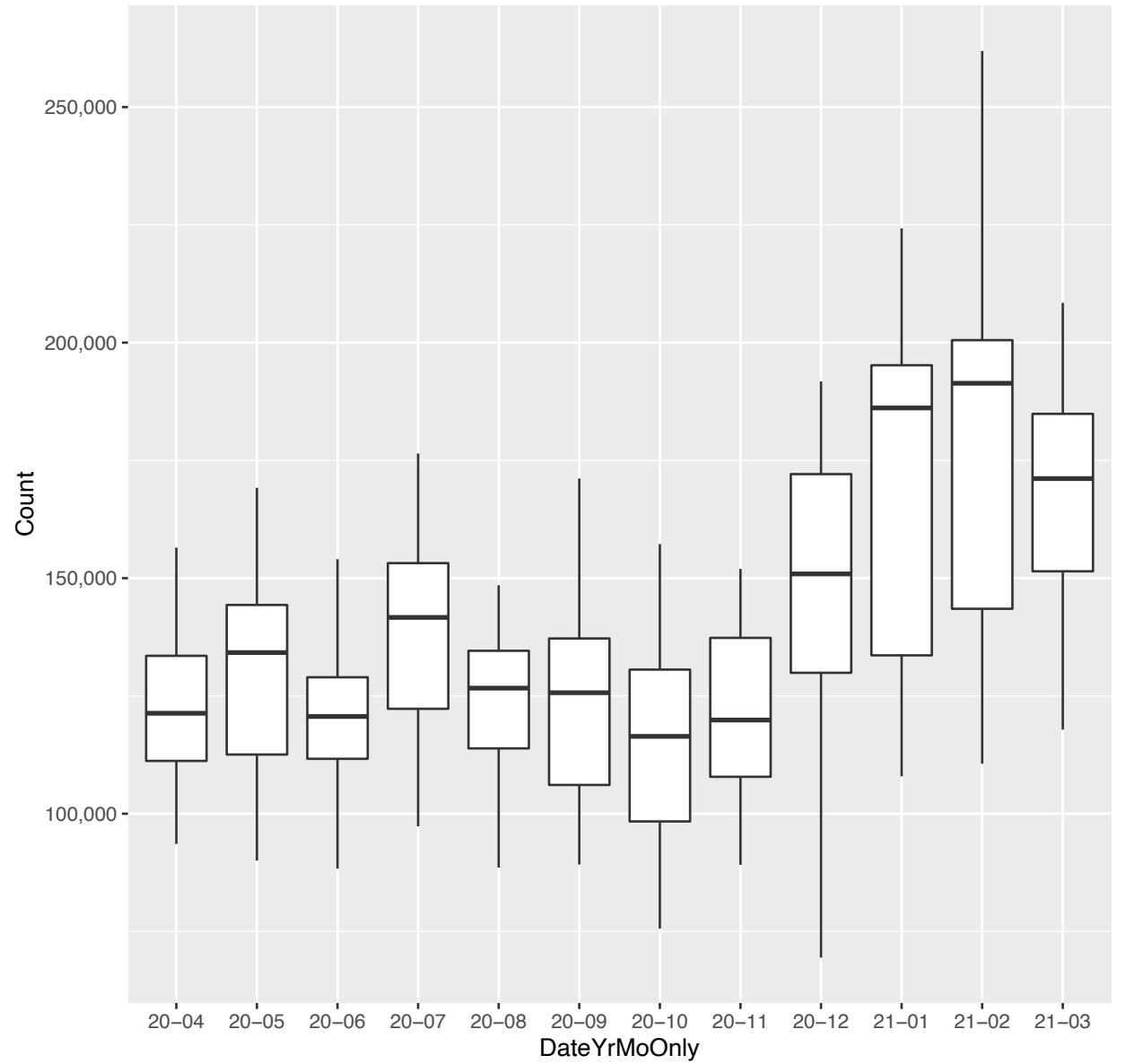
22. circlek.com:

~

*. circlek.com (day-by-day counts and 28 day moving average)



*. circlek.com (monthly boxplots (outliers trimmed))



d) Dollar Stores

[\[back to Retail Sites\]](#)

[\[back to TOC\]](#)

- 23 *.dollargeneral.com ~
- 24 *.dollartree.com ~
- 25 *.familydollar.com ∪ shaped (ending higher)

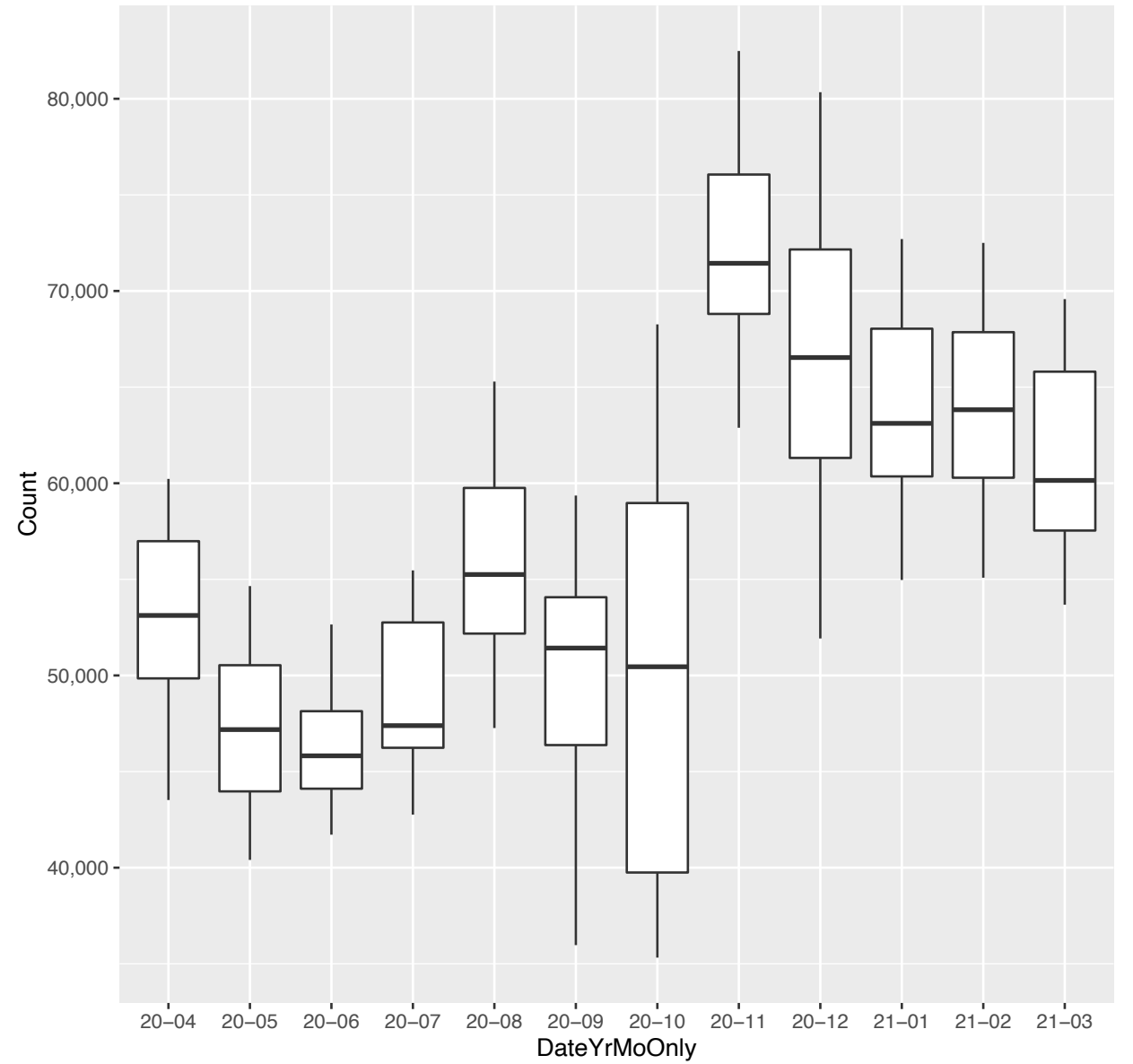
23. dollargeneral.com:

~

*. dollargeneral.com (day-by-day counts and 28 day moving average)



*. dollargeneral.com (monthly boxplots (outliers trimmed))



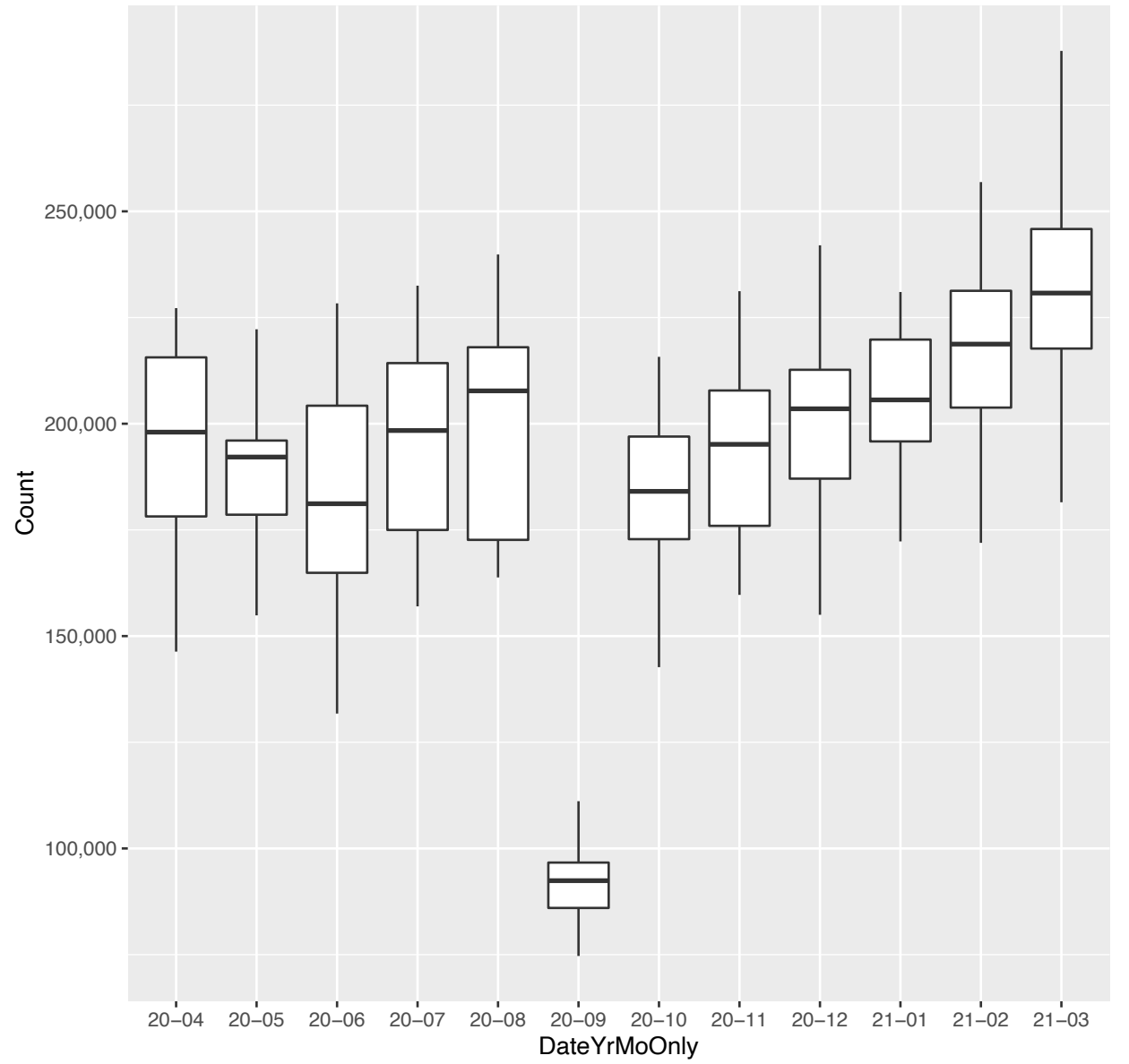
24. dollartree.com:

~

*. dollartree.com (day-by-day counts and 28 day moving average)



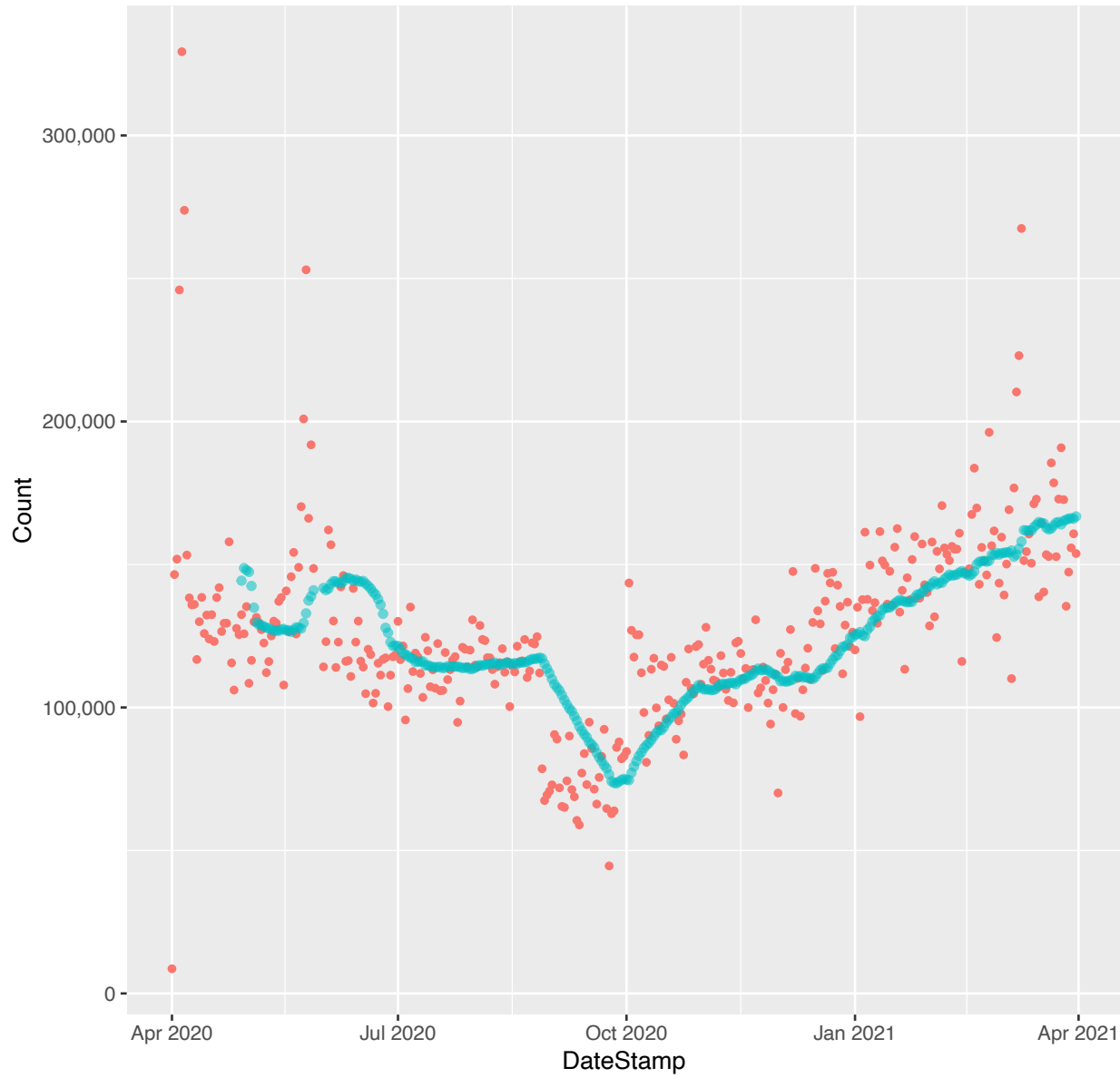
*. dollartree.com (monthly boxplots (outliers trimmed))



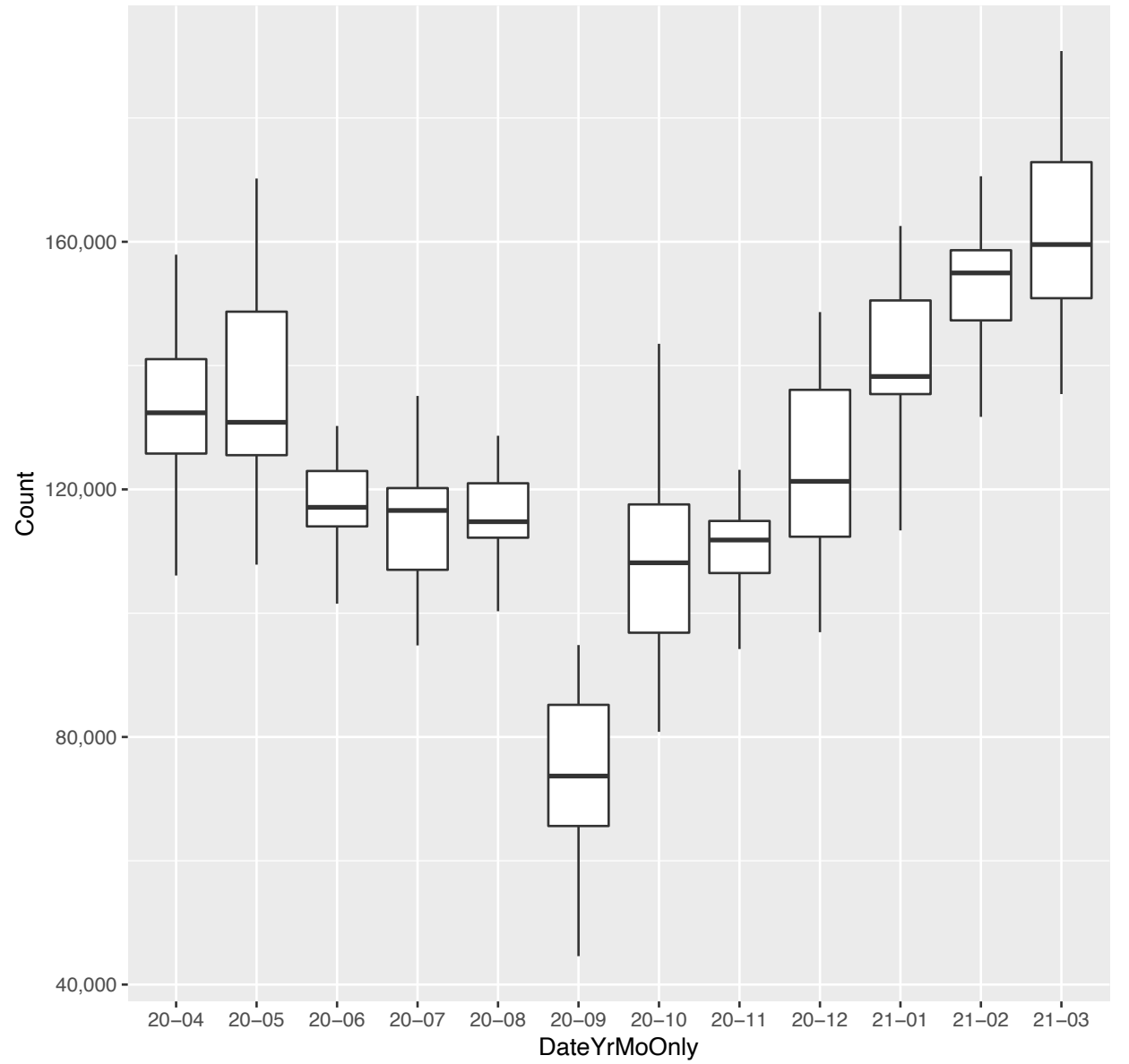
25. familydollar.com:

U shaped (ending higher)

*. familydollar.com (day-by-day counts and 28 day moving average)



*. familydollar.com (monthly boxplots (outliers trimmed))



e) Drug Stores

[\[back to Retail Sites\]](#)

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- 26 *.cvs.com ✱ ~
- 27 *.riteaid.com ~
- 28 *.walgreens.com ↗ M

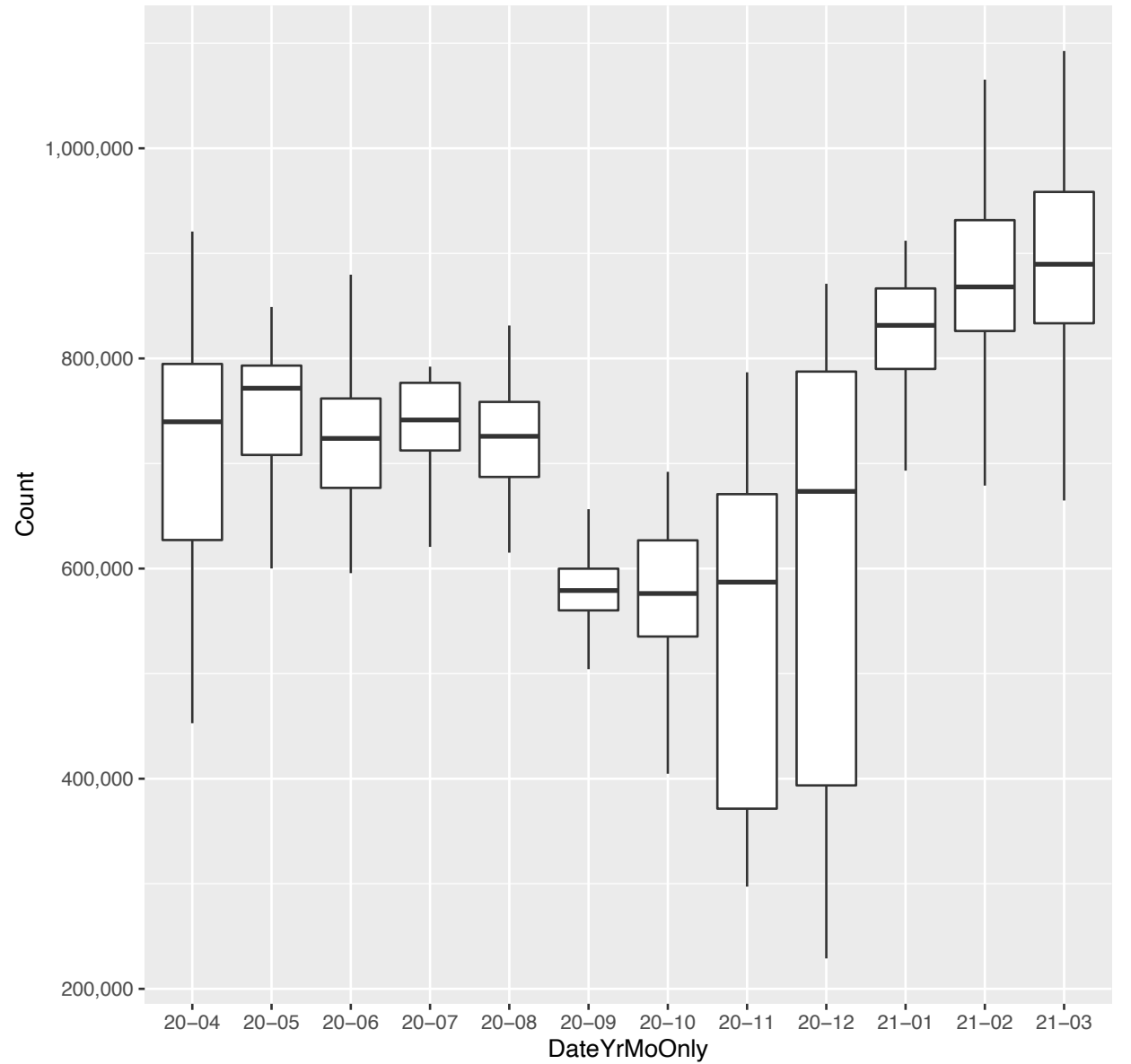
26. cvs.com:



*. cvs.com (day-by-day counts and 28 day moving average)



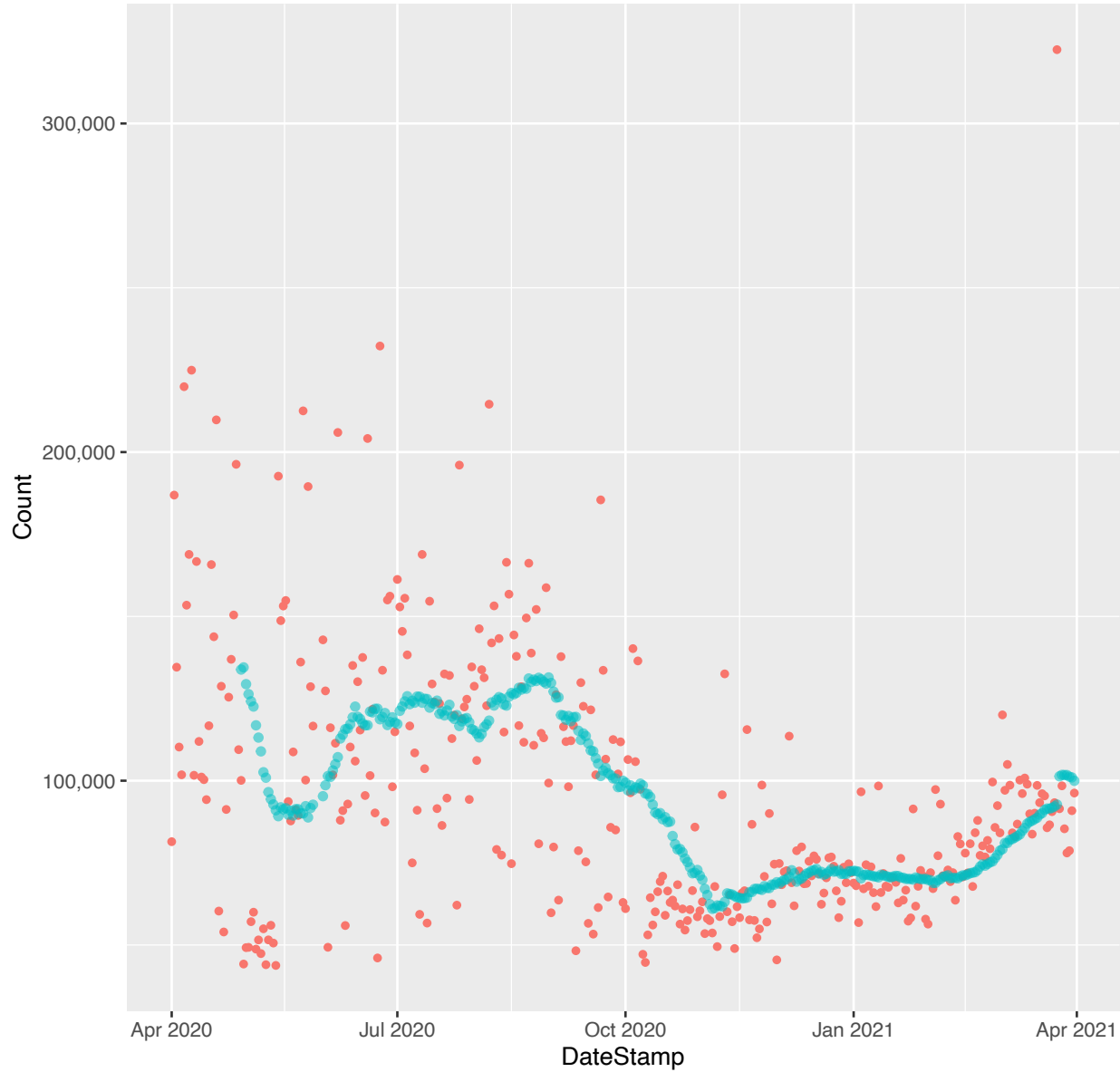
*. cvs.com (monthly boxplots (outliers trimmed))



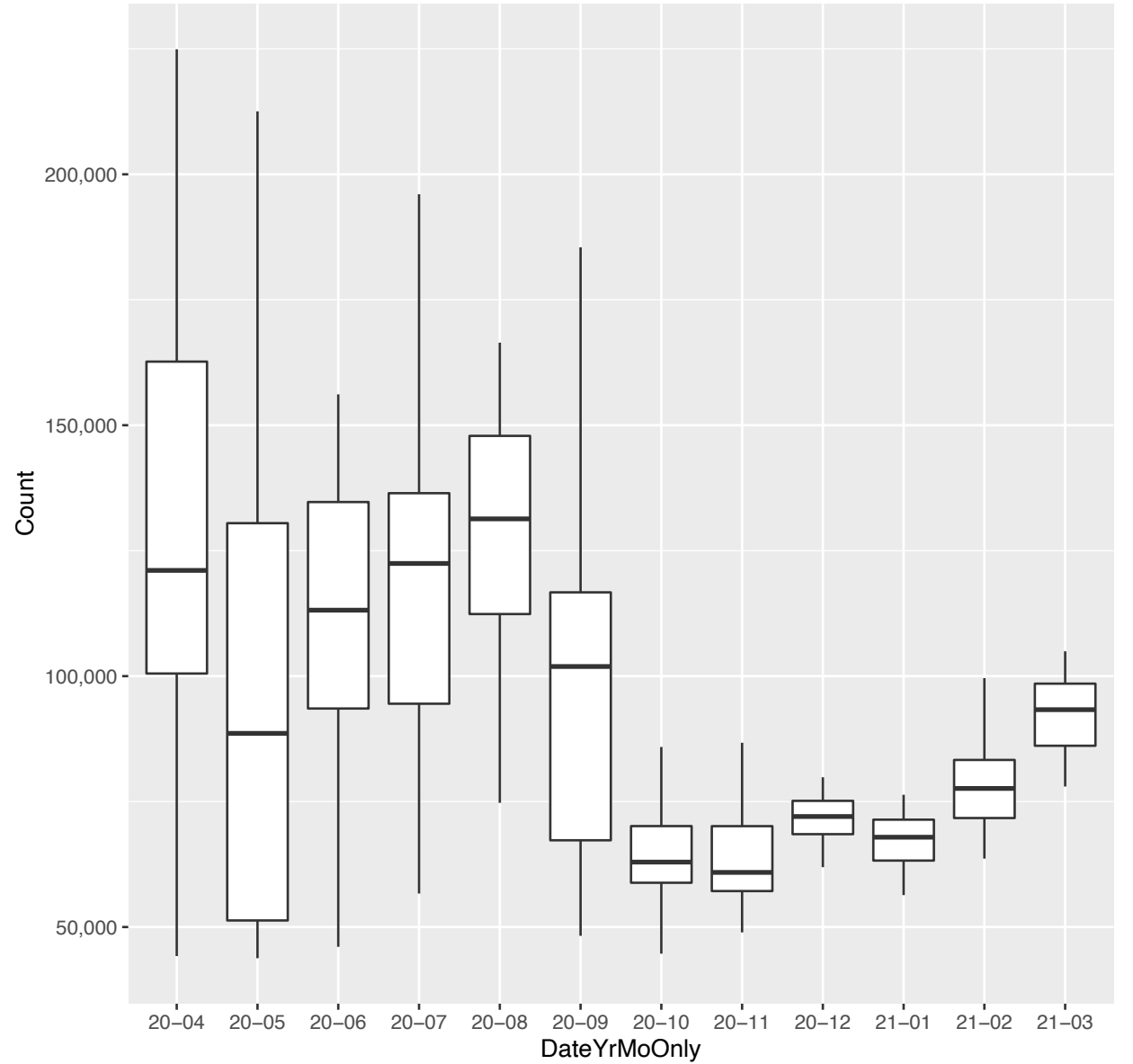
27. riteaid.com:

~

*. riteaid.com (day-by-day counts and 28 day moving average)

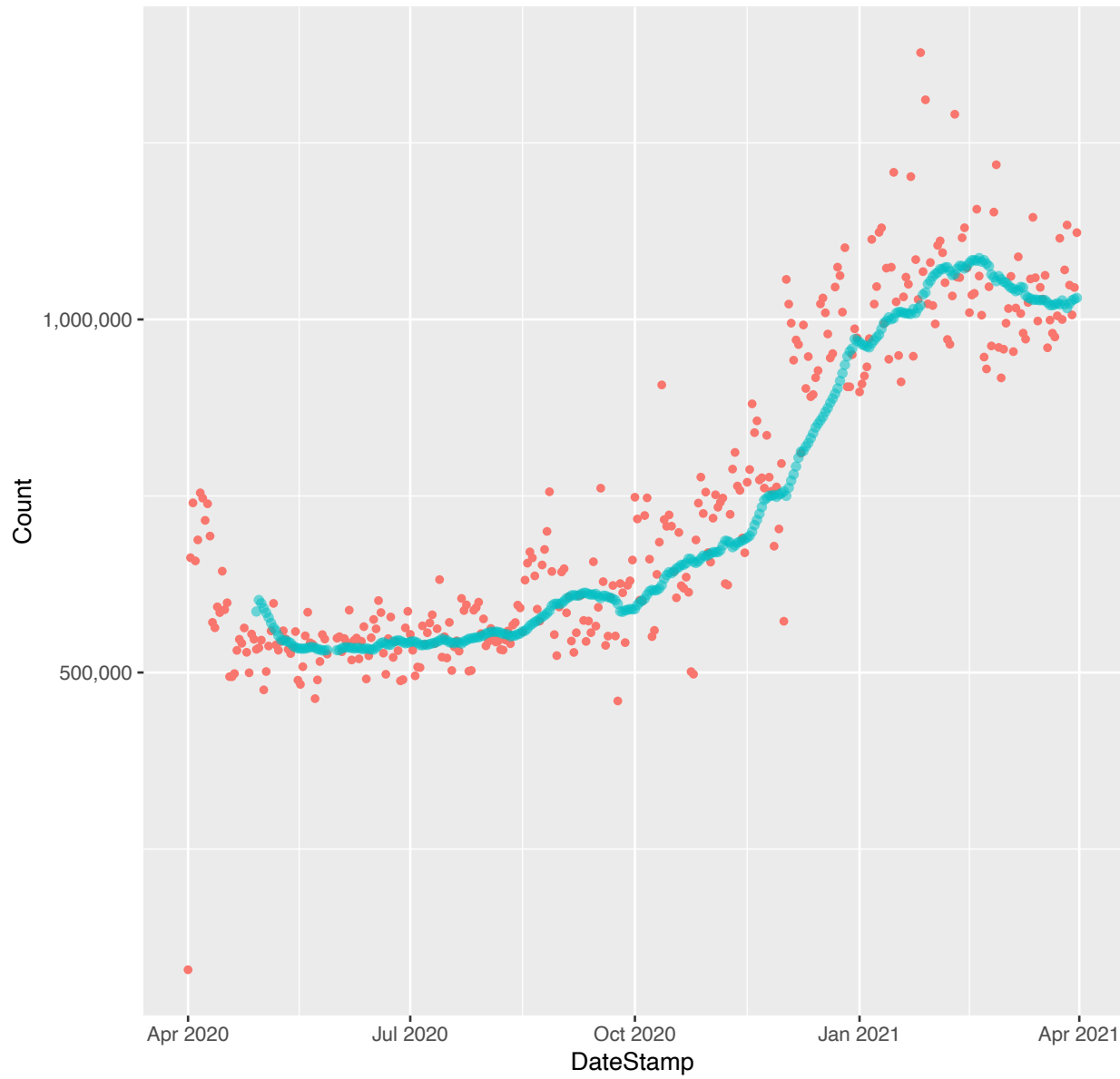


*. riteaid.com (monthly boxplots (outliers trimmed))

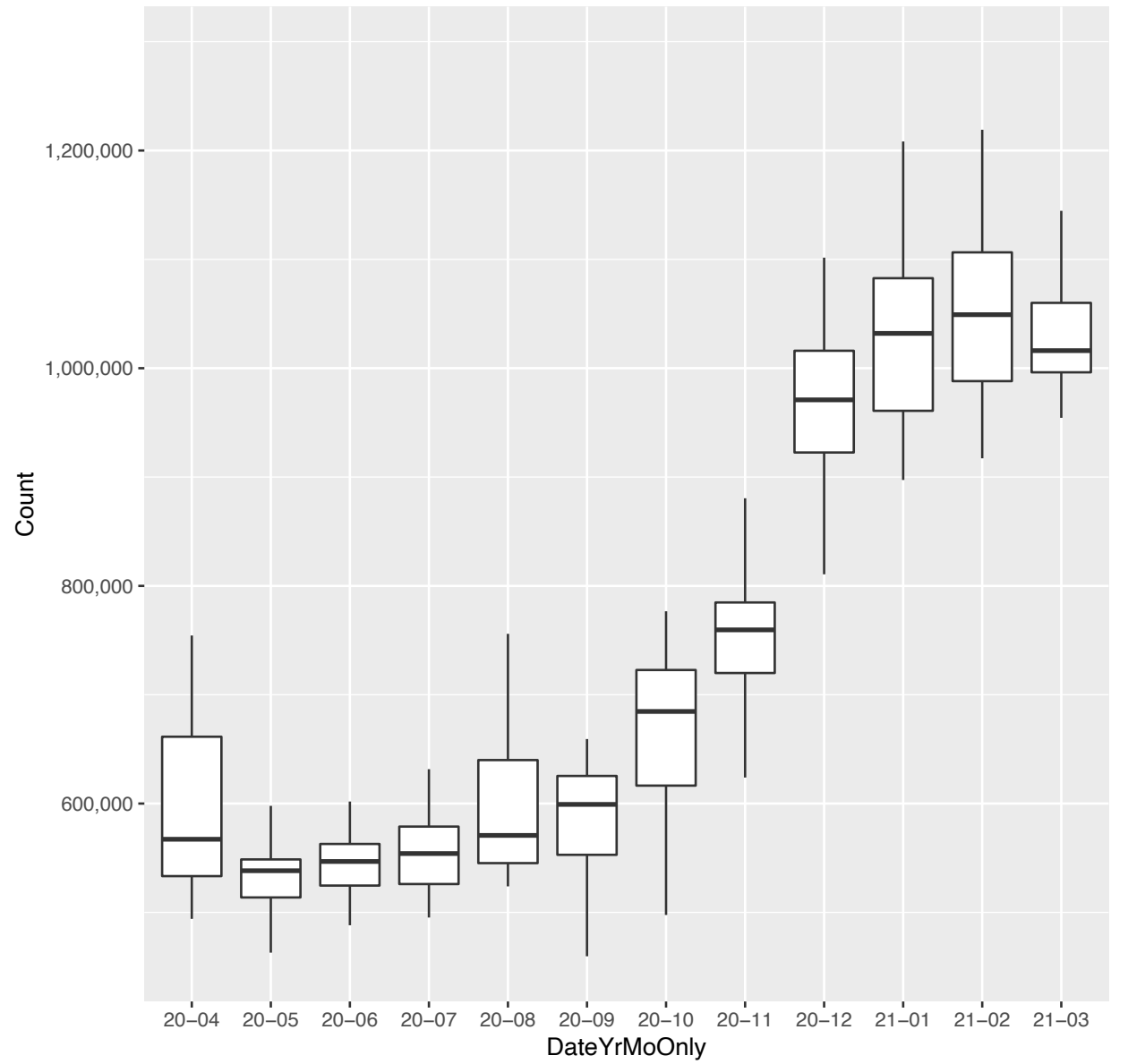




*. walgreens.com (day-by-day counts and 28 day moving average)



*. walgreens.com (monthly boxplots (outliers trimmed))



f) Fast Food and Coffee

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29 *.arbys.com		~	
30 *.bk.com		∩ (ending lower)	
31 *.cariboucoffee.com		↘	
32 *.chick-fil-a.com		↗	M
33 *.chipotle.com		~	
34 *.dominos.com		~	
35 *.dunkindonuts.com		~	
36 *.dutchbros.com		↗	
37 *.jimmyjohns.com		~	
38 *.littlecaesars.com		↗	
39 *.mcdonalds.com	✱	↗	
40 *.panerabread.com		~	
41 *.papajohns.com		↘	
42 *.peets.com		~	
43 *.pizzahut.com	✱	~	
44 *.starbucks.com	✱	↘	MM
45 *.subway.com	✱	~	
46 *.wendys.com		~	M

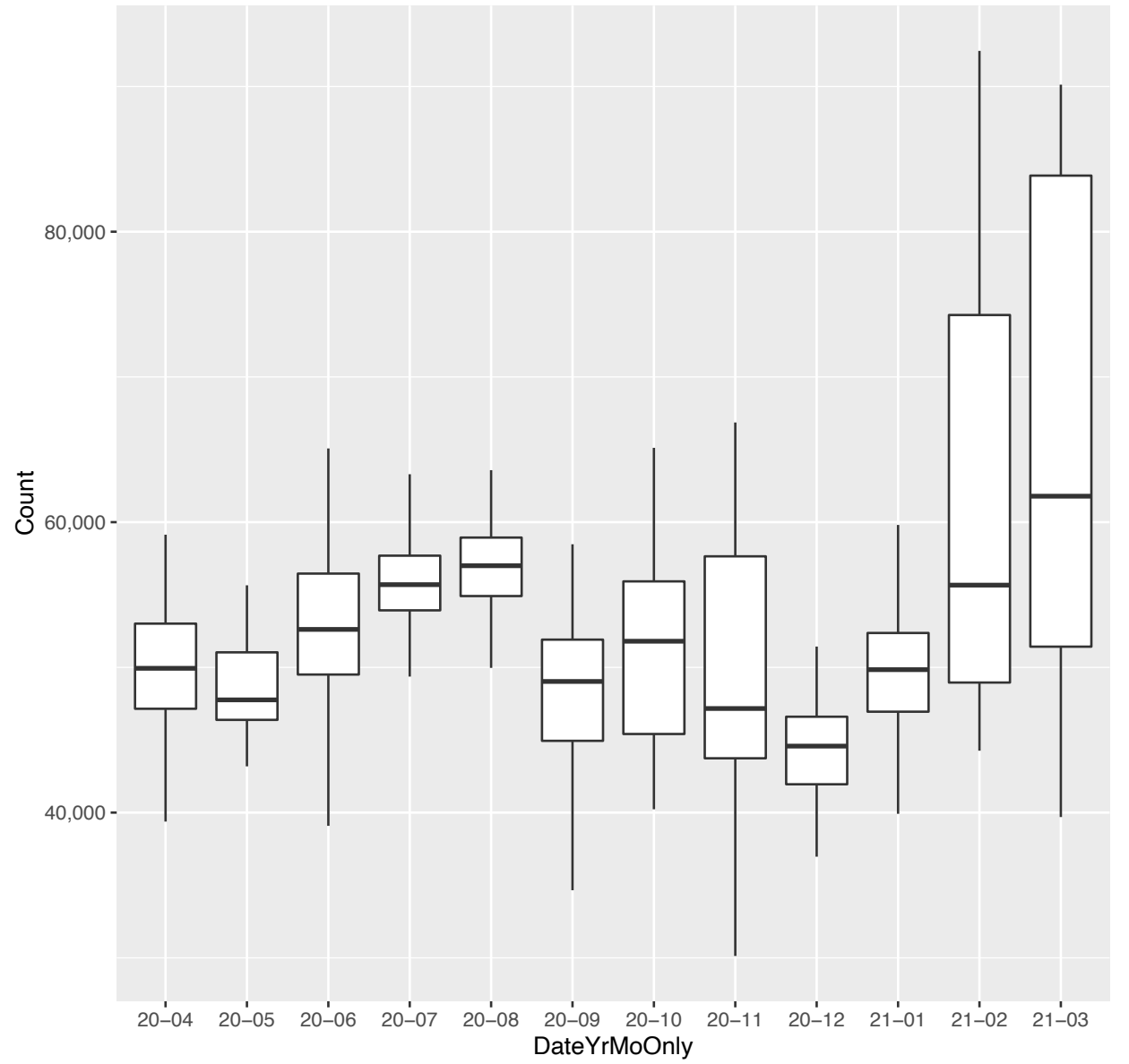
29. arbys.com:

~

*. arbys.com (day-by-day counts and 28 day moving average)



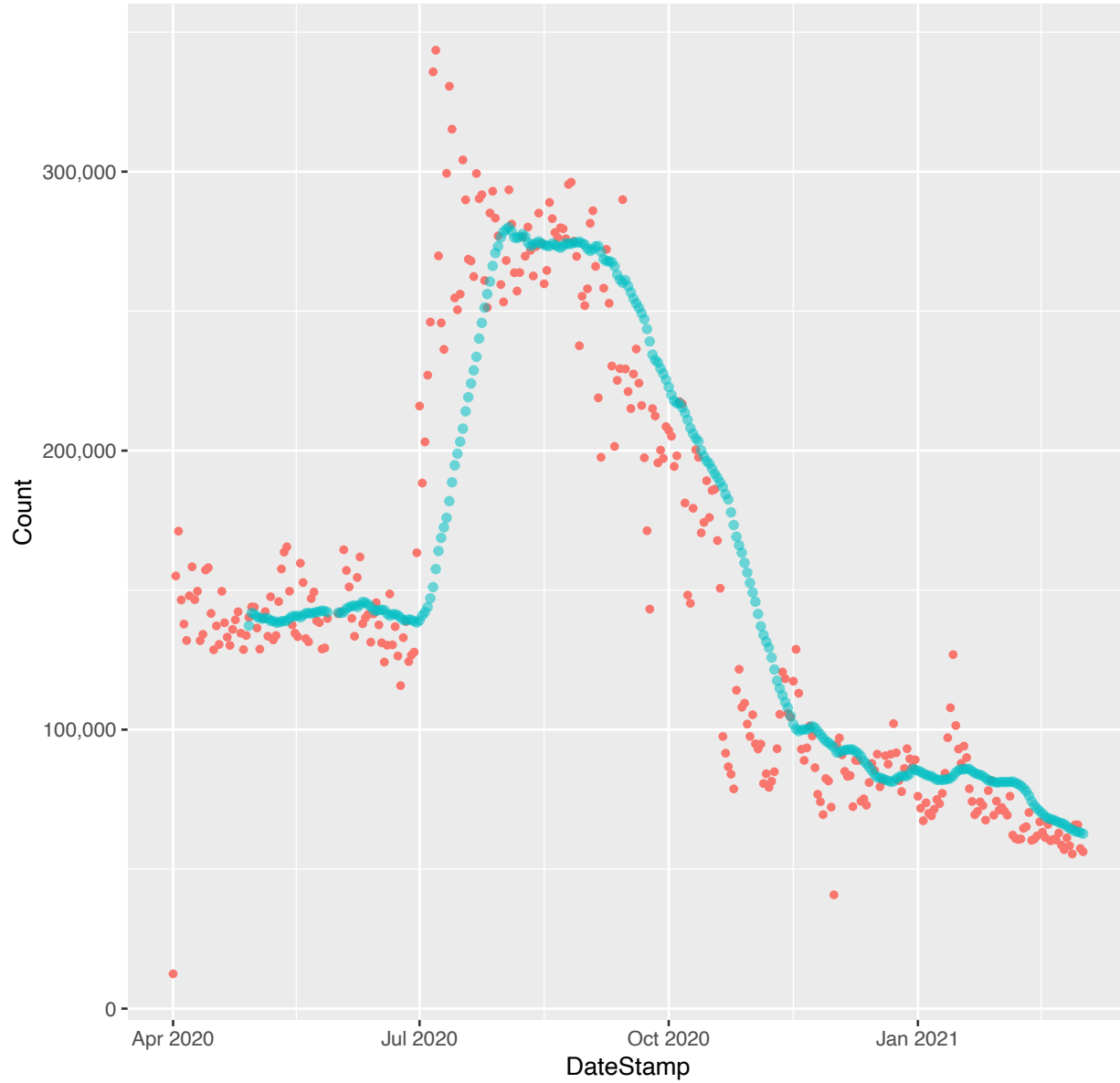
*. arbys.com (monthly boxplots (outliers trimmed))



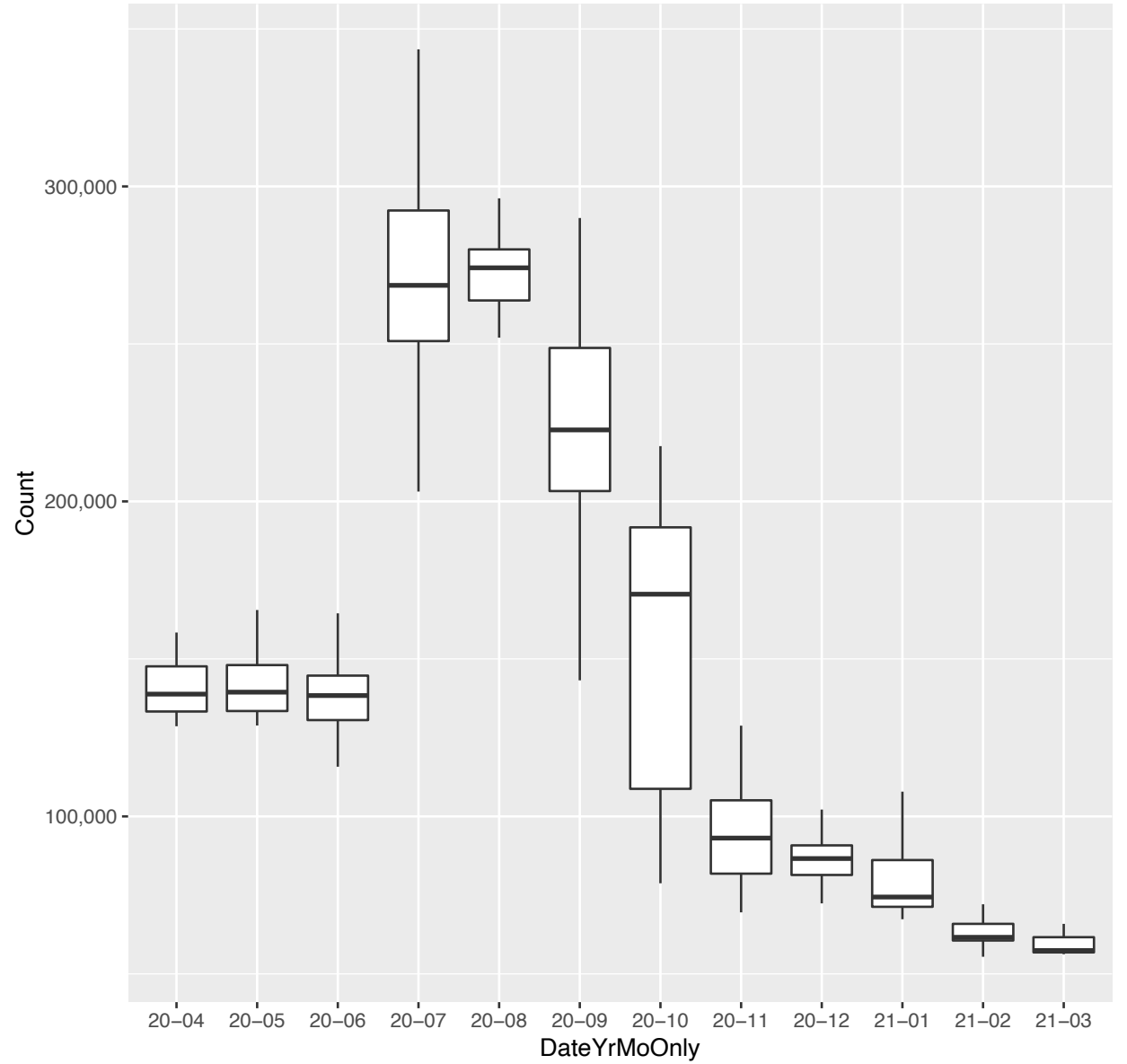
30. bk.com:

○ (ending lower)

*. bk.com (day-by-day counts and 28 day moving average)



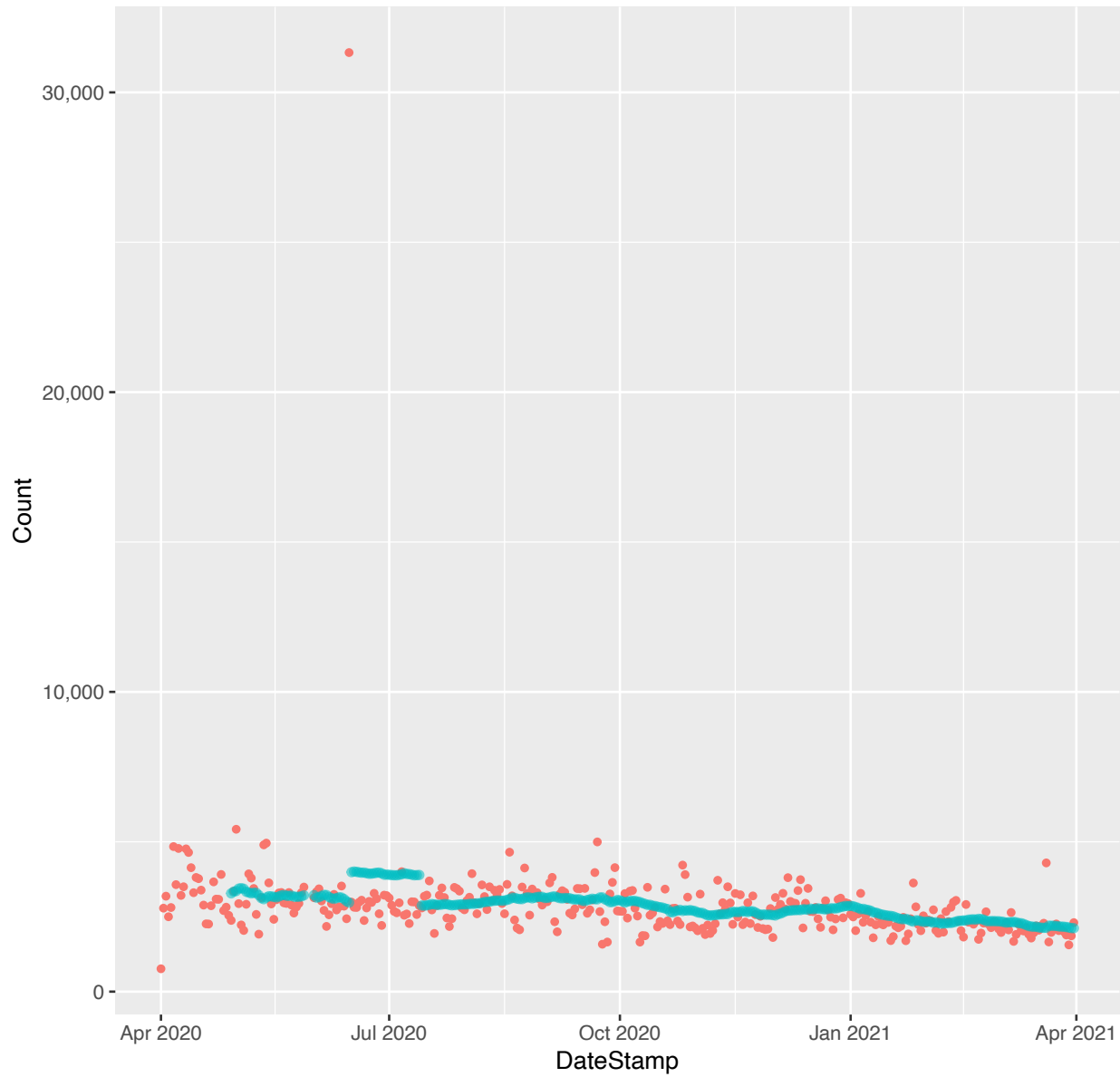
*. bk.com (monthly boxplots (outliers trimmed))



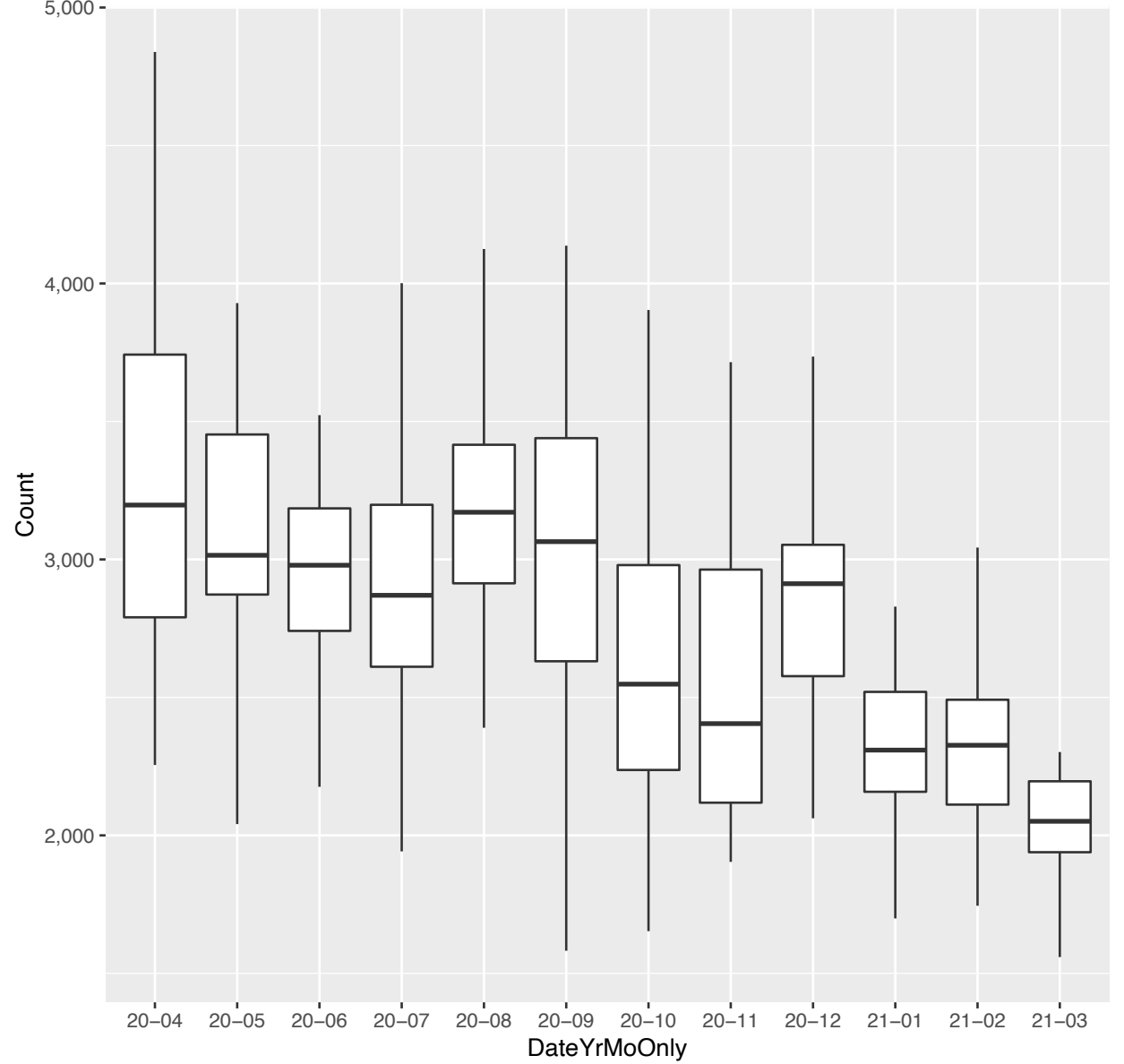
31. cariboucoffee.com:



*. cariboucoffee.com (day-by-day counts and 28 day moving average)



*. cariboucoffee.com (monthly boxplots (outliers trimmed))



32. chick-fil-a.com:

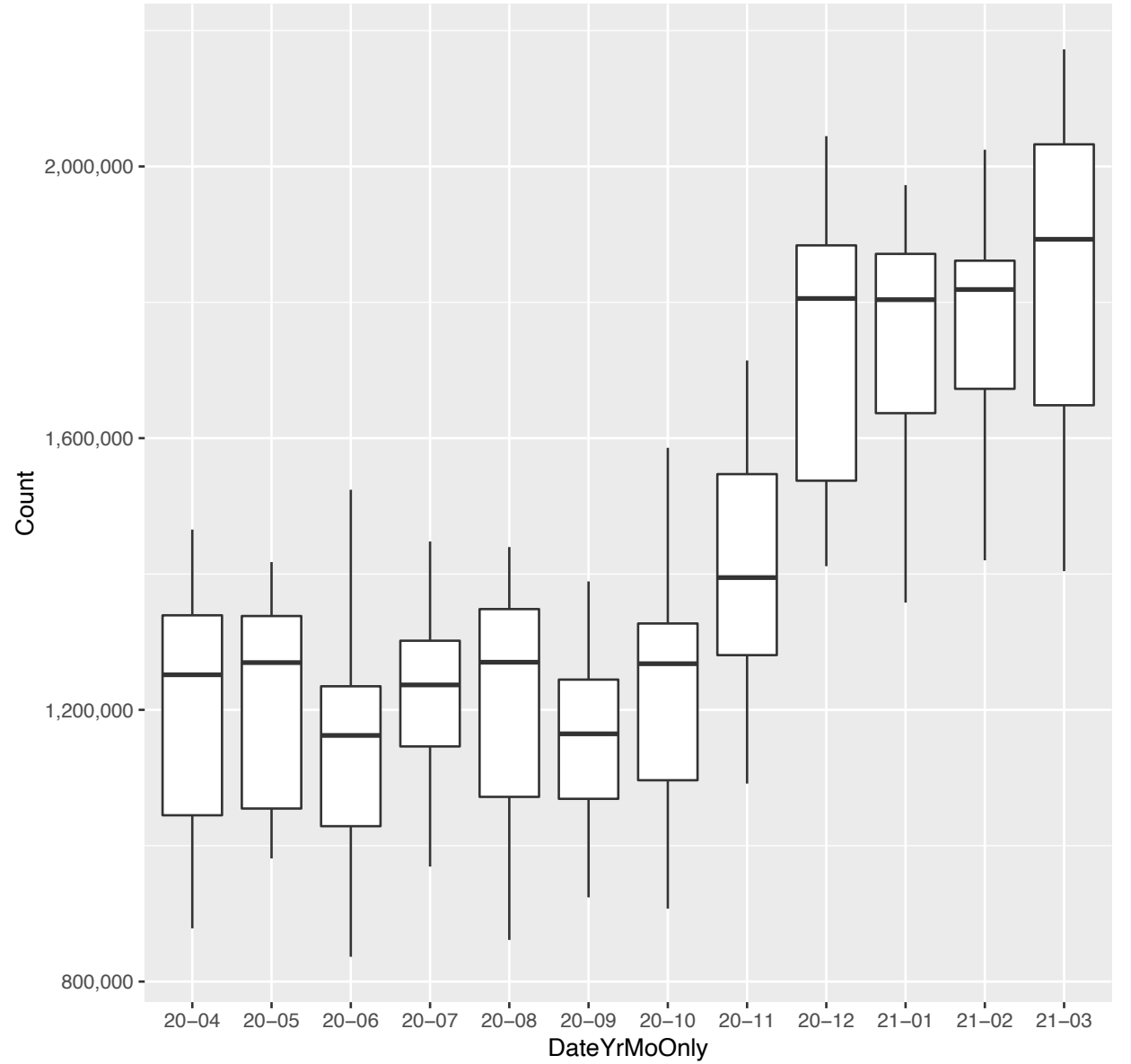


M

*. chick-fil-a.com (day-by-day counts and 28 day moving average)



*. chick-fil-a.com (monthly boxplots (outliers trimmed))

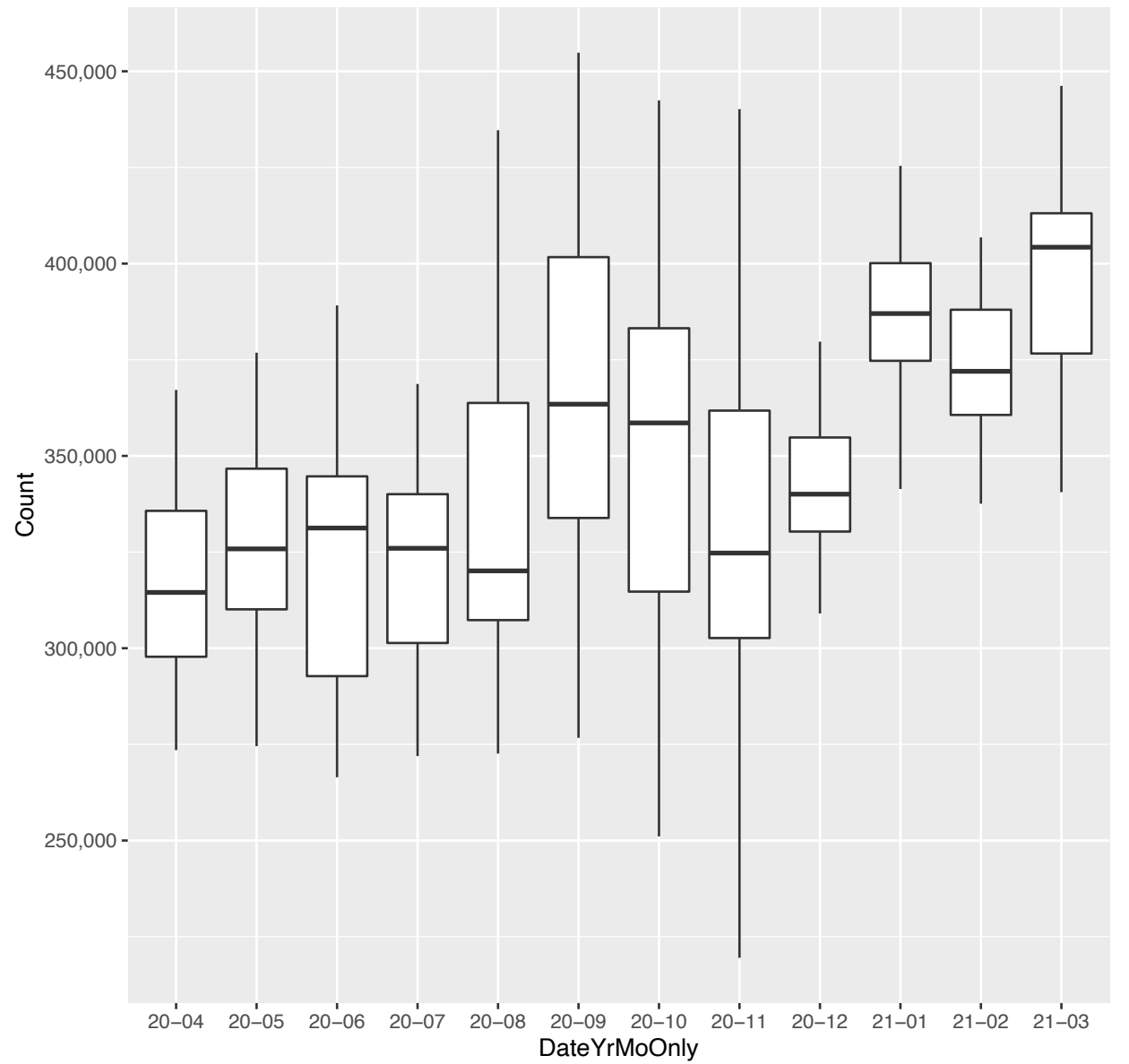


33. chipotle.com: ~

*. chipotle.com (day-by-day counts and 28 day moving average)



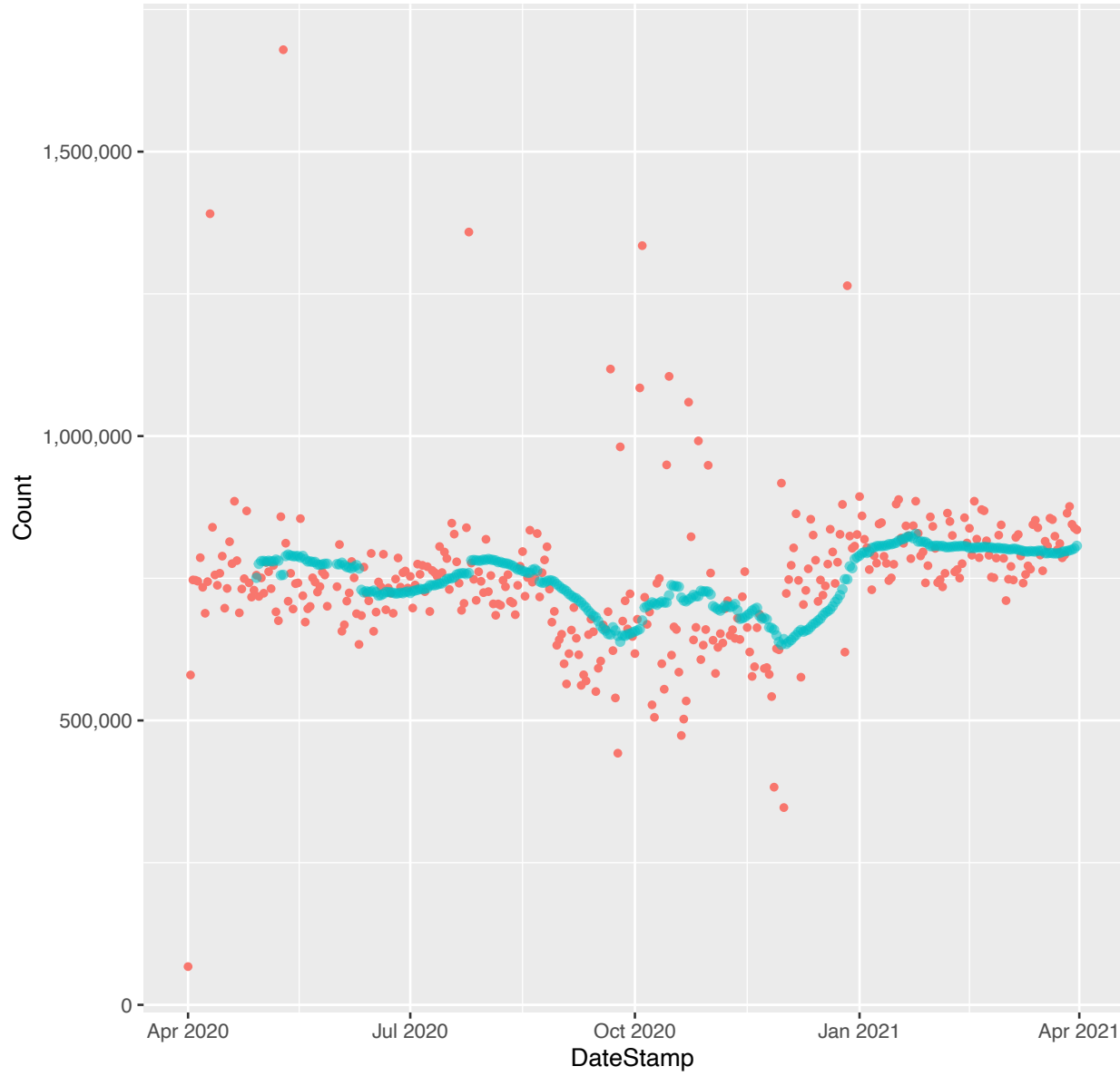
*. chipotle.com (monthly boxplots (outliers trimmed))



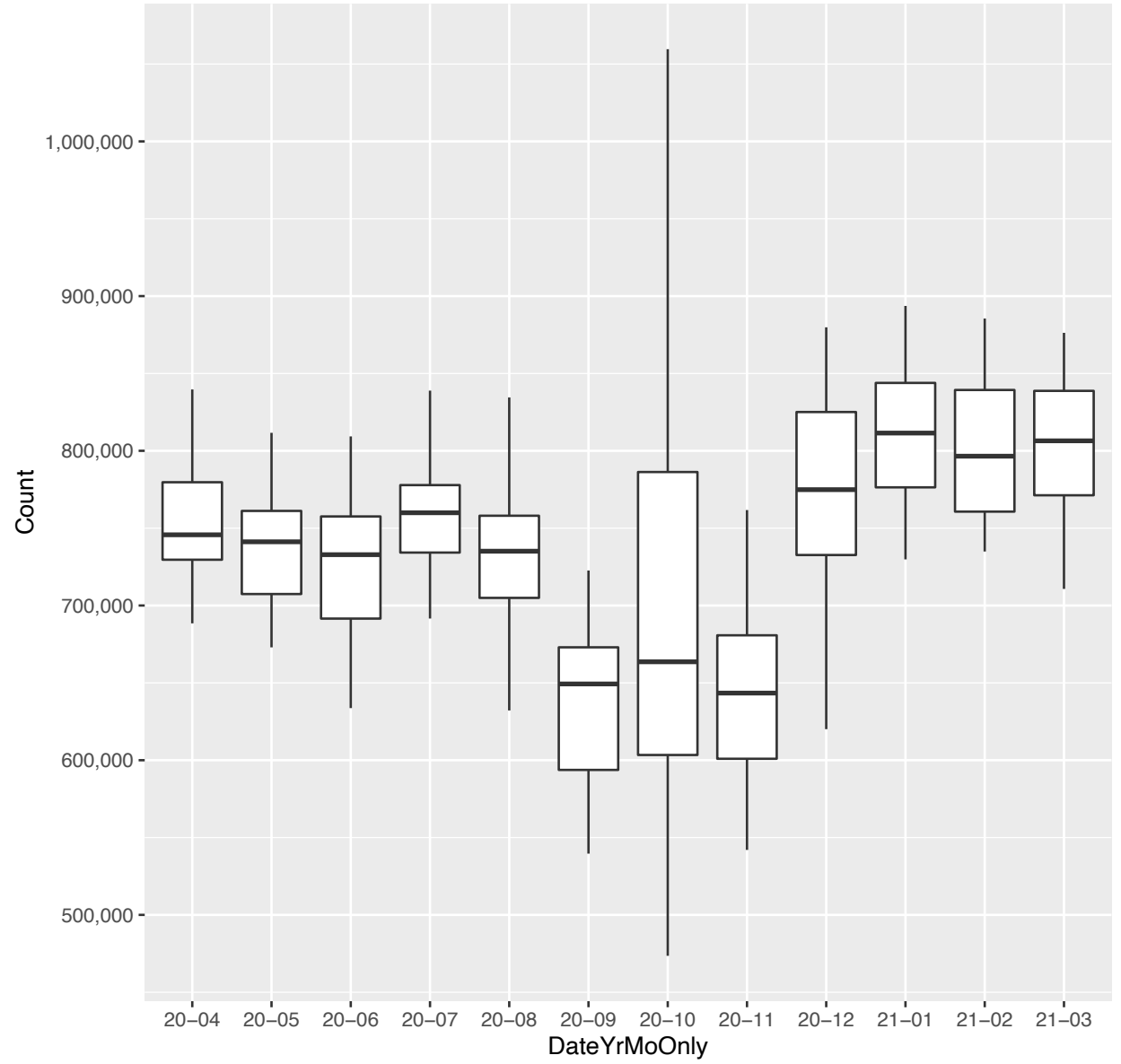
34. dominos.com:

~

*. dominos.com (day-by-day counts and 28 day moving average)



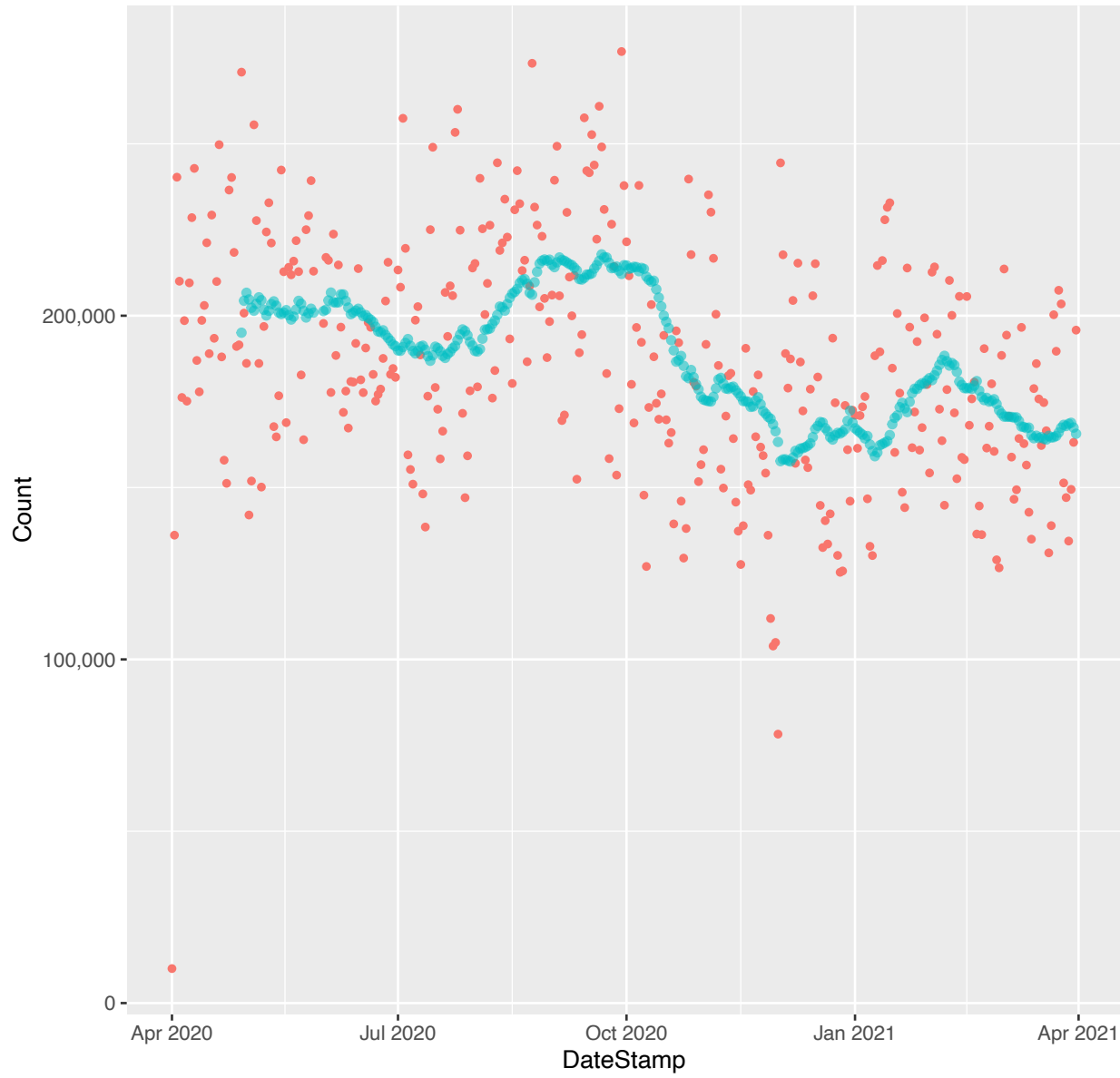
*. dominos.com (monthly boxplots (outliers trimmed))



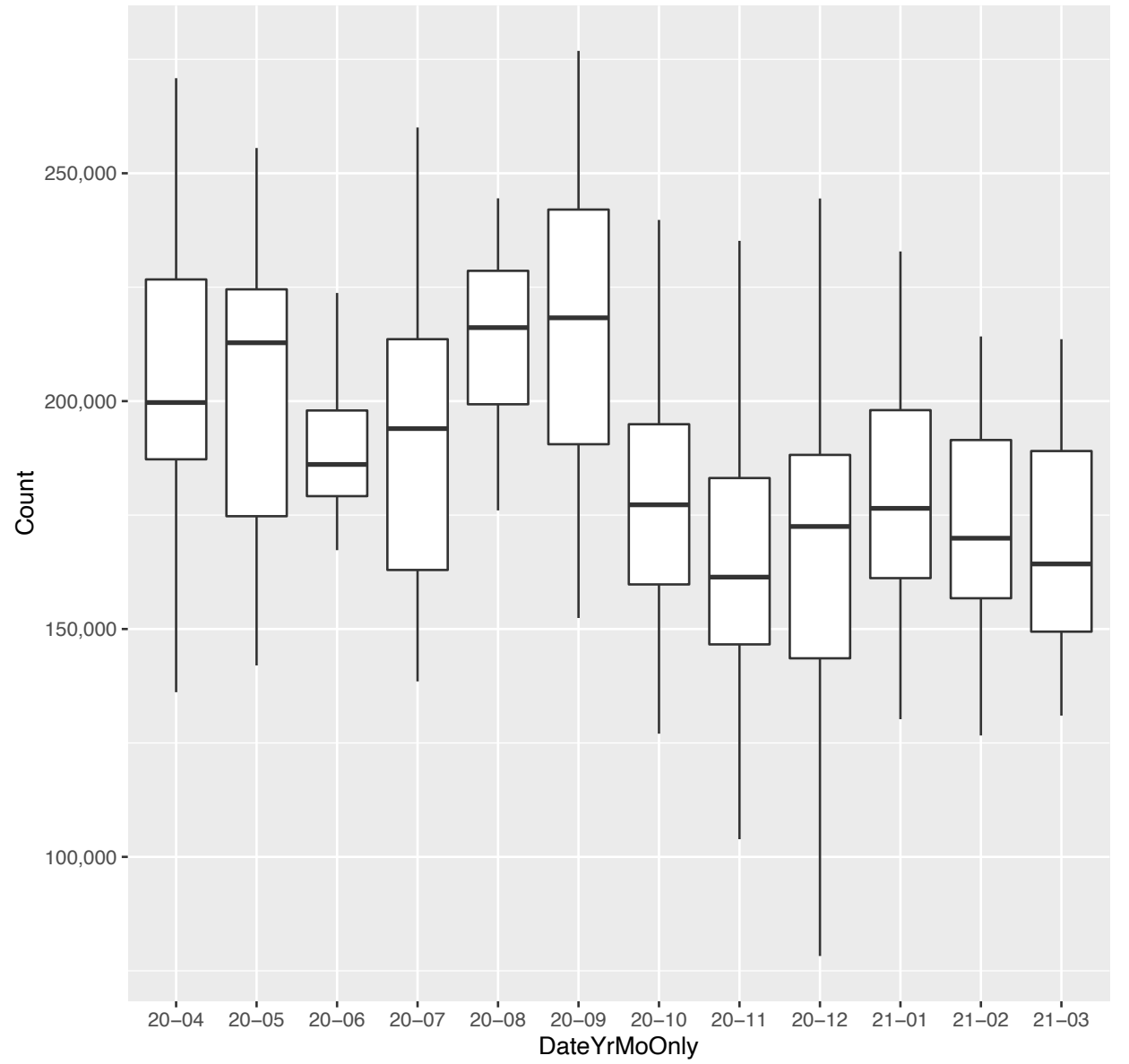
35. dunkindonuts.com:

~

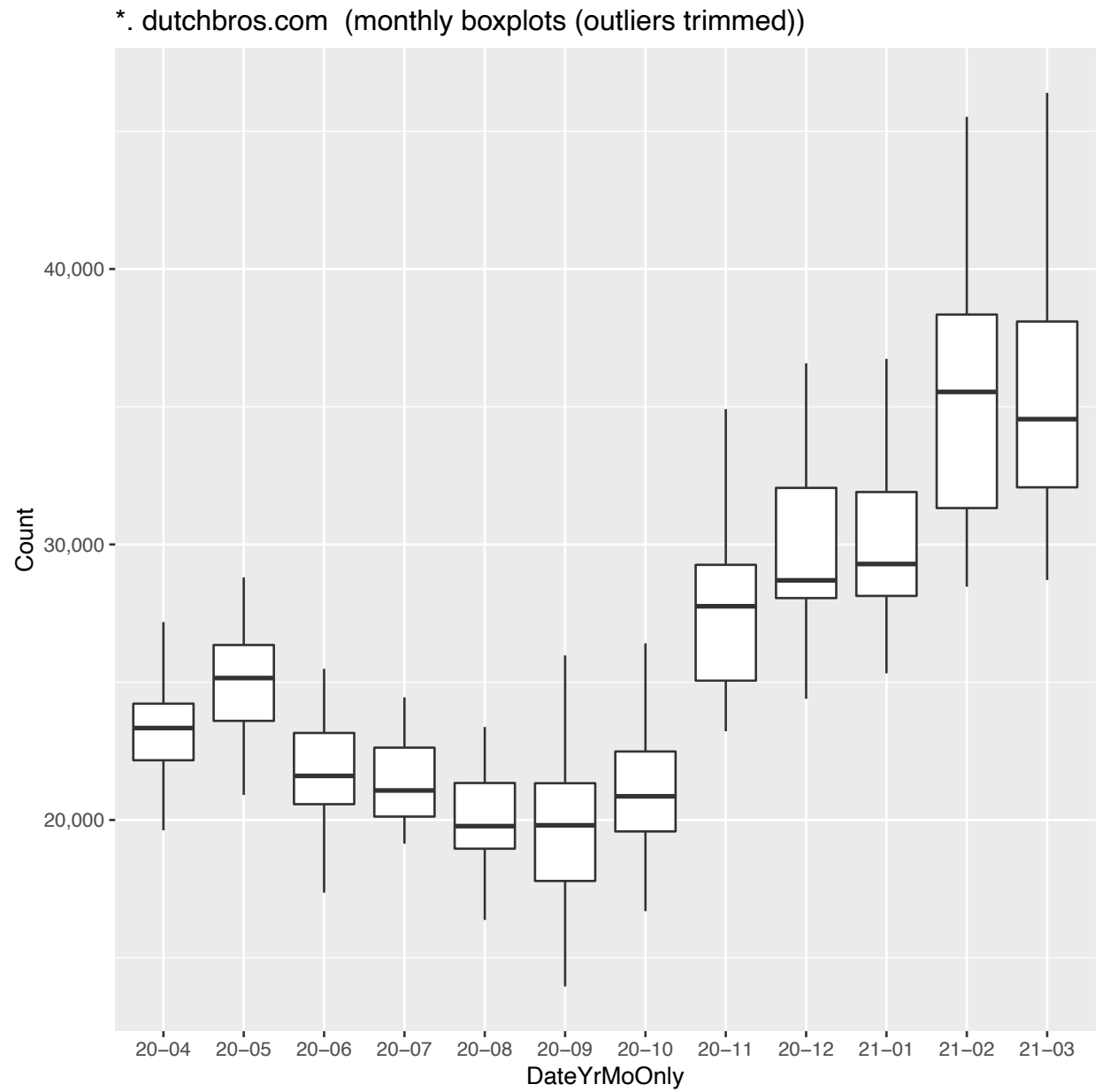
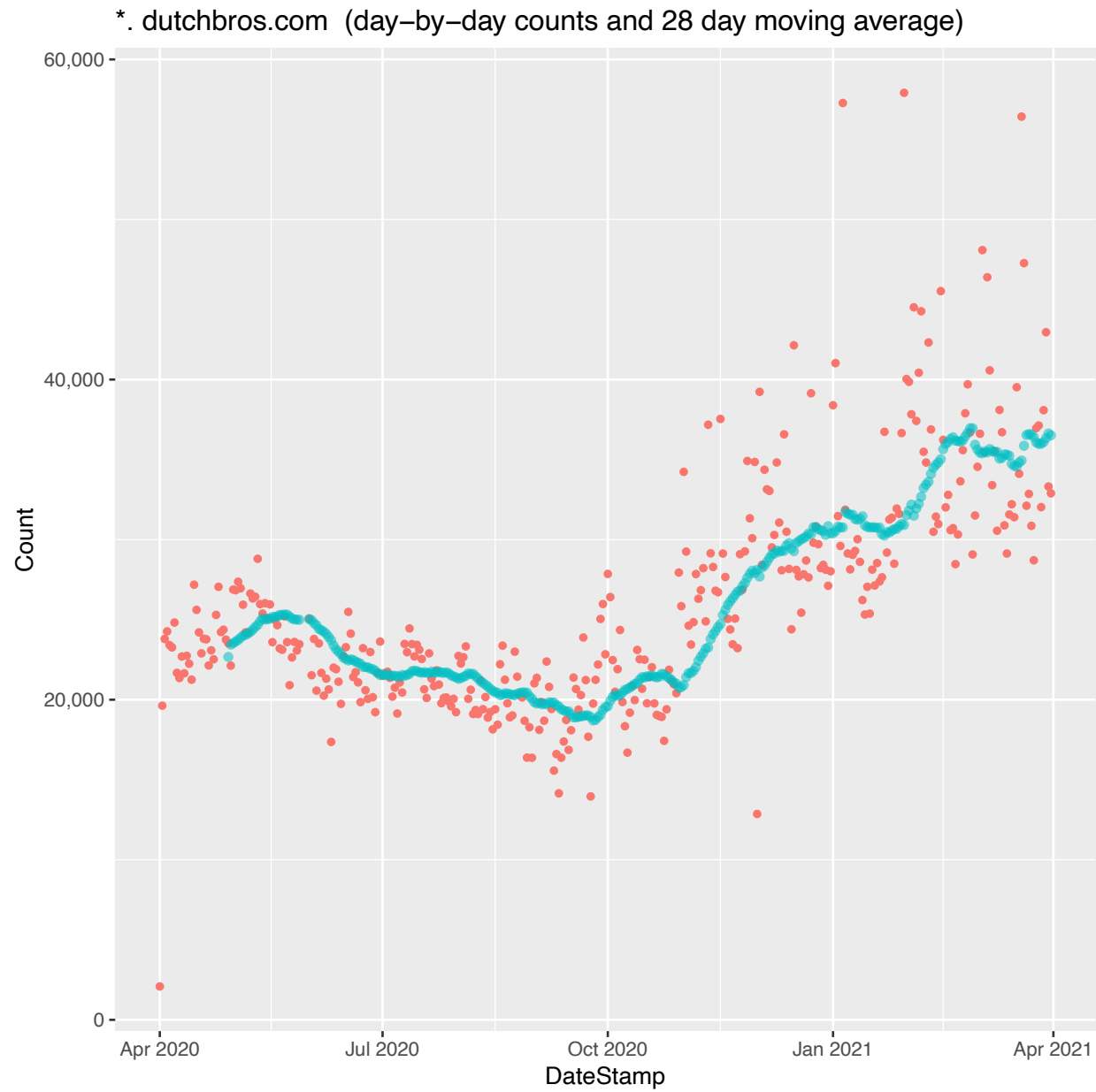
*. dunkindonuts.com (day-by-day counts and 28 day moving average)



*. dunkindonuts.com (monthly boxplots (outliers trimmed))



36. dutchbros.com: ↗

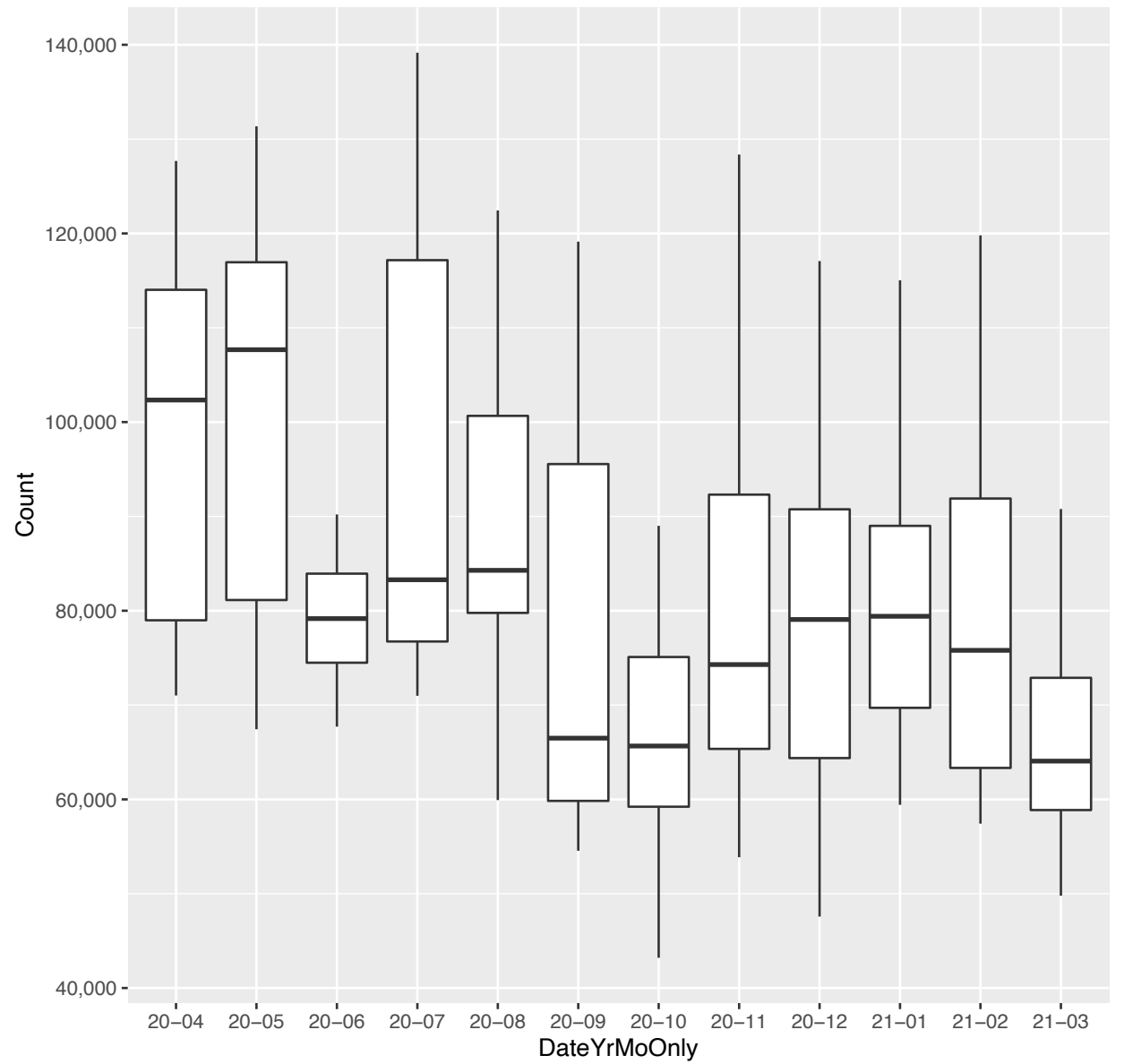


37. jimmyjohns.com: ~

*. jimmyjohns.com (day-by-day counts and 28 day moving average)

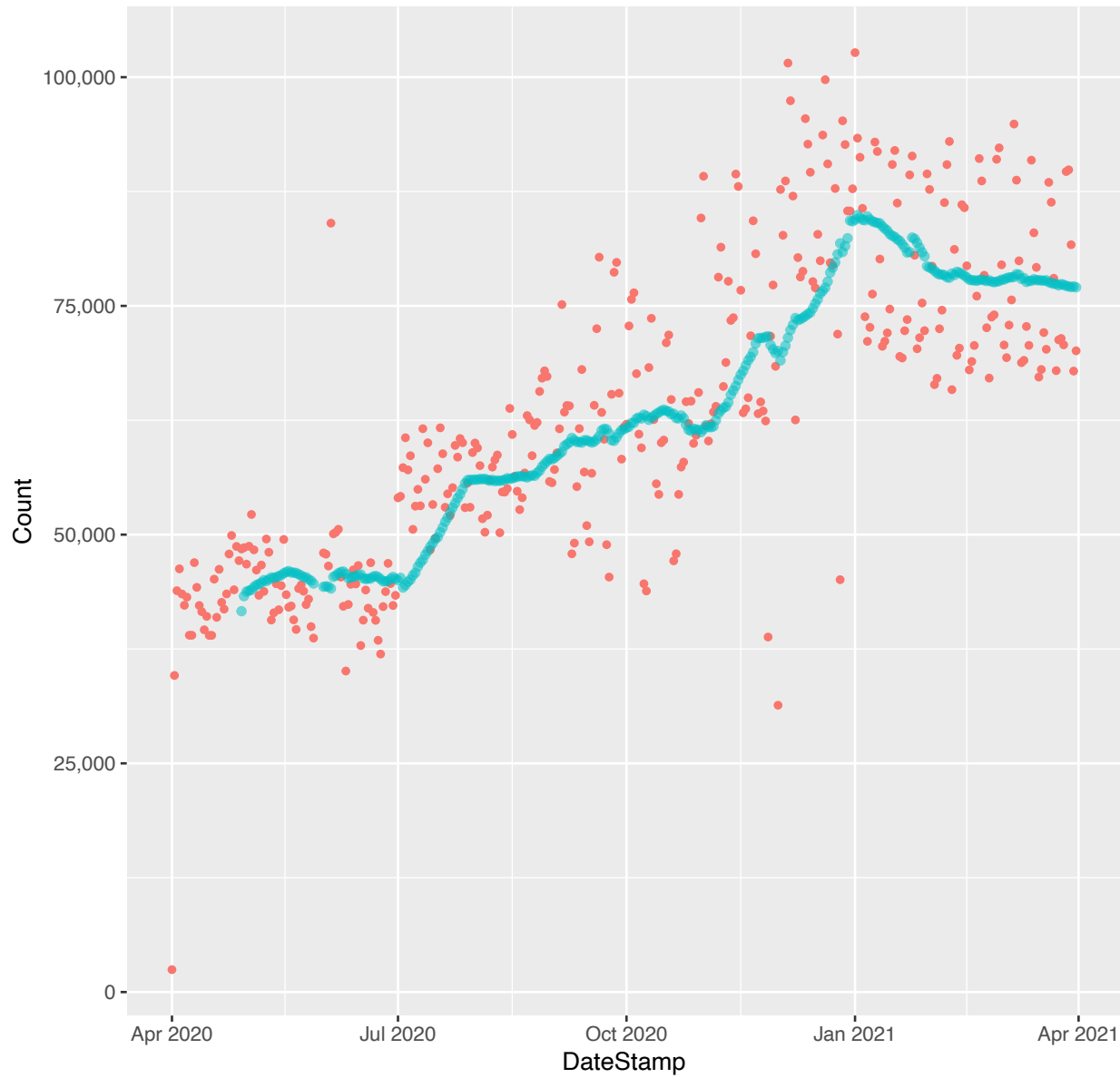


*. jimmyjohns.com (monthly boxplots (outliers trimmed))

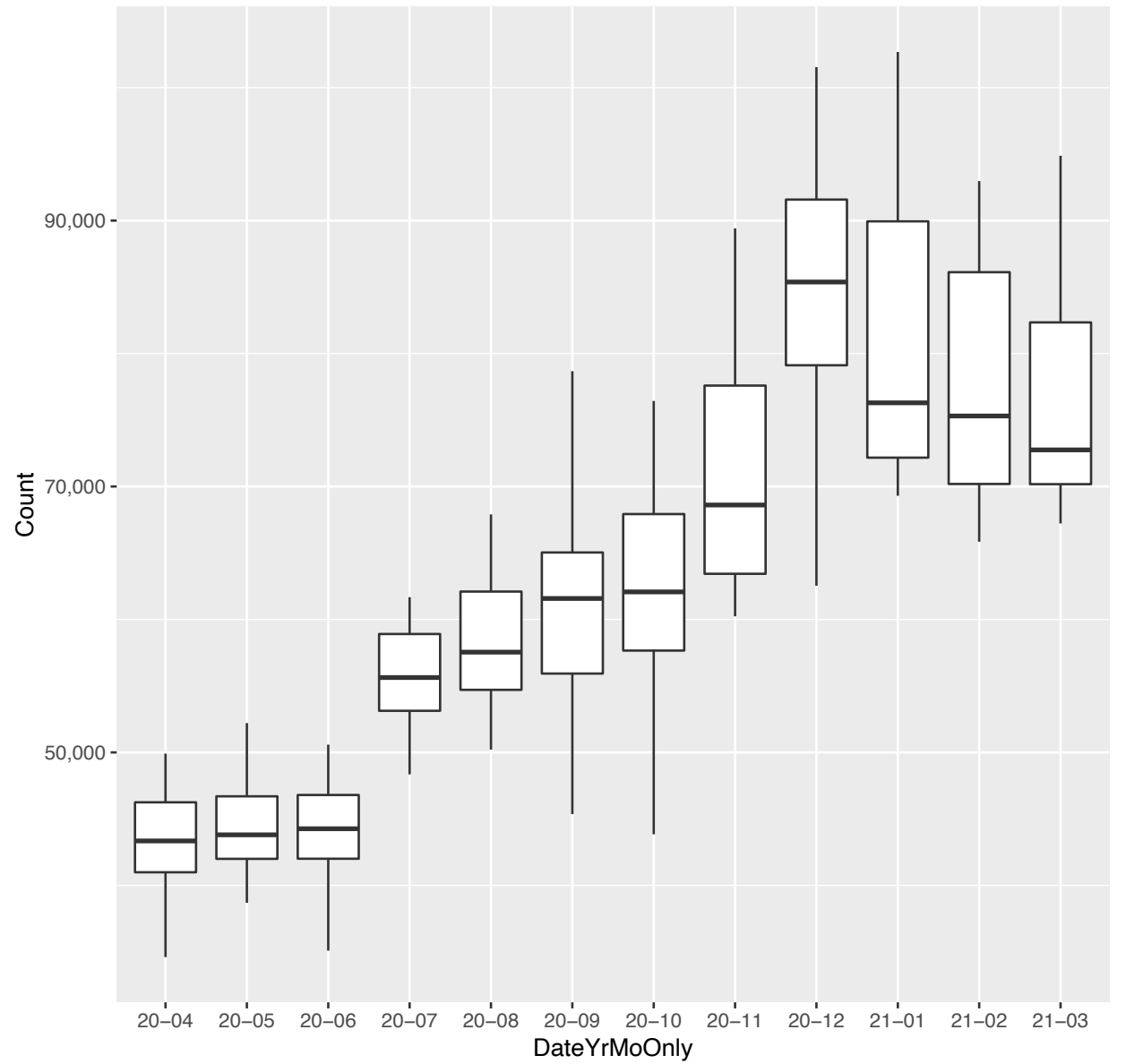


38. littlecaesars.com: ↗

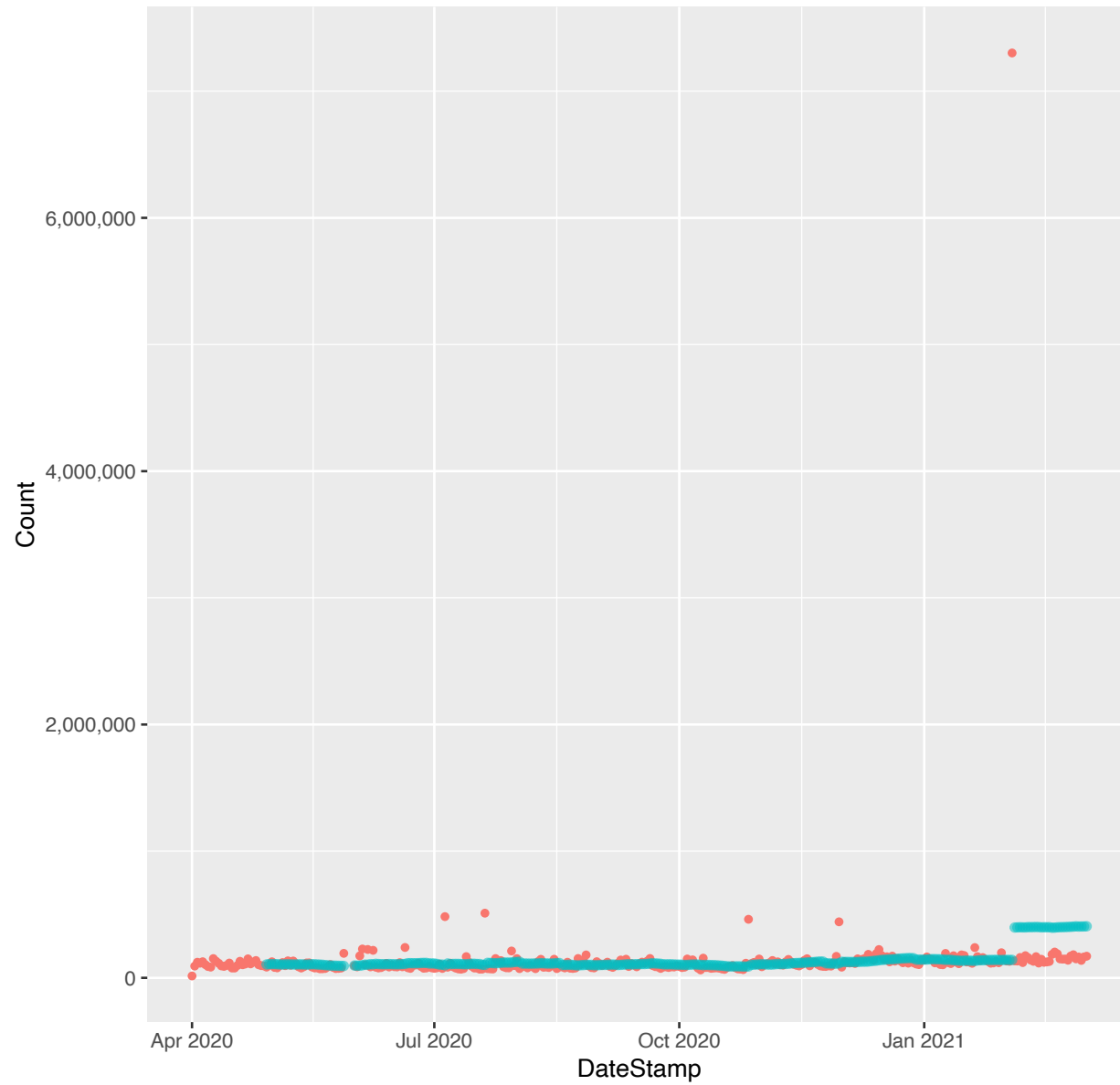
*. littlecaesars.com (day-by-day counts and 28 day moving average)



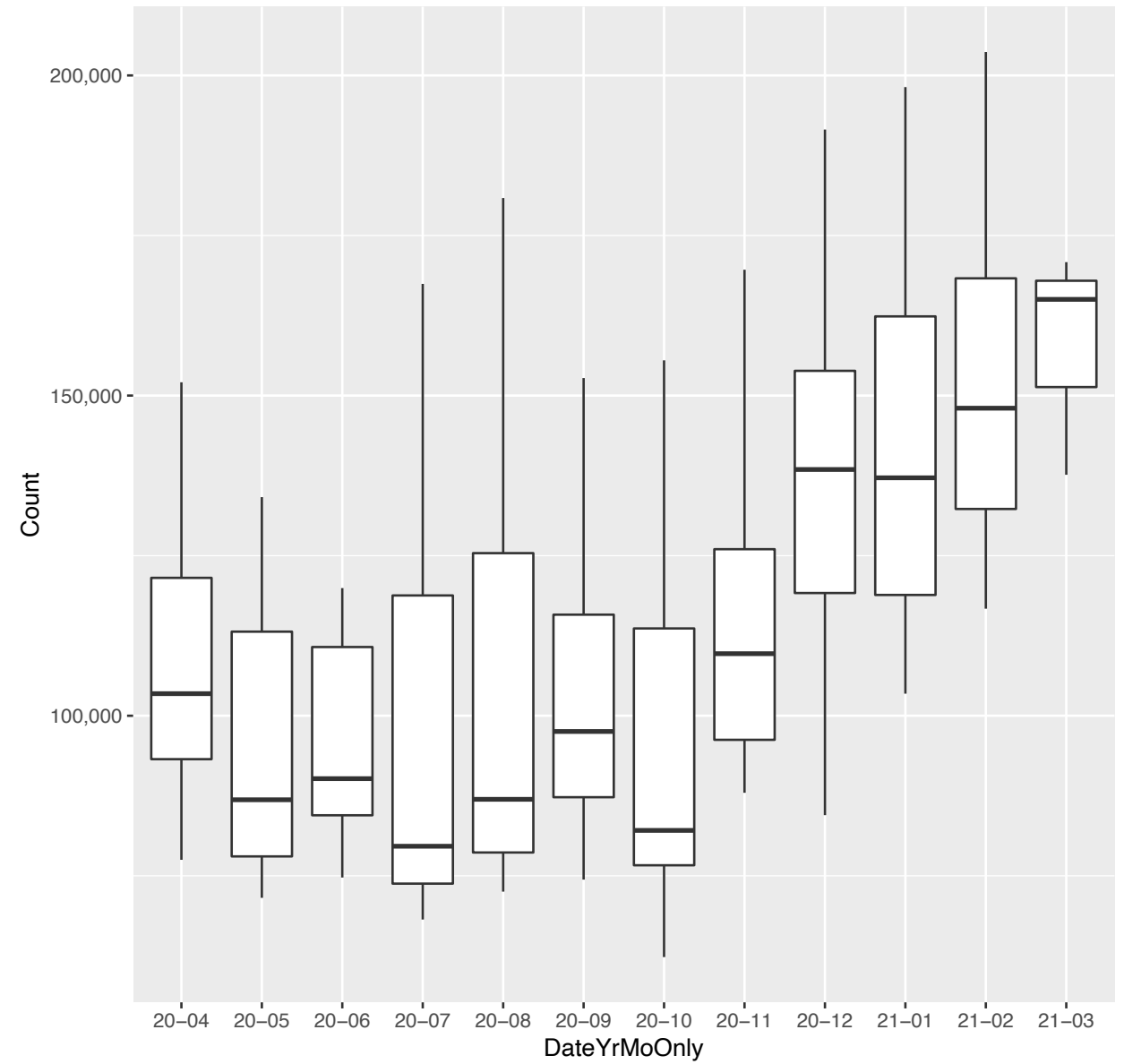
*. littlecaesars.com (monthly boxplots (outliers trimmed))



*. mcdonalds.com (day-by-day counts and 28 day moving average)

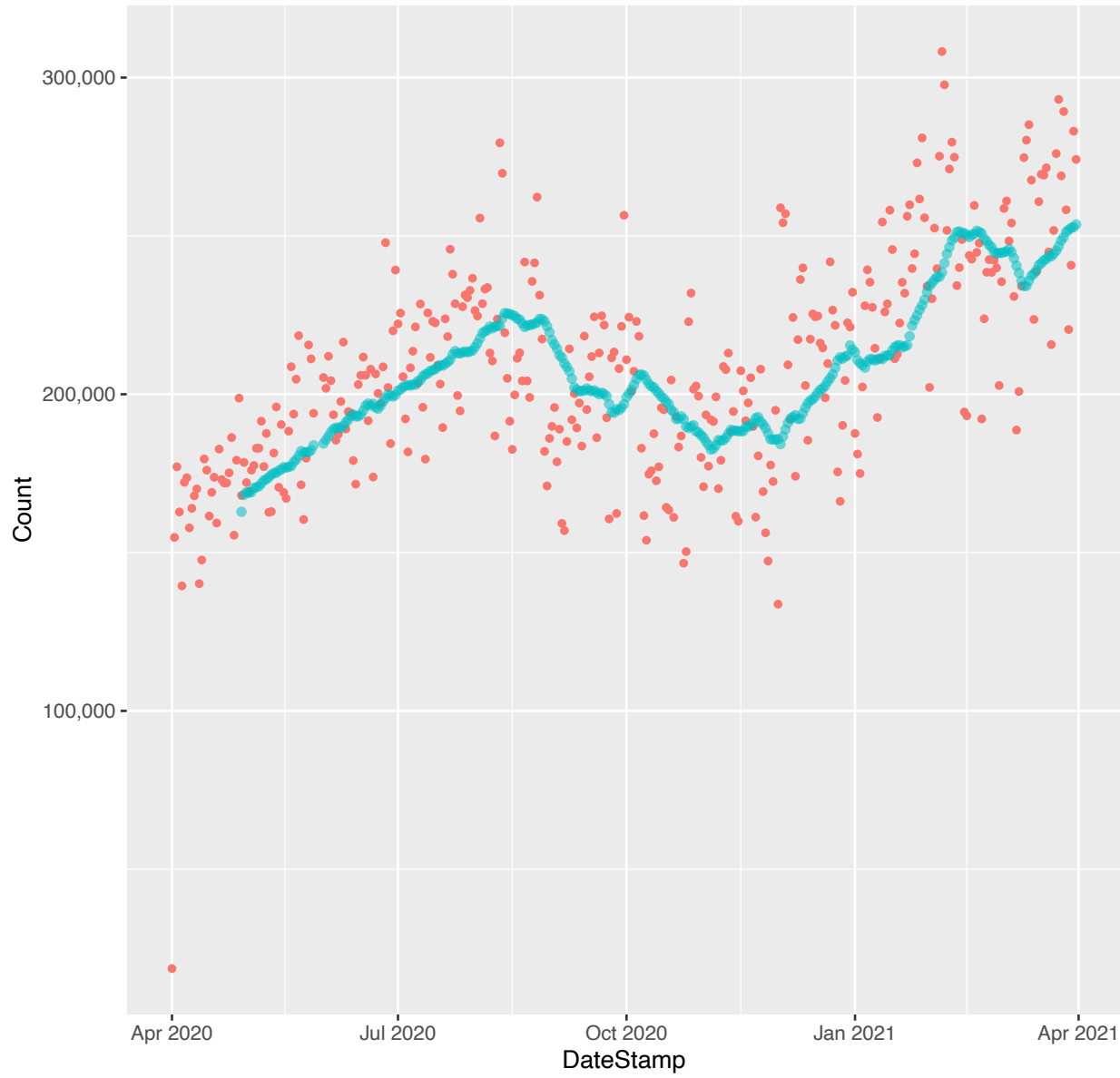


*. mcdonalds.com (monthly boxplots (outliers trimmed))

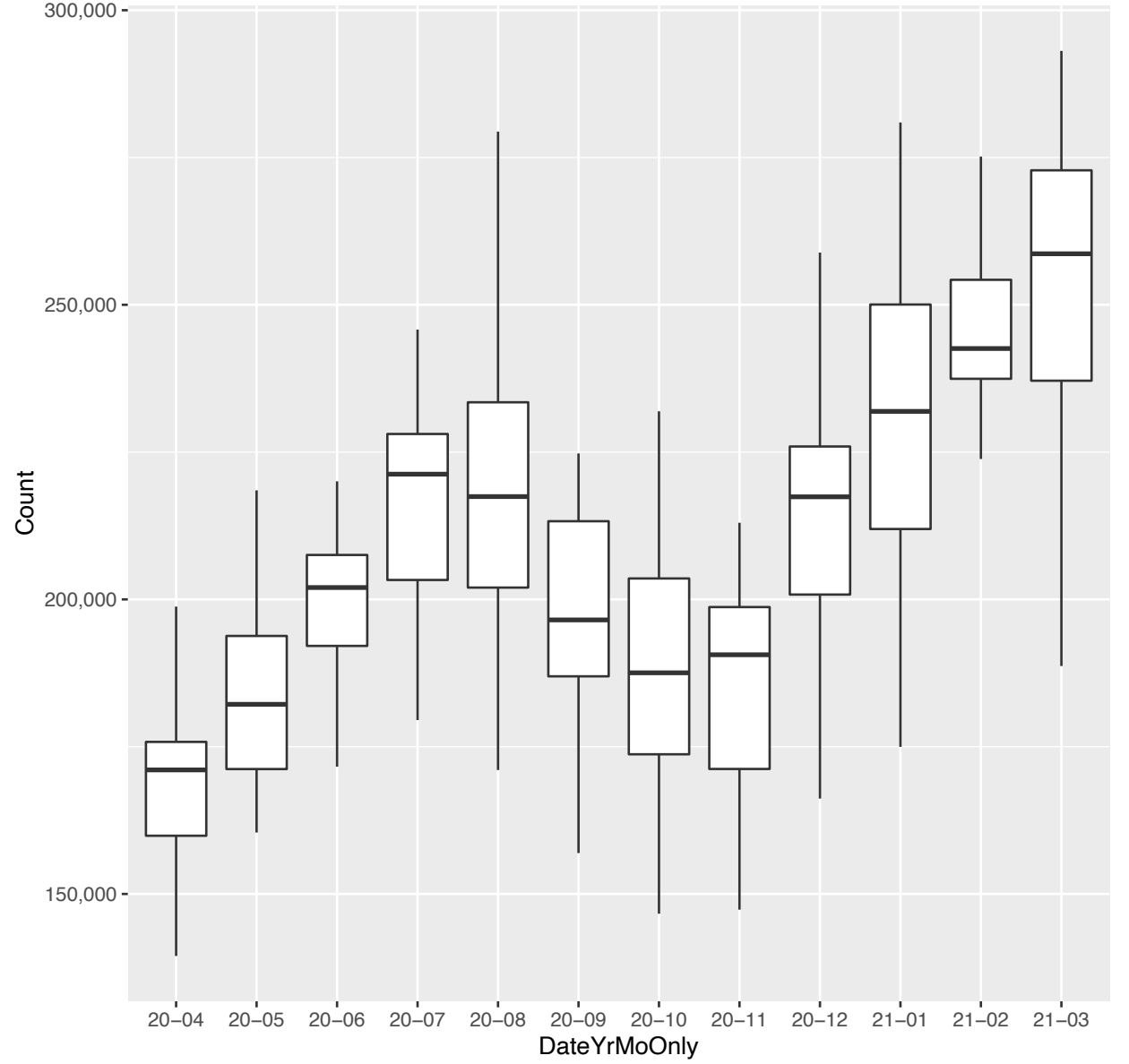


40. panerabread.com: ~

*. panerabread.com (day-by-day counts and 28 day moving average)



*. panerabread.com (monthly boxplots (outliers trimmed))

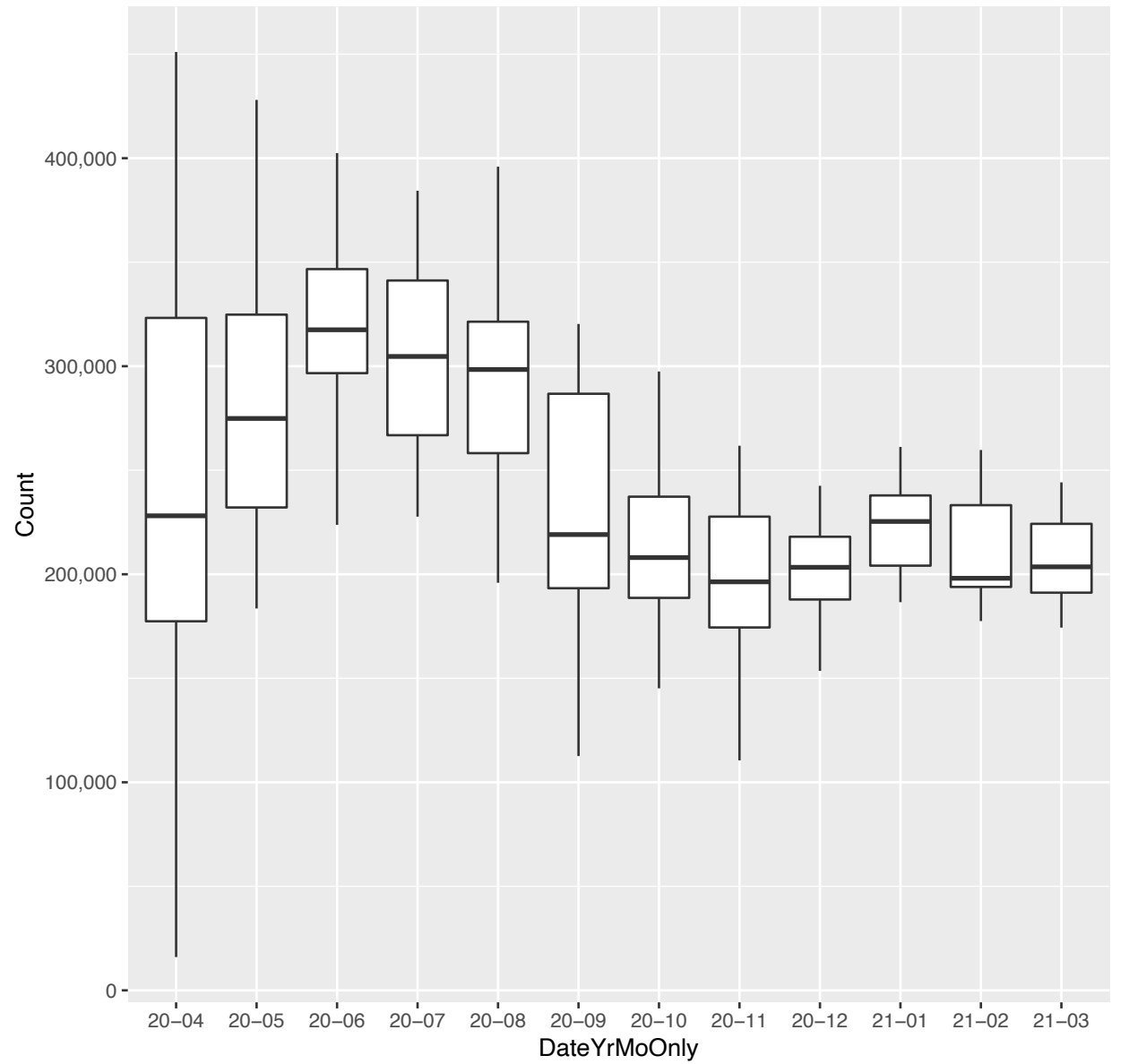


41. papajohns.com: ↘

*. papajohns.com (day-by-day counts and 28 day moving average)



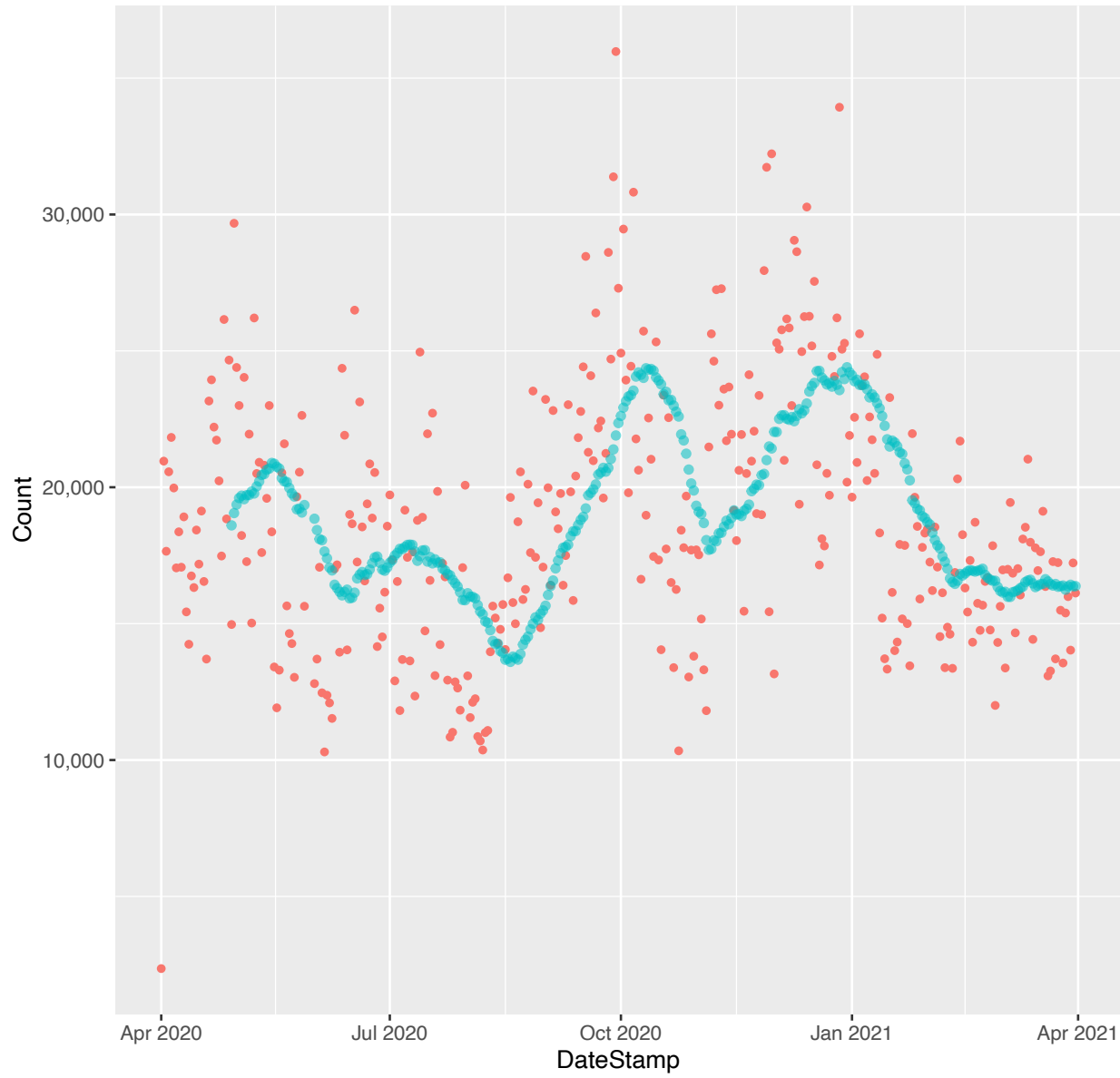
*. papajohns.com (monthly boxplots (outliers trimmed))



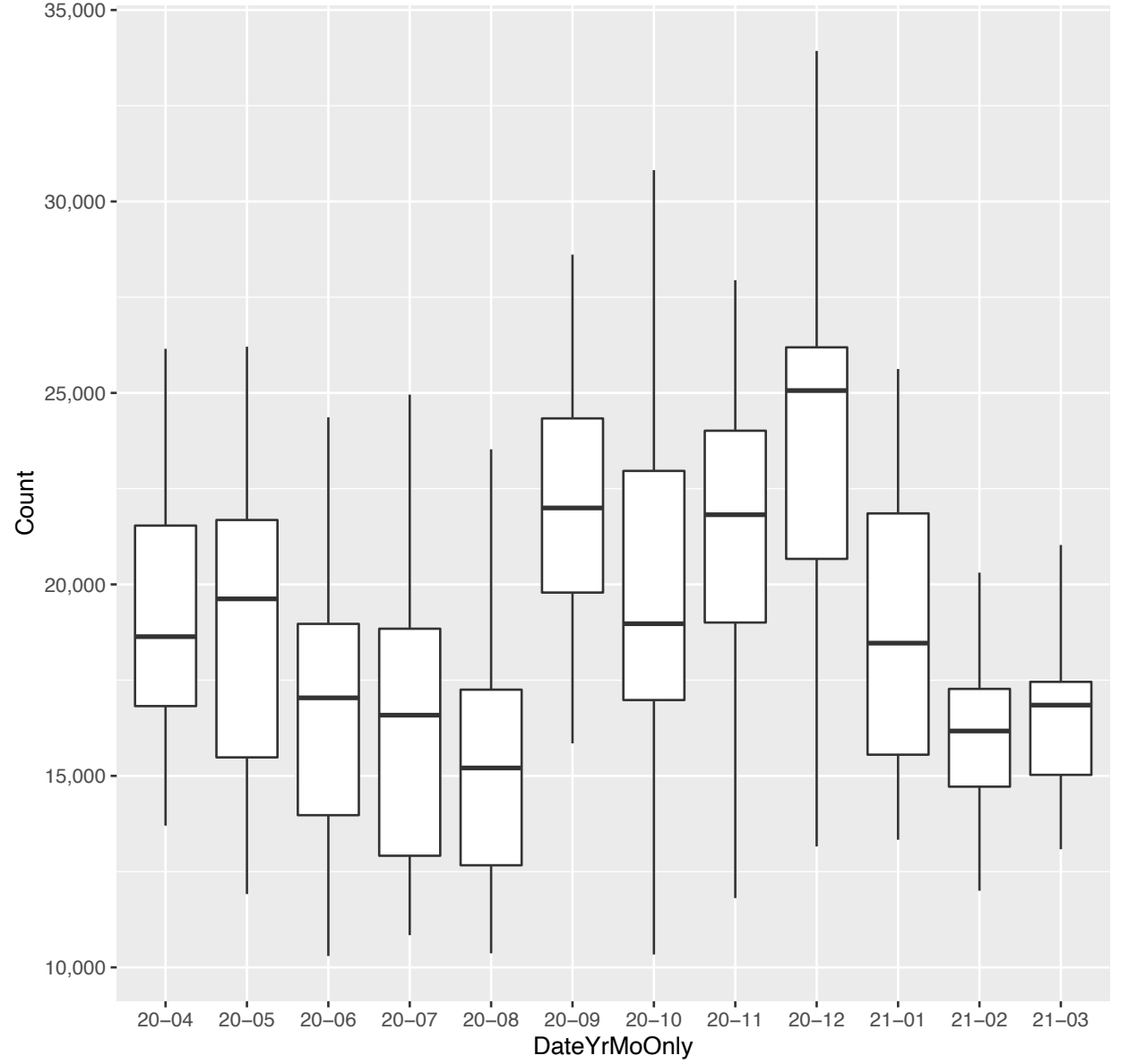
42. peets.com:

~

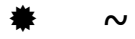
*. peets.com (day-by-day counts and 28 day moving average)



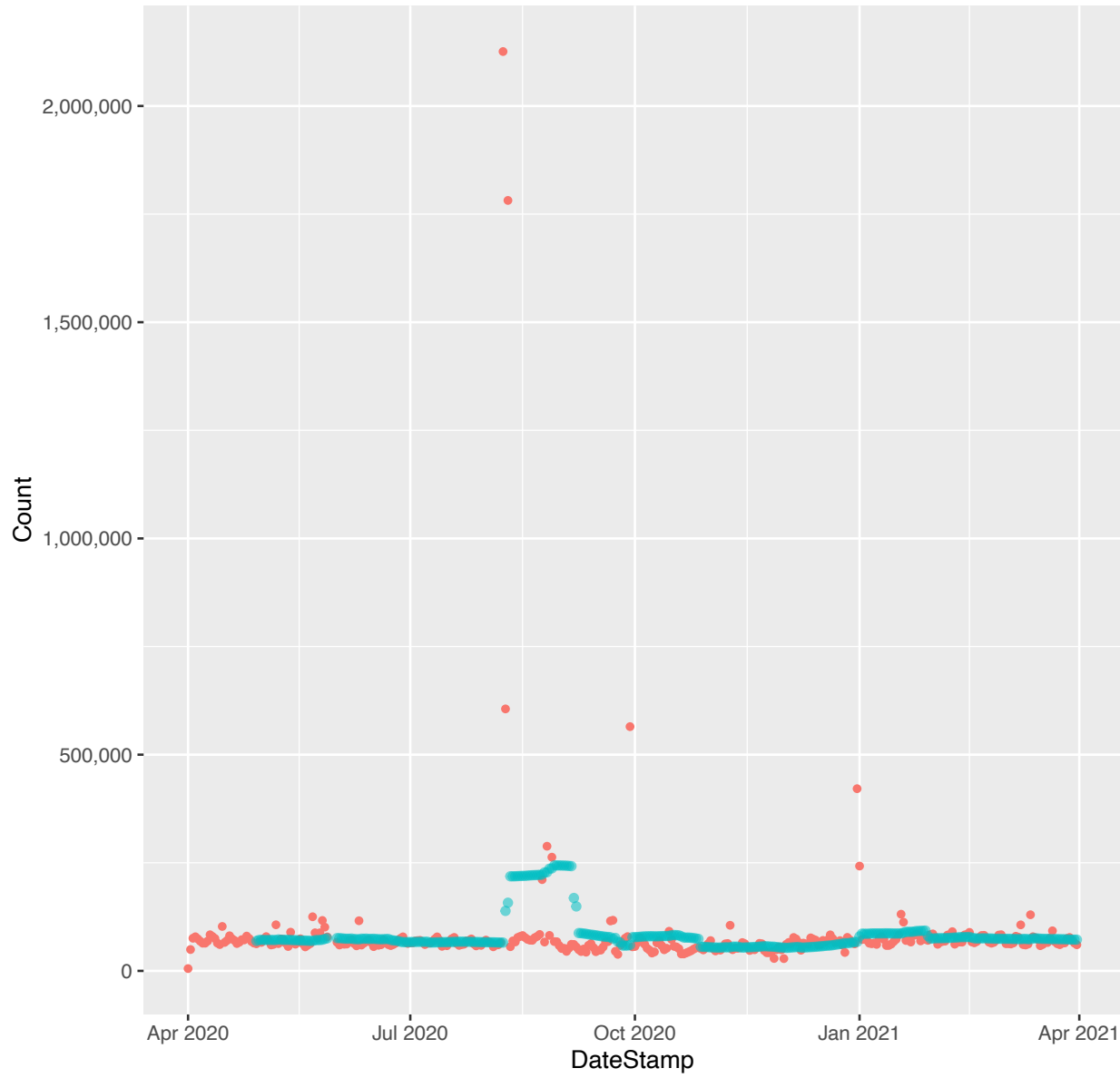
*. peets.com (monthly boxplots (outliers trimmed))



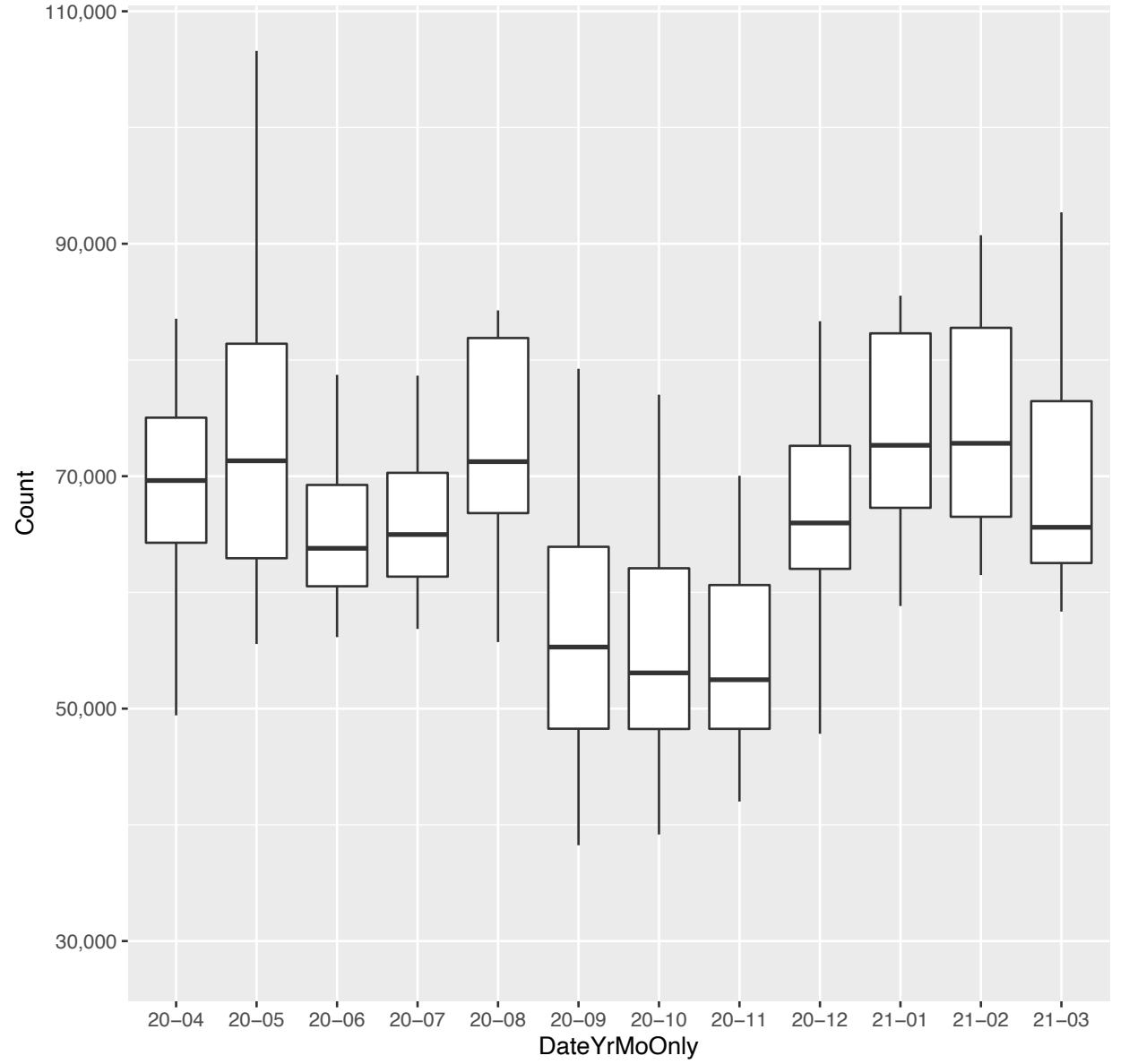
43. pizzahut.com:



*. pizzahut.com (day-by-day counts and 28 day moving average)



*. pizzahut.com (monthly boxplots (outliers trimmed))

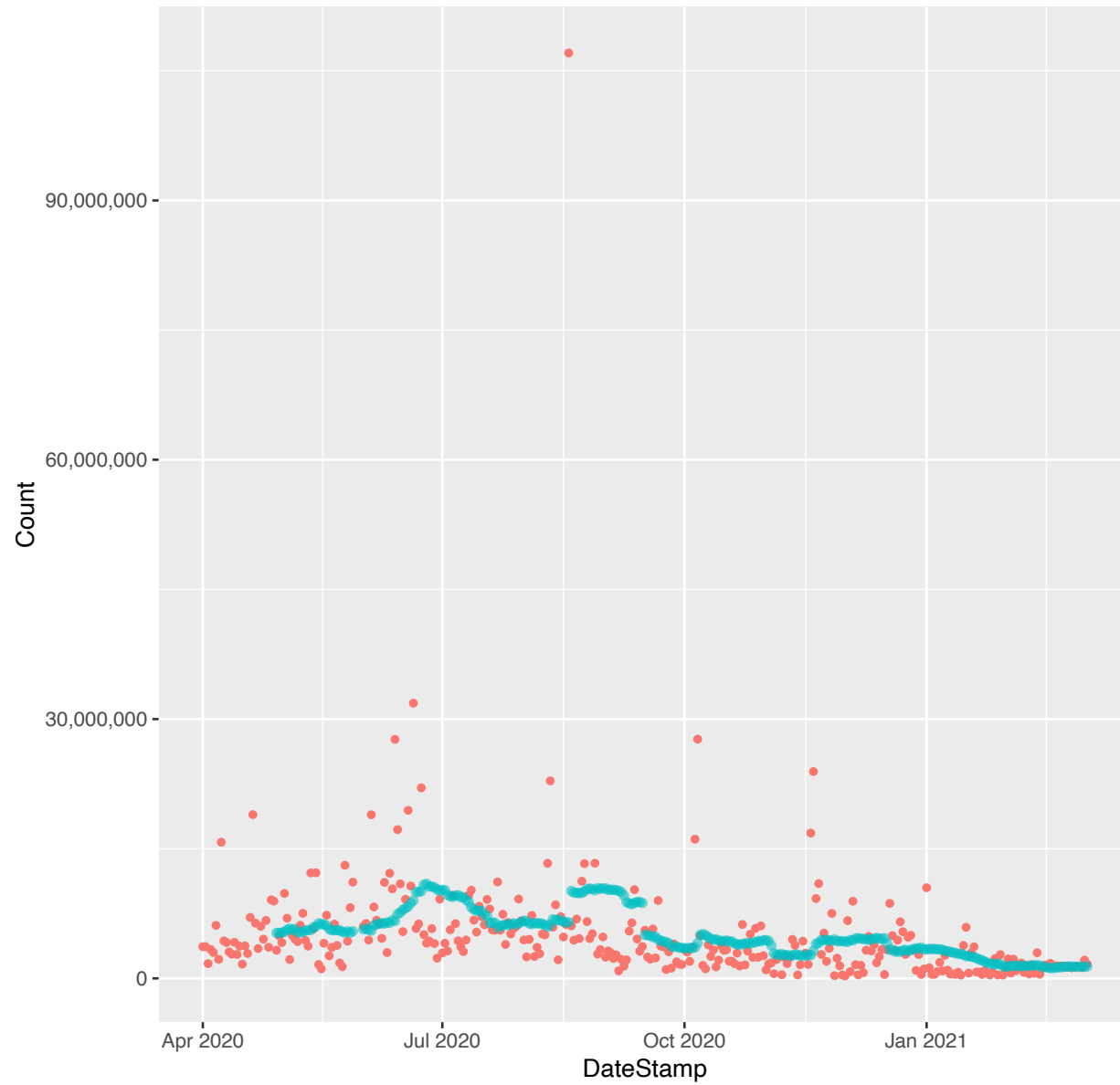


44. starbucks.com:

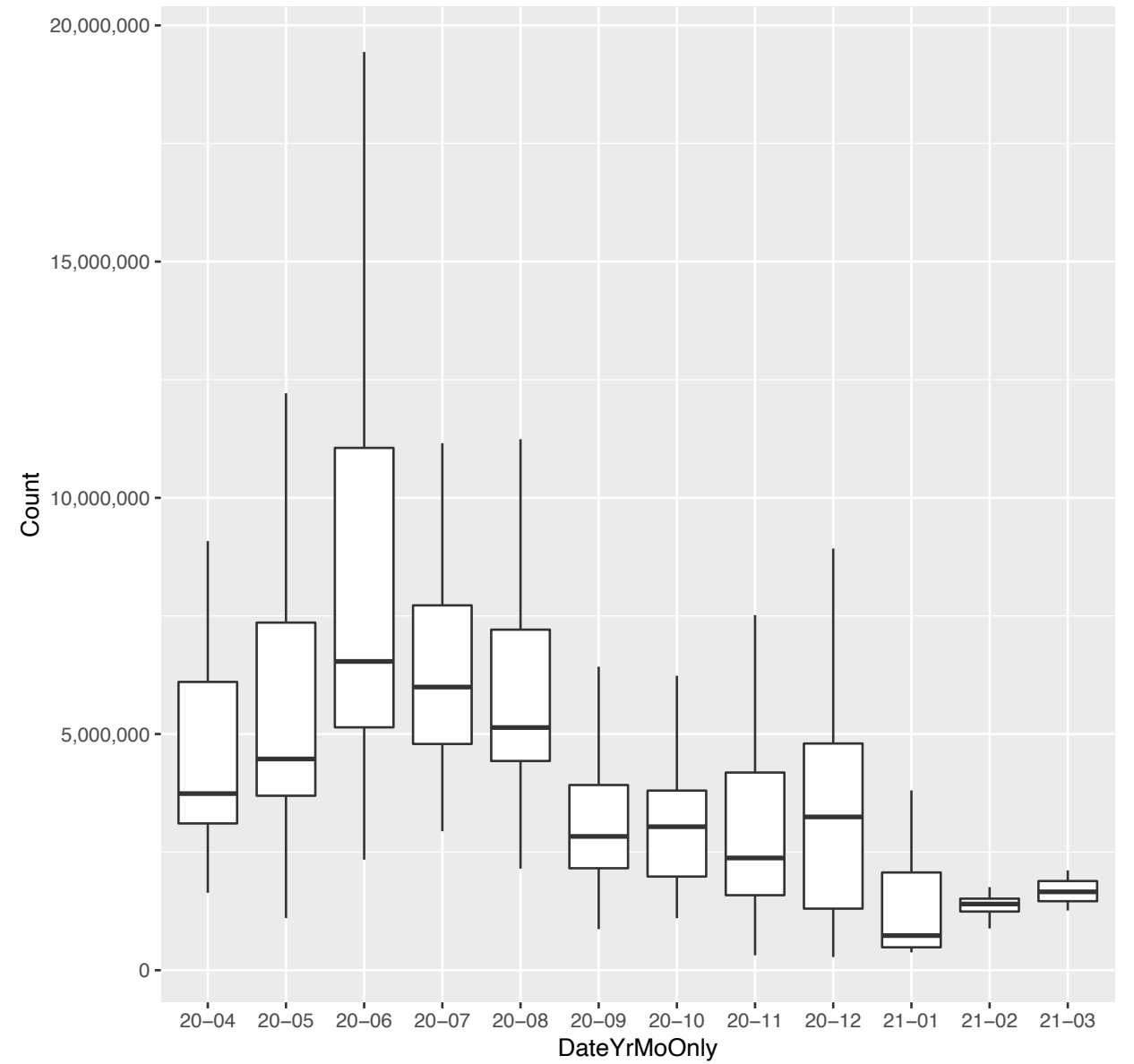


MM

*. starbucks.com (day-by-day counts and 28 day moving average)



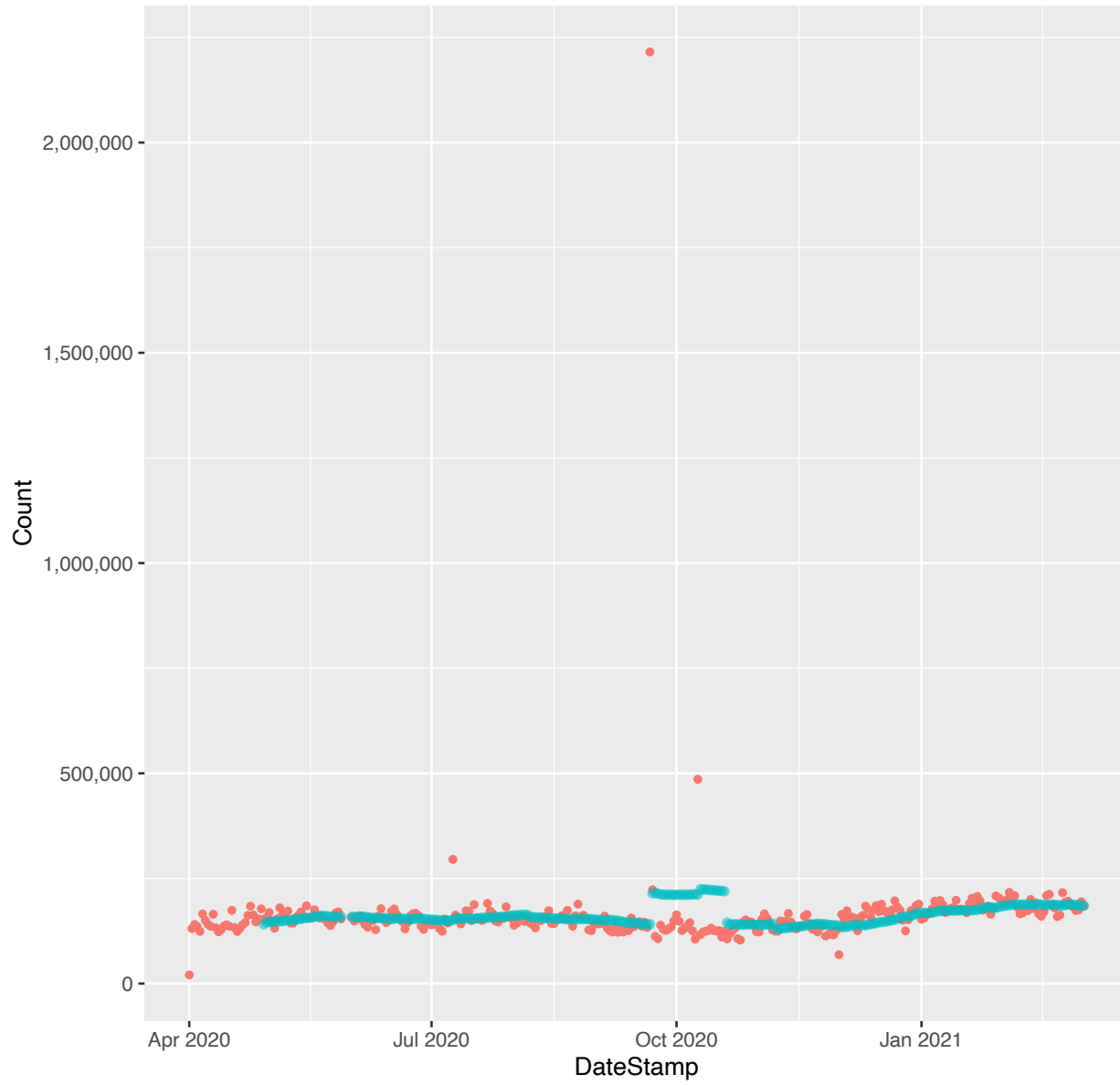
*. starbucks.com (monthly boxplots (outliers trimmed))



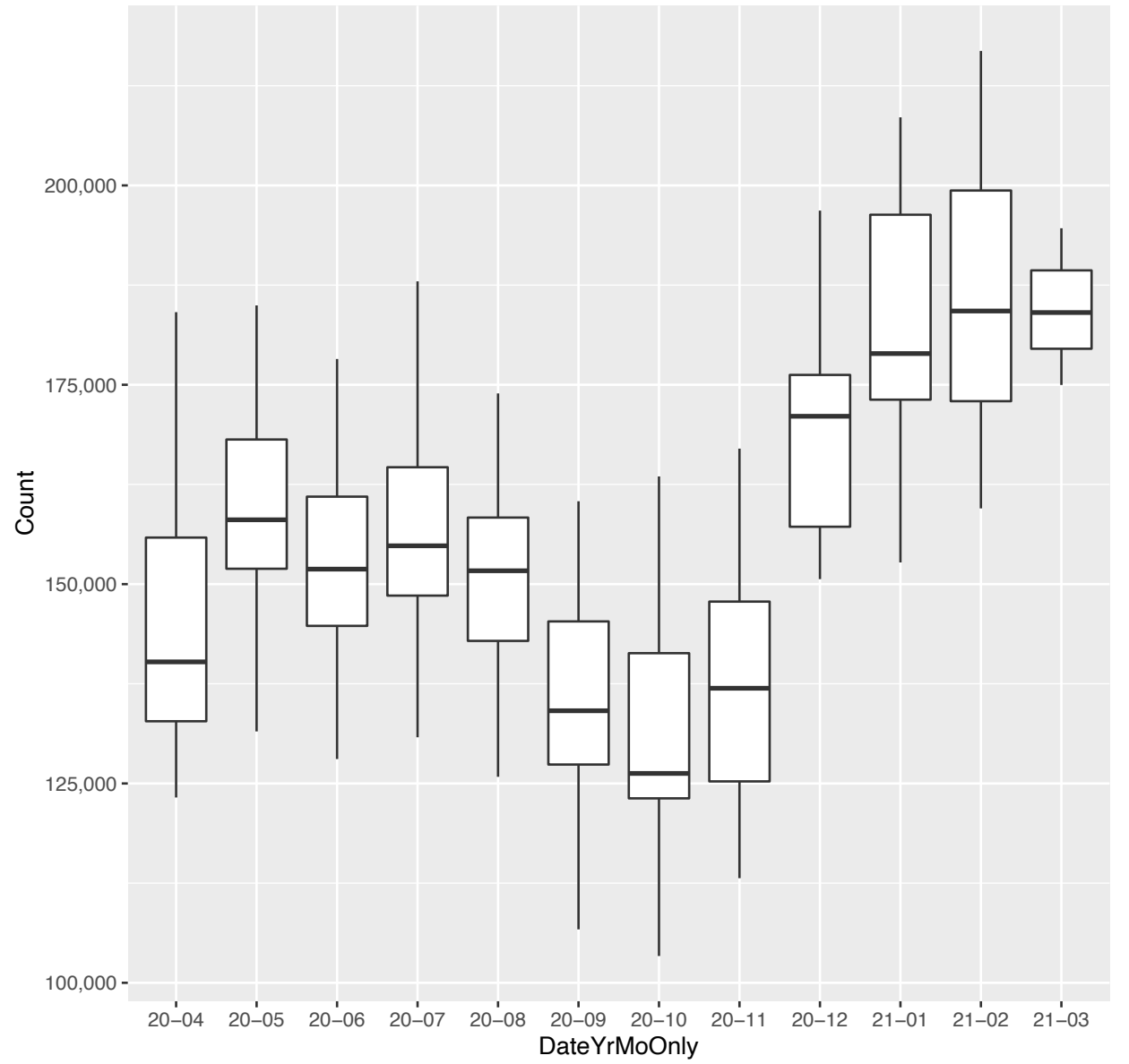
45. subway.com:



*. subway.com (day-by-day counts and 28 day moving average)



*. subway.com (monthly boxplots (outliers trimmed))



46. wendys.com:

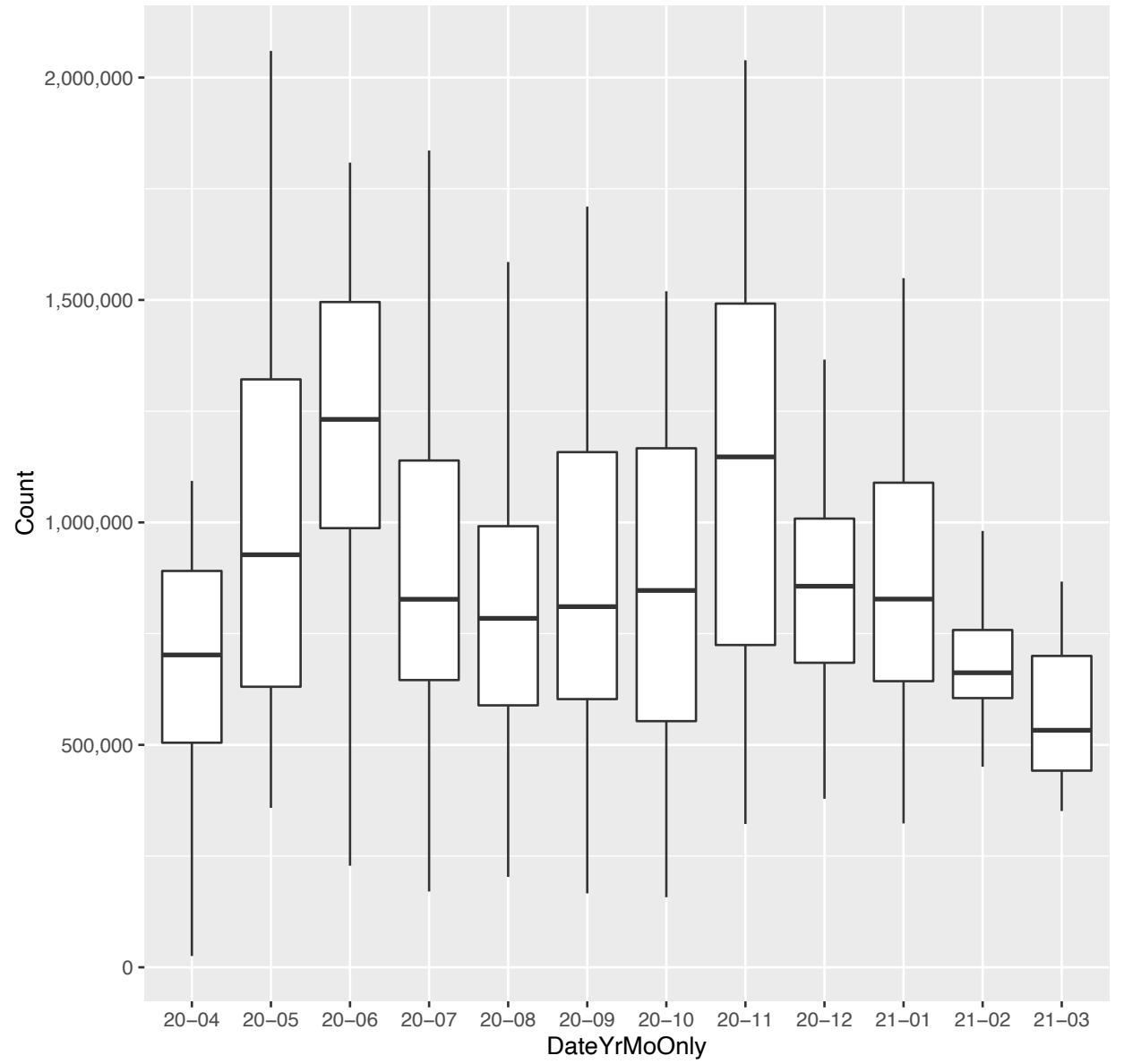
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M

*. wendys.com (day-by-day counts and 28 day moving average)



*. wendys.com (monthly boxplots (outliers trimmed))



g) Food Delivery

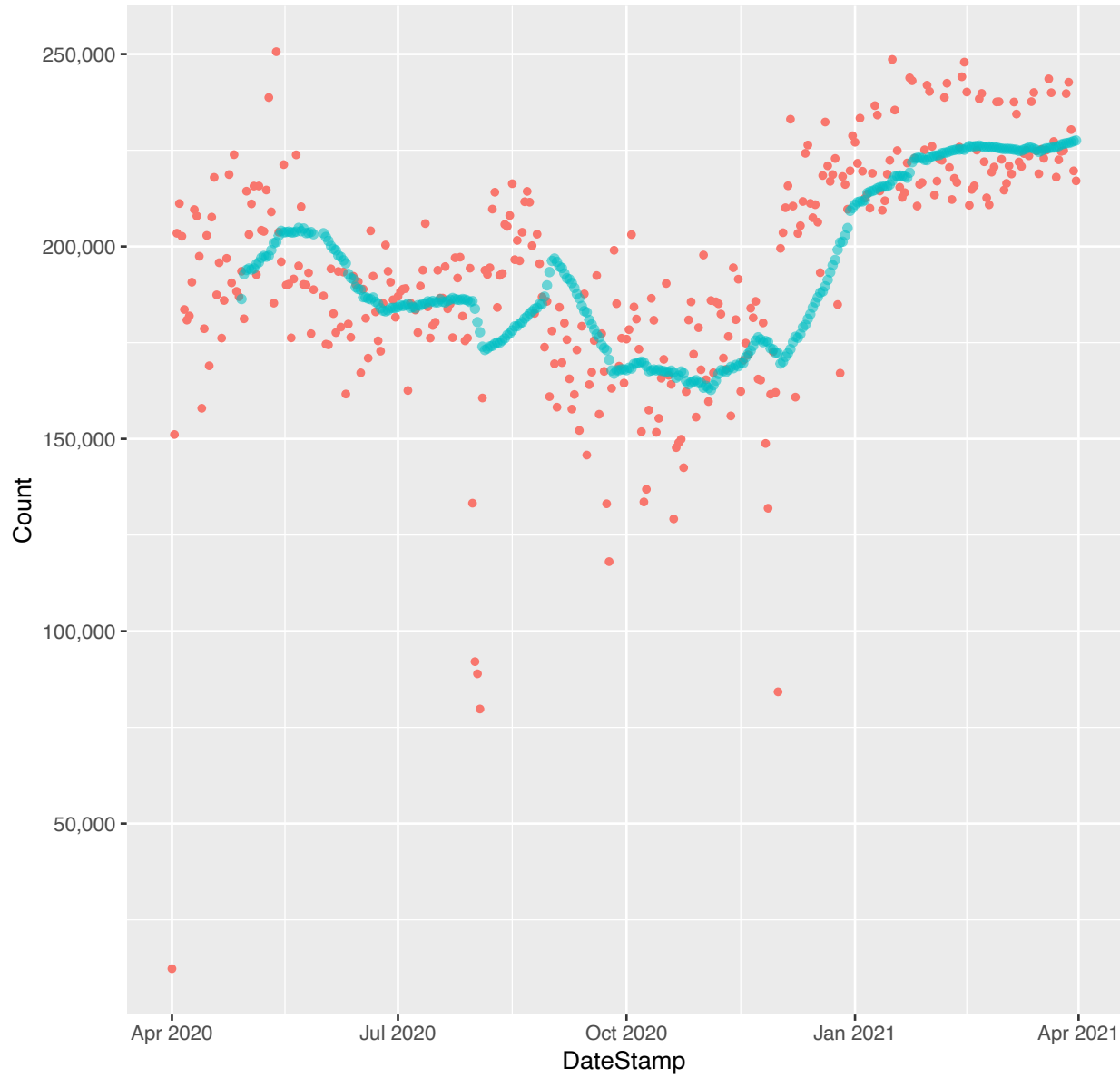
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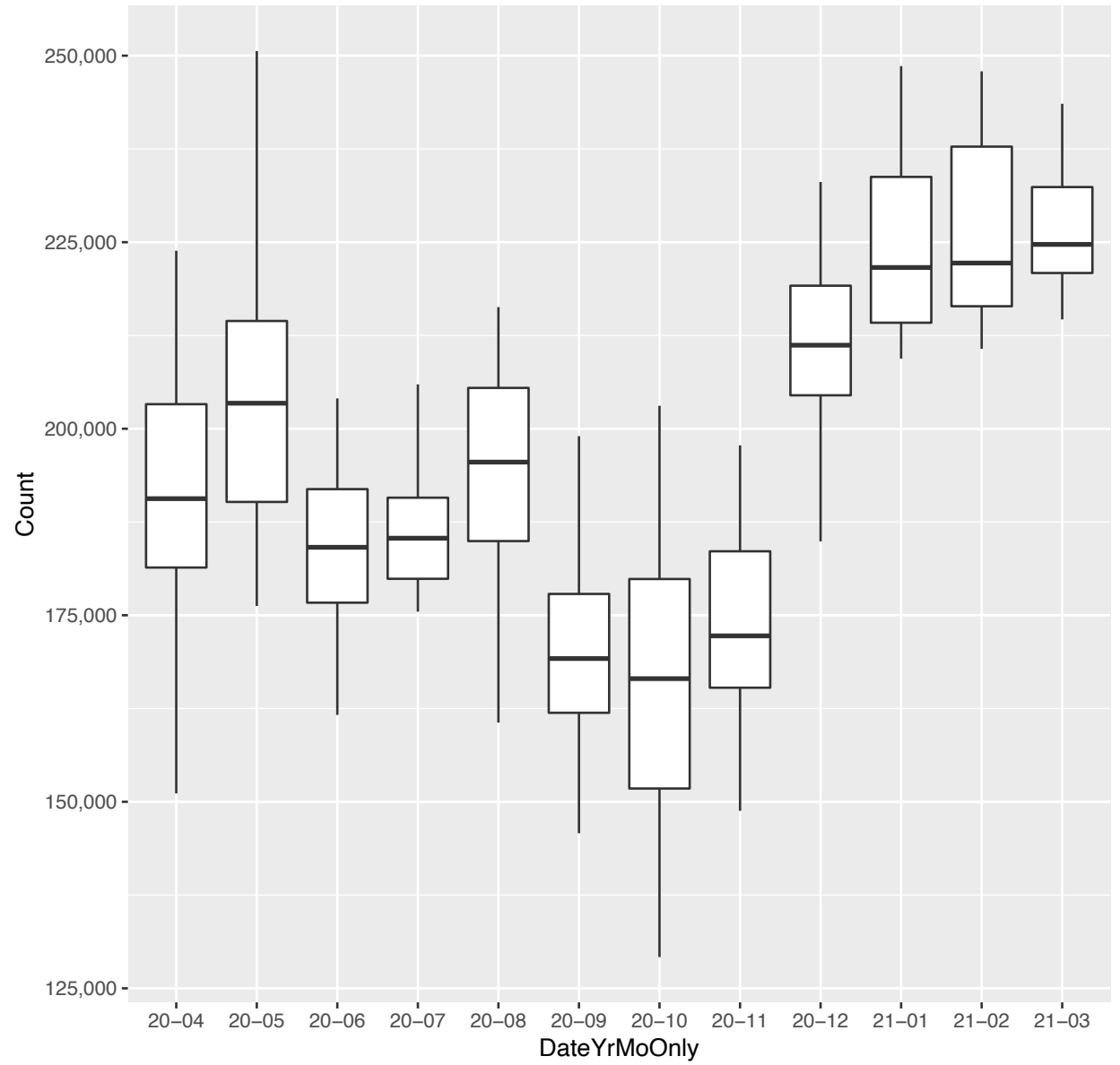
47	*.chownow.com		∪ shaped (ending higher)	
48	*.doordash.com		∪ shaped (ending higher)	M
49	*.gopuff.com		∪ shaped (ending higher)	
50	*.grubhub.com	✱	∪ shaped (ending lower)	
51	*.instacart.com	✱	~	M
52	*.postmates.com	✱	↘	
53	*.ubereats.com		~	

47. chownow.com: U shaped (ending higher)

*. chownow.com (day-by-day counts and 28 day moving average)



*. chownow.com (monthly boxplots (outliers trimmed))



48. doordash.com:

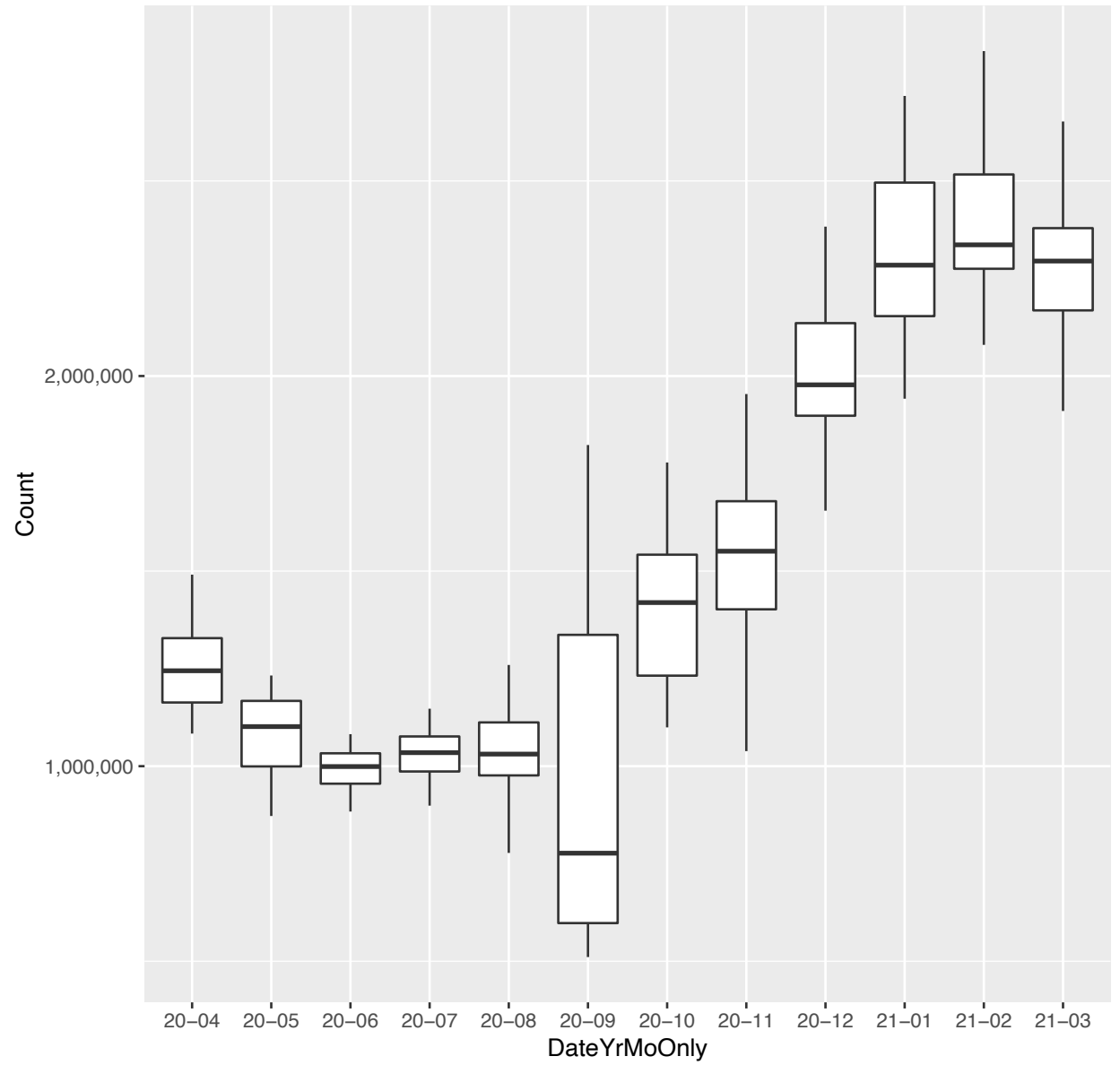
U shaped (ending higher)

M

*. doordash.com (day-by-day counts and 28 day moving average)



*. doordash.com (monthly boxplots (outliers trimmed))



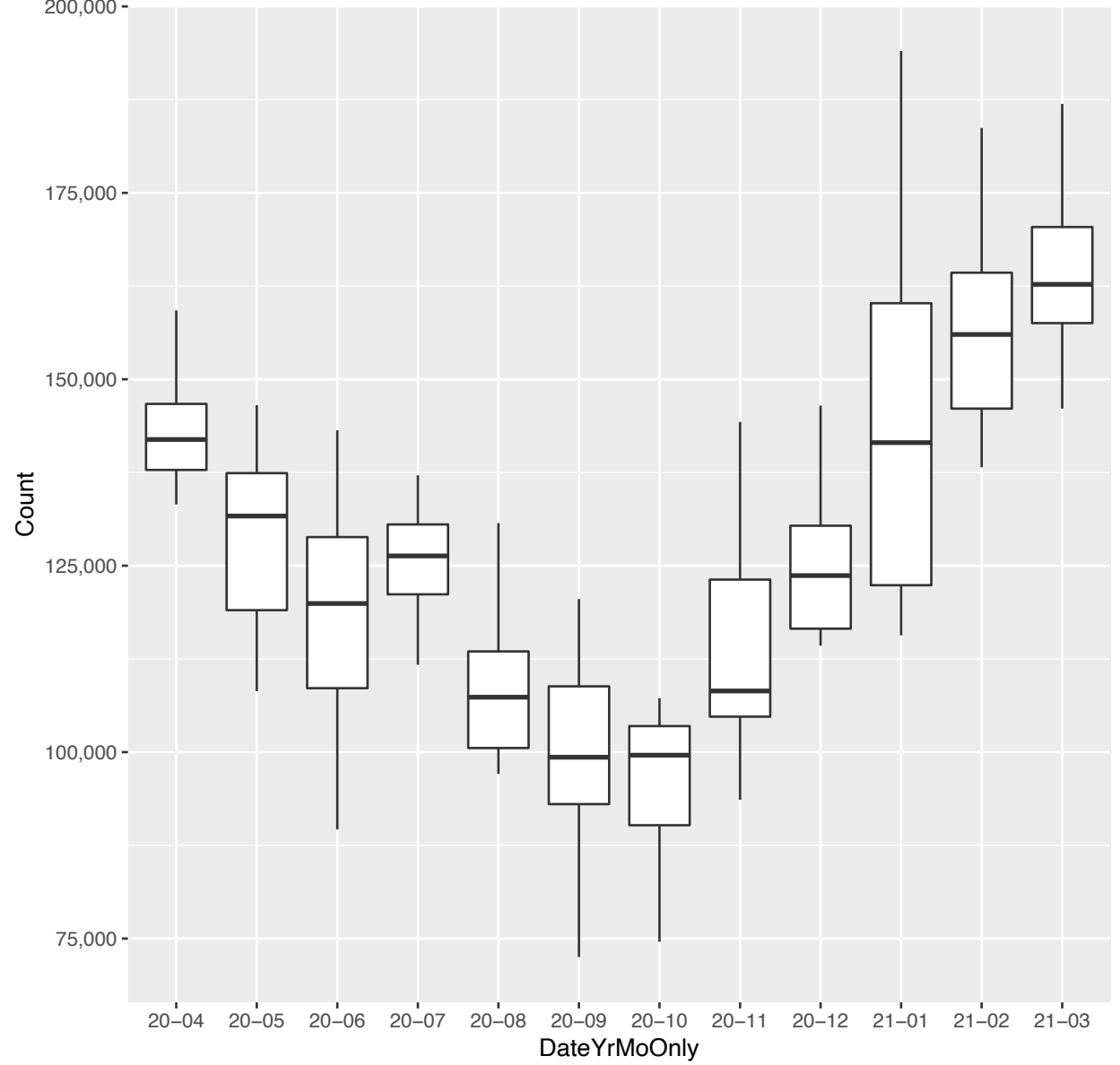
49. gopuff.com:

U shaped (ending higher)

*. gopuff.com (day-by-day counts and 28 day moving average)



*. gopuff.com (monthly boxplots (outliers trimmed))



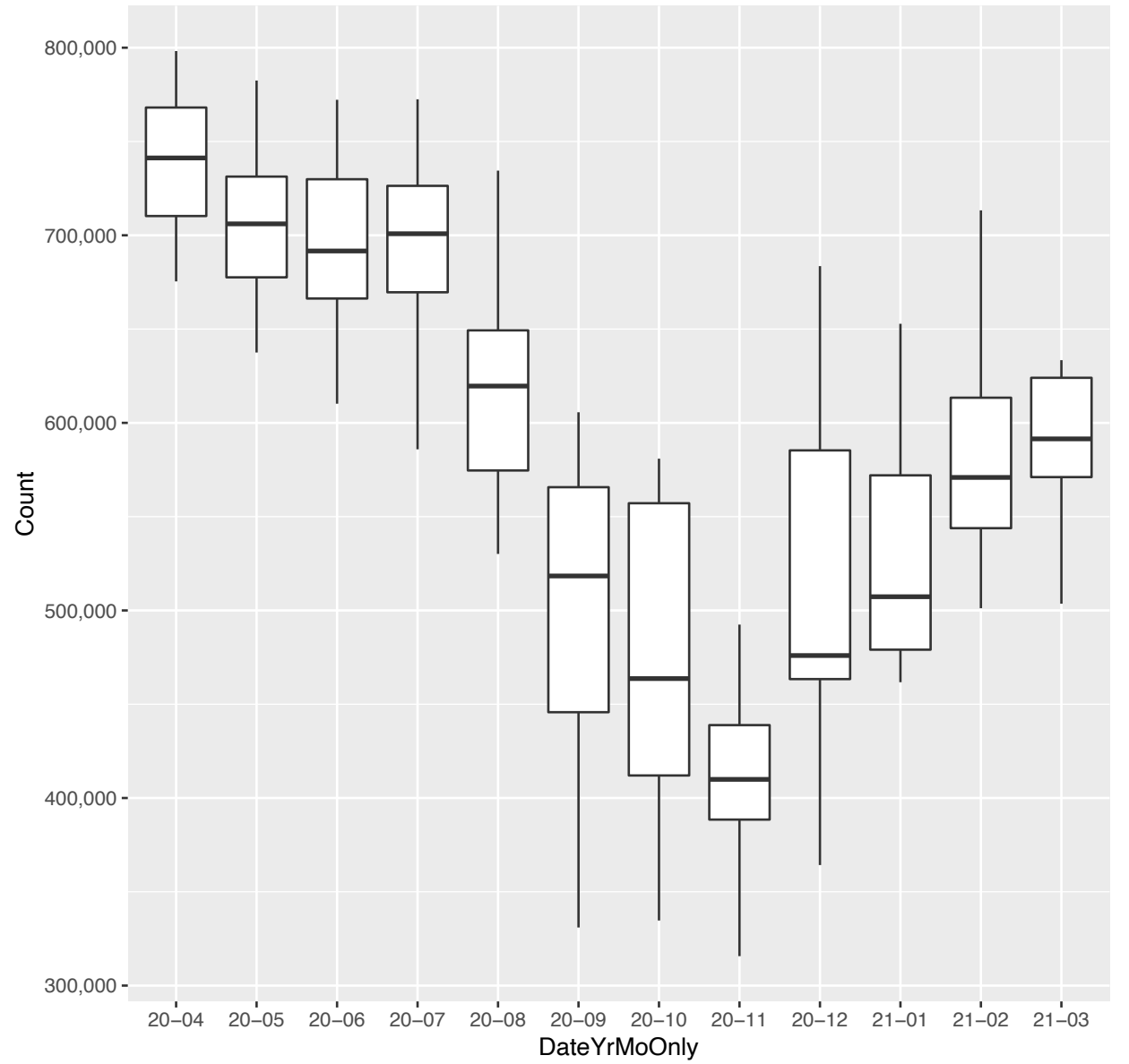
50. grubhub.com:

✱ ◡ shaped (ending lower)

*. grubhub.com (day-by-day counts and 28 day moving average)



*. grubhub.com (monthly boxplots (outliers trimmed))

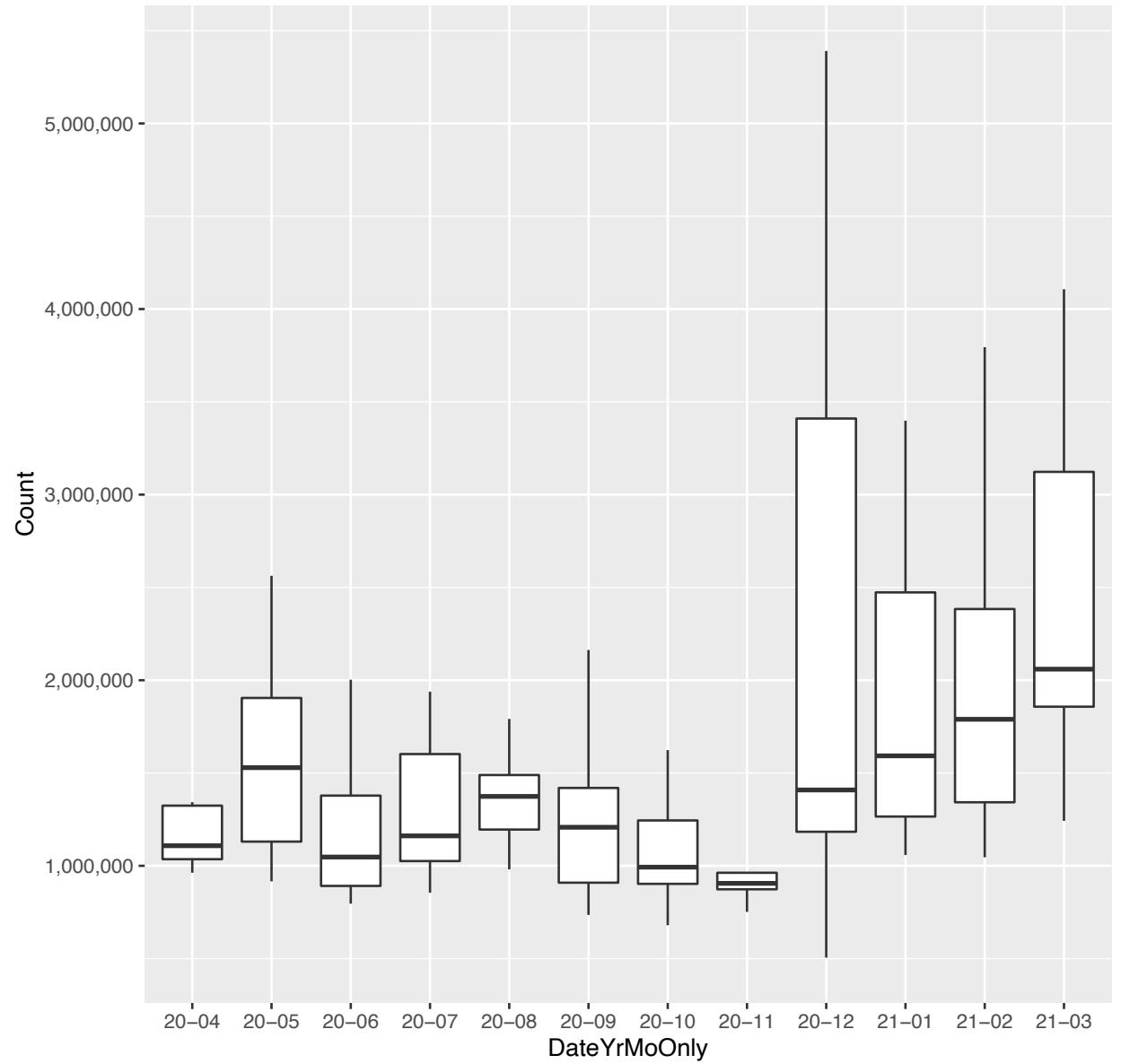




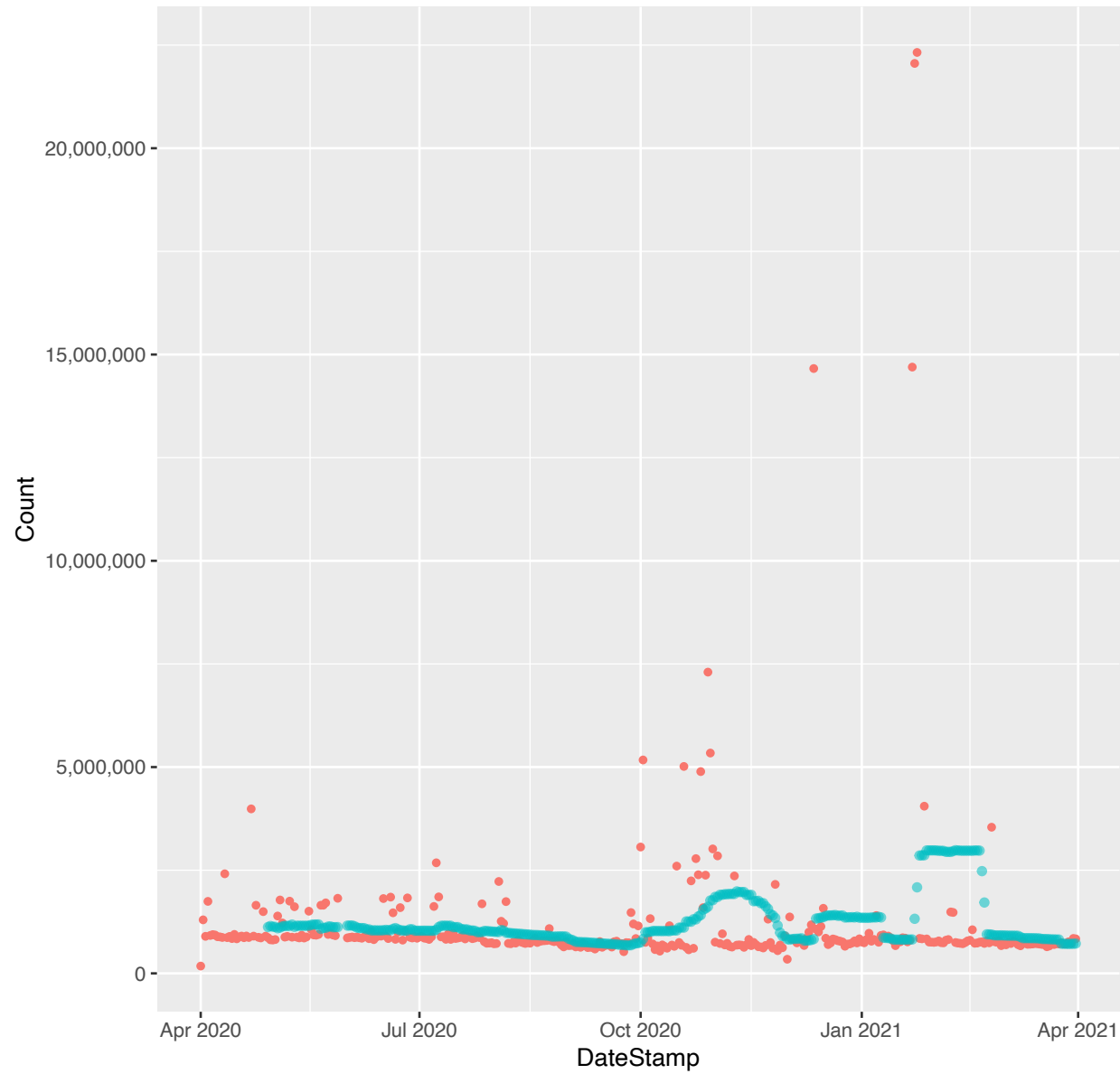
*. instacart.com (day-by-day counts and 28 day moving average)



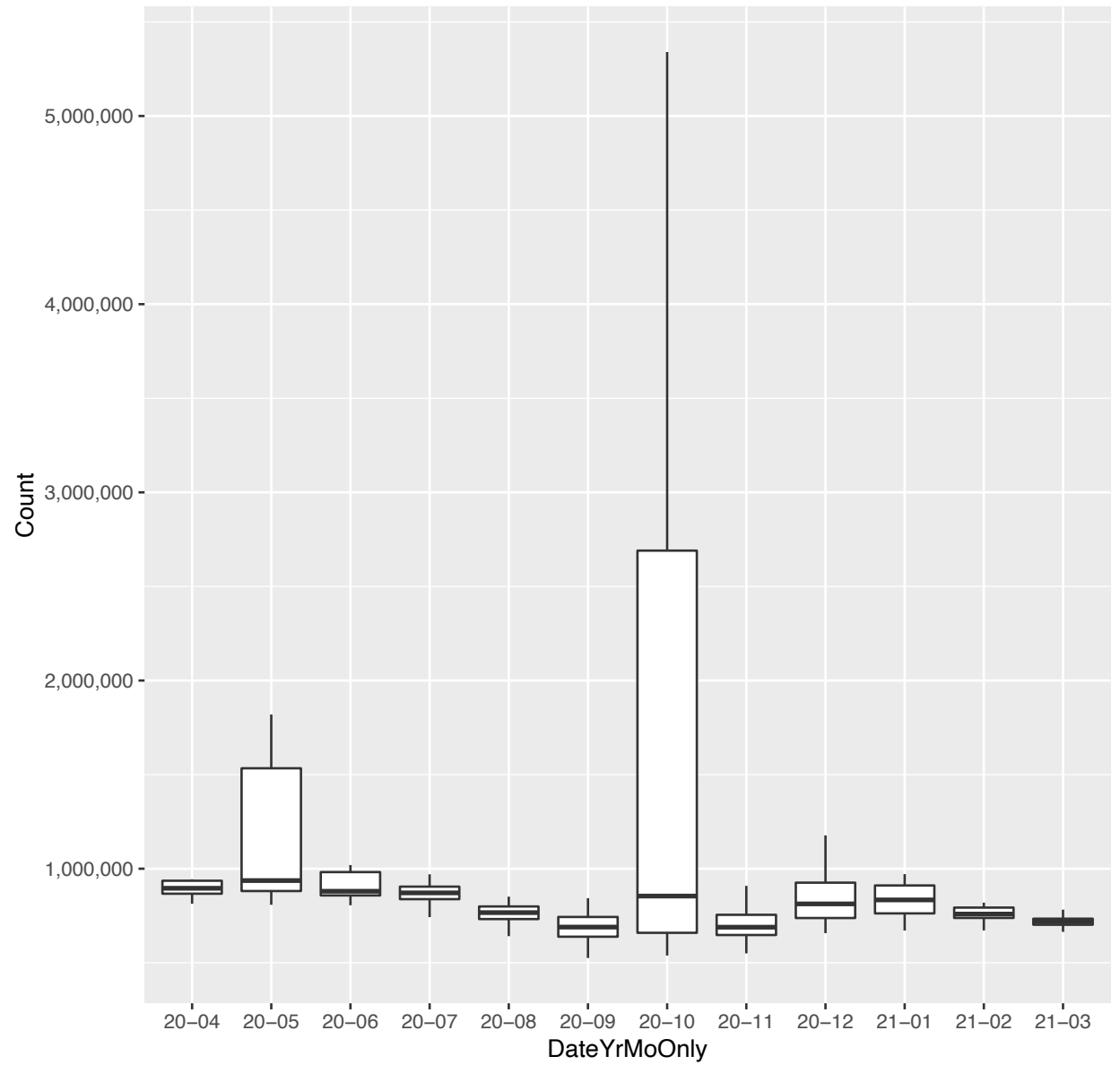
*. instacart.com (monthly boxplots (outliers trimmed))



*. postmates.com (day-by-day counts and 28 day moving average)



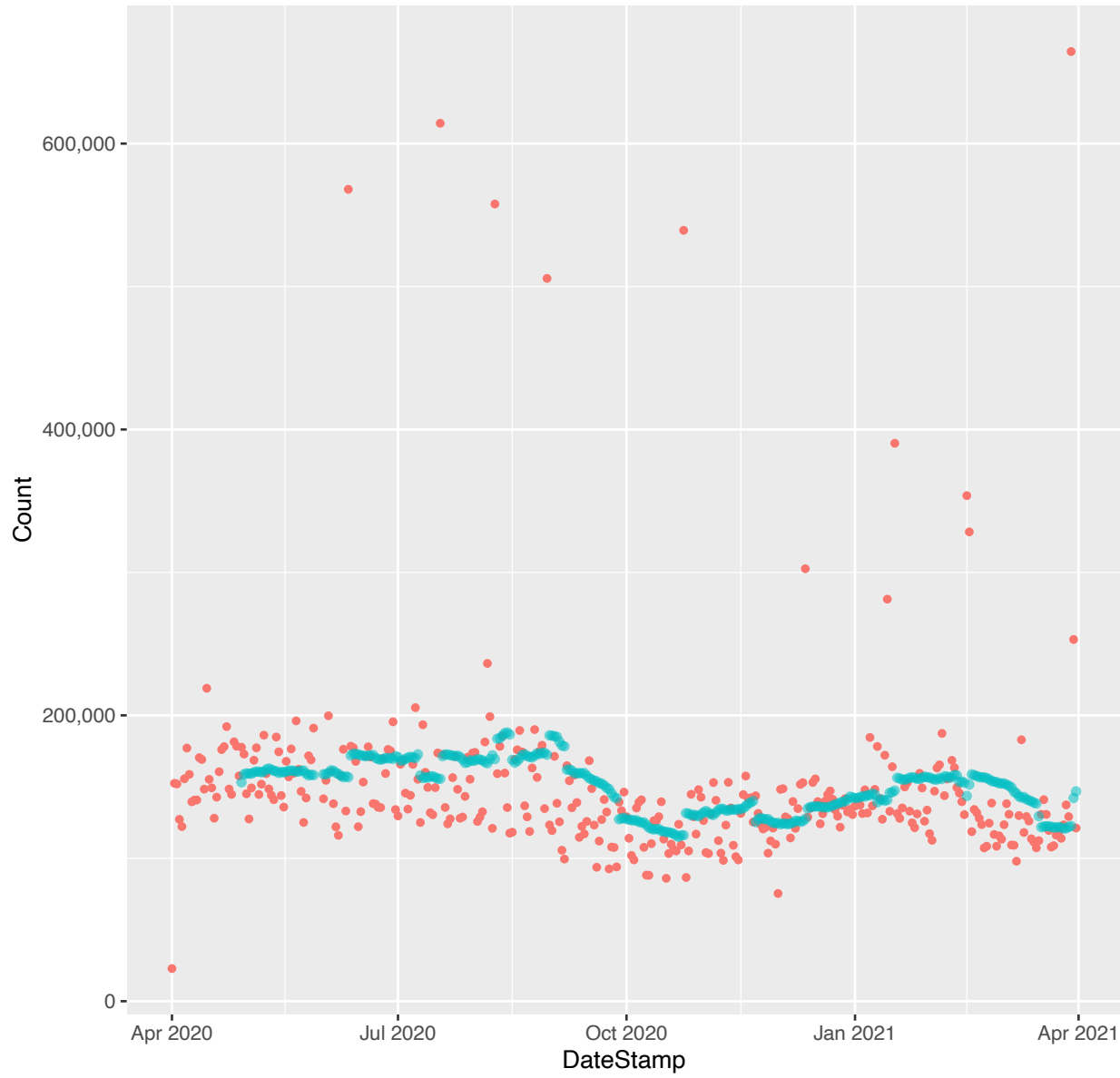
*. postmates.com (monthly boxplots (outliers trimmed))



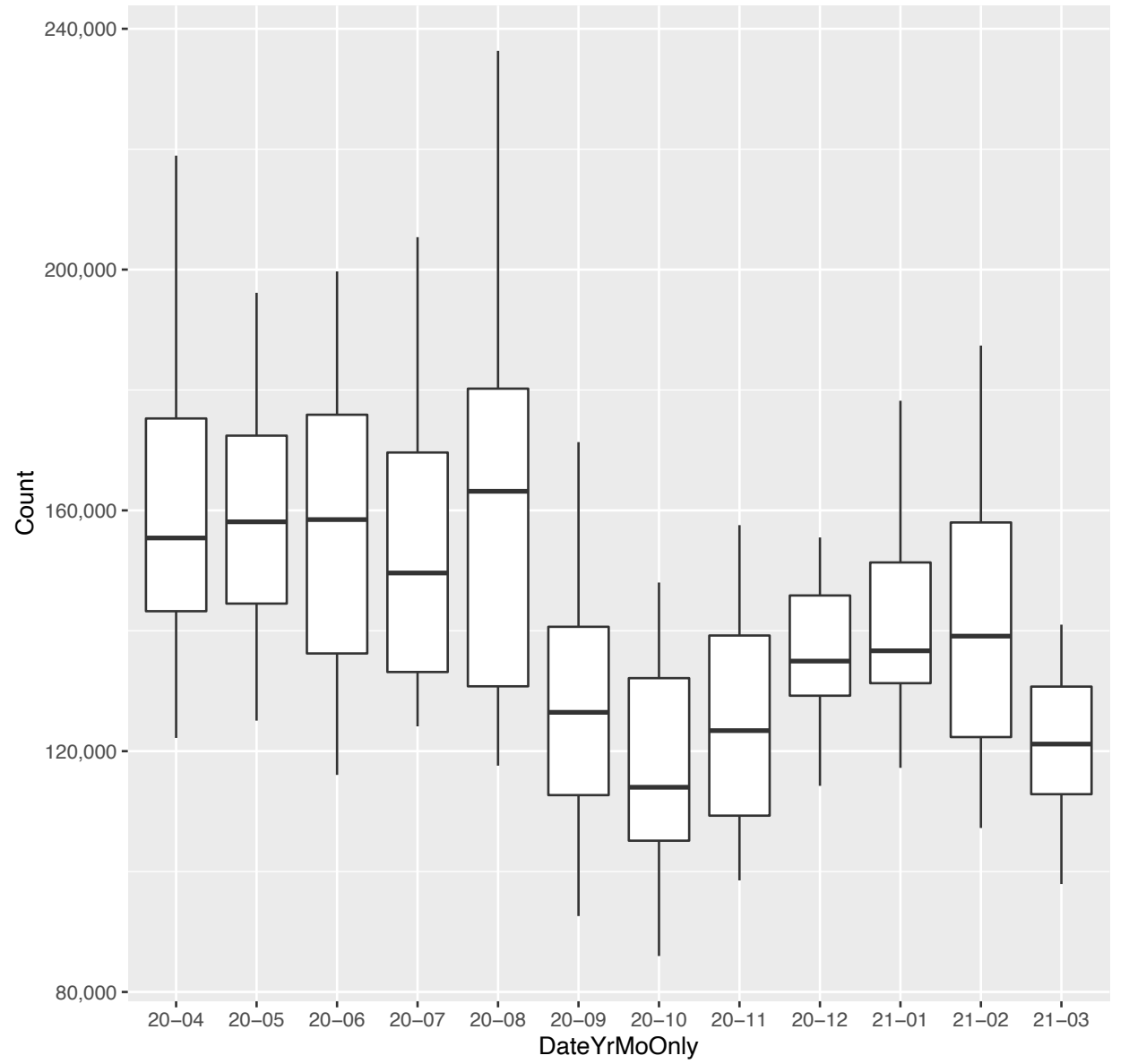
53. ubereats.com:

~

*. ubereats.com (day-by-day counts and 28 day moving average)



*. ubereats.com (monthly boxplots (outliers trimmed))



h) Gas Stations

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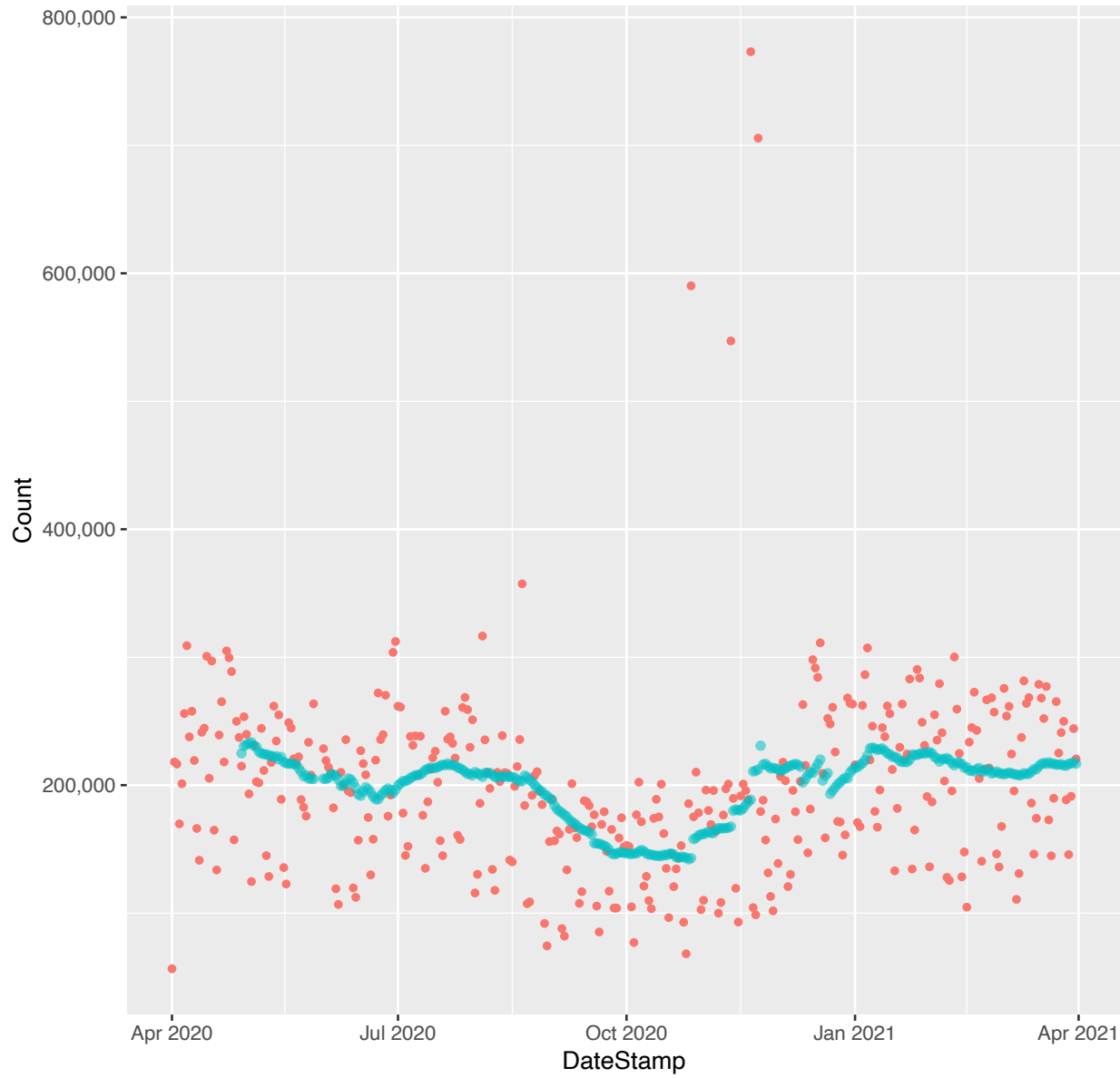
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54	*.bp.com	✱	∪ shaped
55	*.chevron.com	✱	~
56	*.loves.com		~
57	*.lukoil.com	✱	~
58	*.mobil.com		∩
59	*.shell.com	✱	∪ shaped (ending lower)
60	*.valero.com		↘

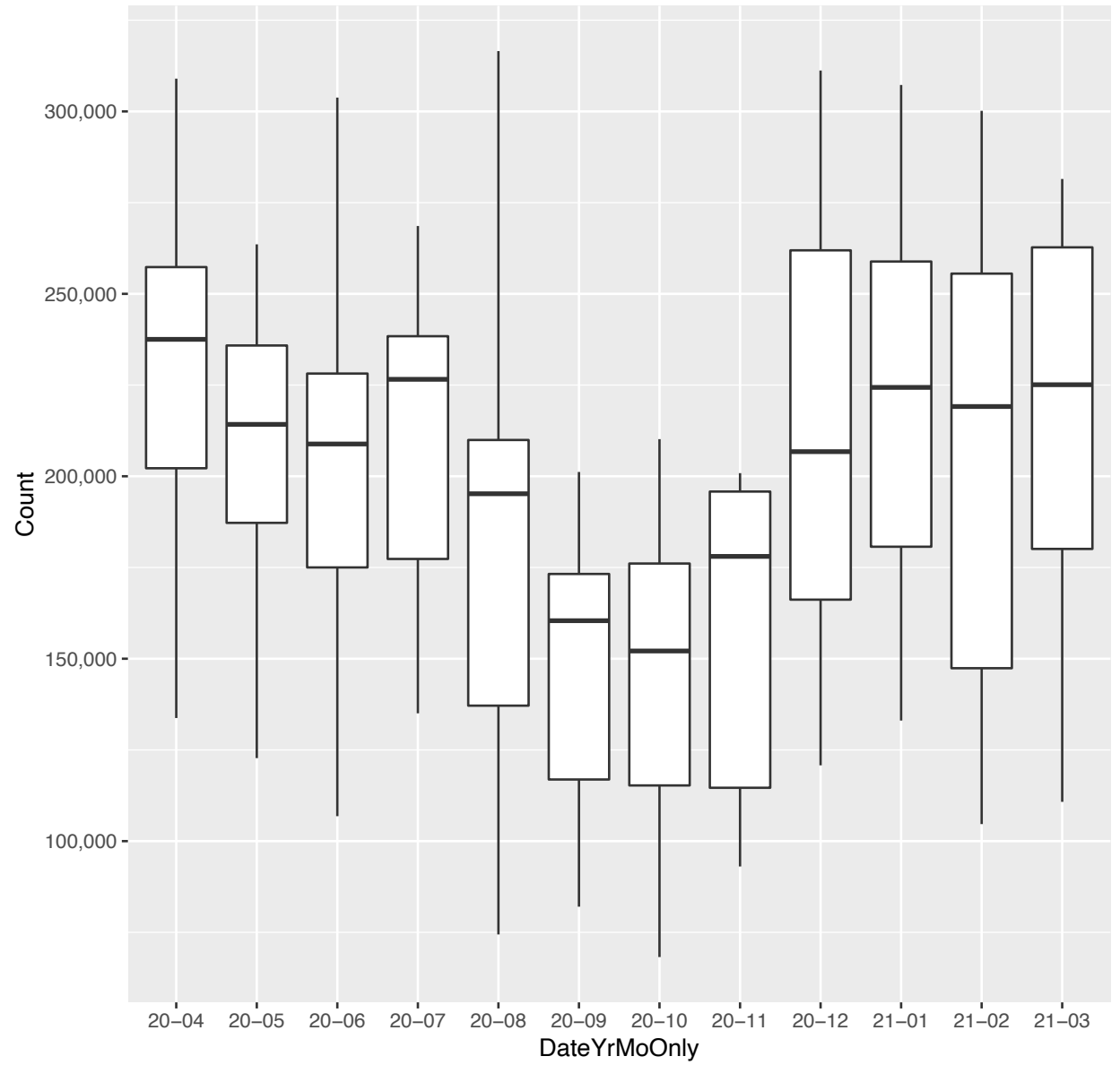
54. bp.com:

⬤ U shaped

*. bp.com (day-by-day counts and 28 day moving average)



*. bp.com (monthly boxplots (outliers trimmed))

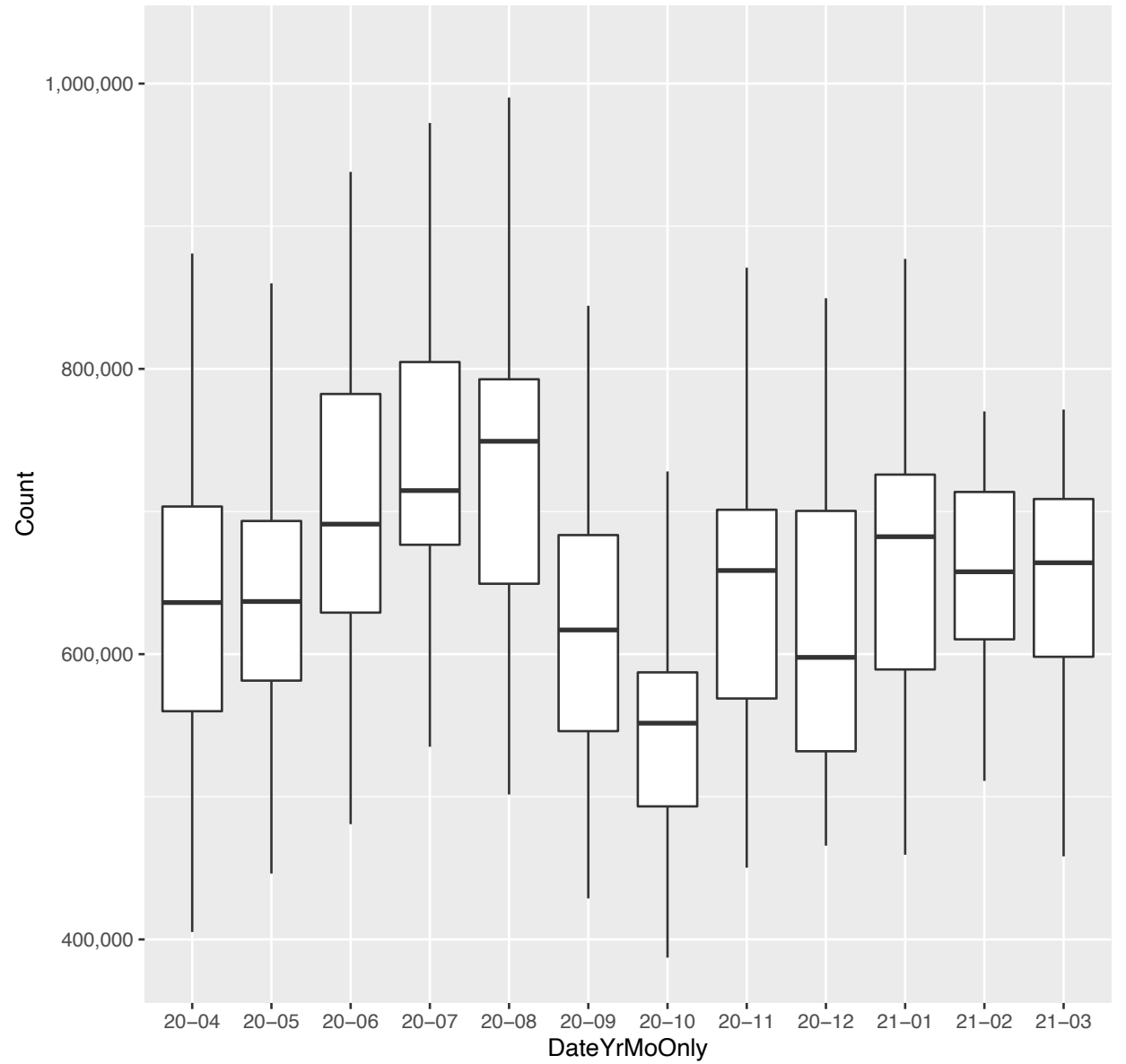




*. chevron.com (day-by-day counts and 28 day moving average)



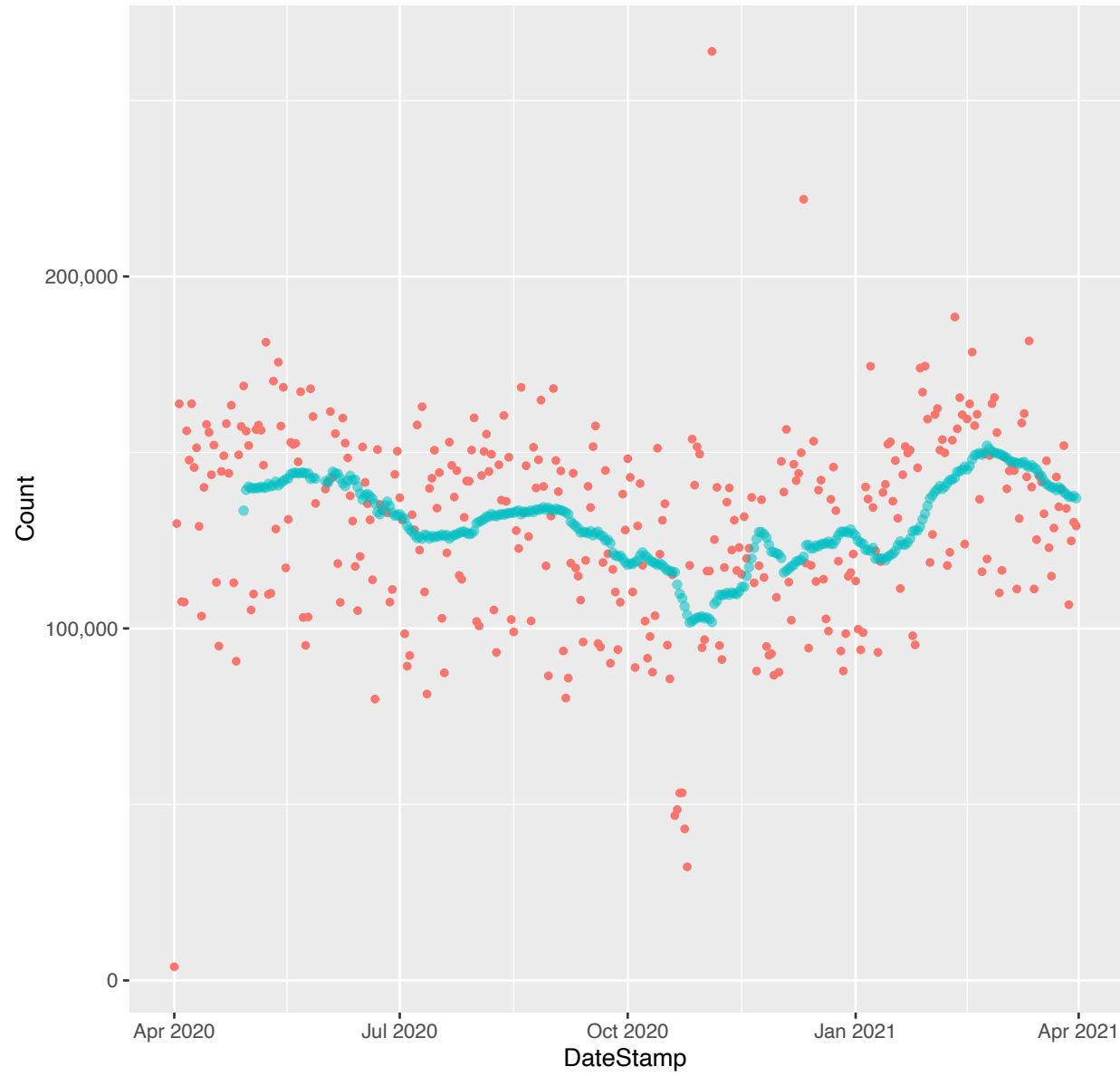
*. chevron.com (monthly boxplots (outliers trimmed))



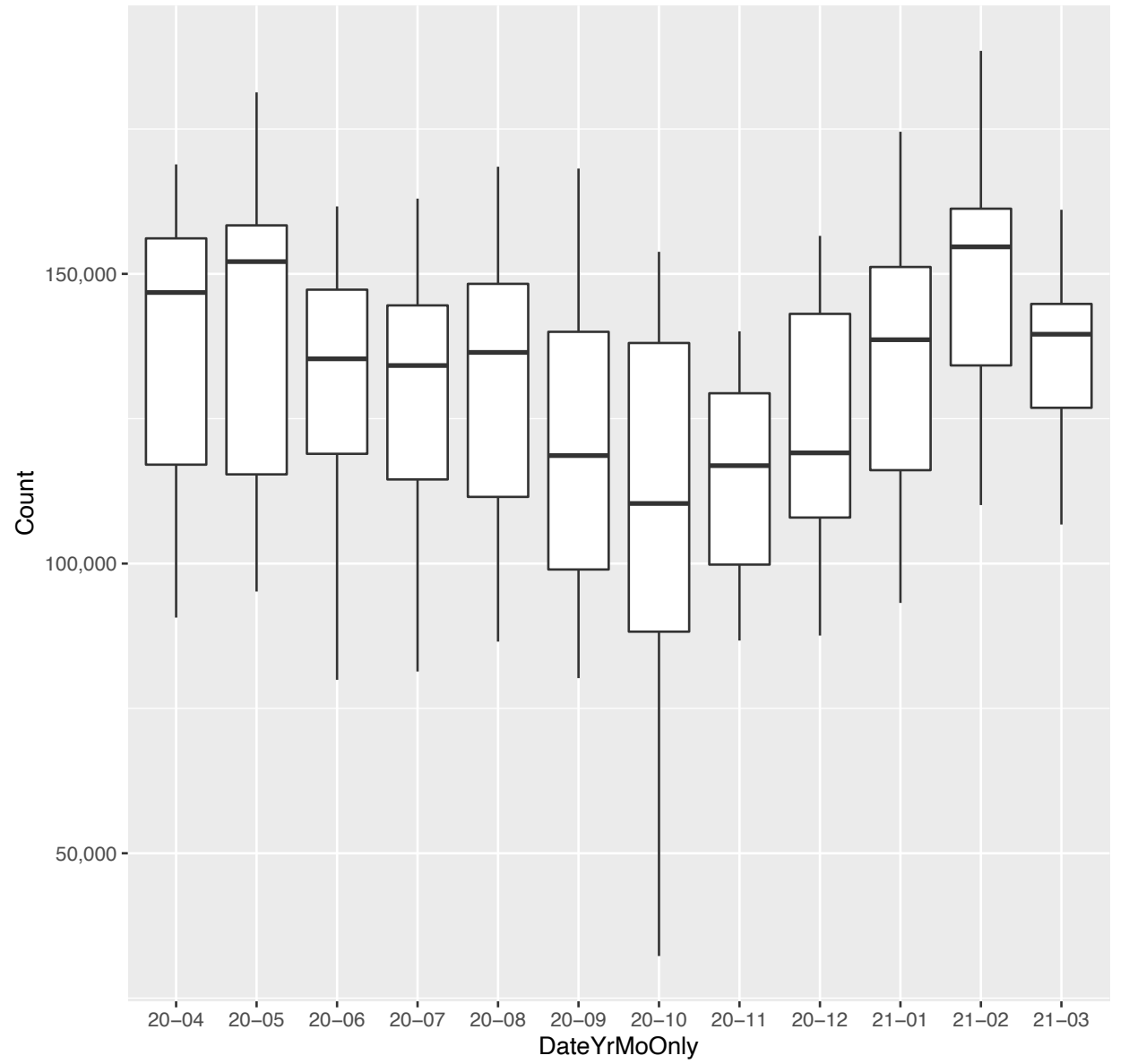
56. loves.com:

~

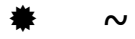
*. loves.com (day-by-day counts and 28 day moving average)



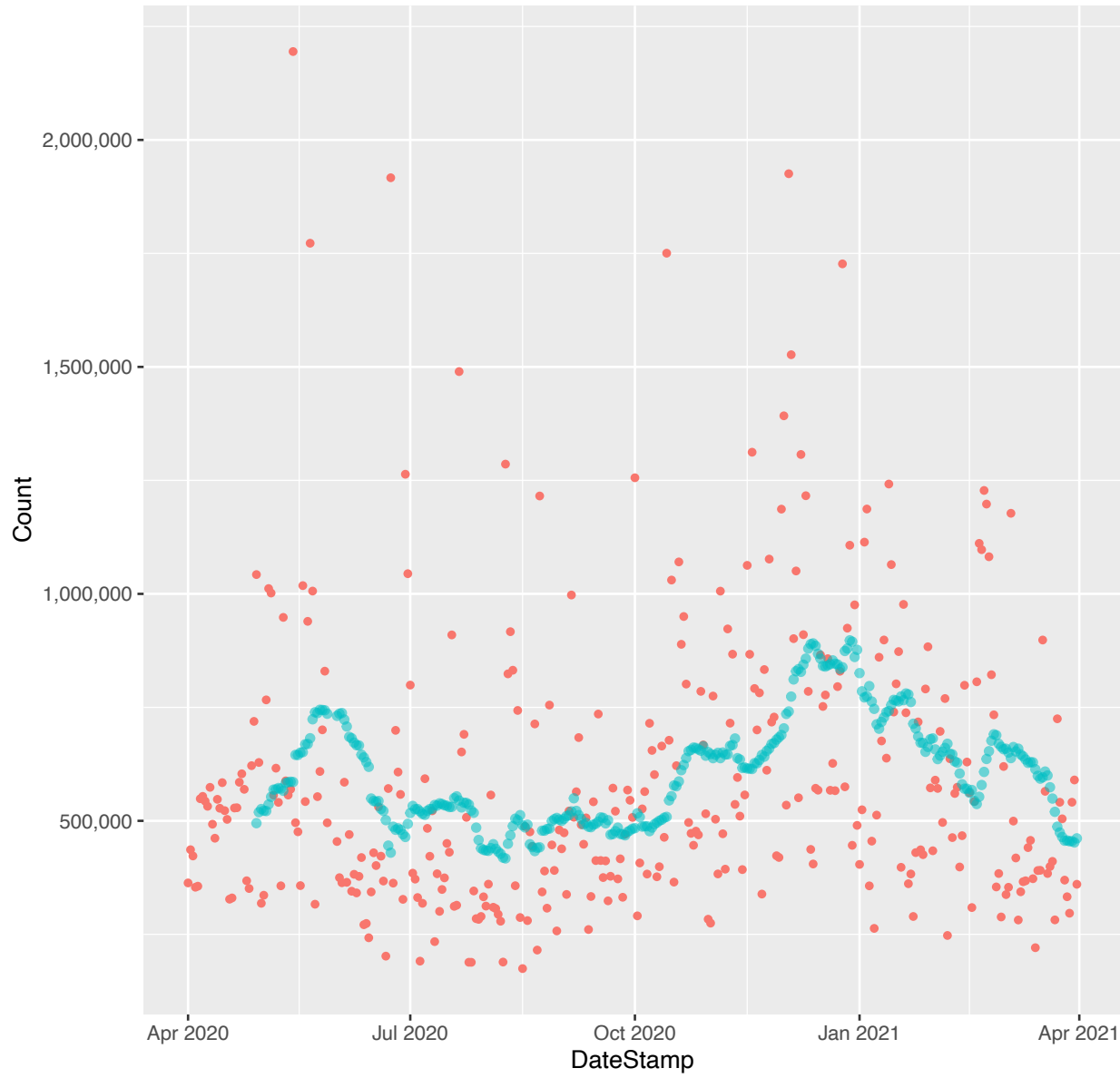
*. loves.com (monthly boxplots (outliers trimmed))



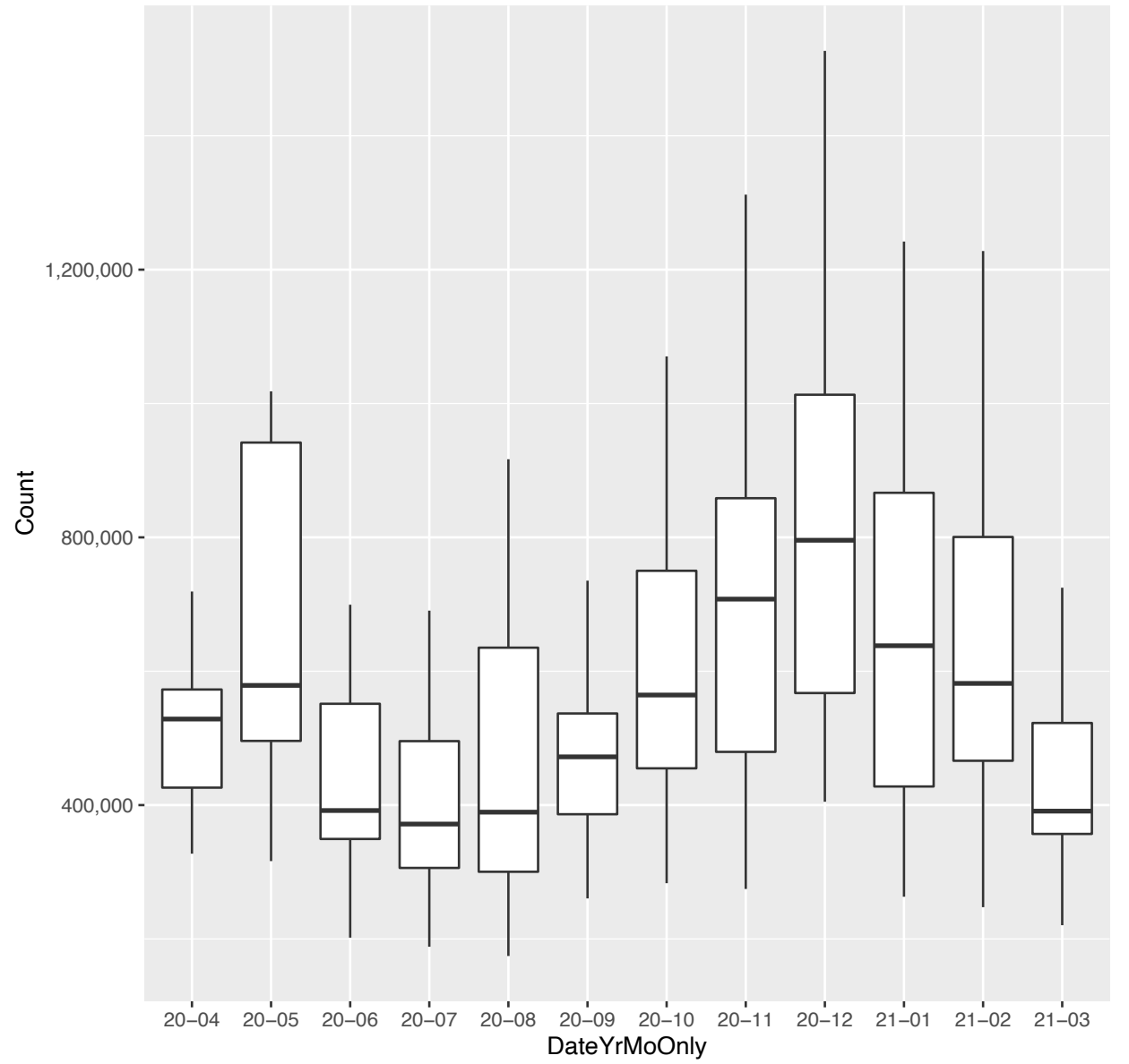
57. lukoil.com:



*. lukoil.com (day-by-day counts and 28 day moving average)



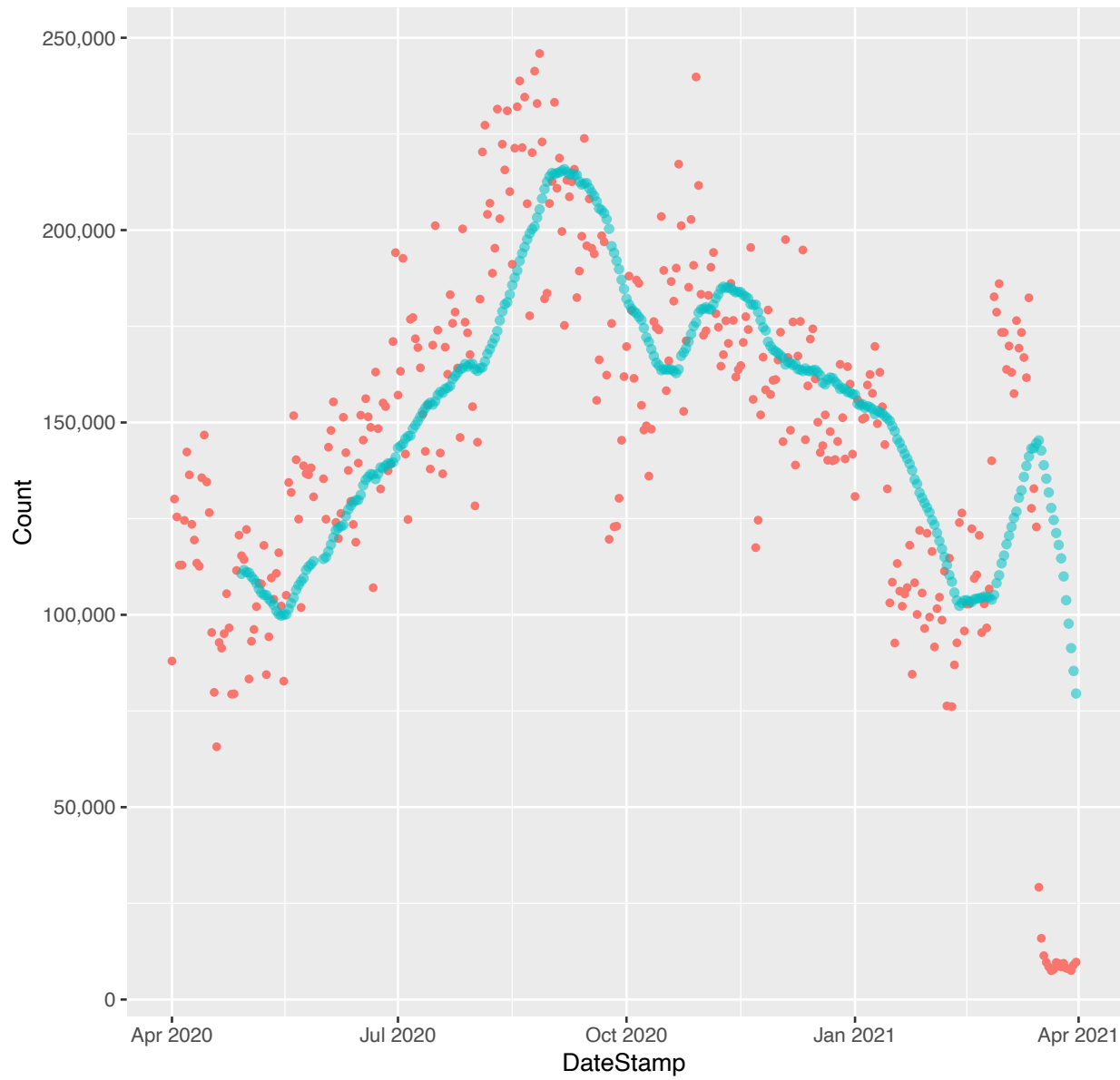
*. lukoil.com (monthly boxplots (outliers trimmed))



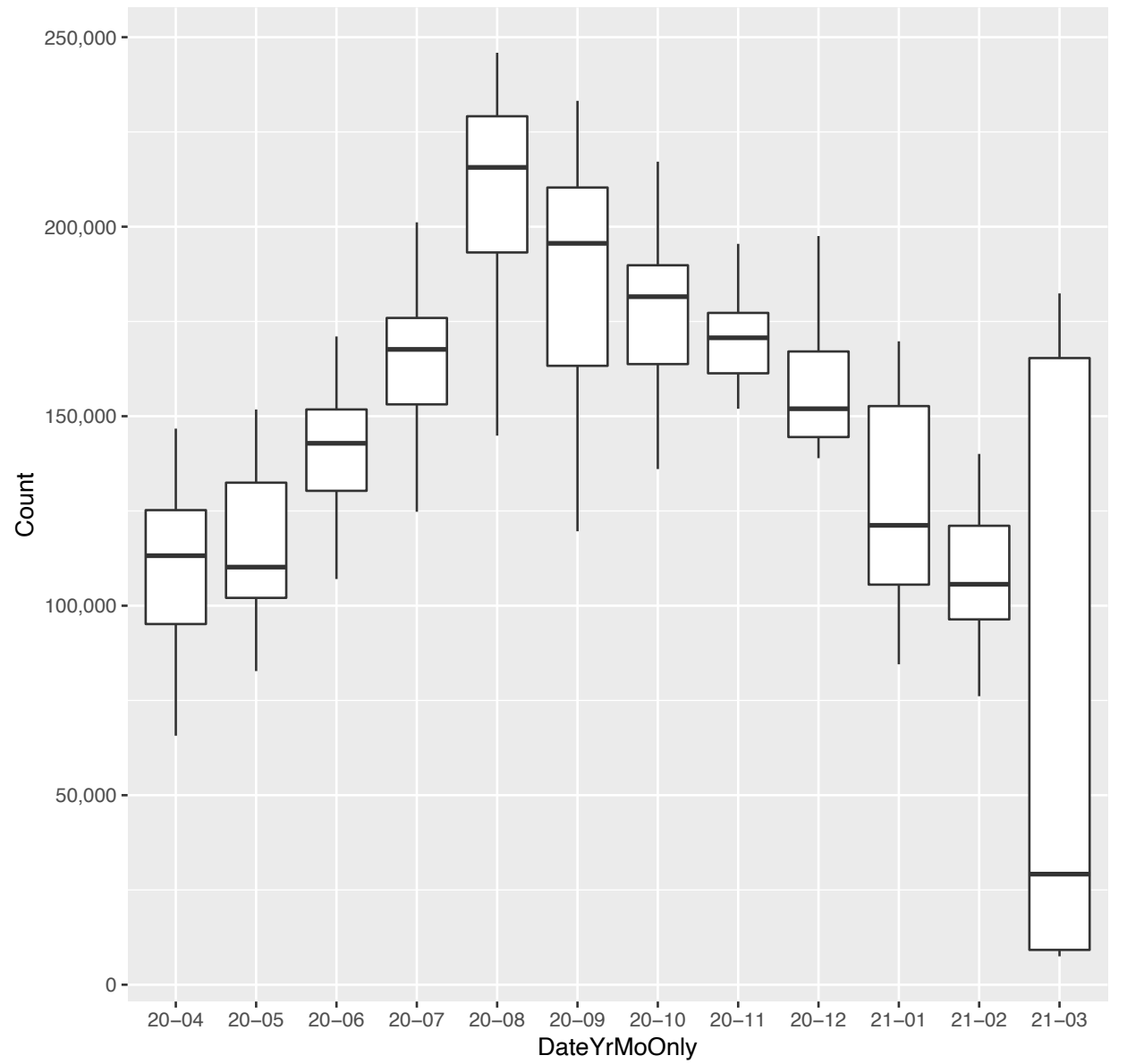
58. mobil.com:



*. mobil.com (day-by-day counts and 28 day moving average)



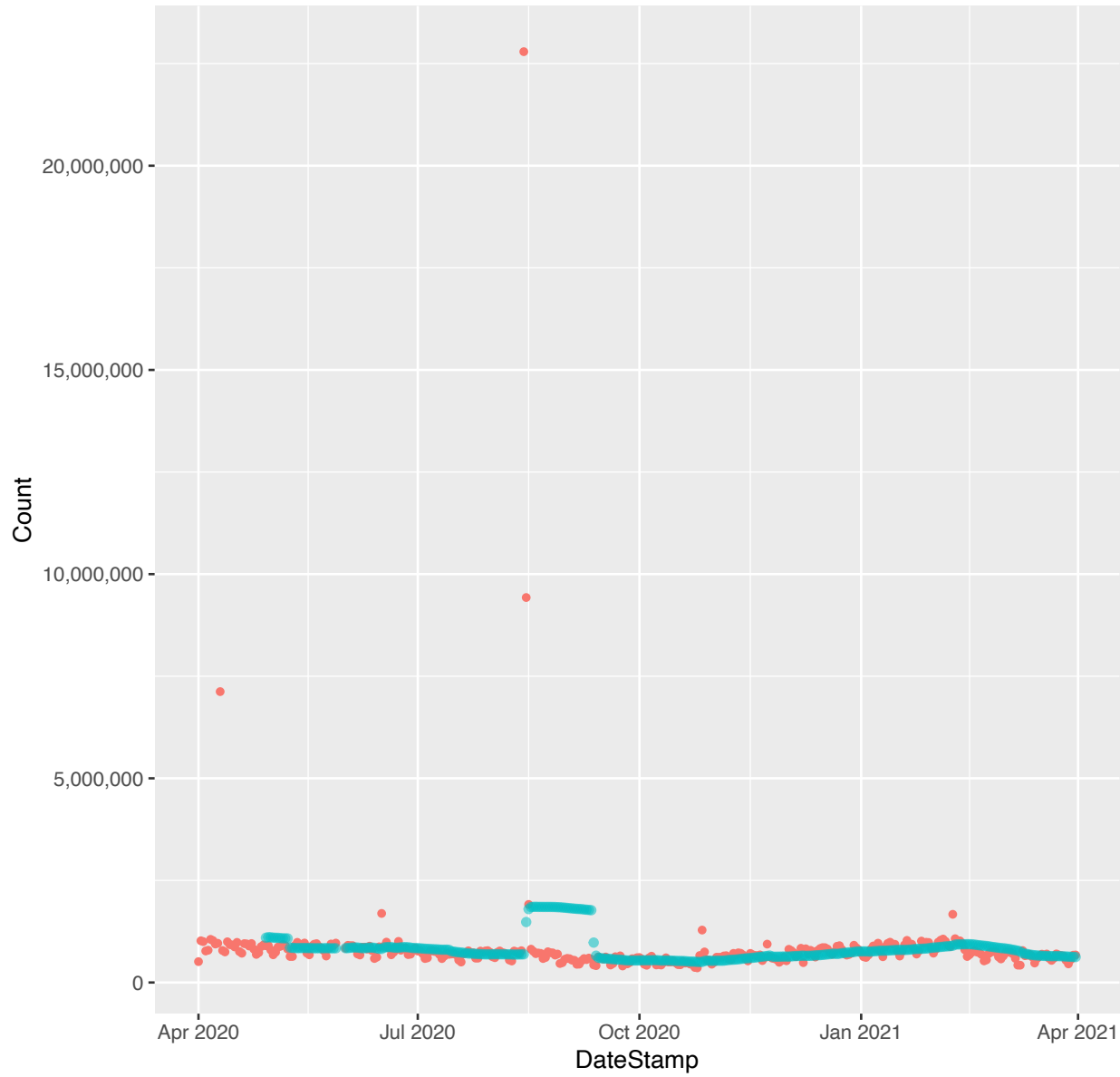
*. mobil.com (monthly boxplots (outliers trimmed))



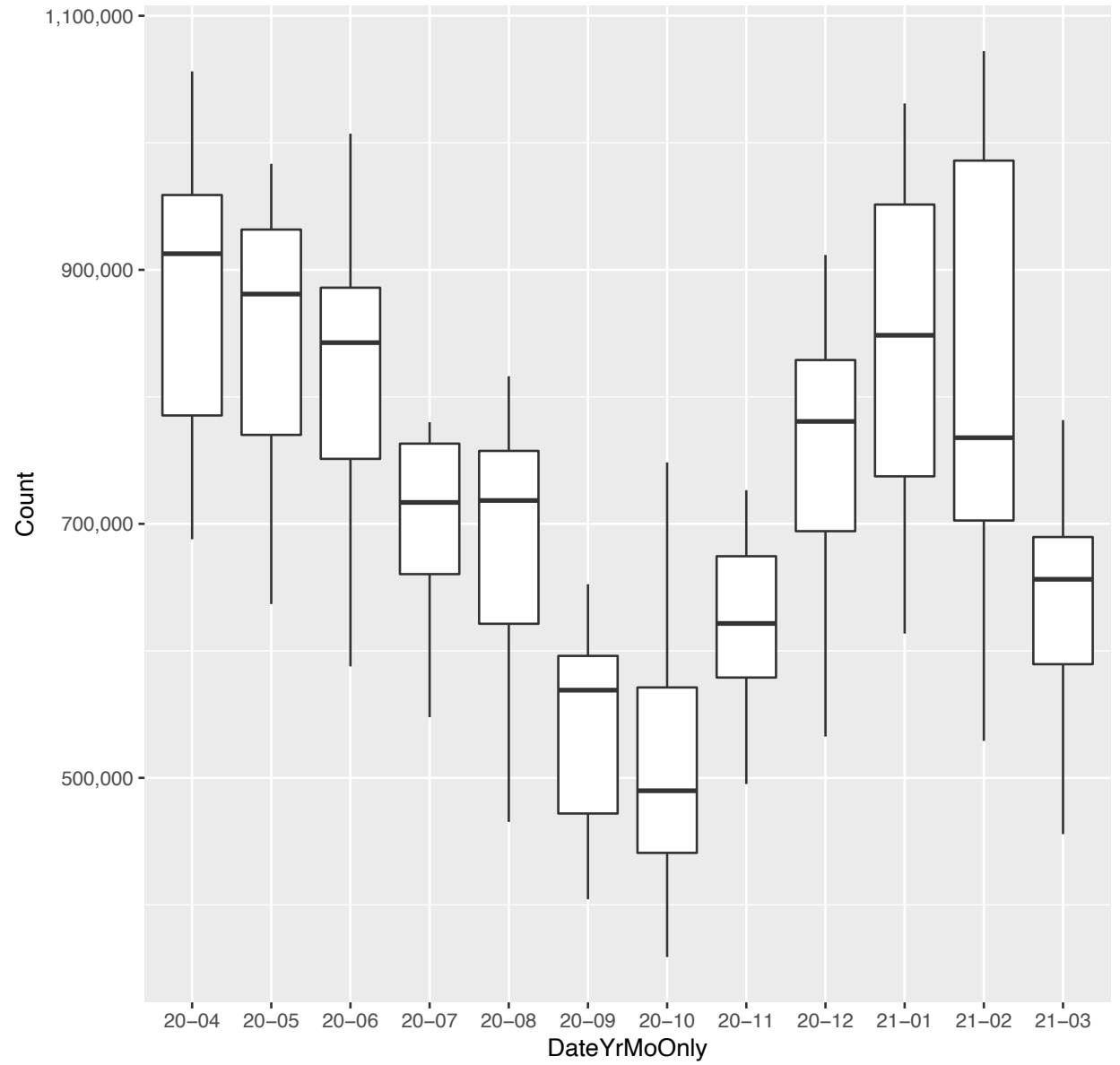
59. shell.com:

★ ◡ shaped (ending lower)

*. shell.com (day-by-day counts and 28 day moving average)

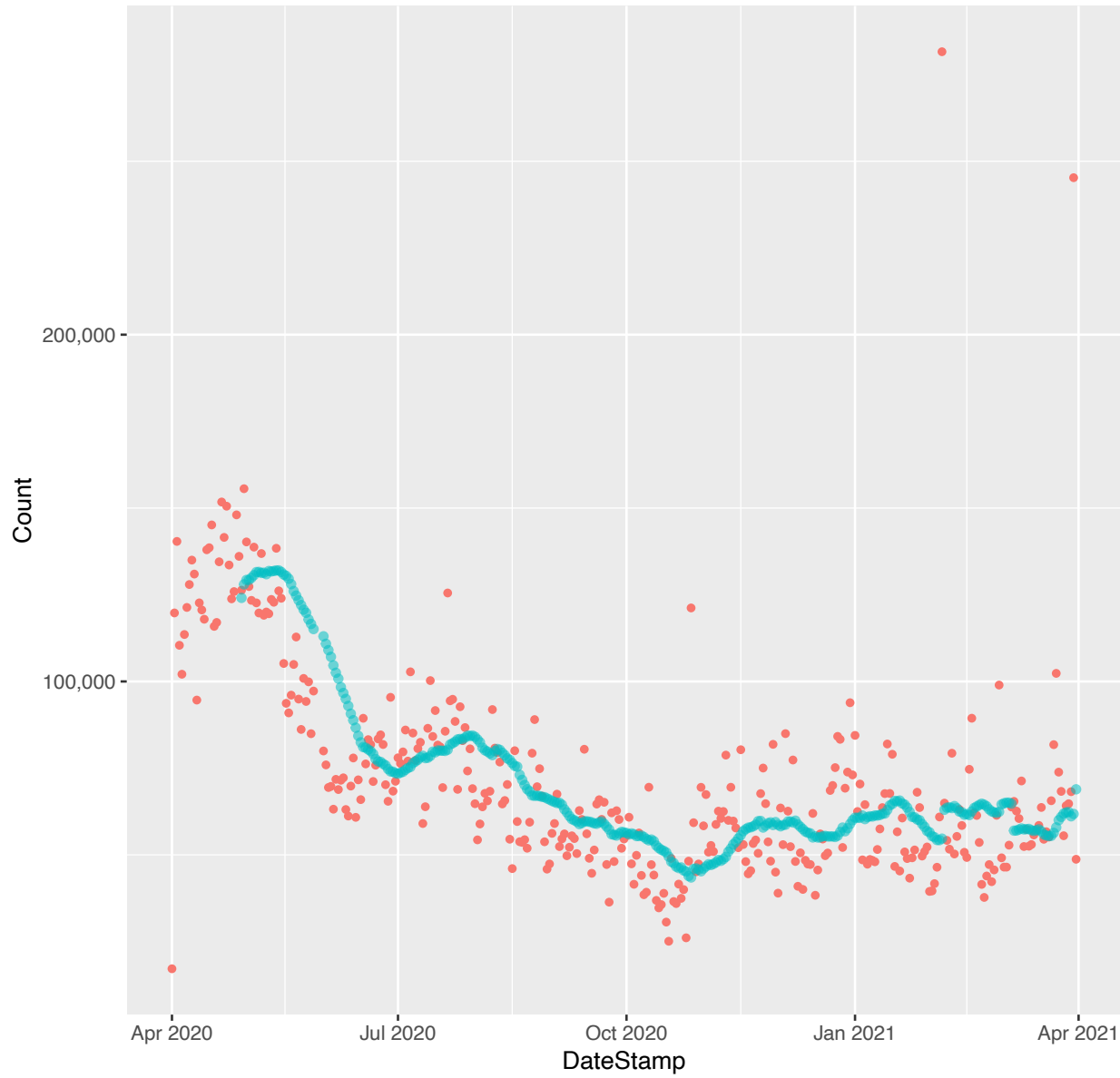


*. shell.com (monthly boxplots (outliers trimmed))

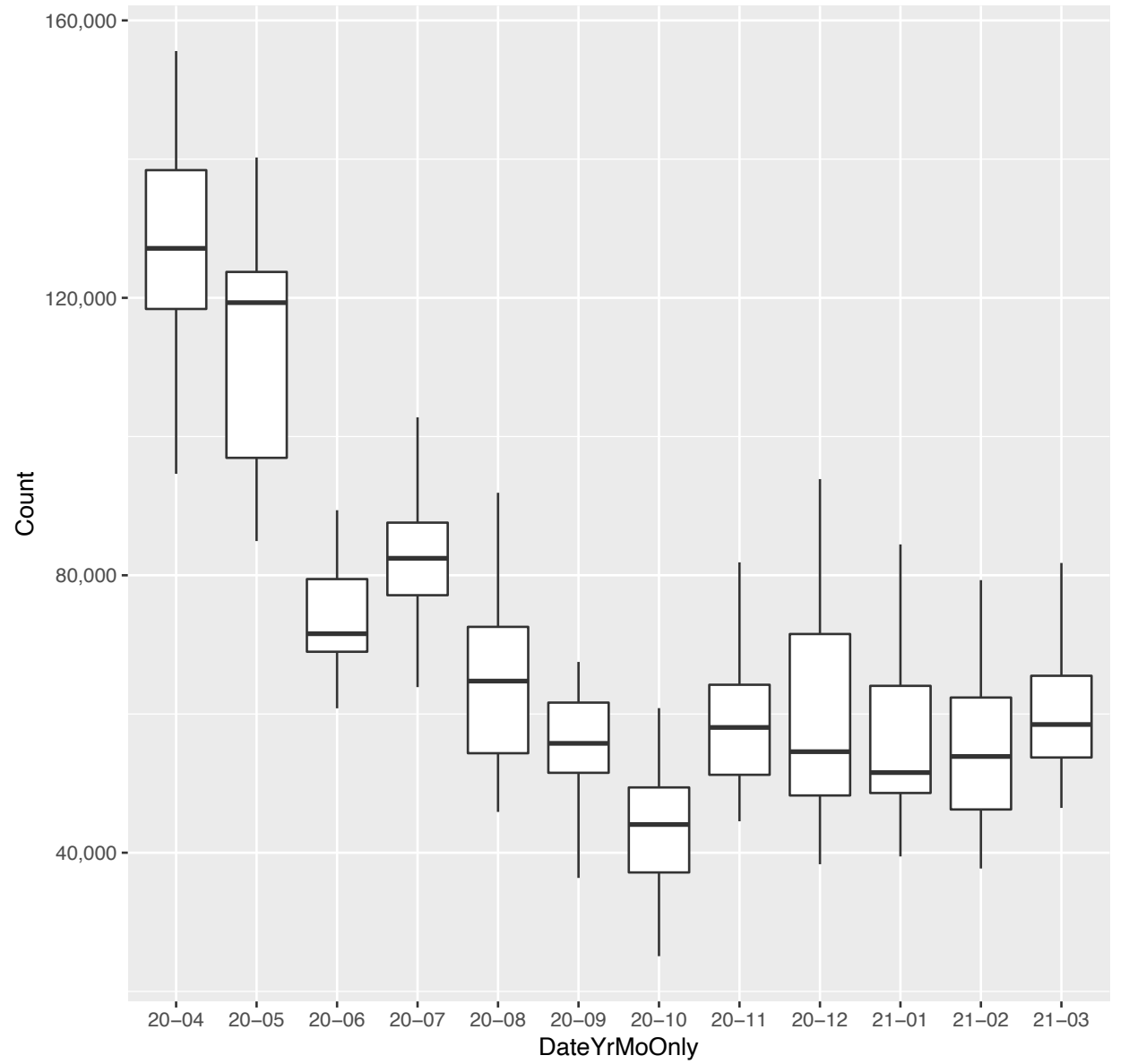




*. valero.com (day-by-day counts and 28 day moving average)



*. valero.com (monthly boxplots (outliers trimmed))



i) Grocery Stores

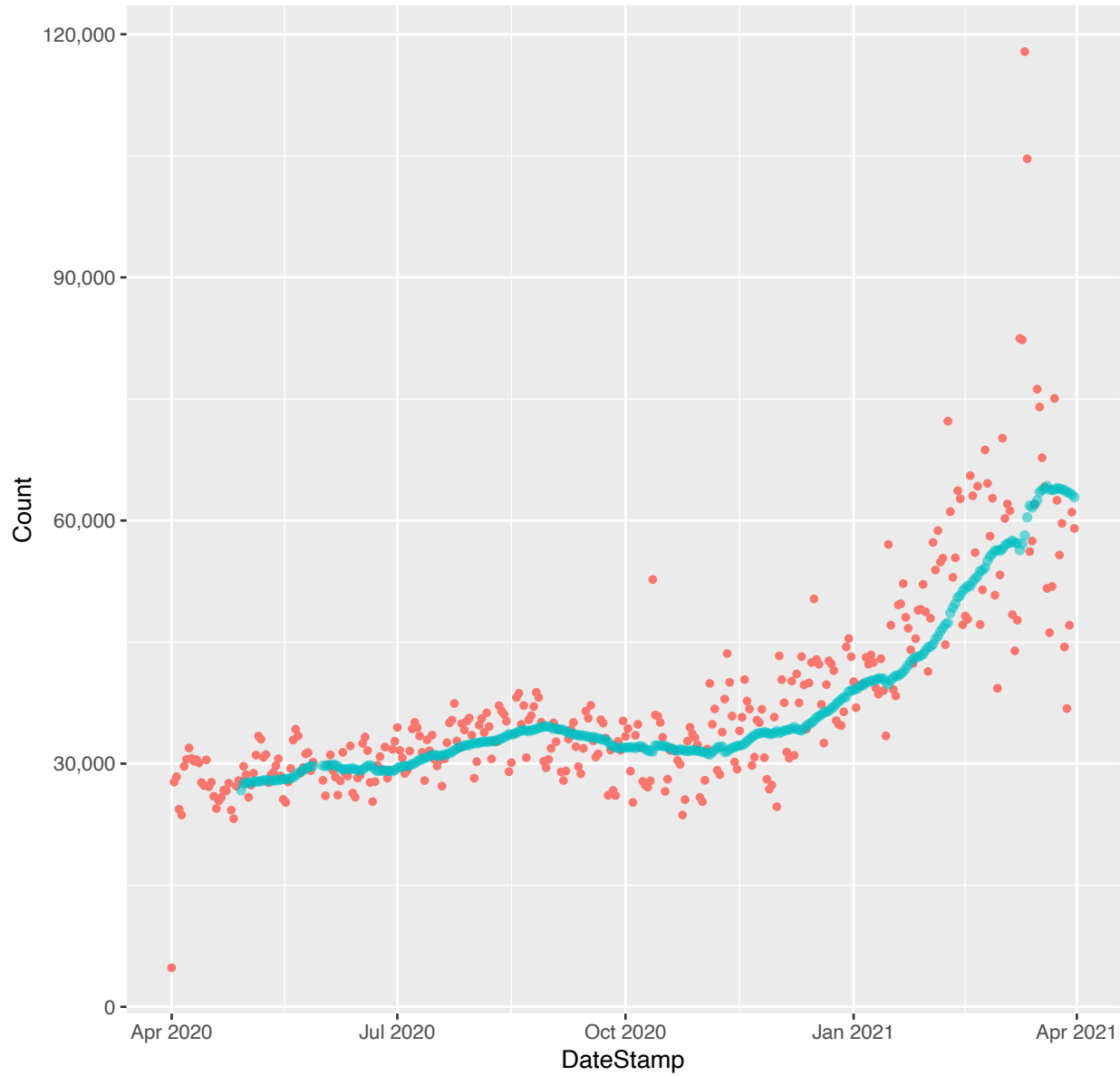
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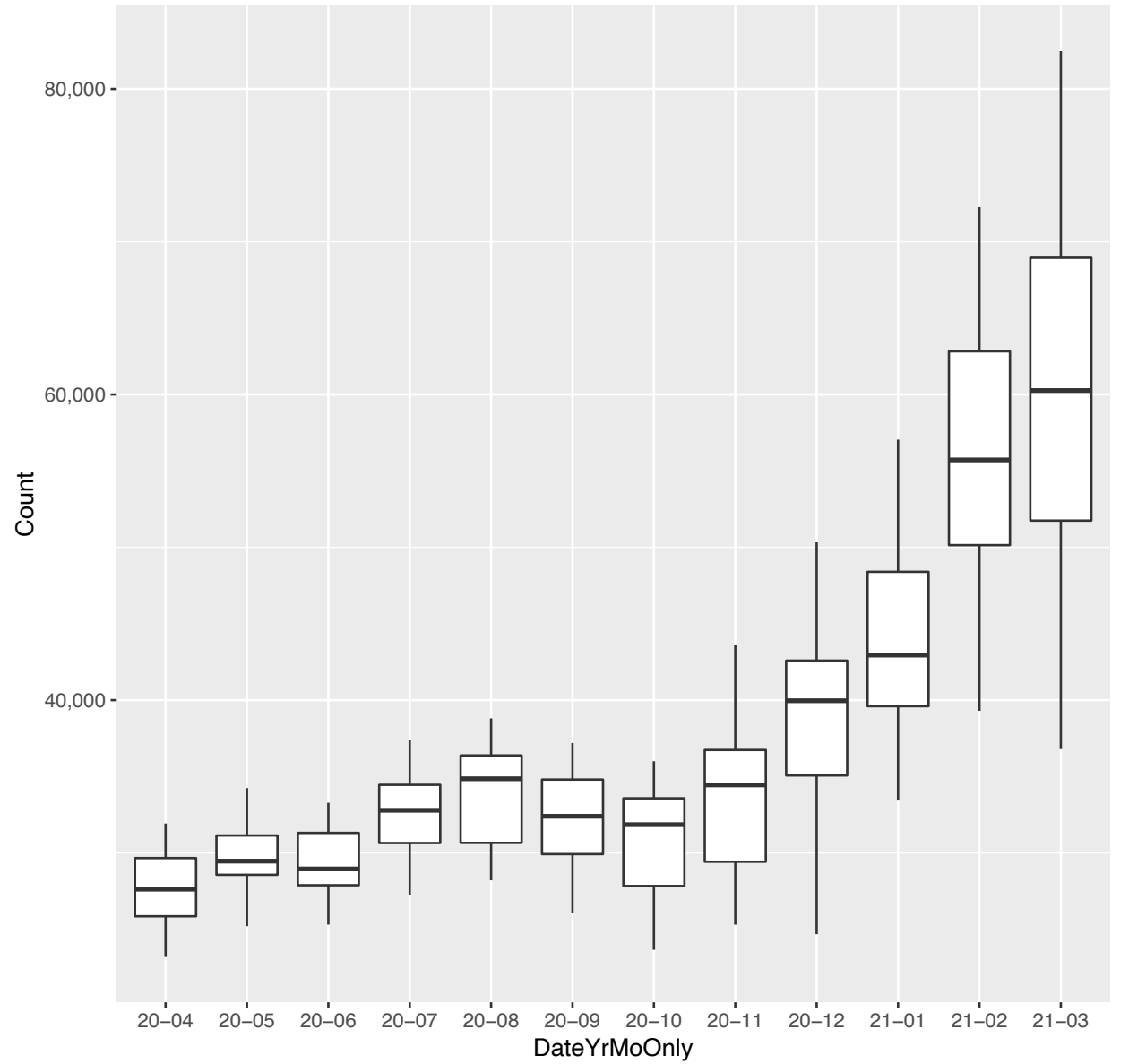
61	*.albertsons.com	↗	
62	*.aldi.us	↘	
63	*.bjs.com	~	
64	*.kroger.com	⤵	M
65	*.meijer.com	↗	
66	*.publix.com	↗	
67	*.safeway.com	↗	M
68	*.stopandshop.com	⤵	
69	*.wegmans.com	~	

61. albertsons.com: ↗

*. albertsons.com (day-by-day counts and 28 day moving average)



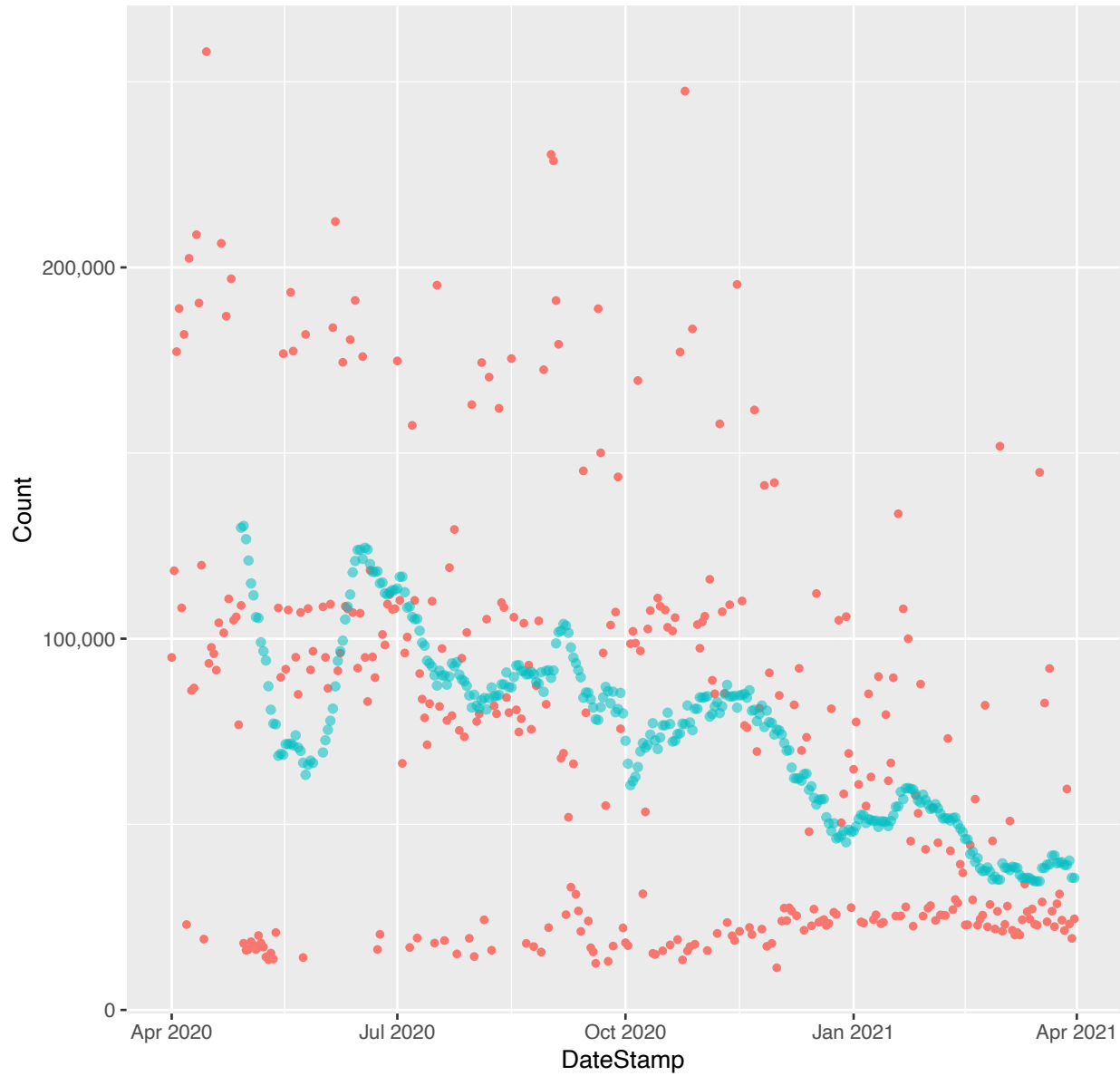
*. albertsons.com (monthly boxplots (outliers trimmed))



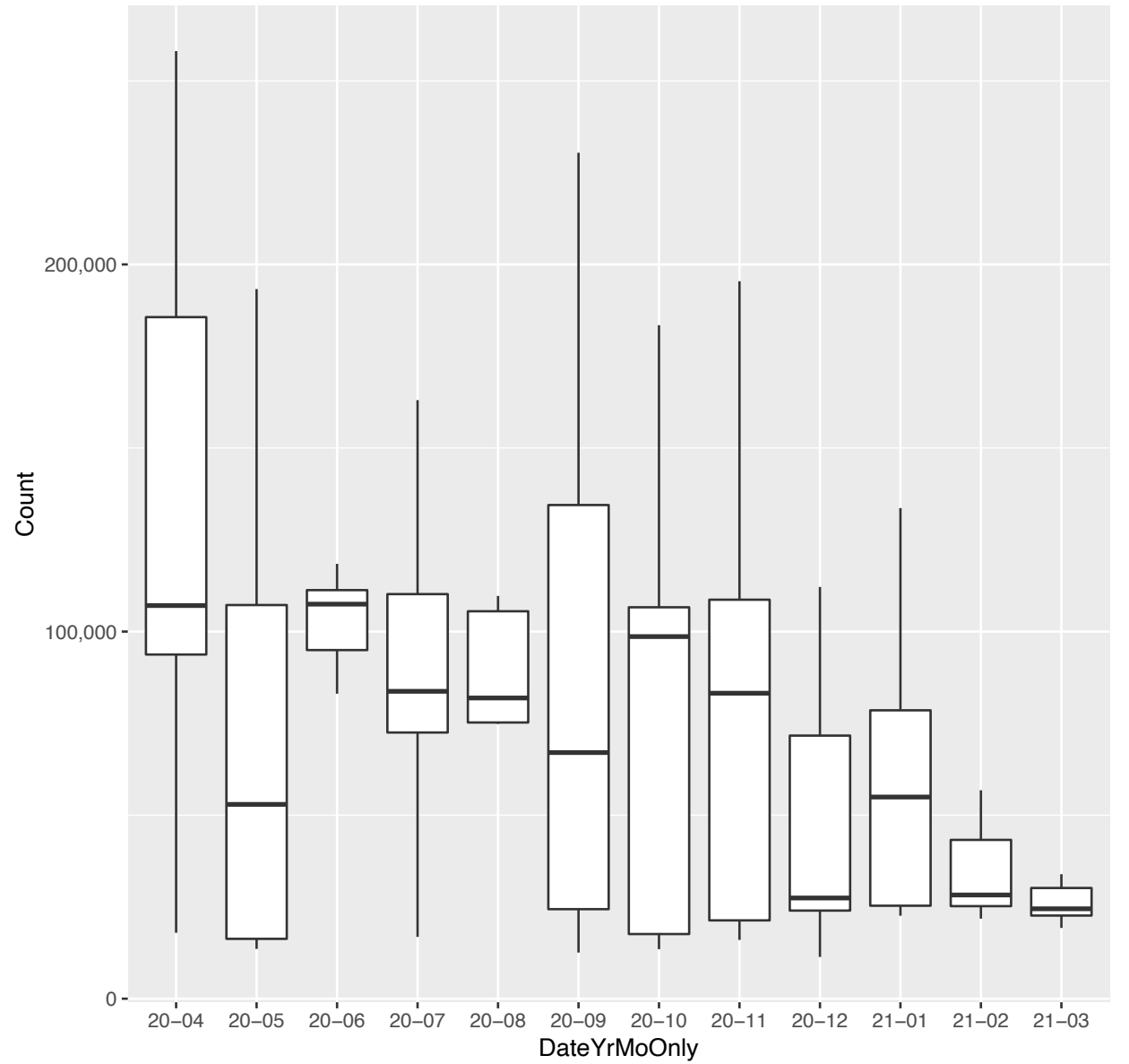
62. aldi.us:



*. aldi.us (day-by-day counts and 28 day moving average)



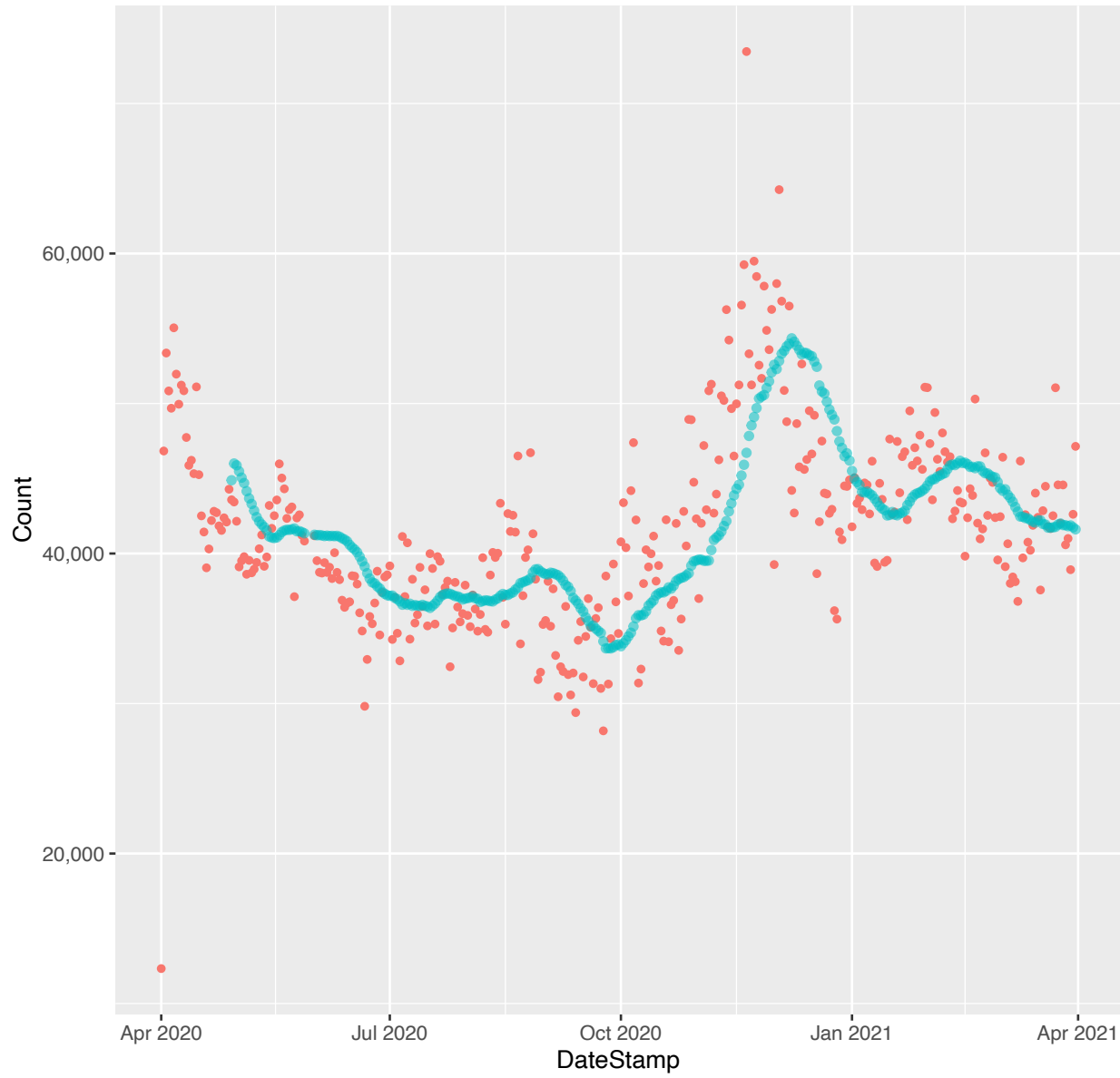
*. aldi.us (monthly boxplots (outliers trimmed))



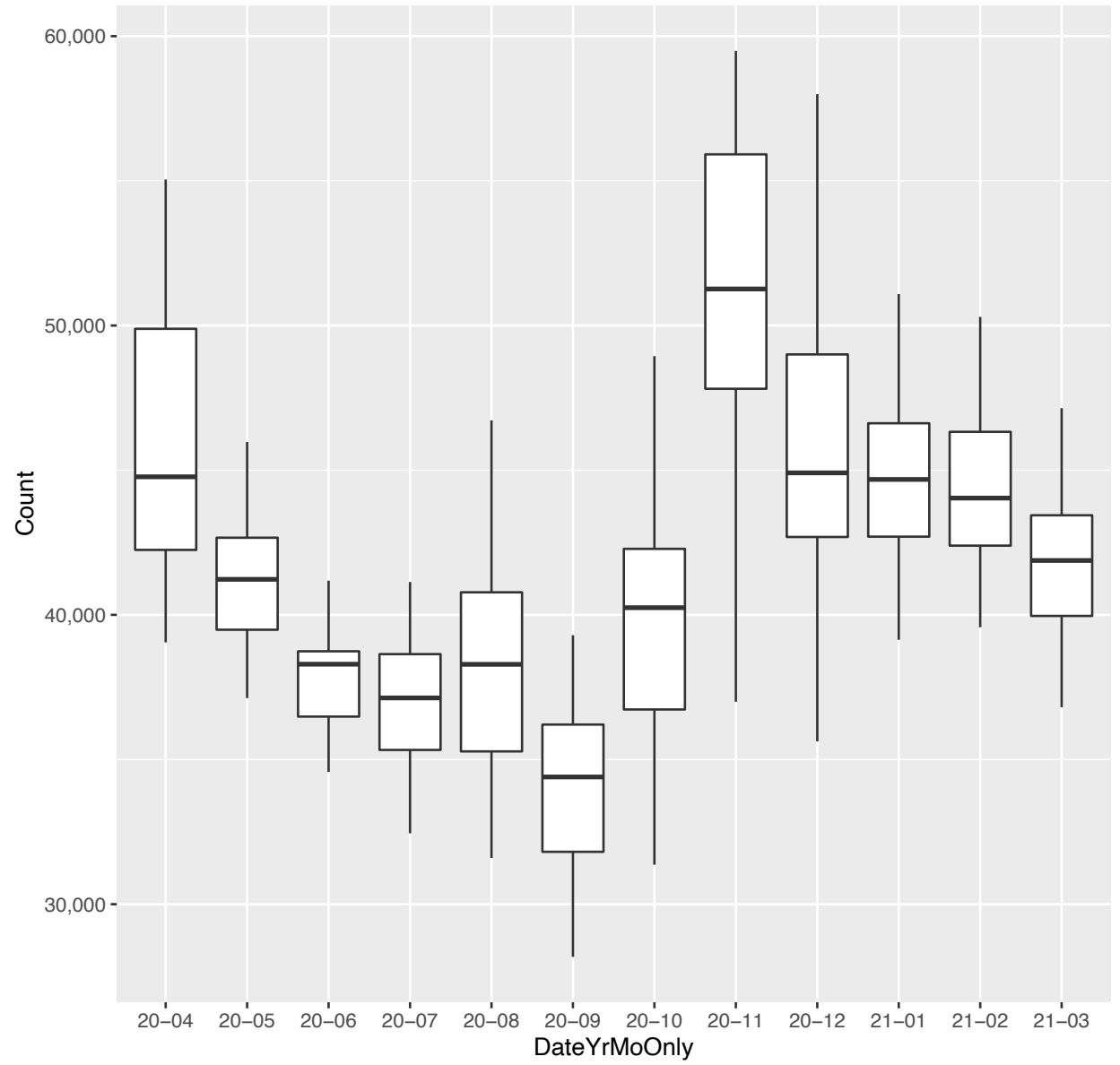
63. bjs.com:

~

*. bjs.com (day-by-day counts and 28 day moving average)

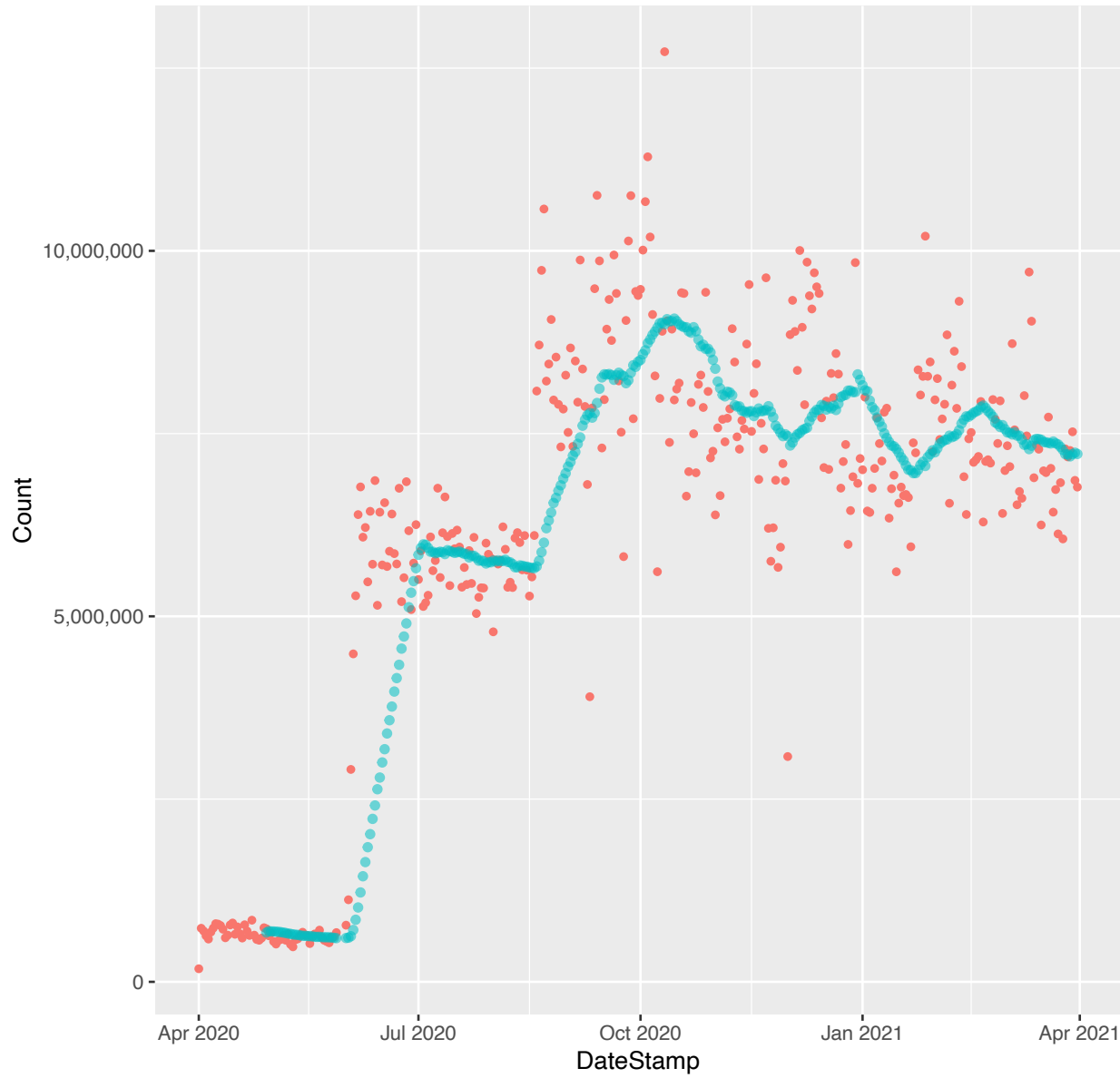


*. bjs.com (monthly boxplots (outliers trimmed))

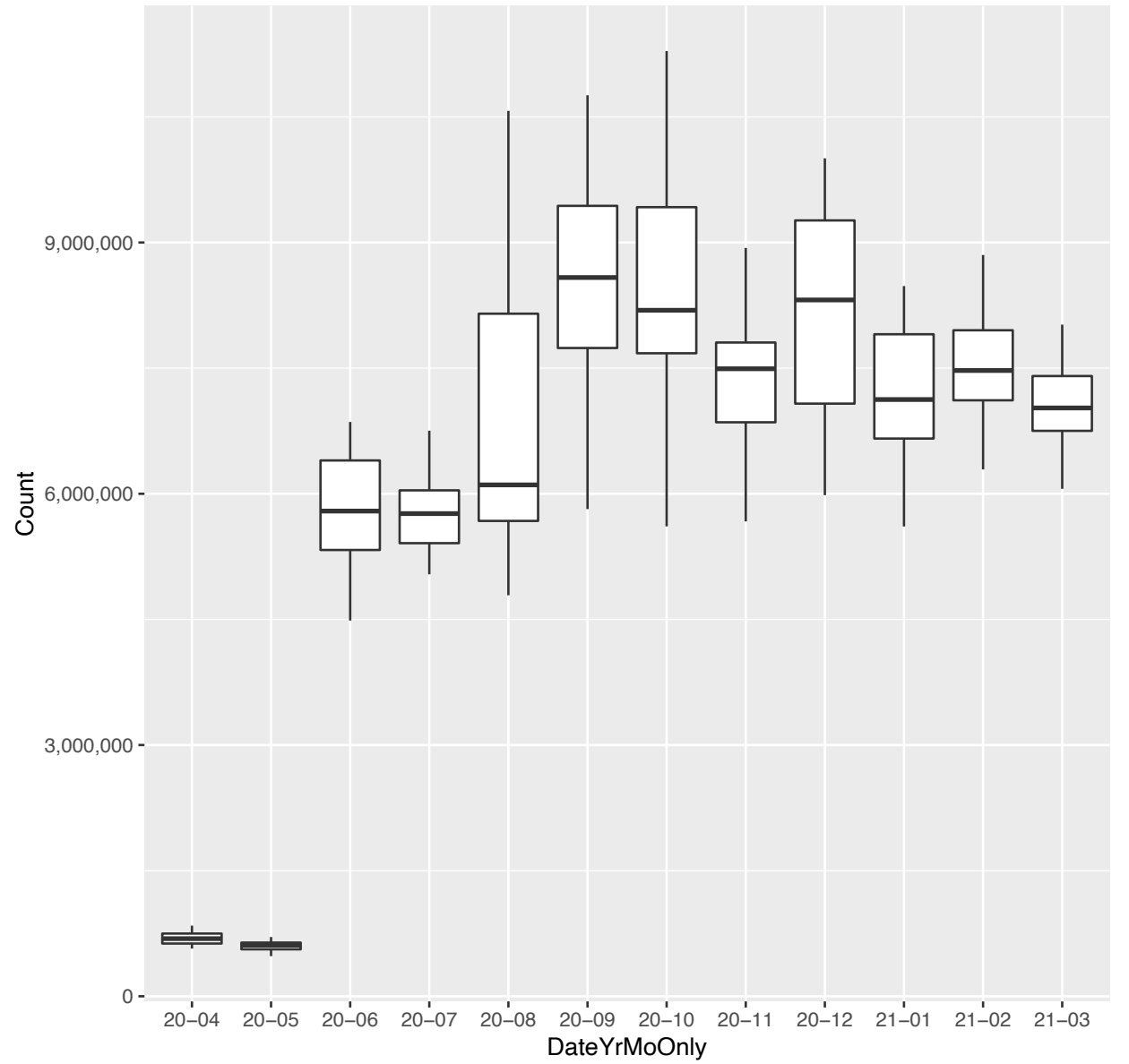


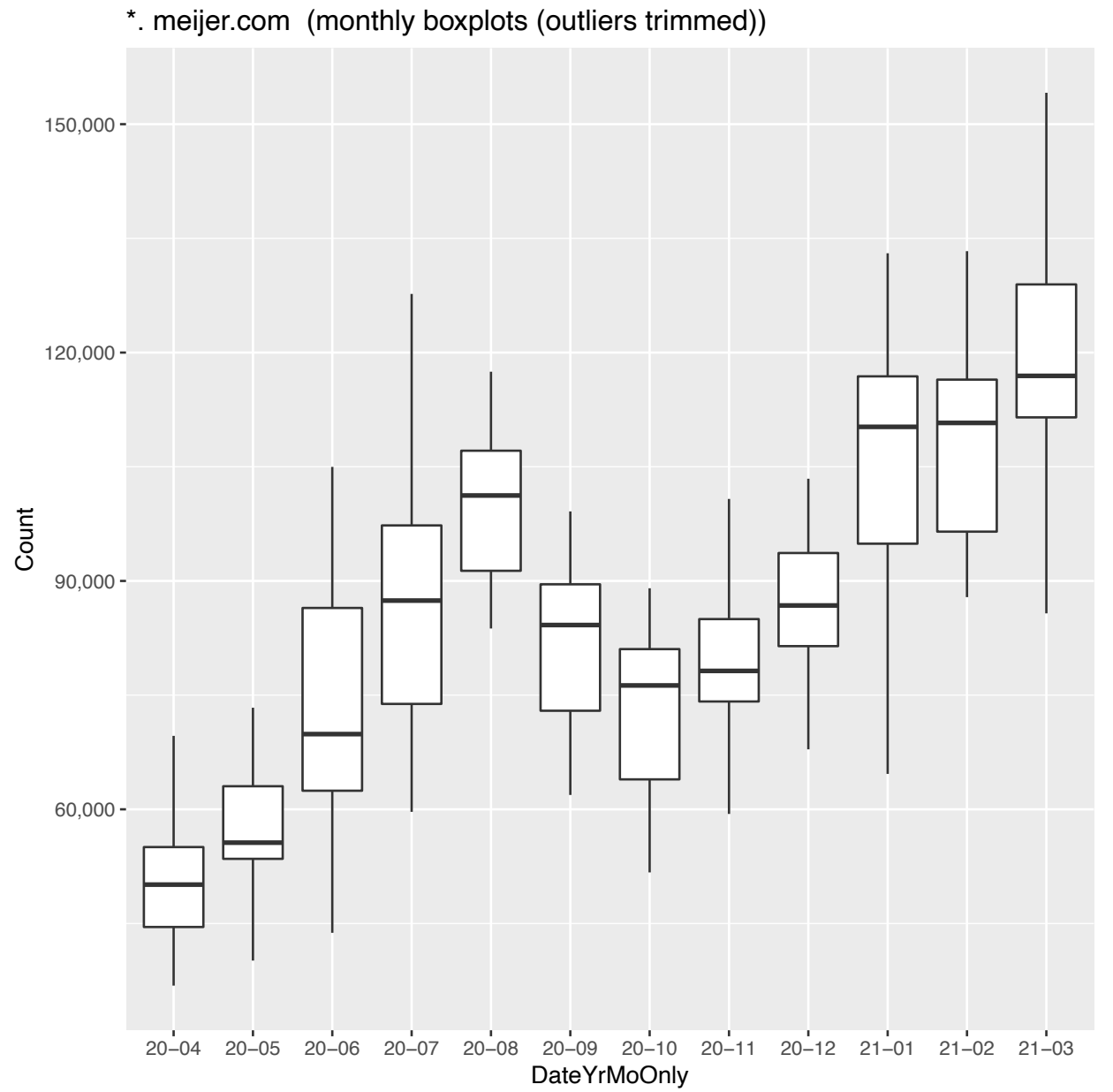
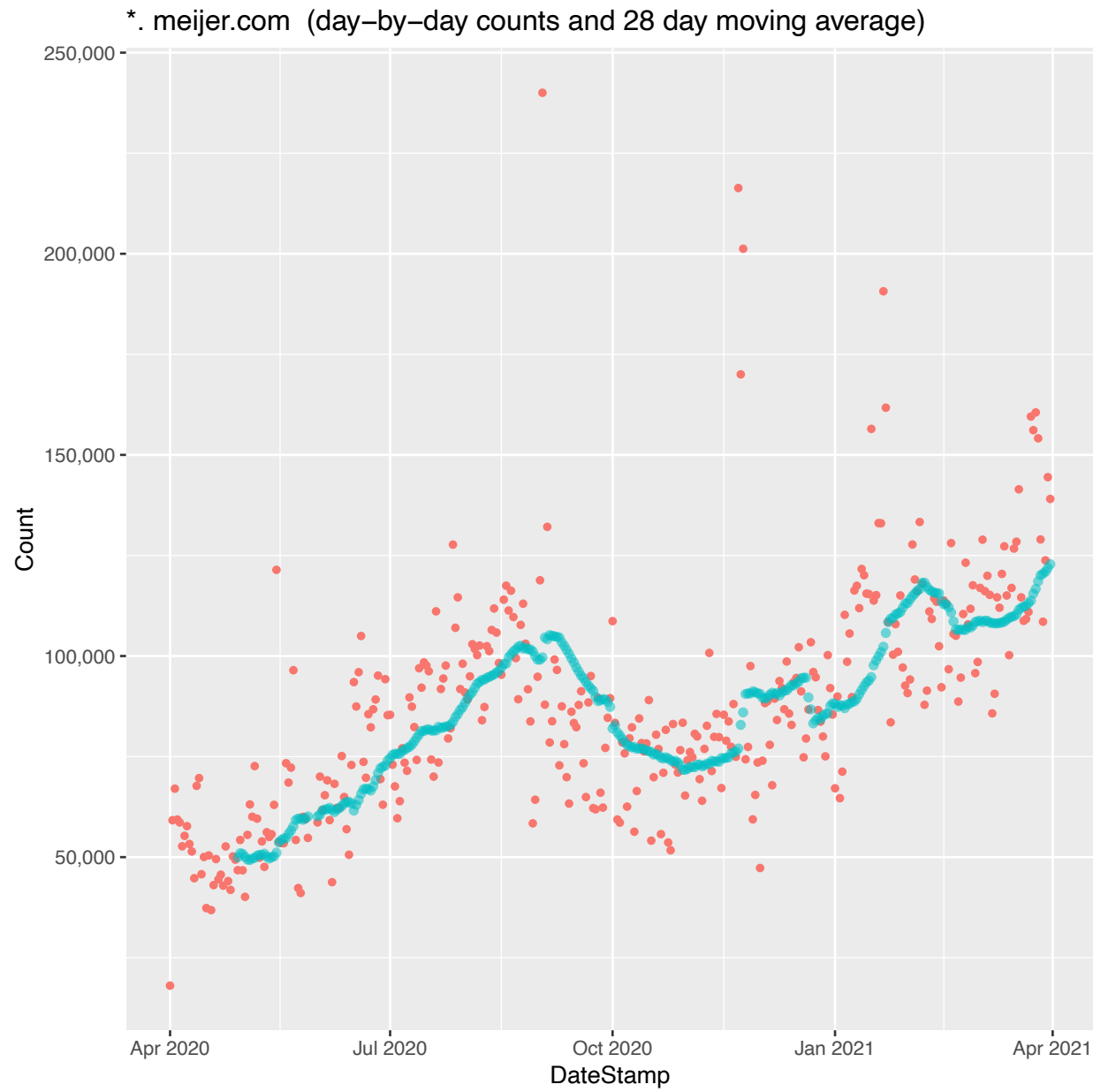


*. kroger.com (day-by-day counts and 28 day moving average)



*. kroger.com (monthly boxplots (outliers trimmed))

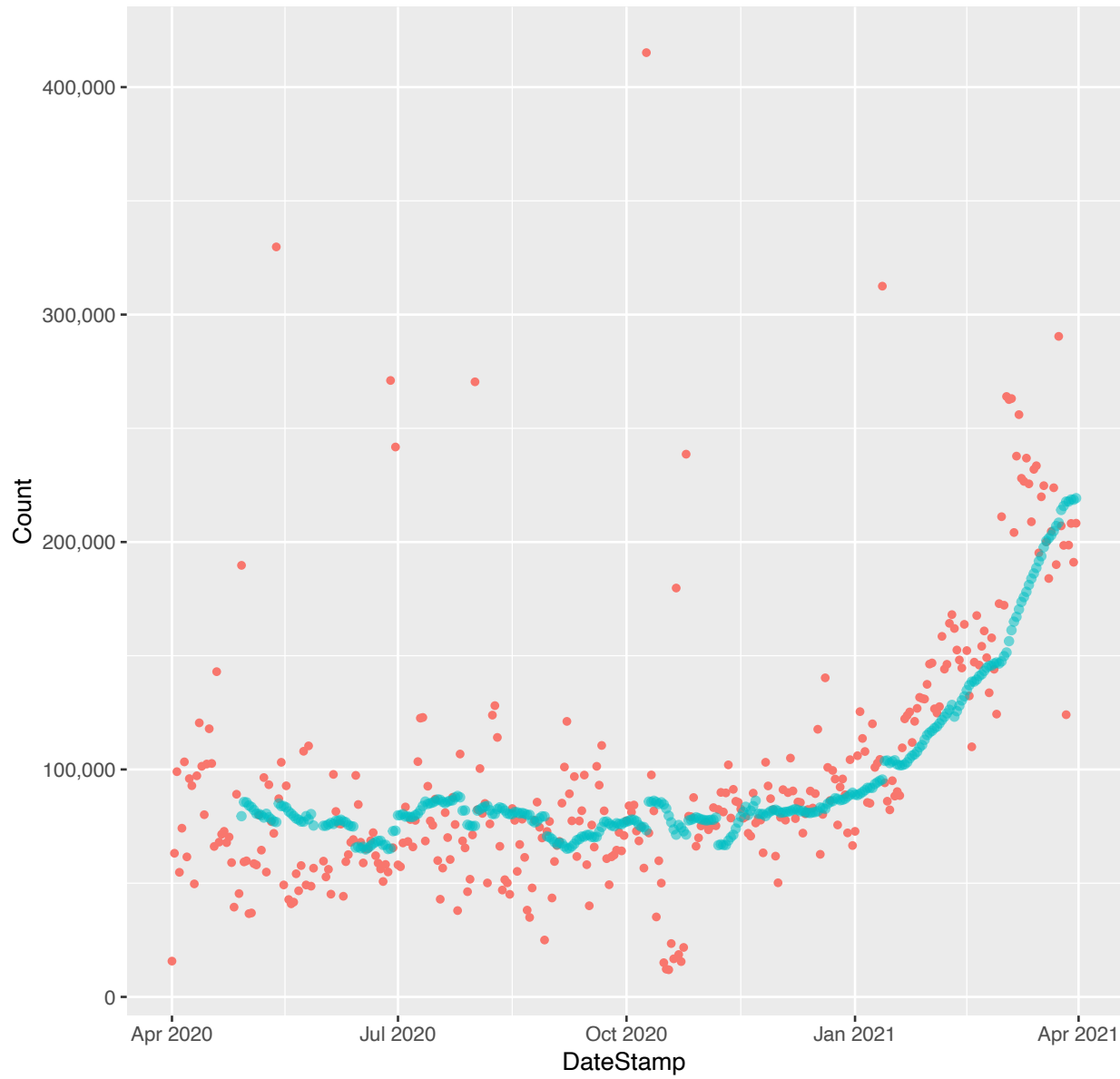




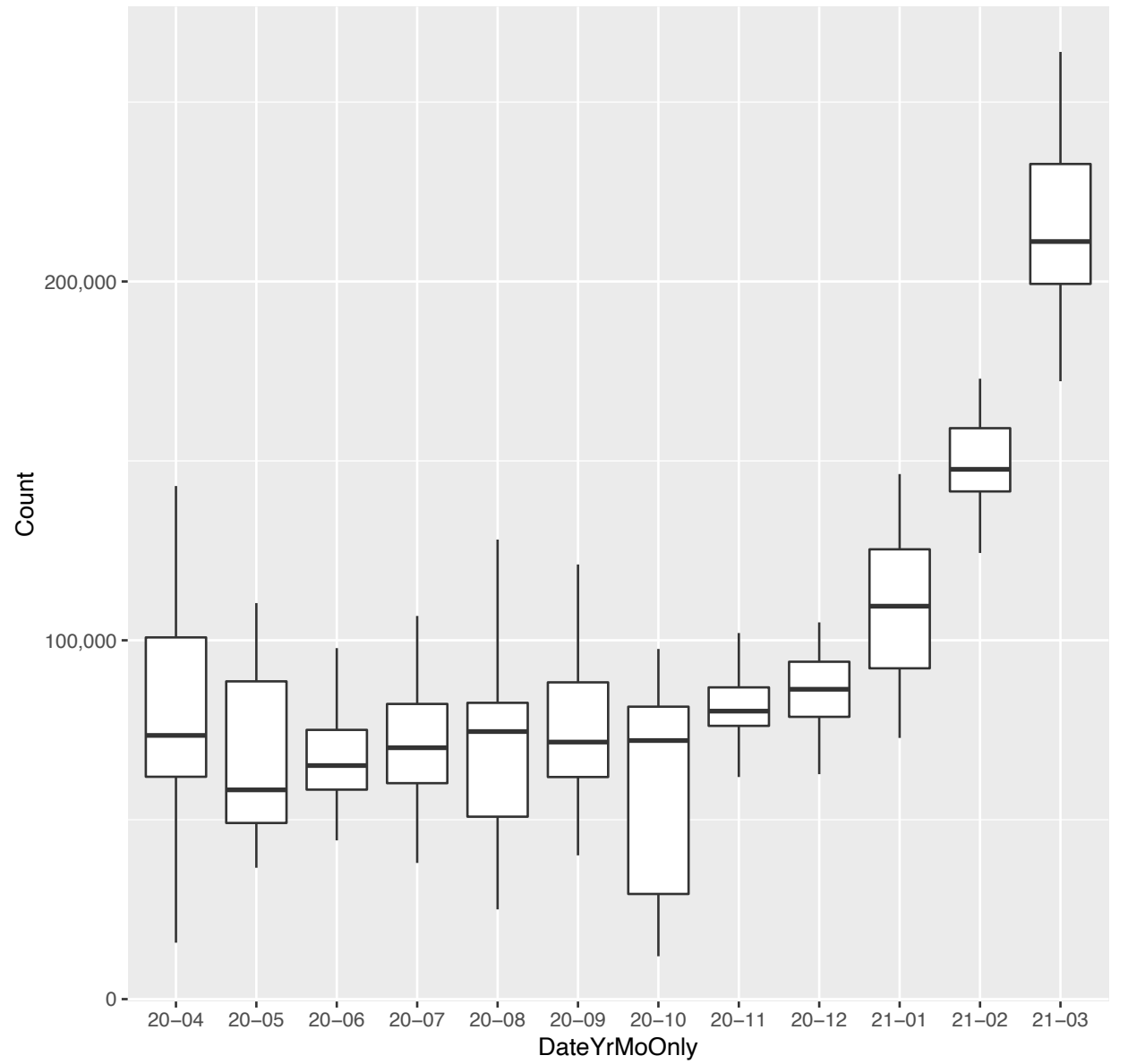
66. publix.com:



*. publix.com (day-by-day counts and 28 day moving average)

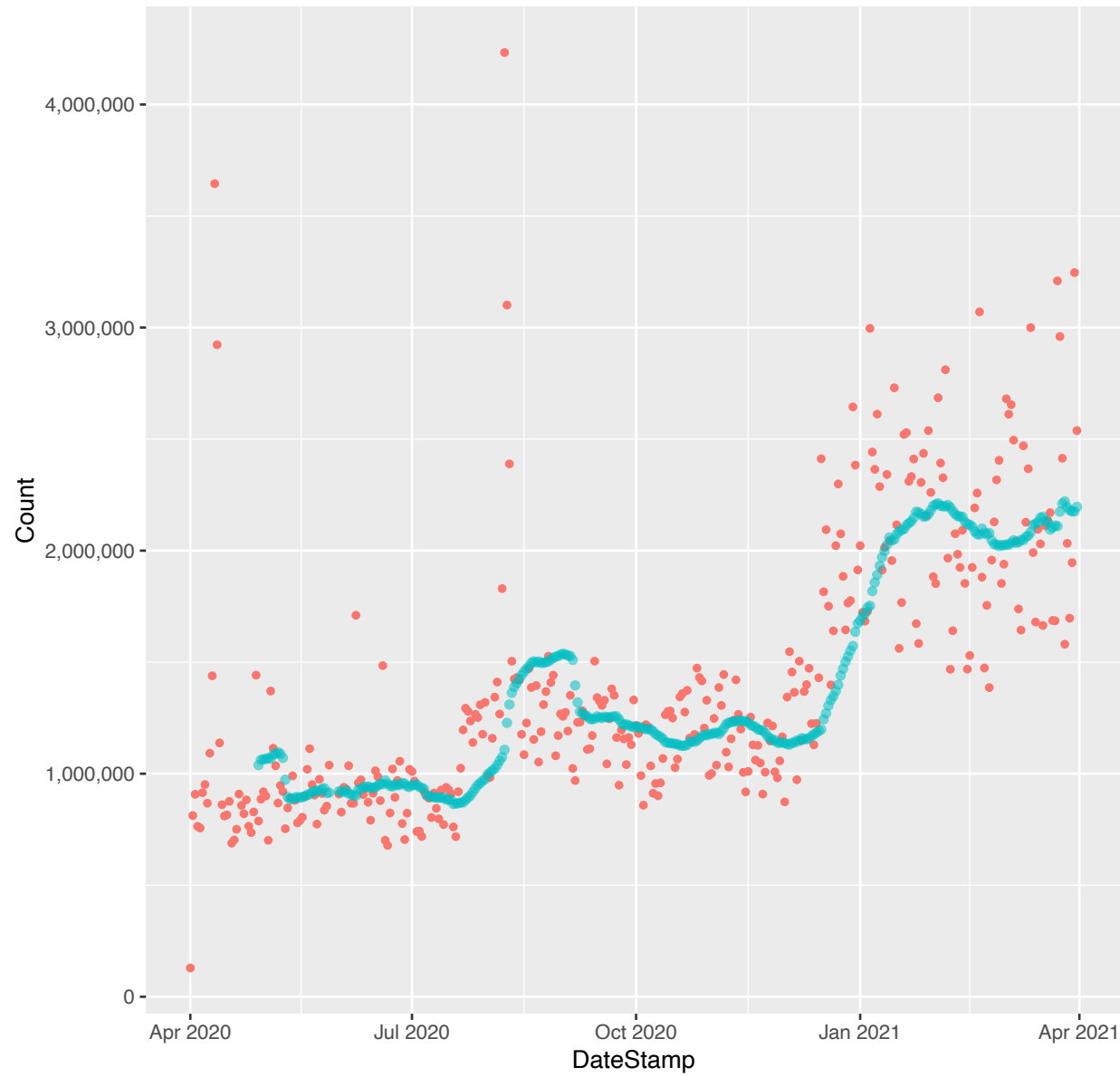


*. publix.com (monthly boxplots (outliers trimmed))

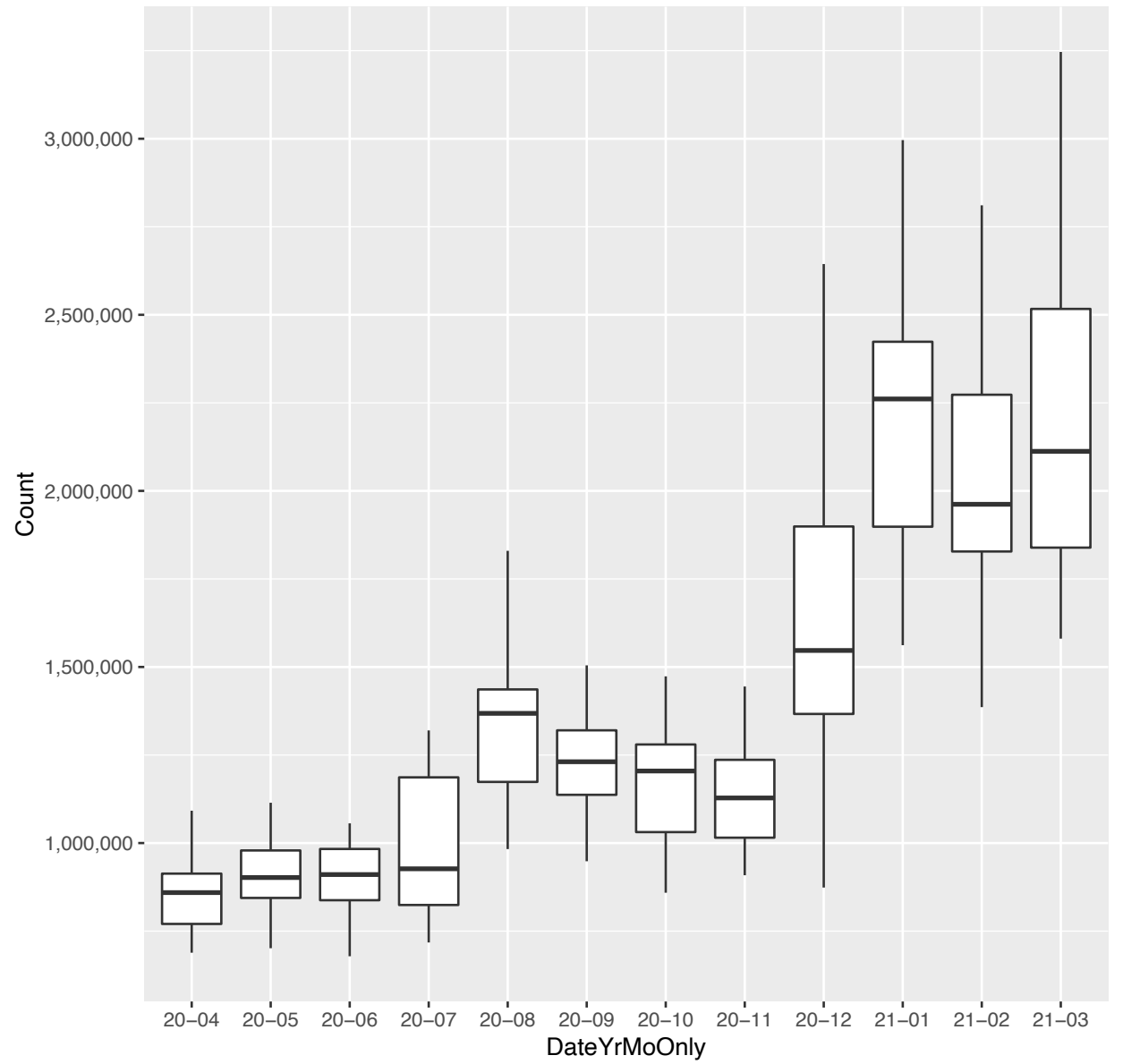




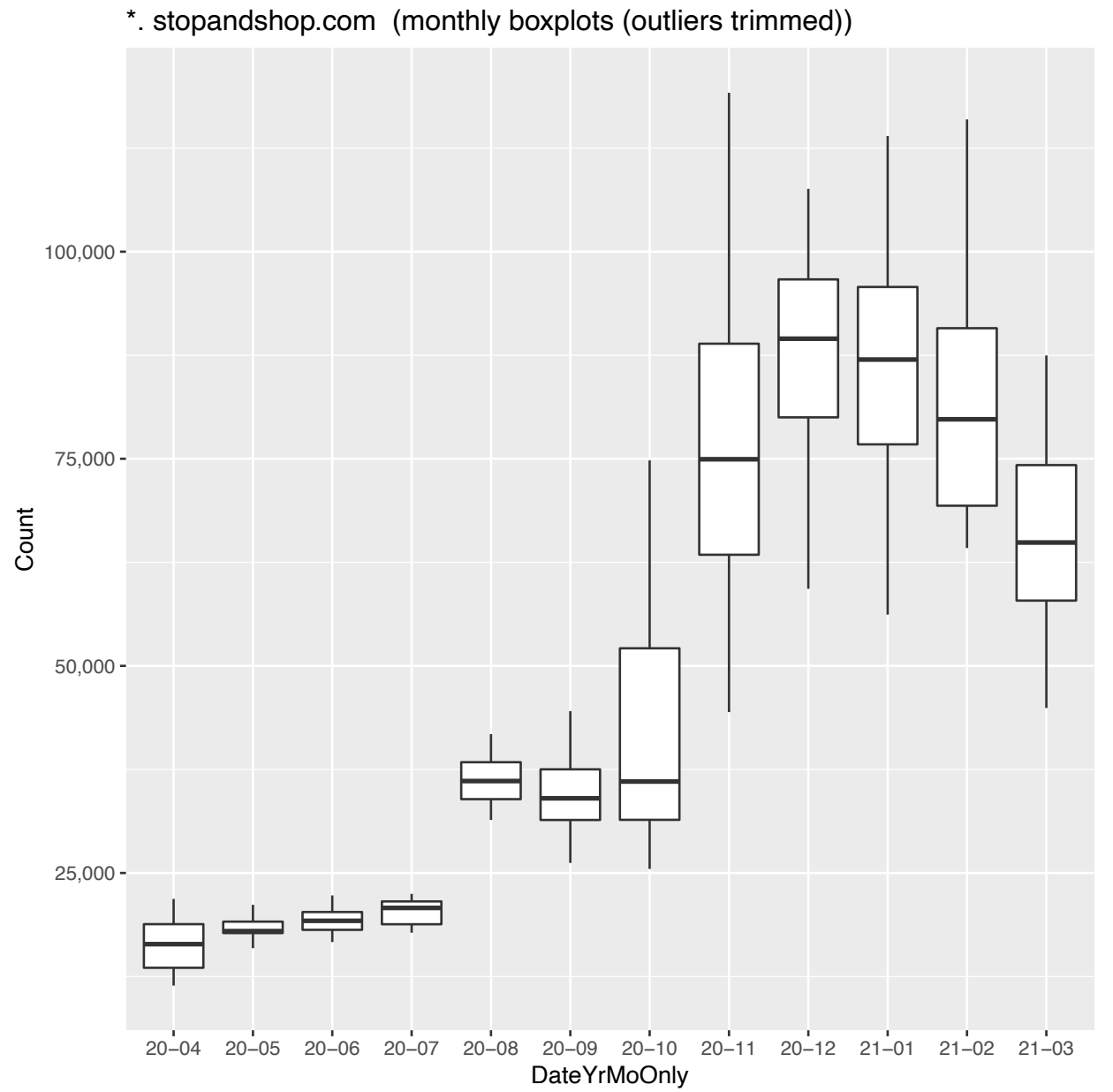
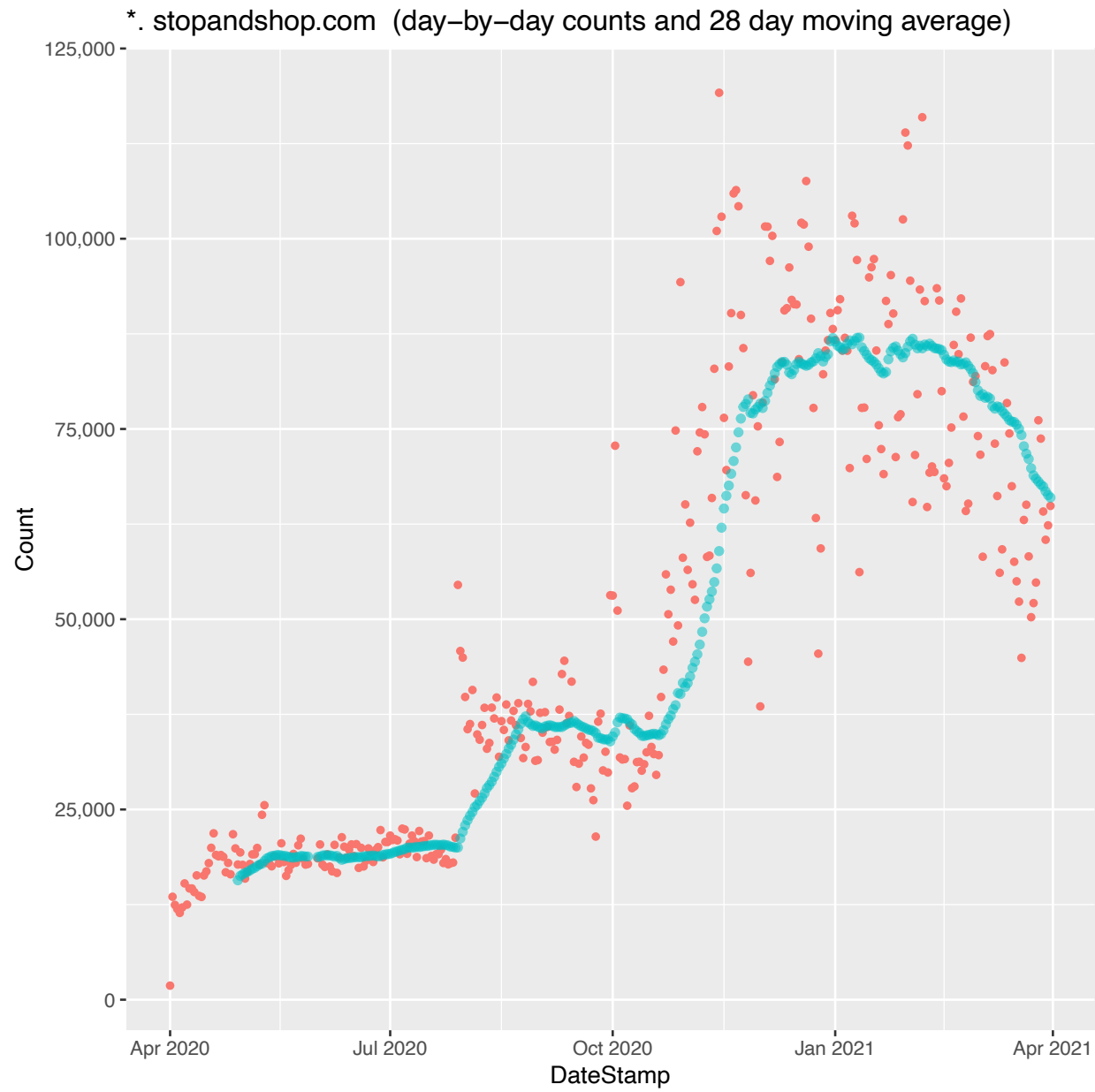
*. safeway.com (day-by-day counts and 28 day moving average)



*. safeway.com (monthly boxplots (outliers trimmed))

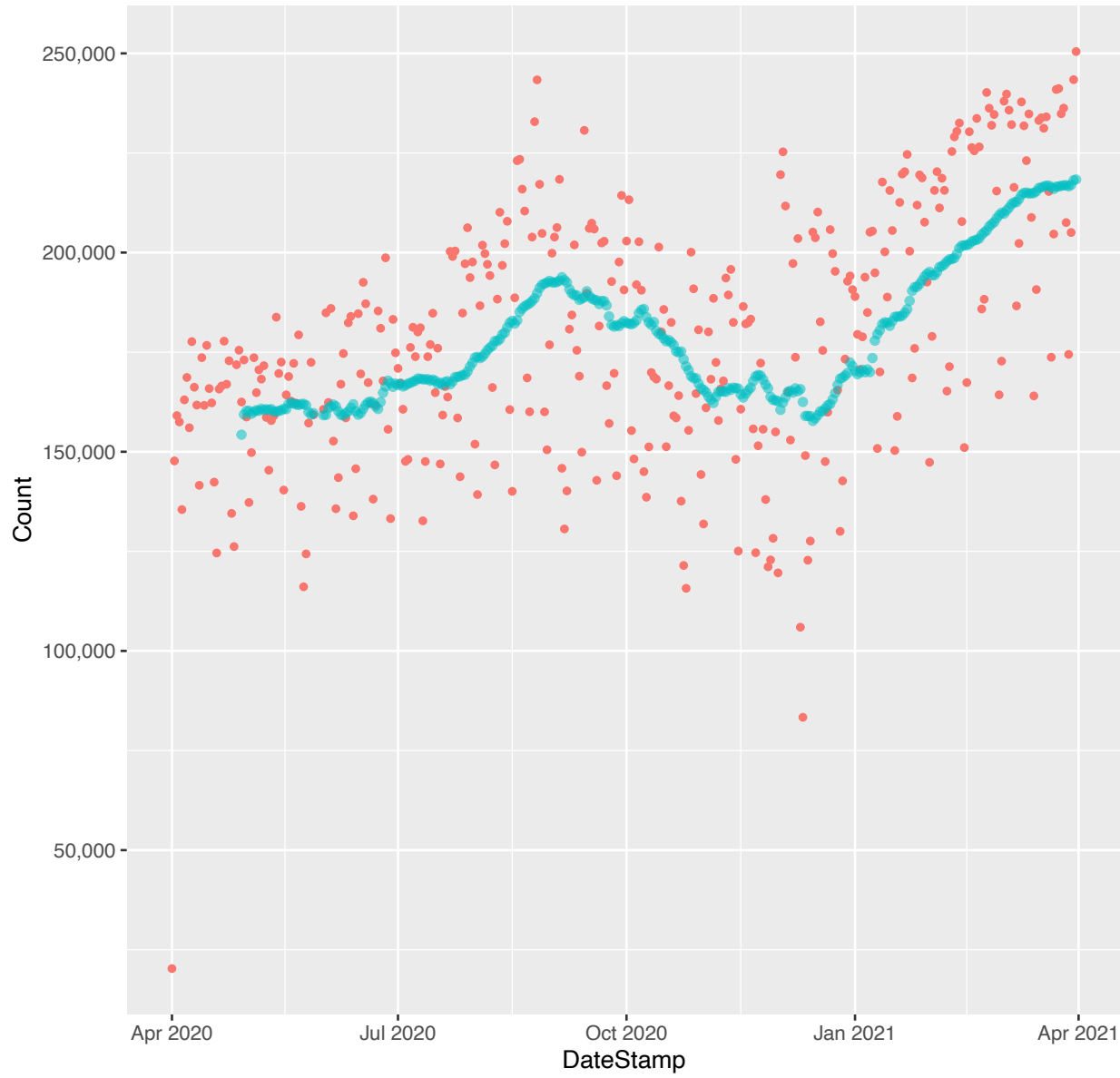


68. stopandshop.com: ☺

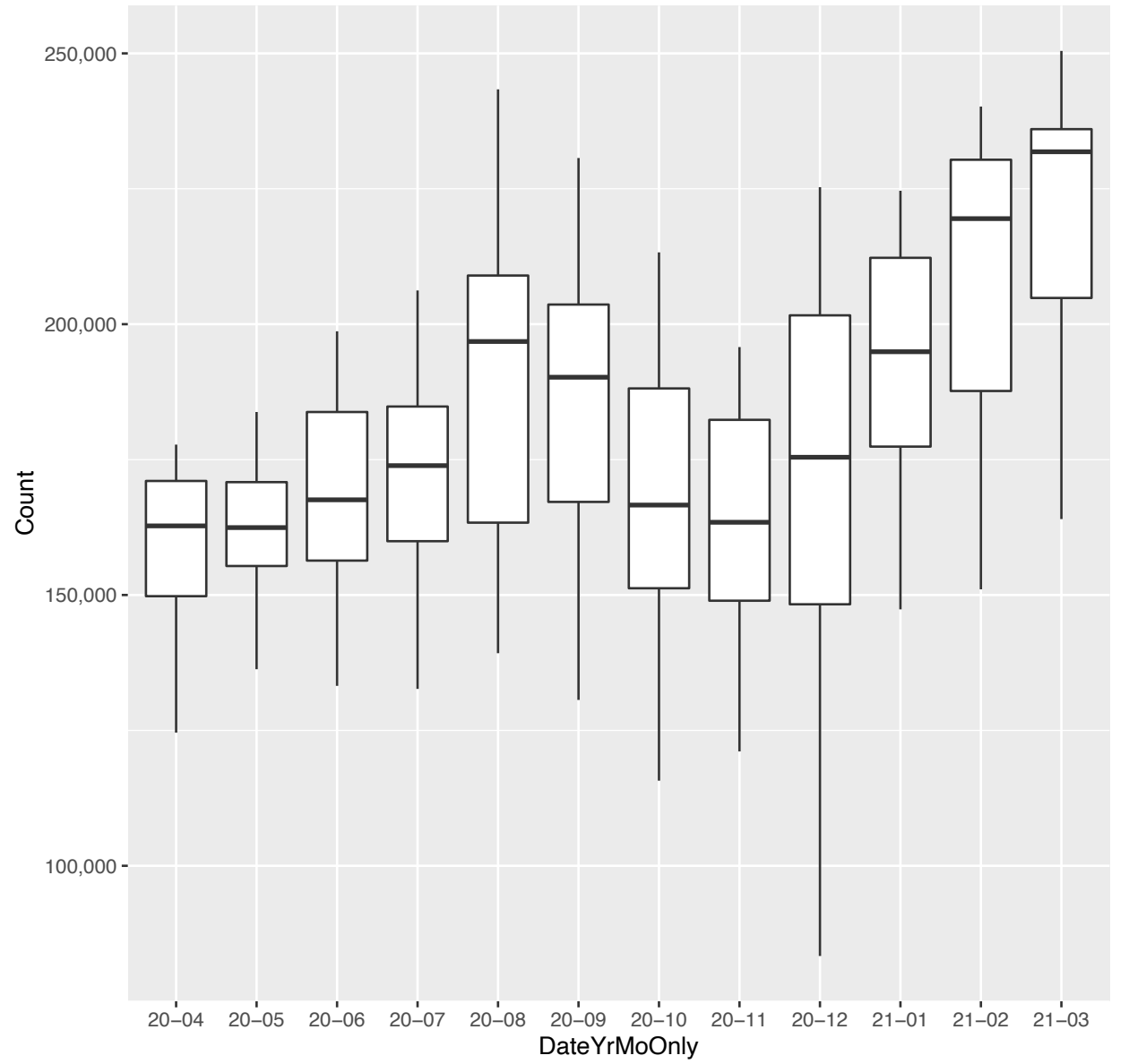


69. wegmans.com: ~

*. wegmans.com (day-by-day counts and 28 day moving average)



*. wegmans.com (monthly boxplots (outliers trimmed))



j) Home Improvements

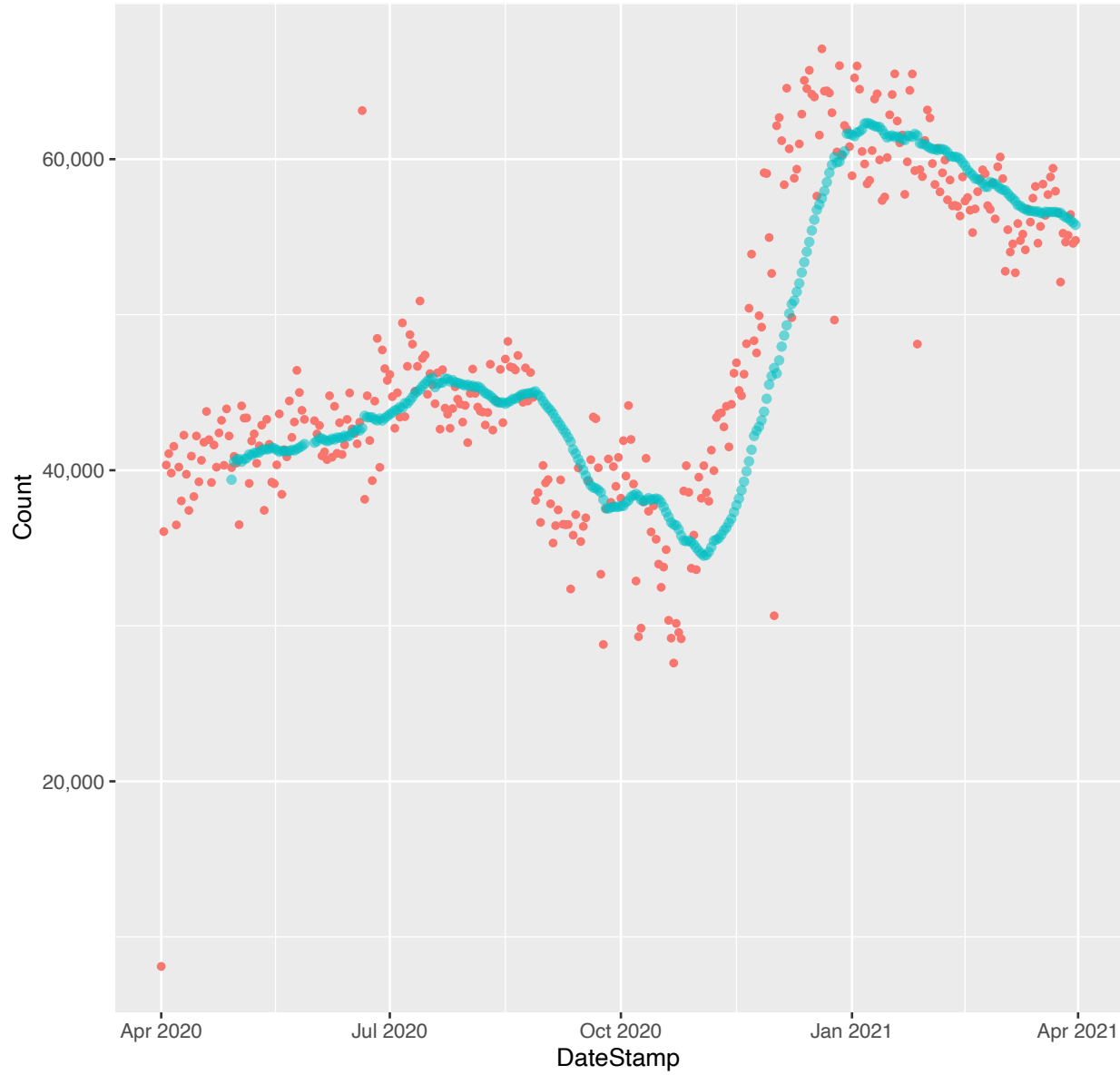
[\[back to Retail Sites\]](#)

[\[back to TOC\]](#)

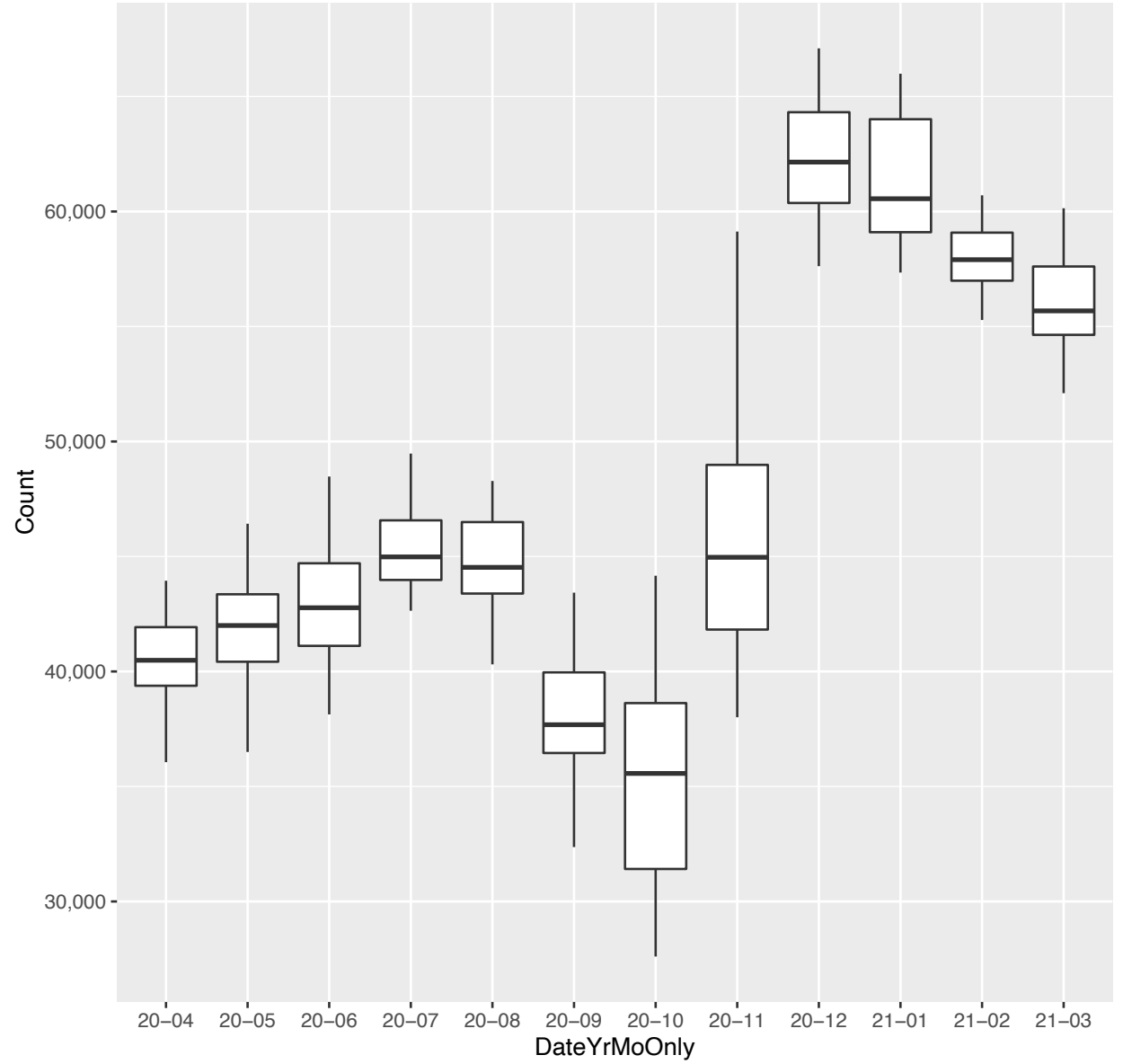
70	*.bedbathandbeyond.com		~	
71	*.crateandbarrel.com	✱	➔	
72	*.homedepot.com	✱	~	M
73	*.ikea.com	✱	~	
74	*.lowes.com	✱	~	
75	*.midea.com	✱	~	
76	*.wayfair.com	✱	~	

70. bedbathandbeyond.com: ~

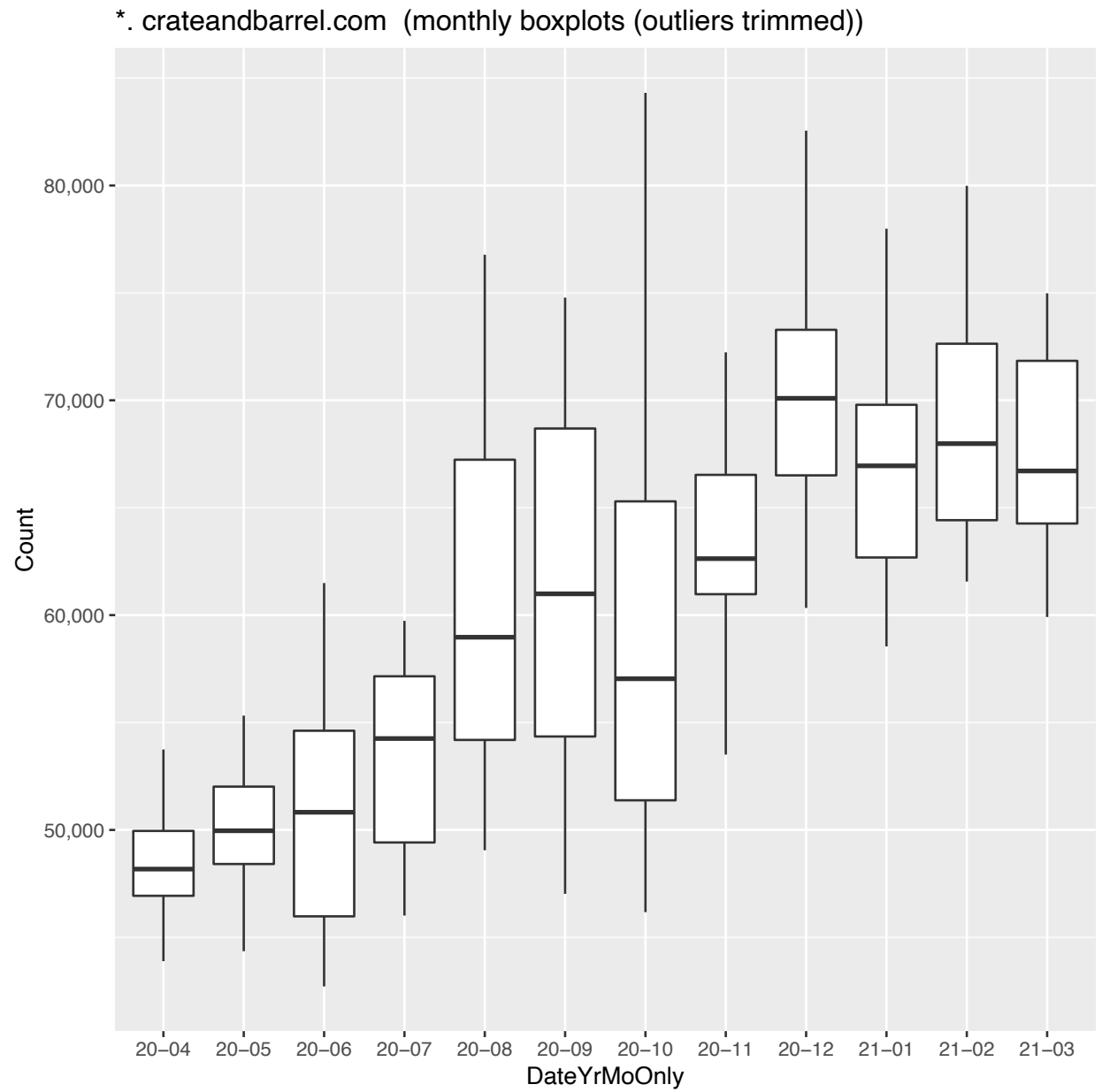
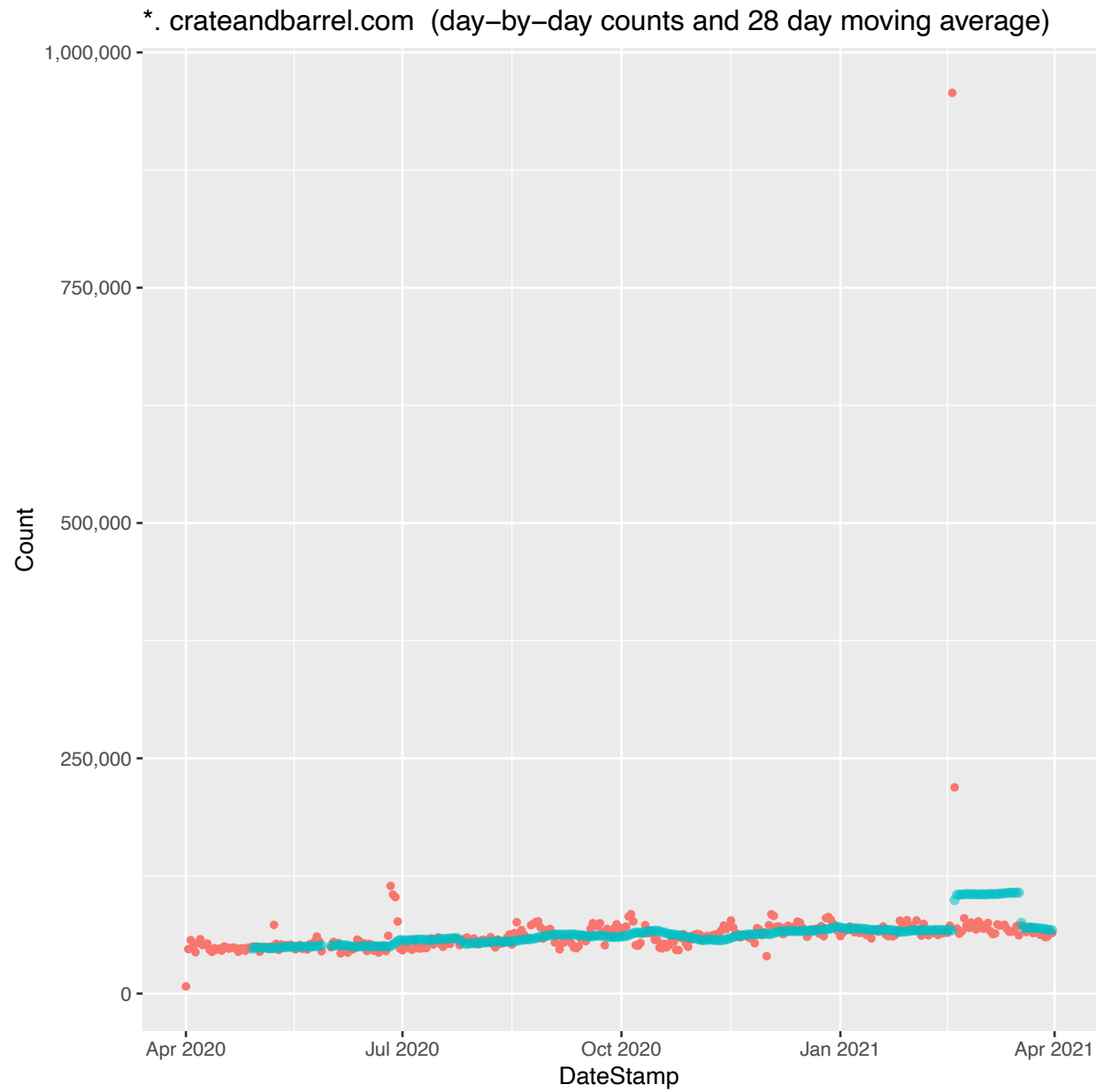
*. bedbathandbeyond.com (day-by-day counts and 28 day moving average)



*. bedbathandbeyond.com (monthly boxplots (outliers trimmed))



71. crateandbarrel.com:

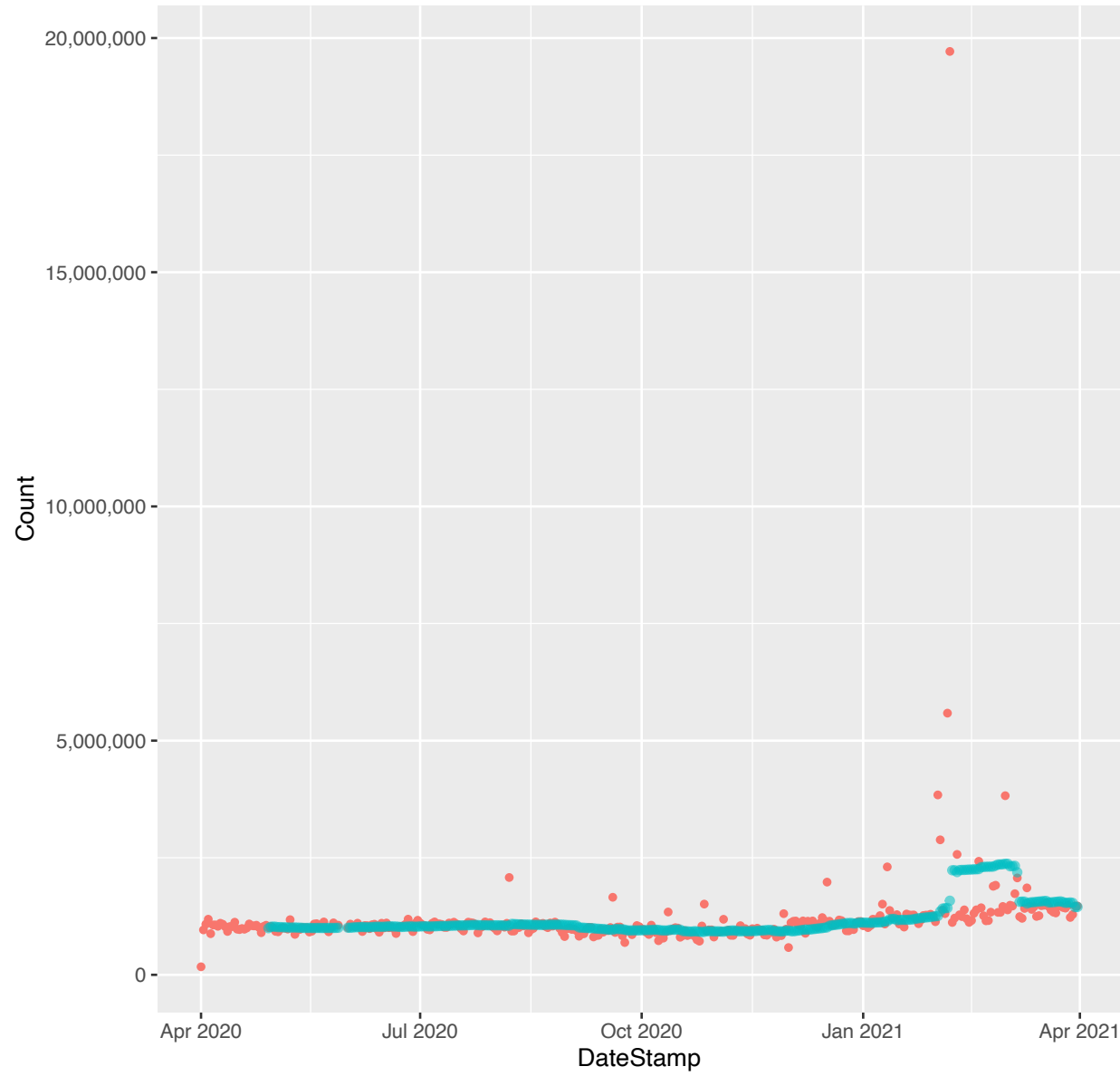


72. homedepot.com:

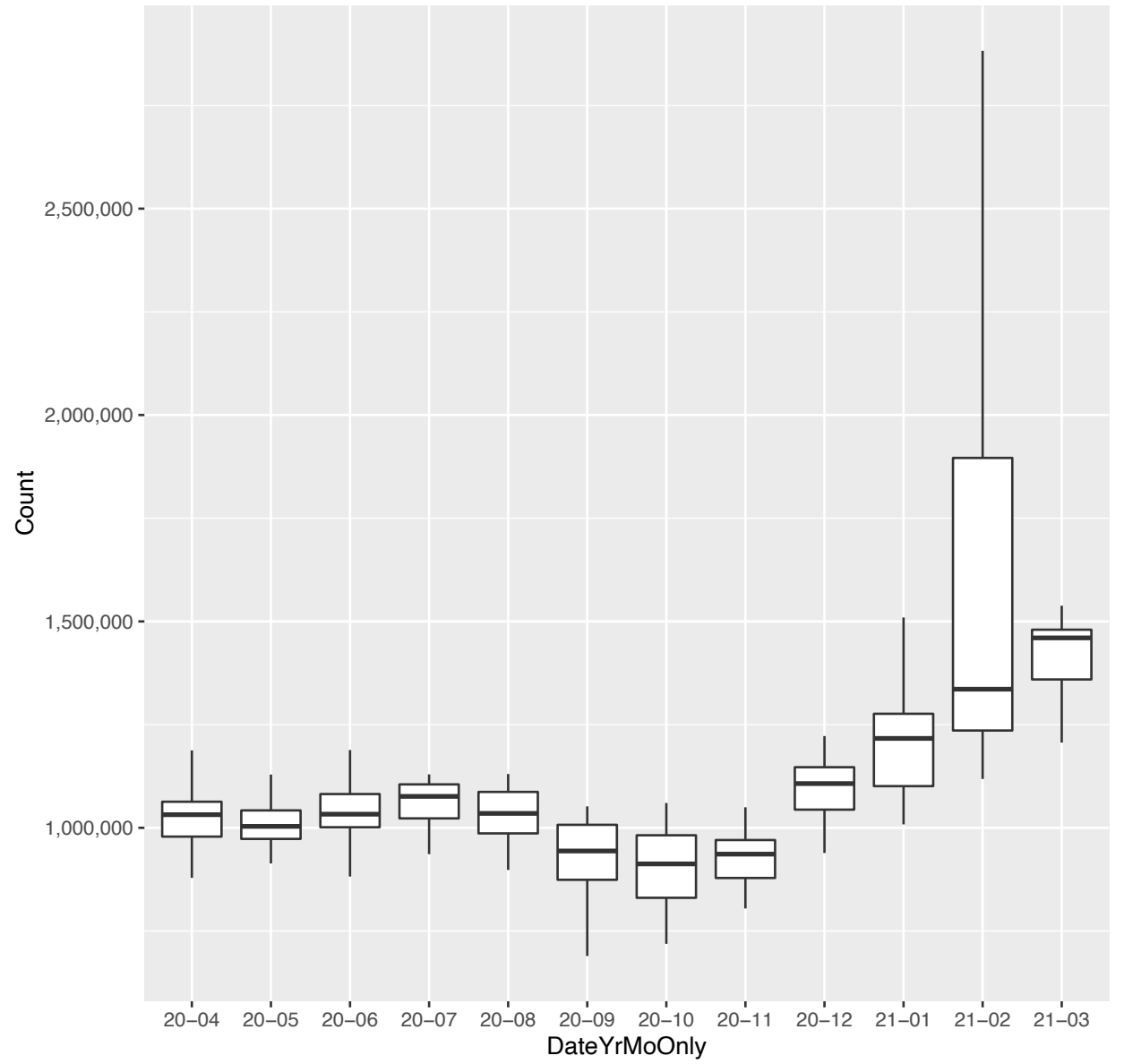


M

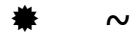
*. homedepot.com (day-by-day counts and 28 day moving average)



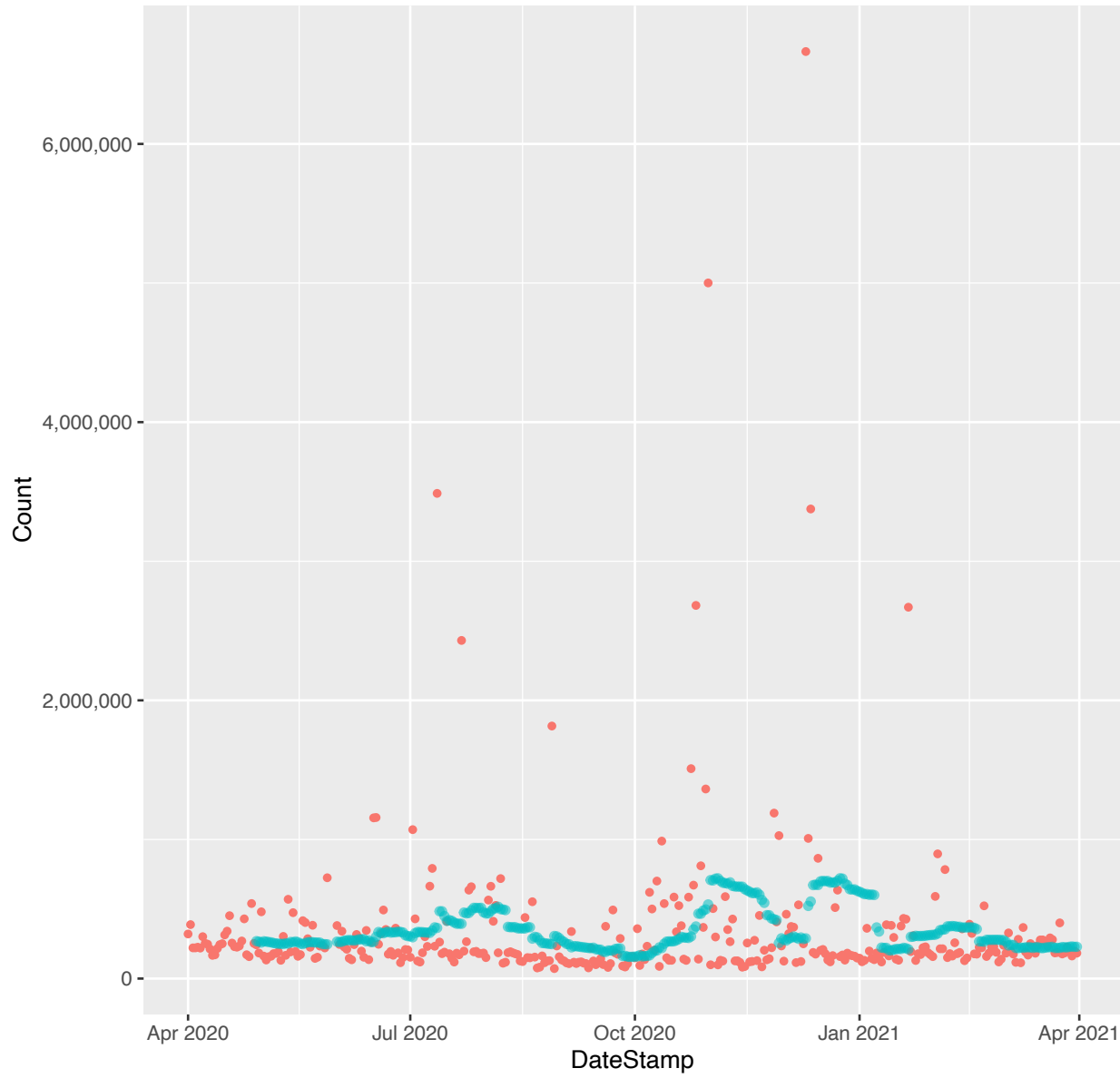
*. homedepot.com (monthly boxplots (outliers trimmed))



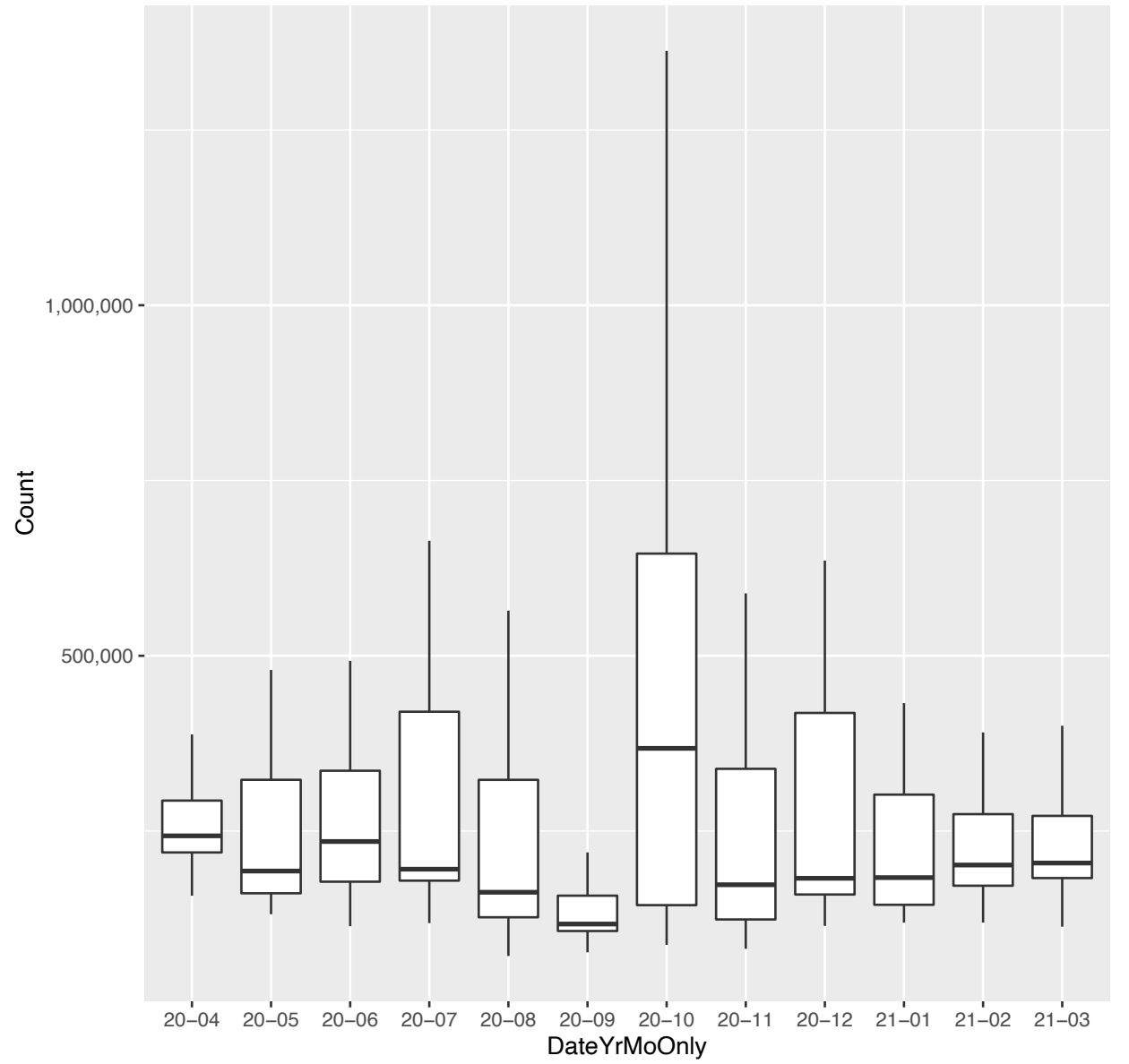
73. ikea.com:



*. ikea.com (day-by-day counts and 28 day moving average)



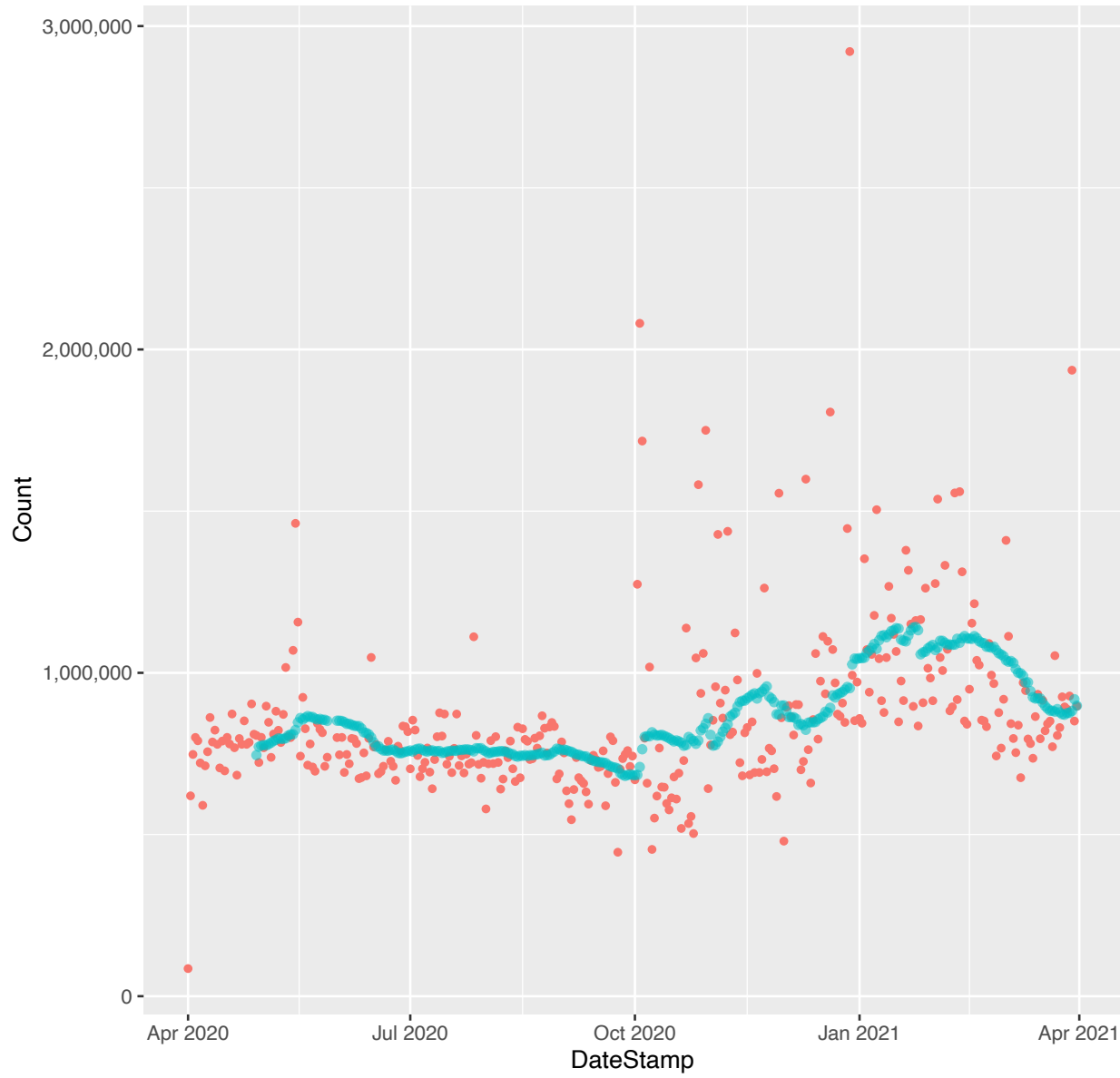
*. ikea.com (monthly boxplots (outliers trimmed))



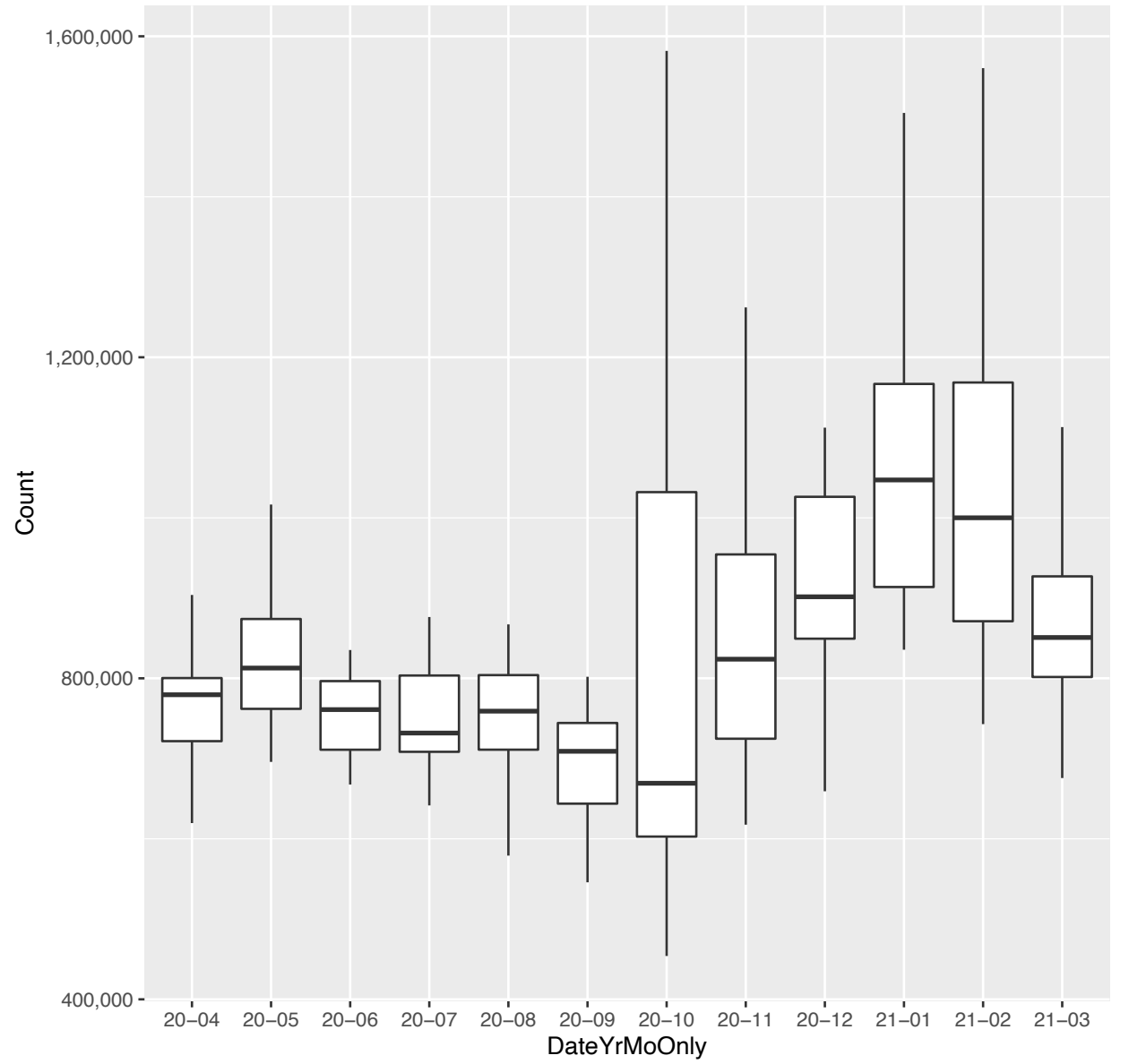
74. lowes.com:



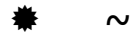
*. lowes.com (day-by-day counts and 28 day moving average)



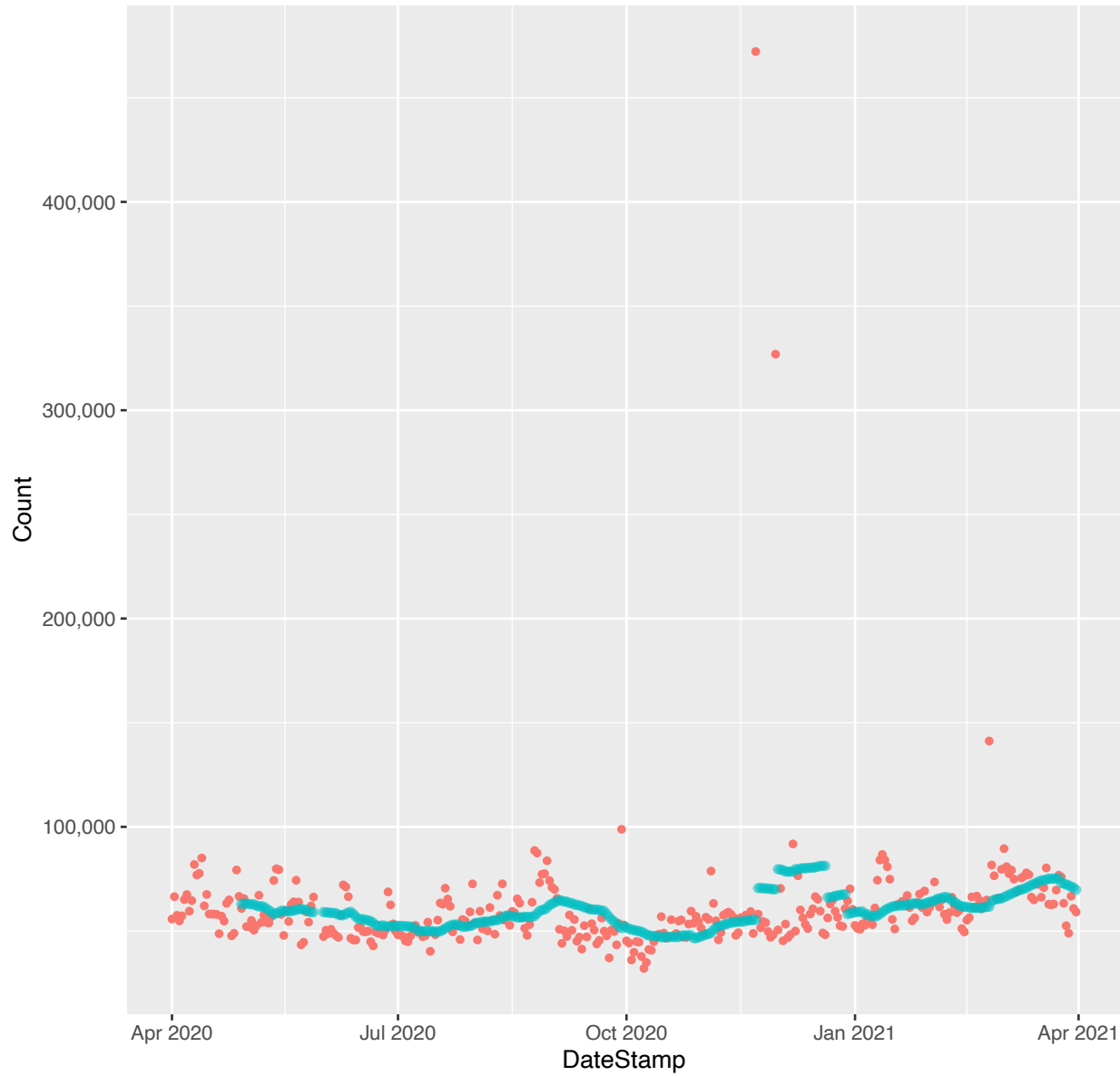
*. lowes.com (monthly boxplots (outliers trimmed))



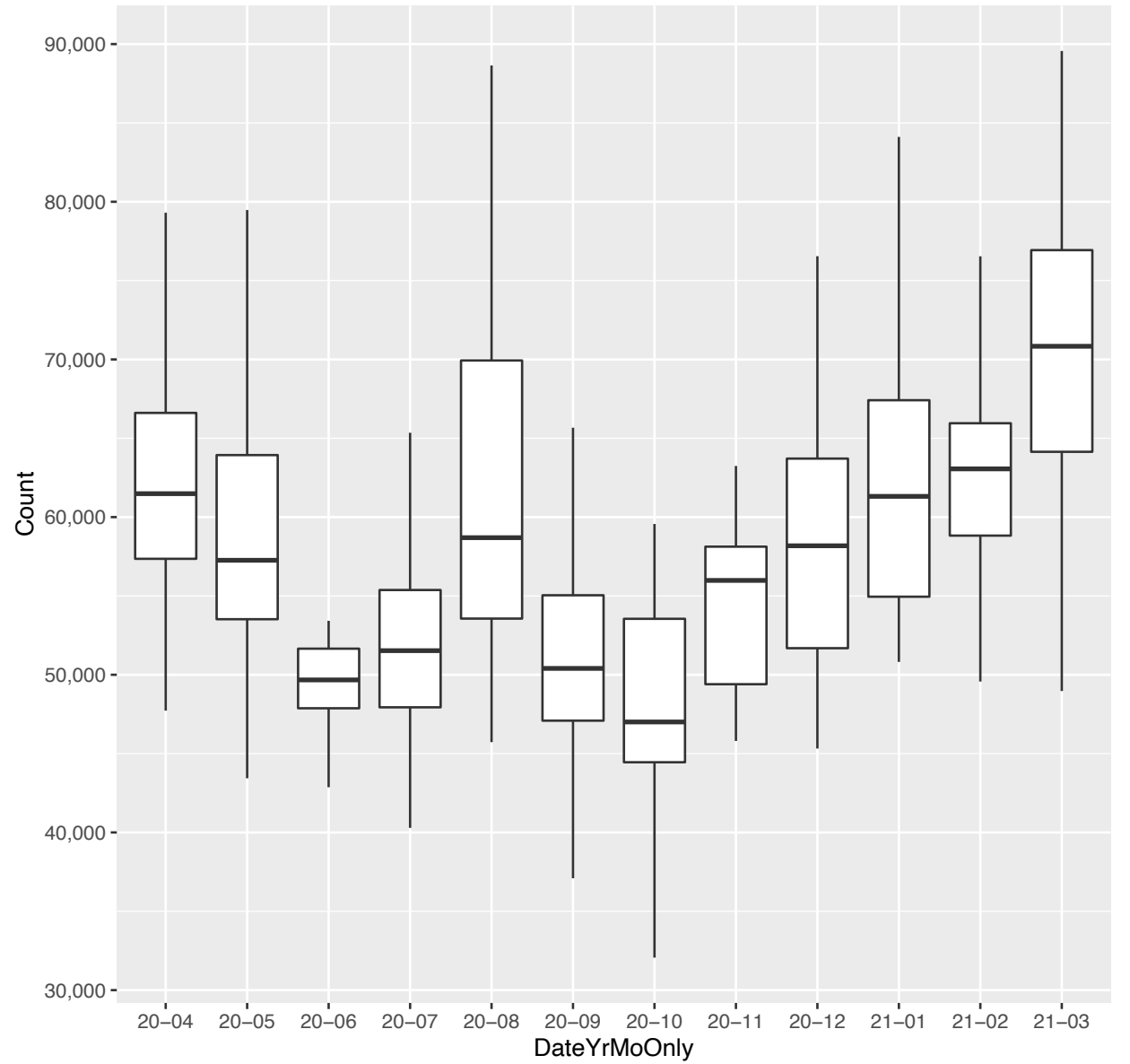
75. midea.com:



*. midea.com (day-by-day counts and 28 day moving average)



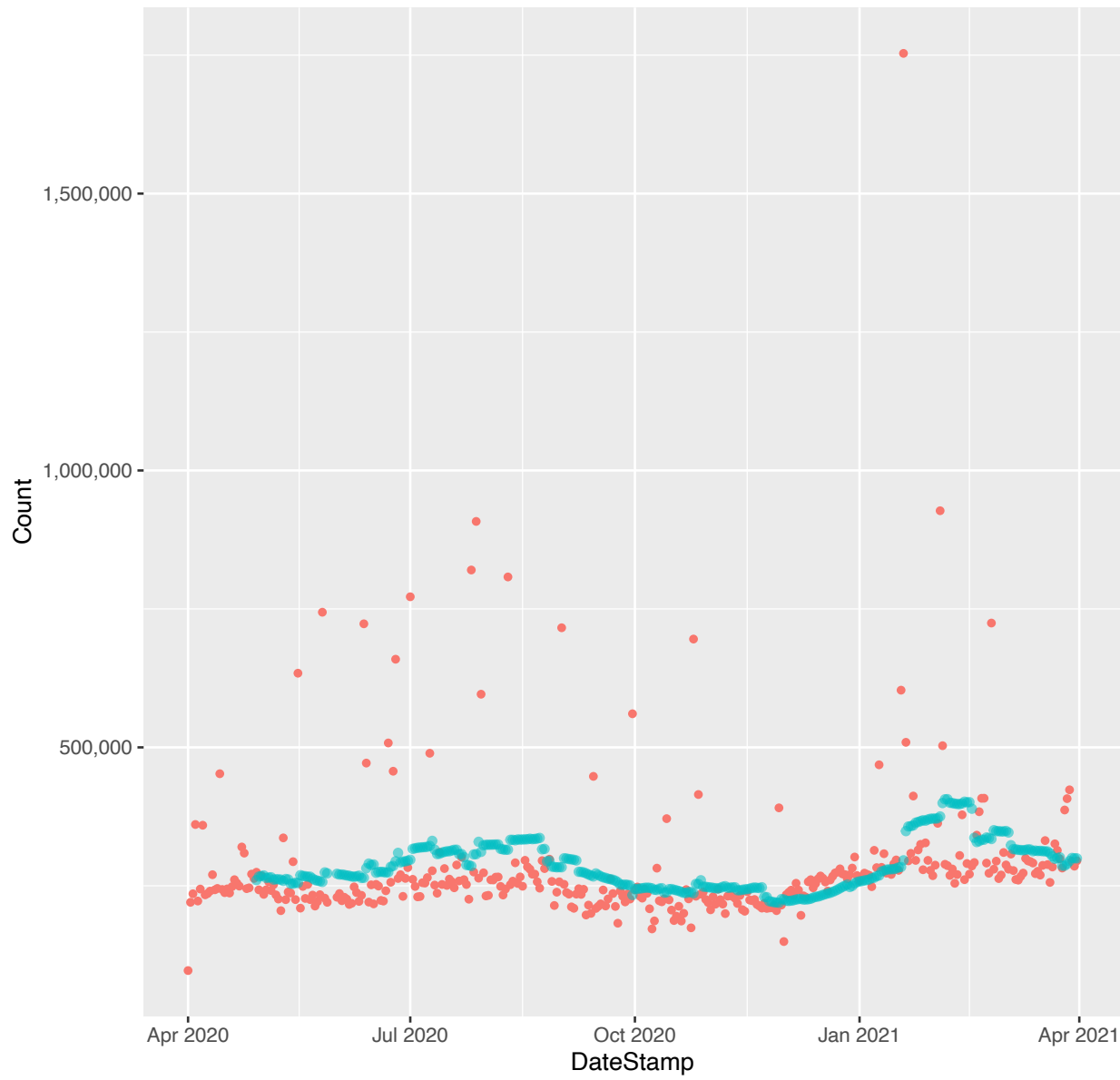
*. midea.com (monthly boxplots (outliers trimmed))



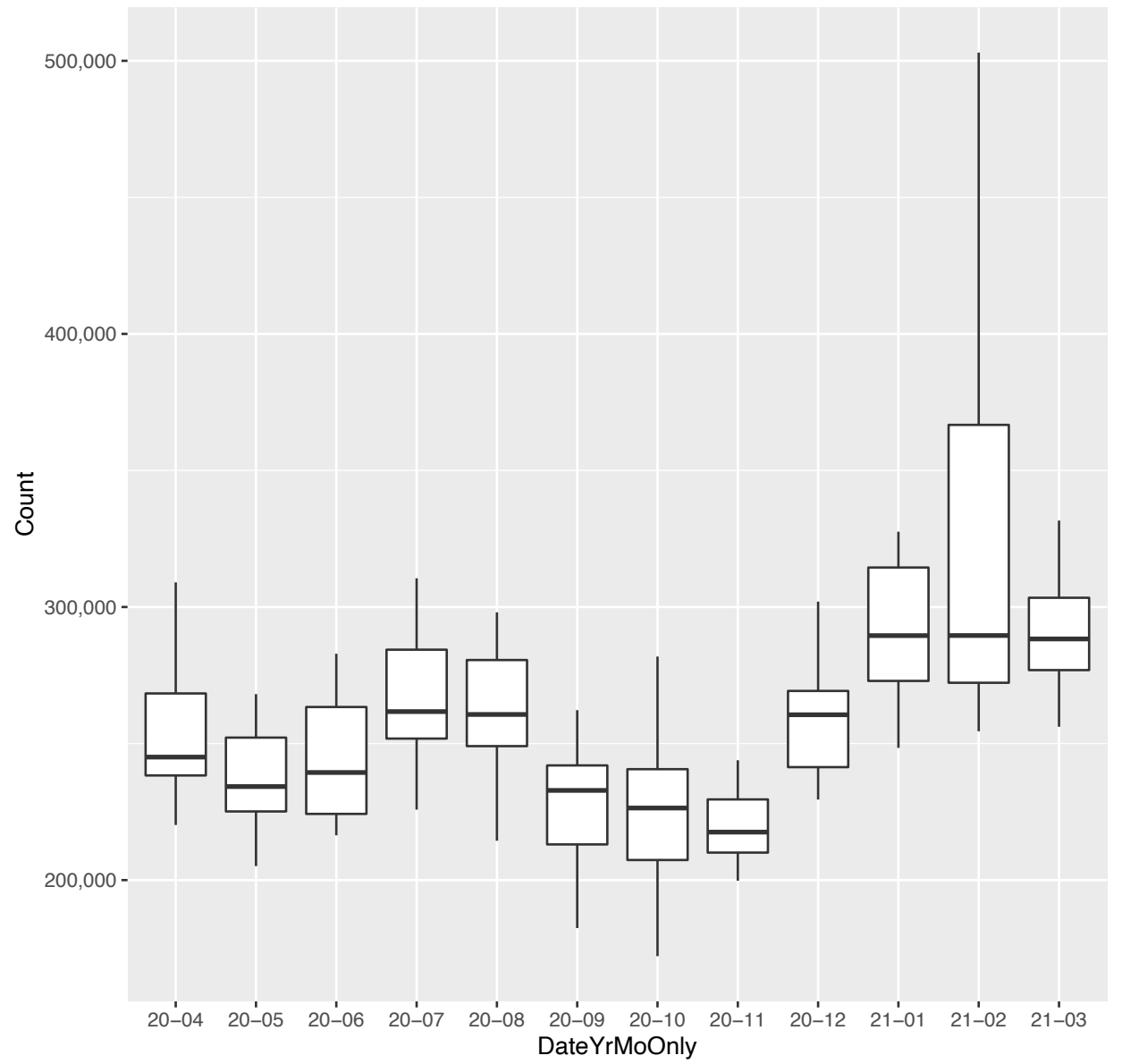
76. wayfair.com:



*. wayfair.com (day-by-day counts and 28 day moving average)



*. wayfair.com (monthly boxplots (outliers trimmed))



k) Online Retailers

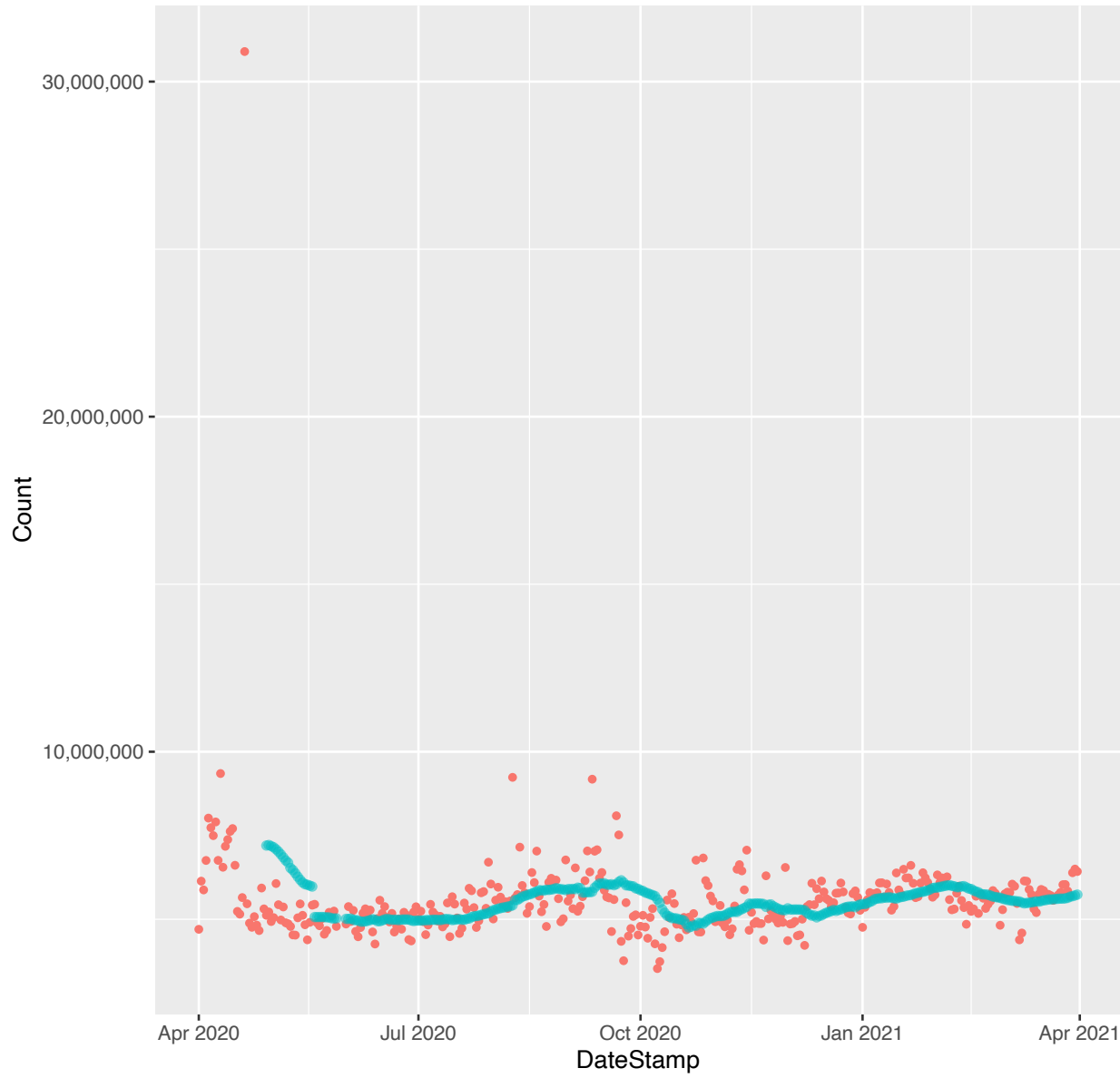
[\[back to Retail Sites\]](#)

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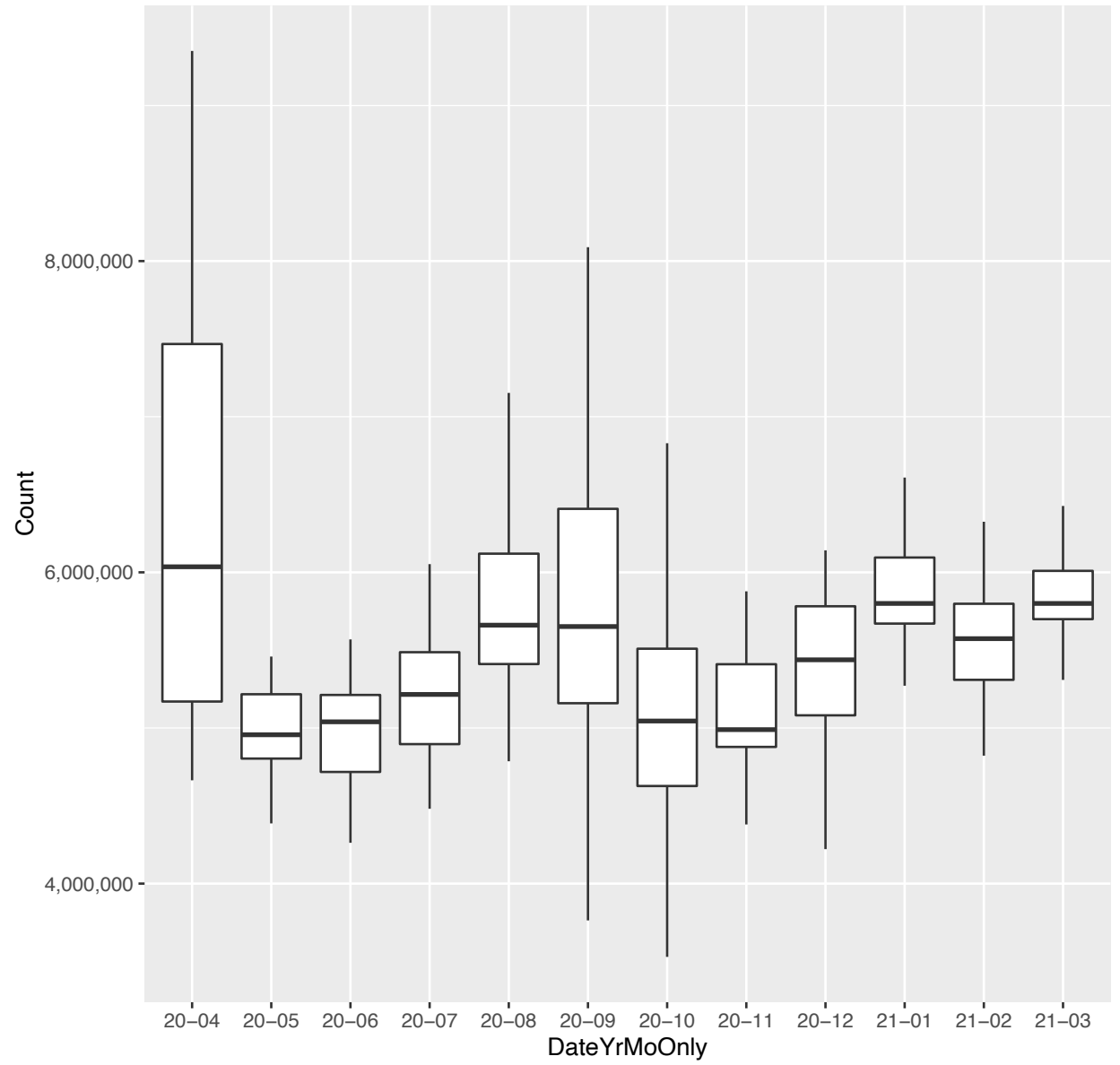
77 *.aliexpress.com	✱	~	M
78 *.amazon.com	✱	~	MM
79 *.ebay.com	✱	↗	MM
80 *.etsy.com	✱	↘	
81 *.flipkart.com	✱	~	
82 *.overstock.com	✱	~	
83 *.qvc.com		∪ shaped (ending lower)	
84 *.wish.com		~	M



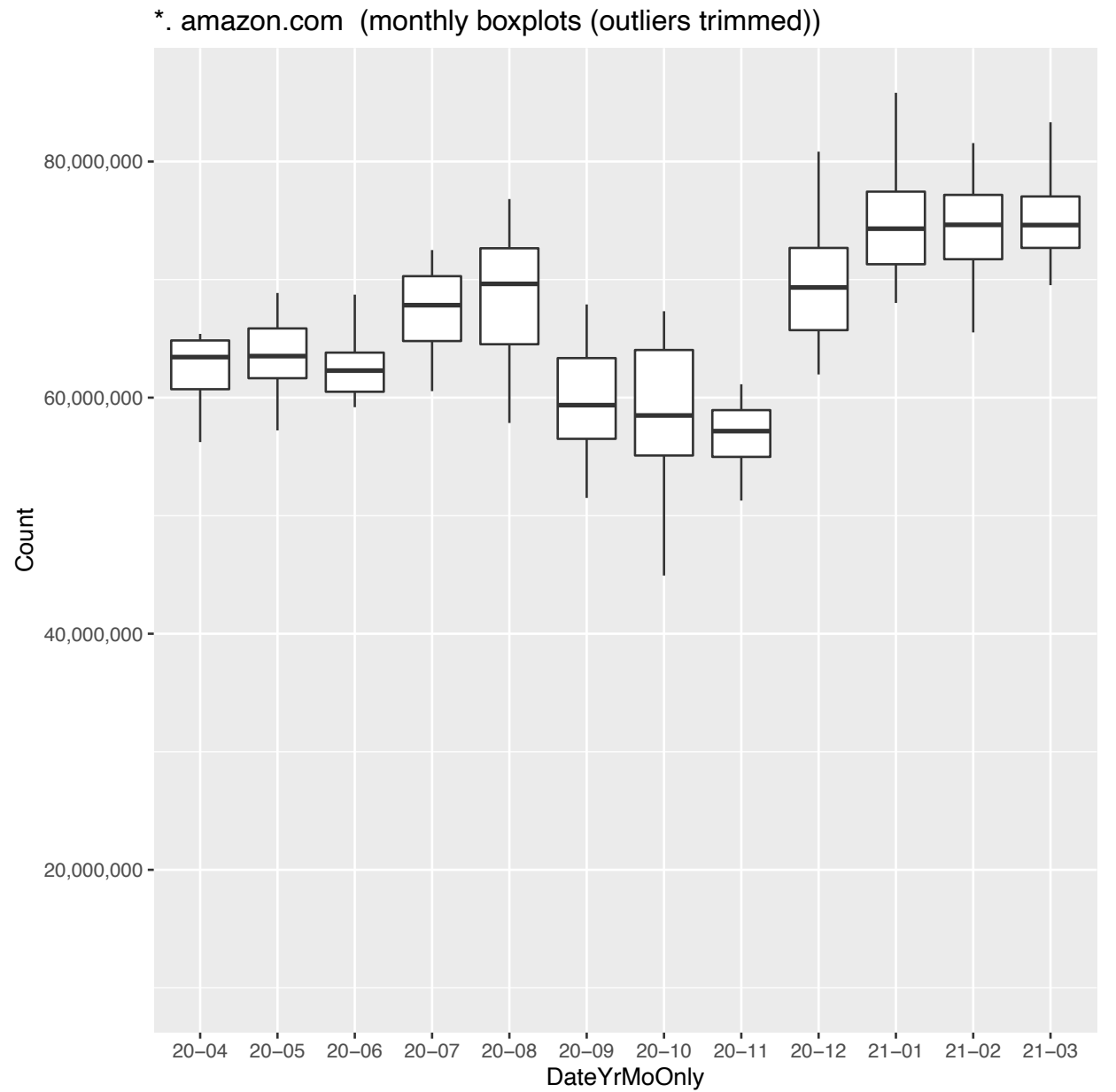
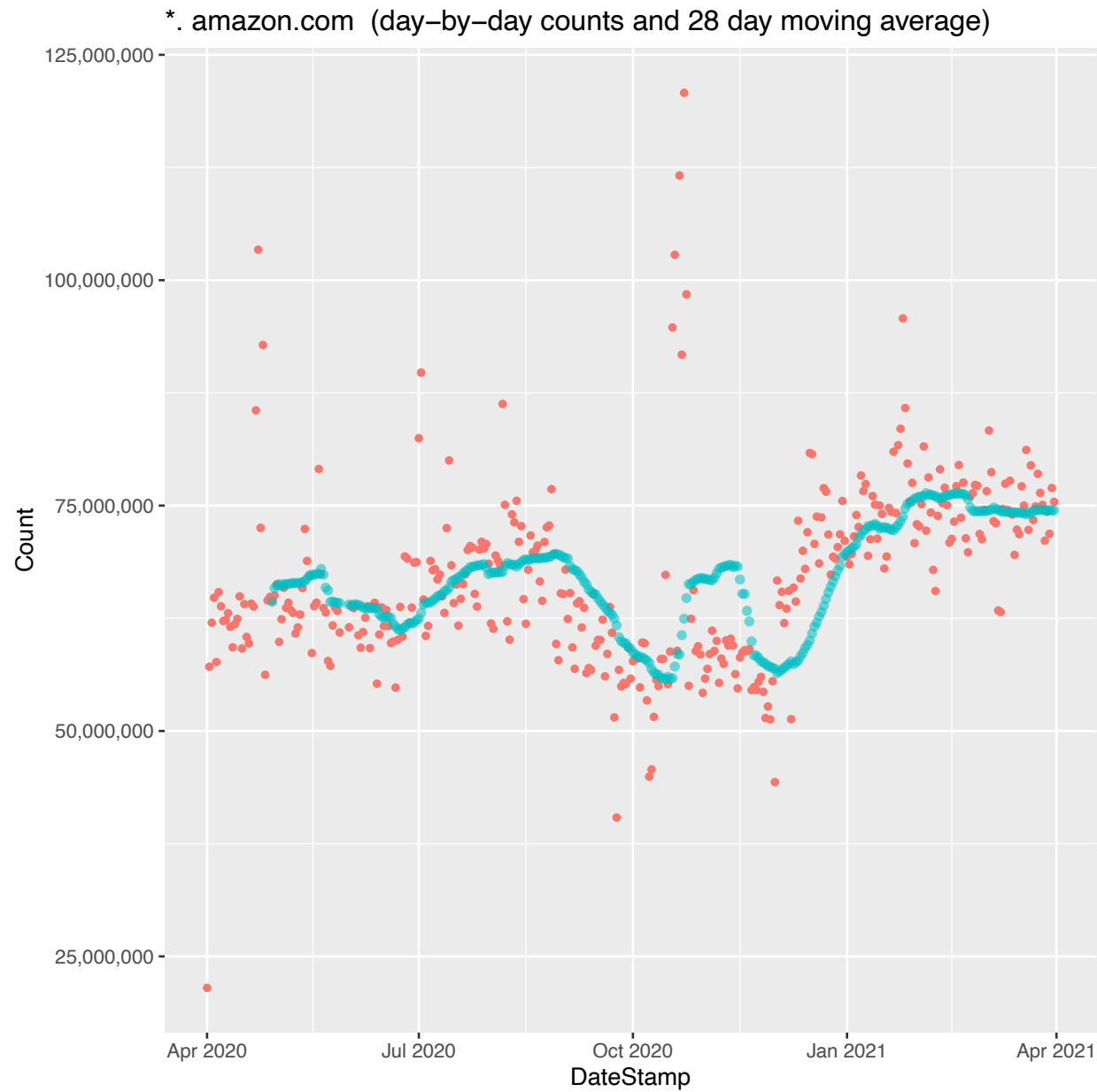
*. aliexpress.com (day-by-day counts and 28 day moving average)



*. aliexpress.com (monthly boxplots (outliers trimmed))



78. amazon.com: * ~ MM

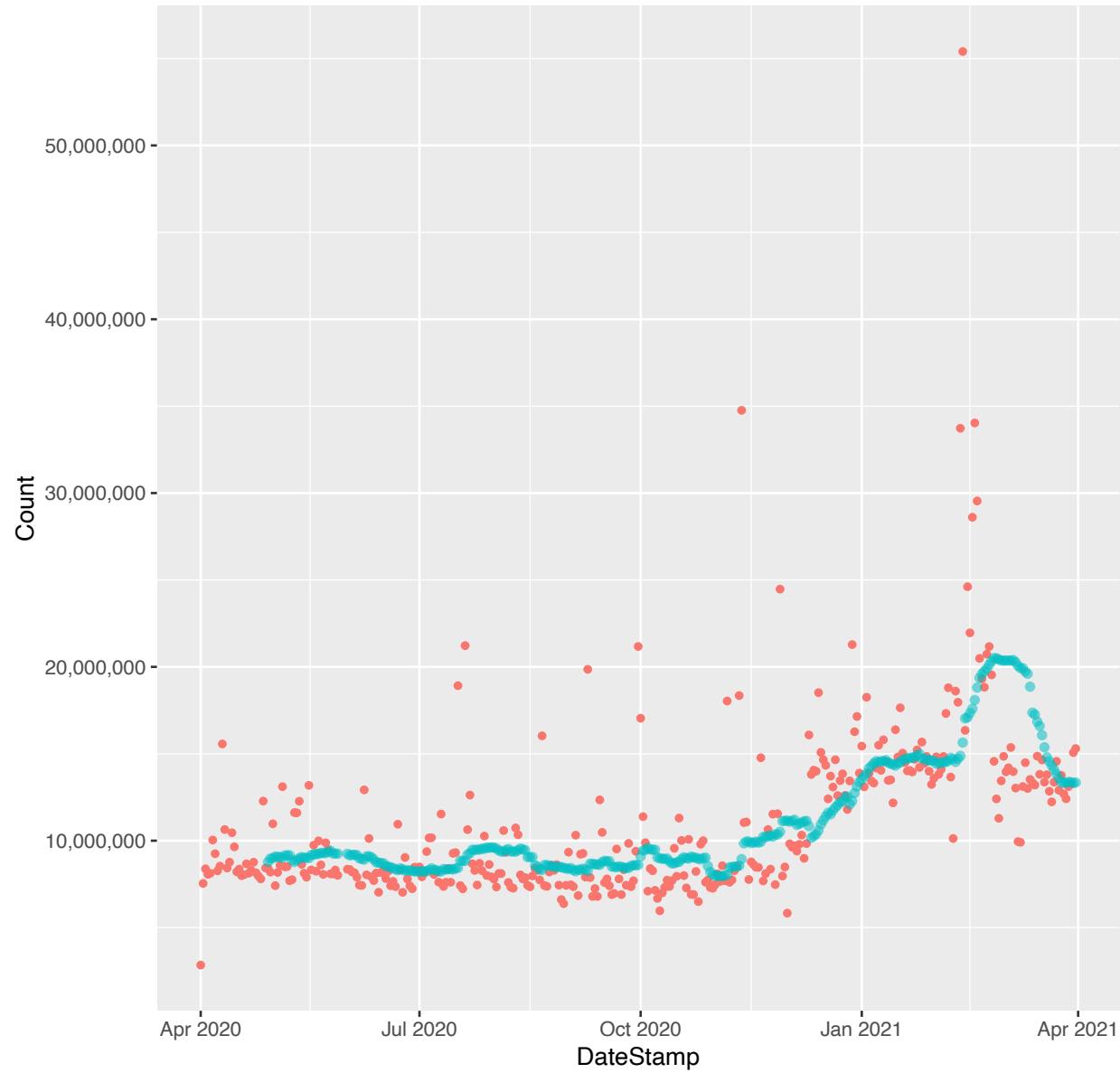


79. ebay.com:

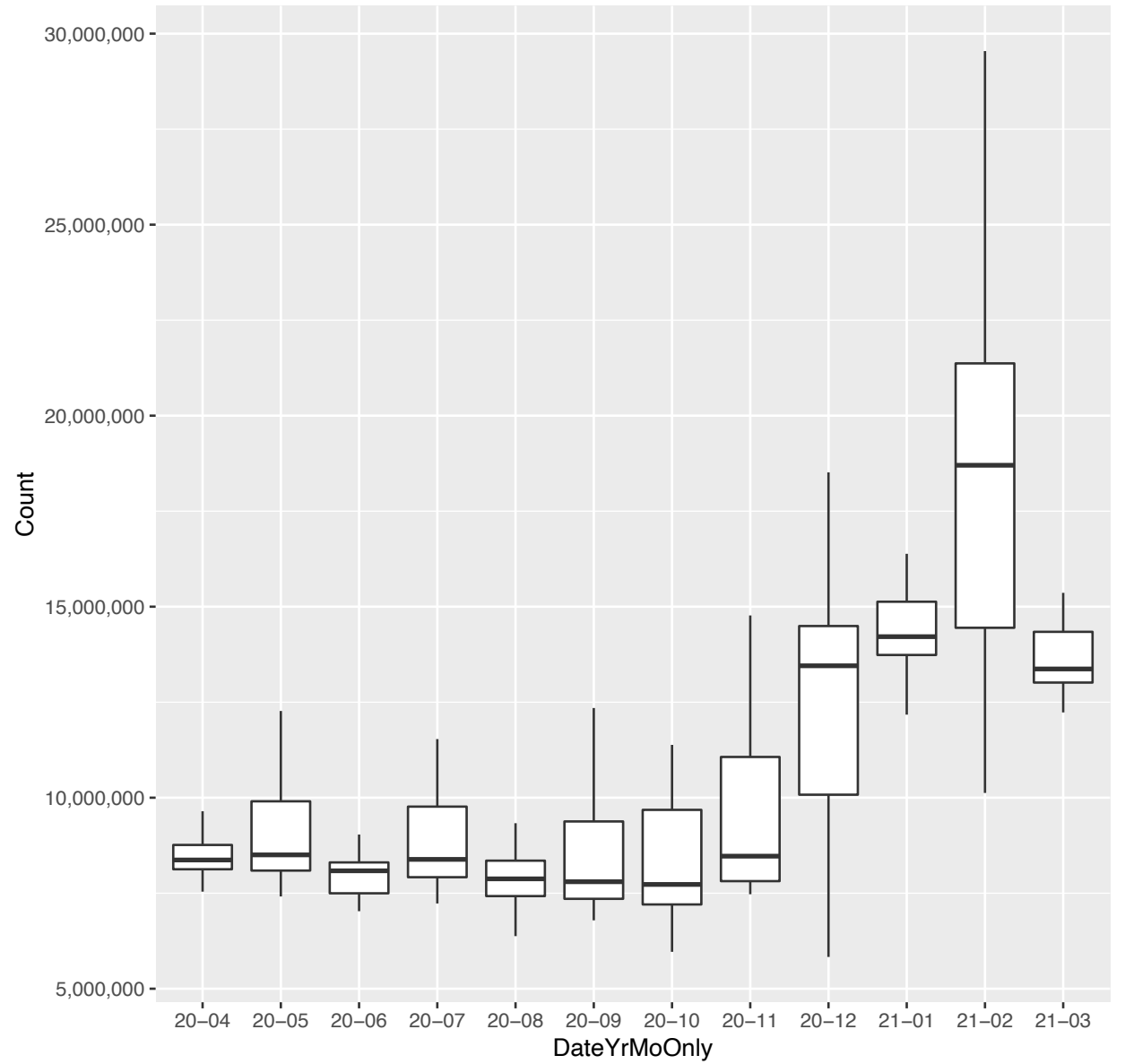


MM

*. ebay.com (day-by-day counts and 28 day moving average)

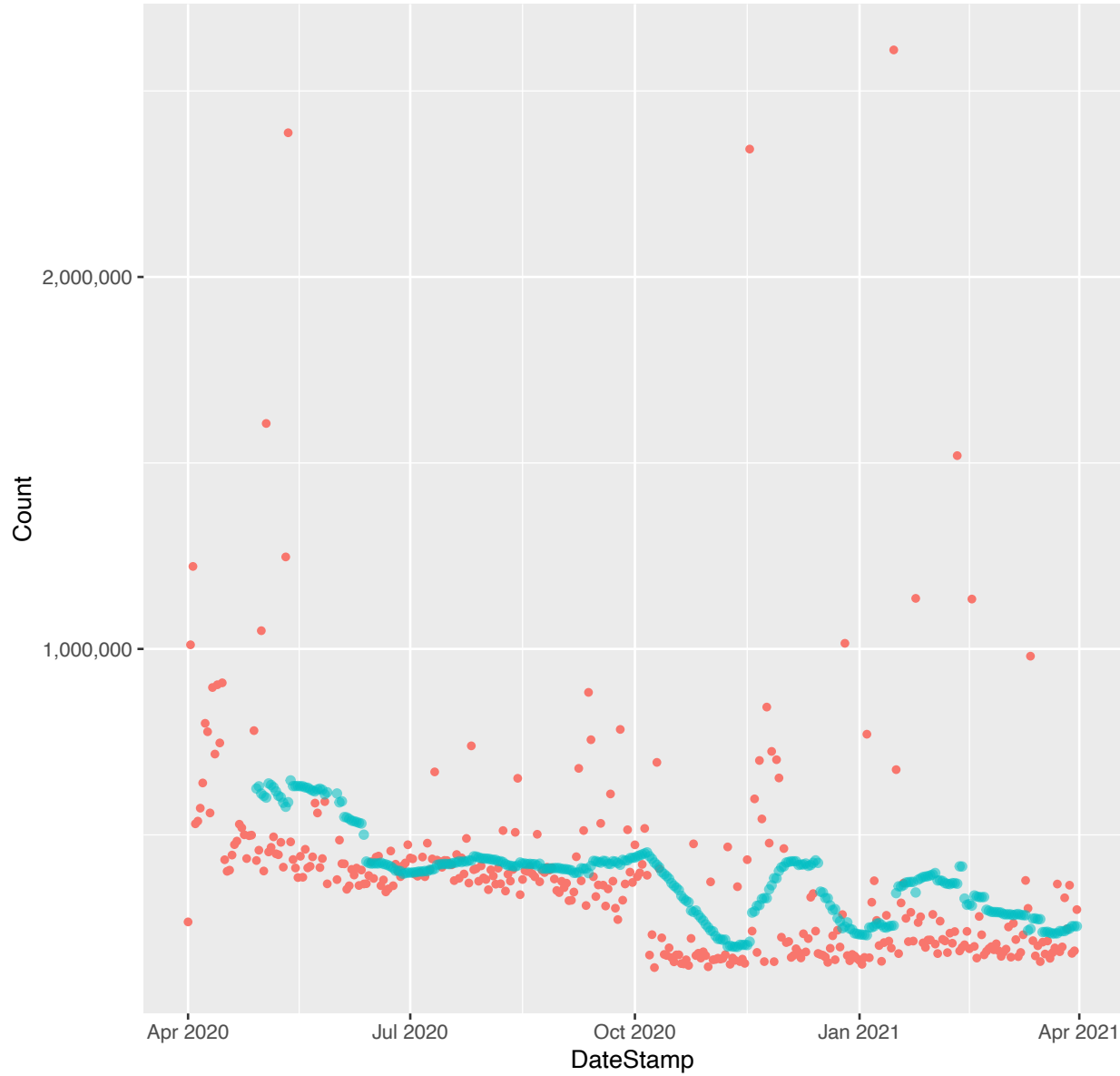


*. ebay.com (monthly boxplots (outliers trimmed))

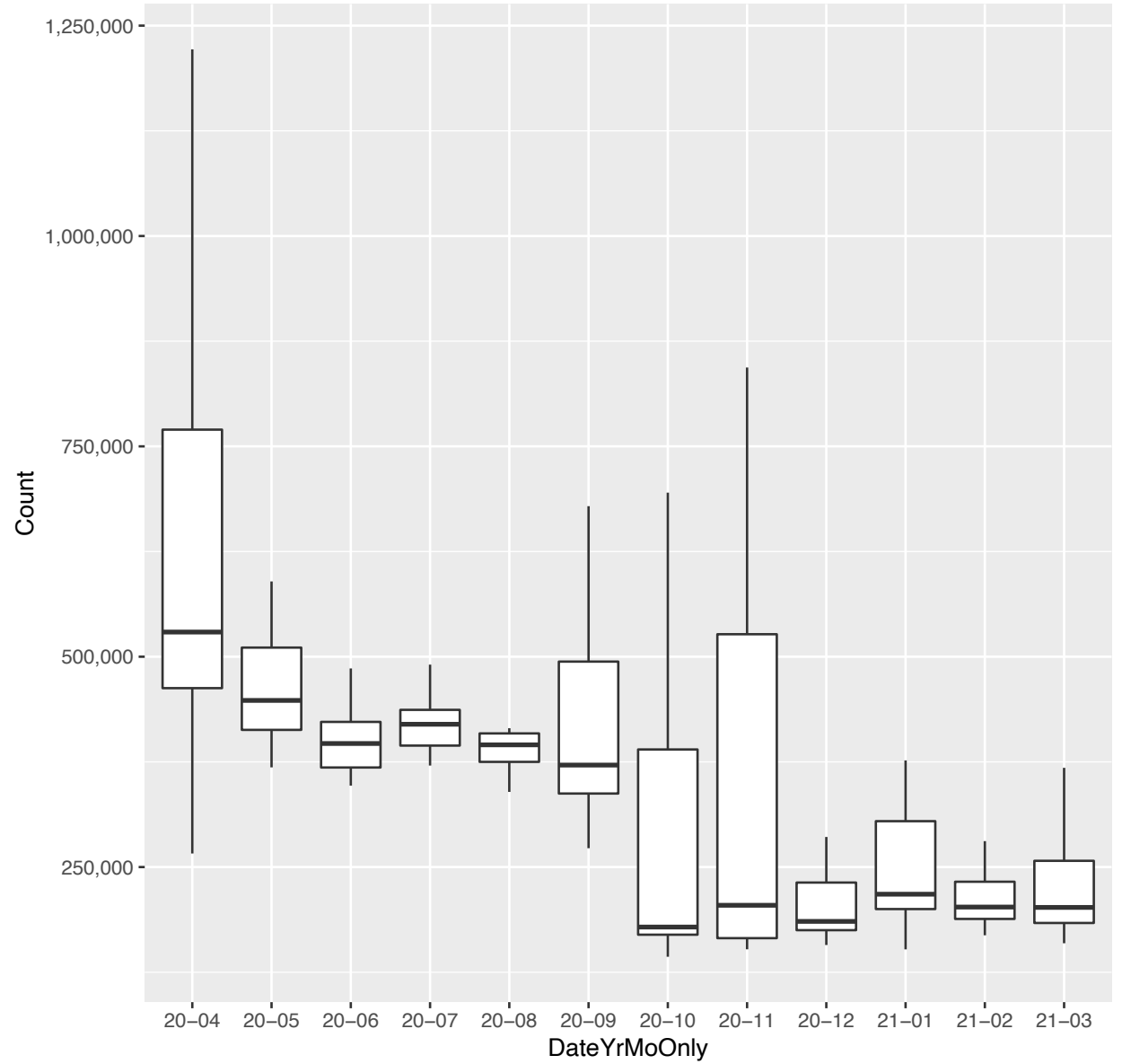




*. etsy.com (day-by-day counts and 28 day moving average)



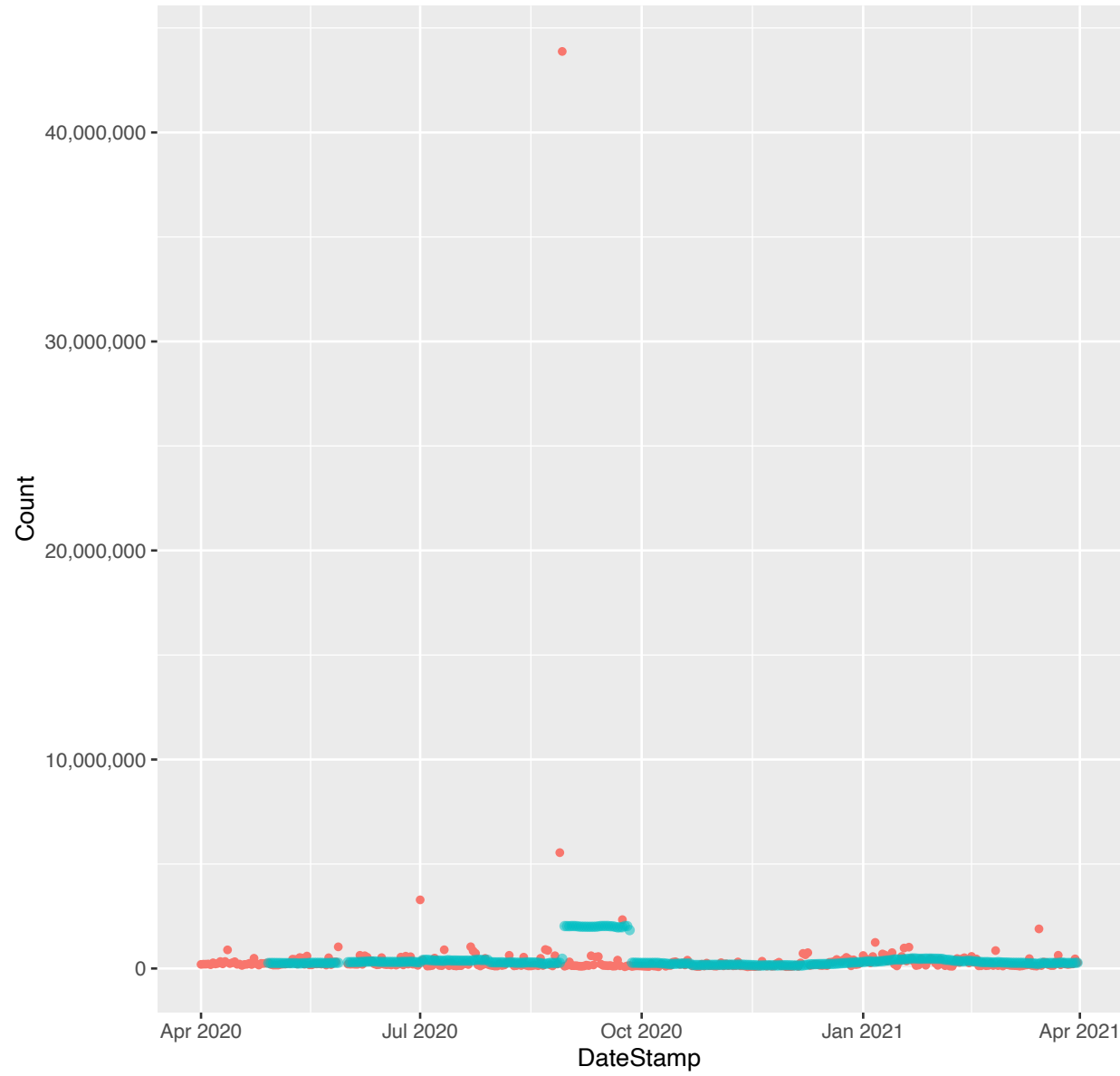
*. etsy.com (monthly boxplots (outliers trimmed))



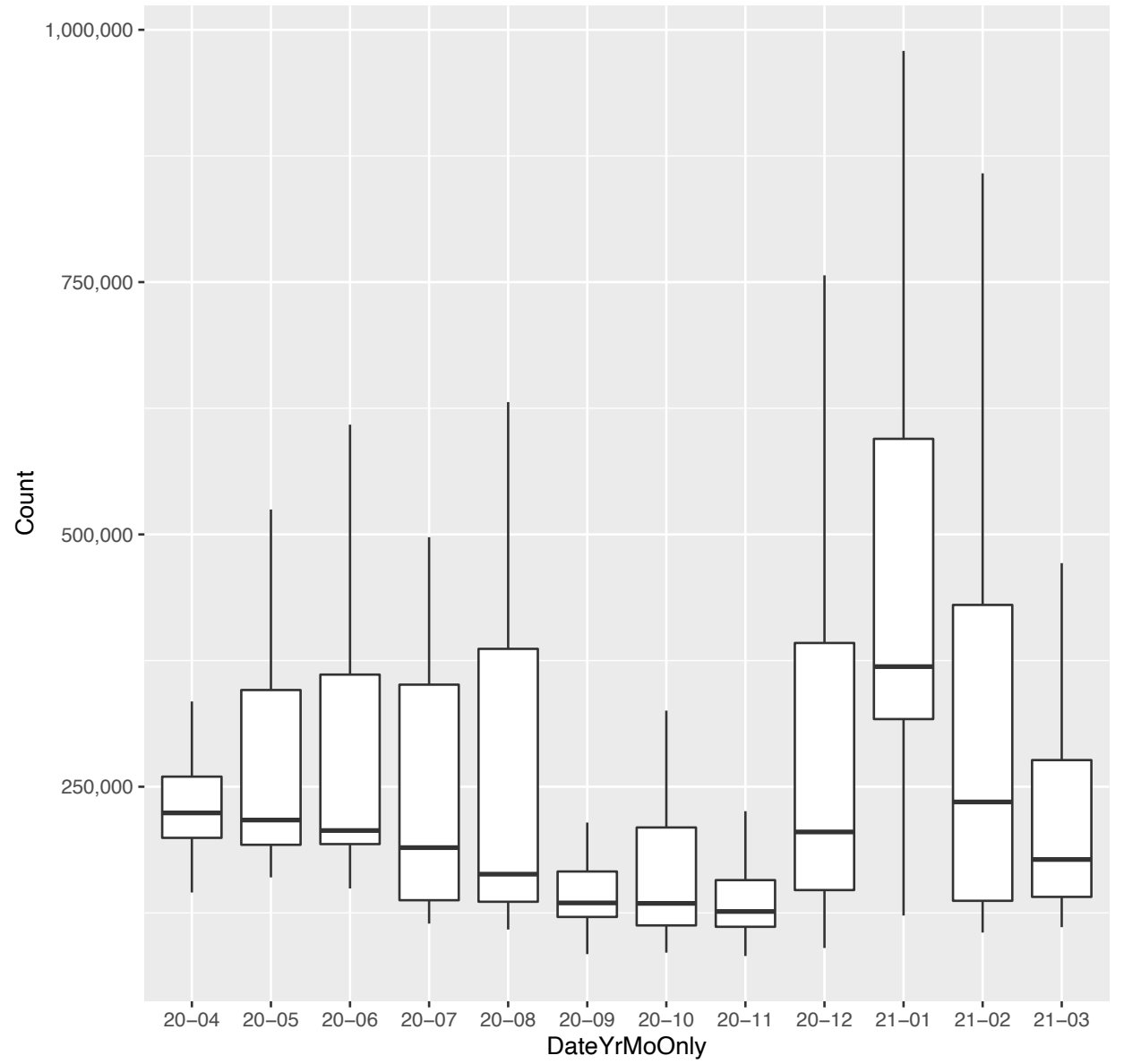
81. flipkart.com:



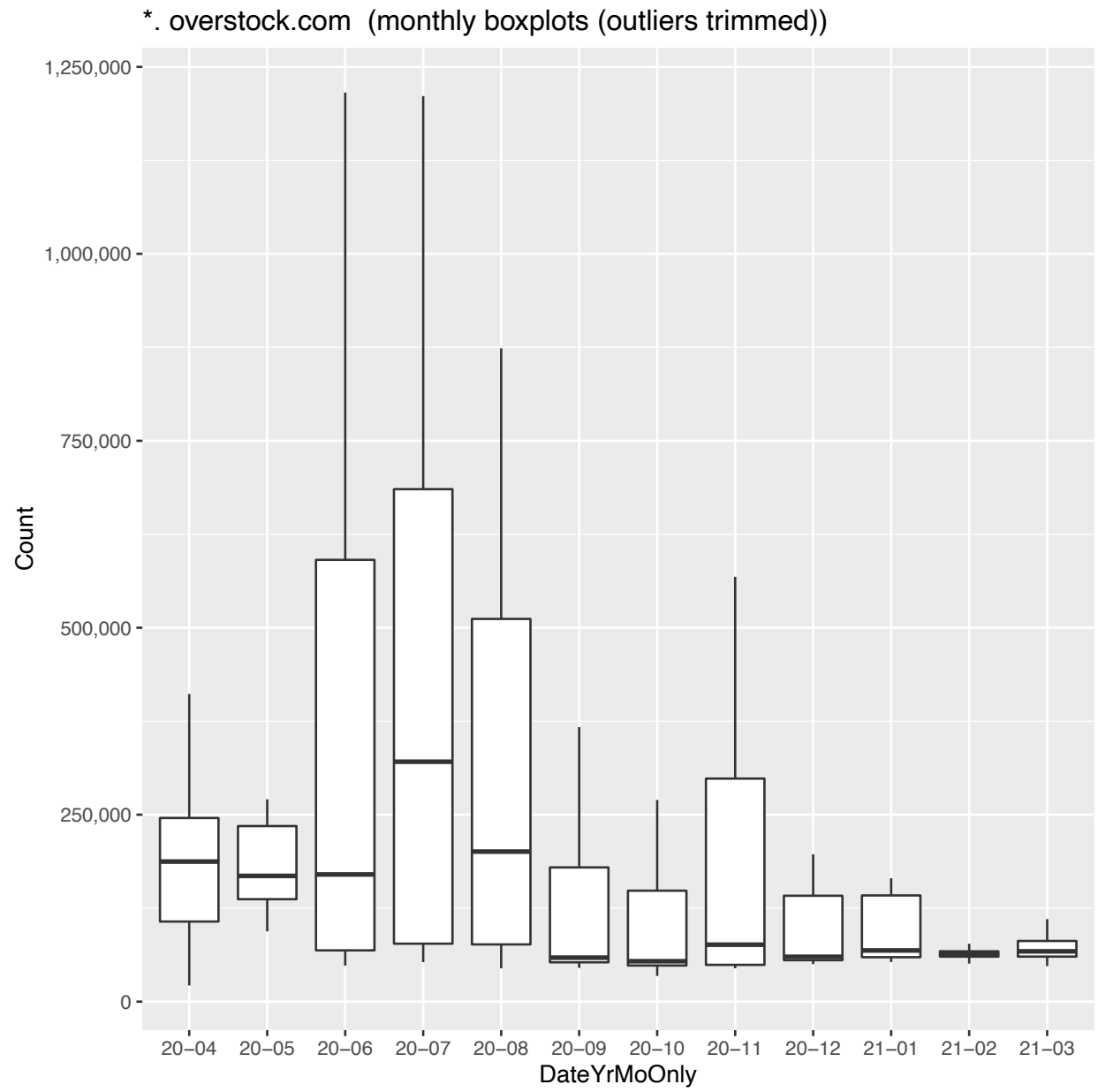
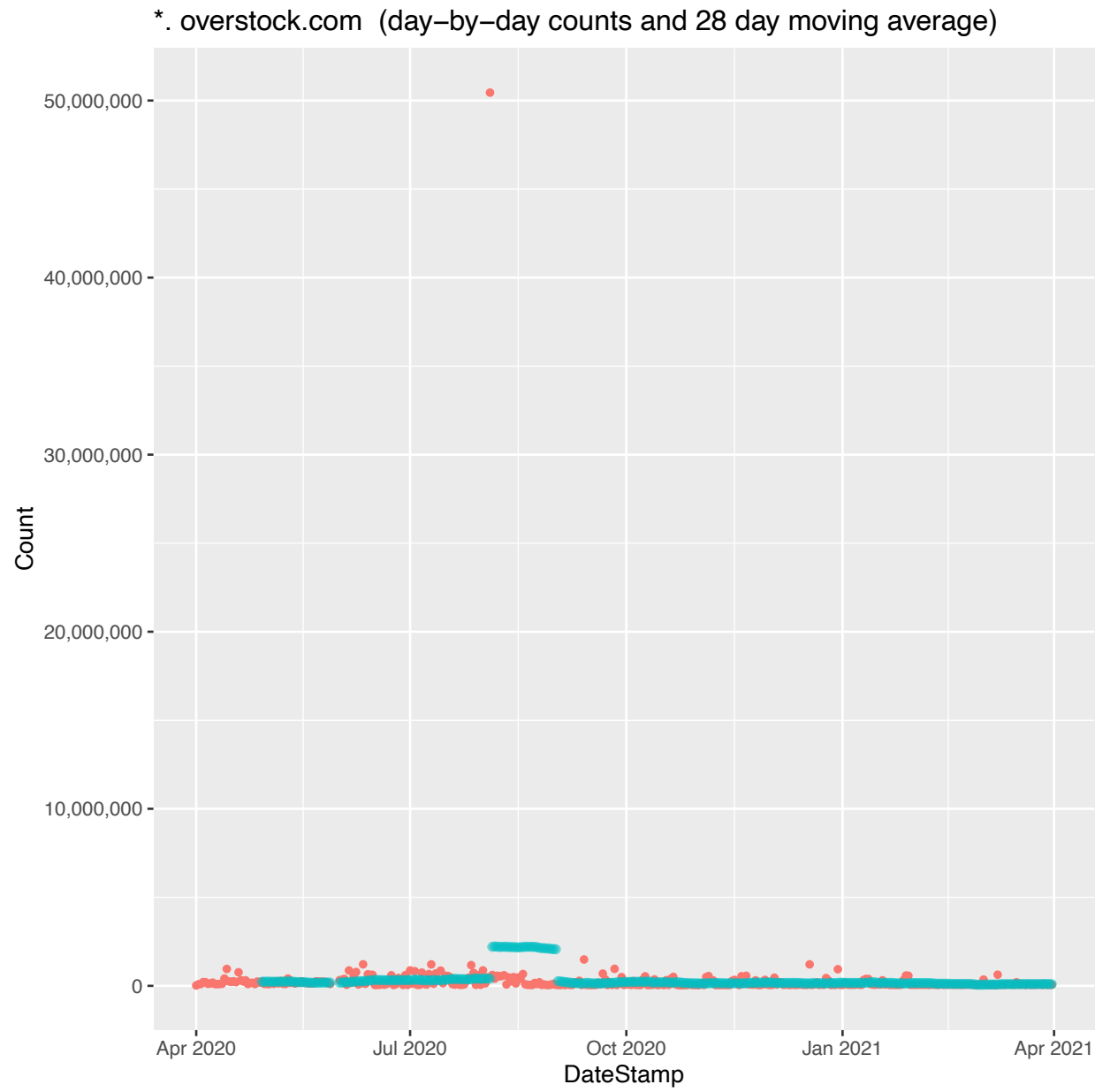
*. flipkart.com (day-by-day counts and 28 day moving average)



*. flipkart.com (monthly boxplots (outliers trimmed))



82. overstock.com: * ~



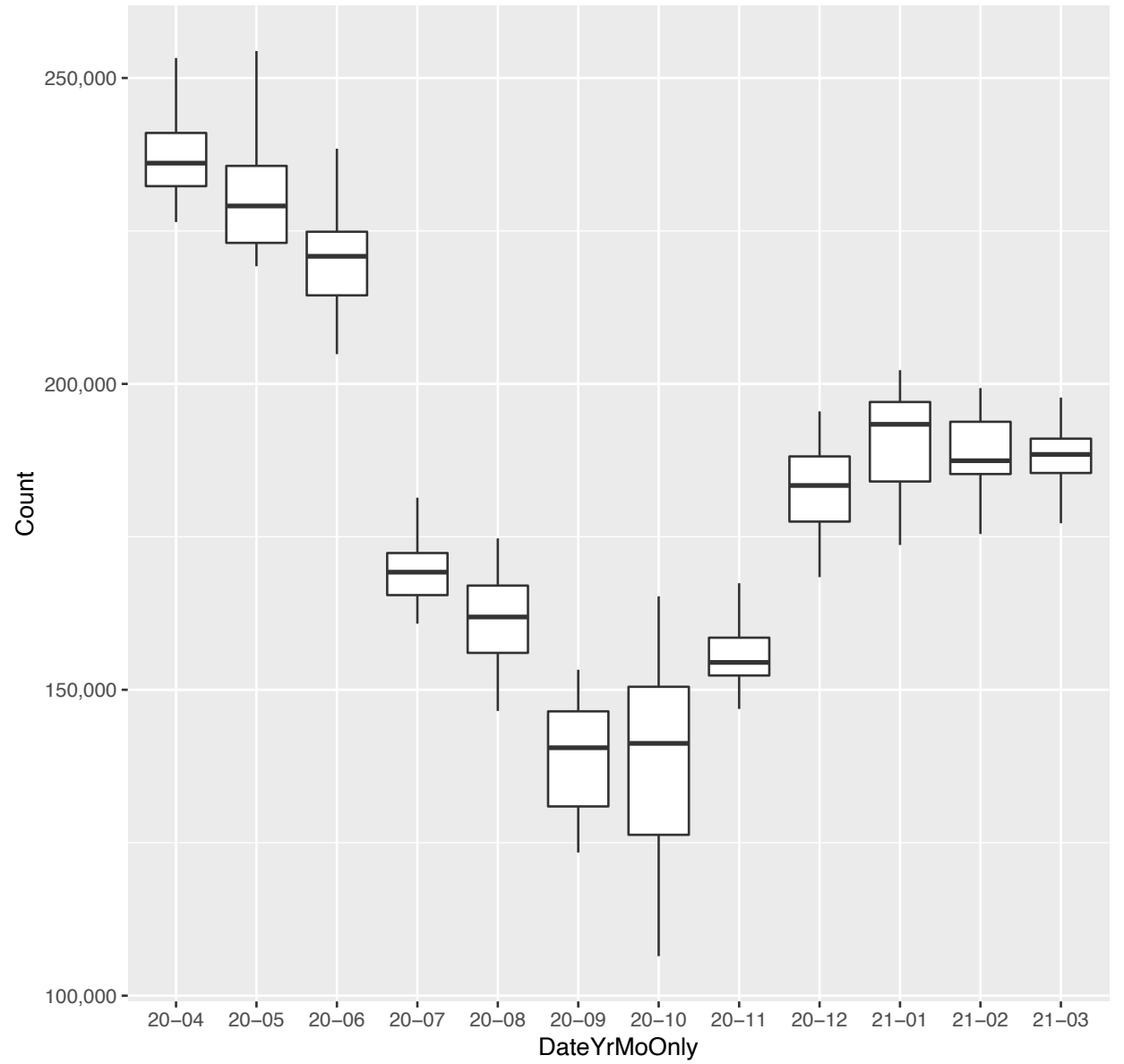
83. qvc.com:

U shaped (ending lower)

*. qvc.com (day-by-day counts and 28 day moving average)



*. qvc.com (monthly boxplots (outliers trimmed))

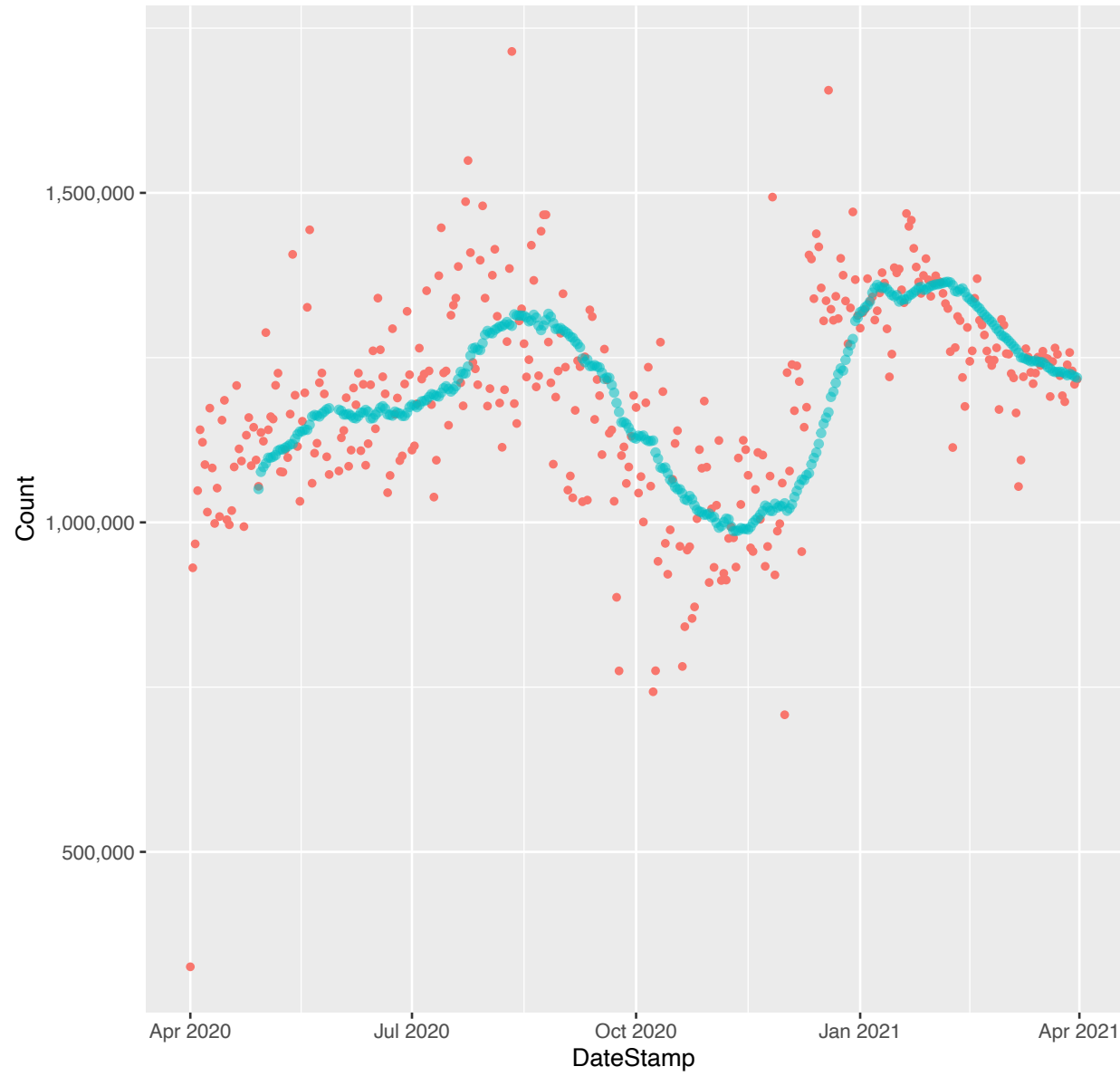


84. wish.com:

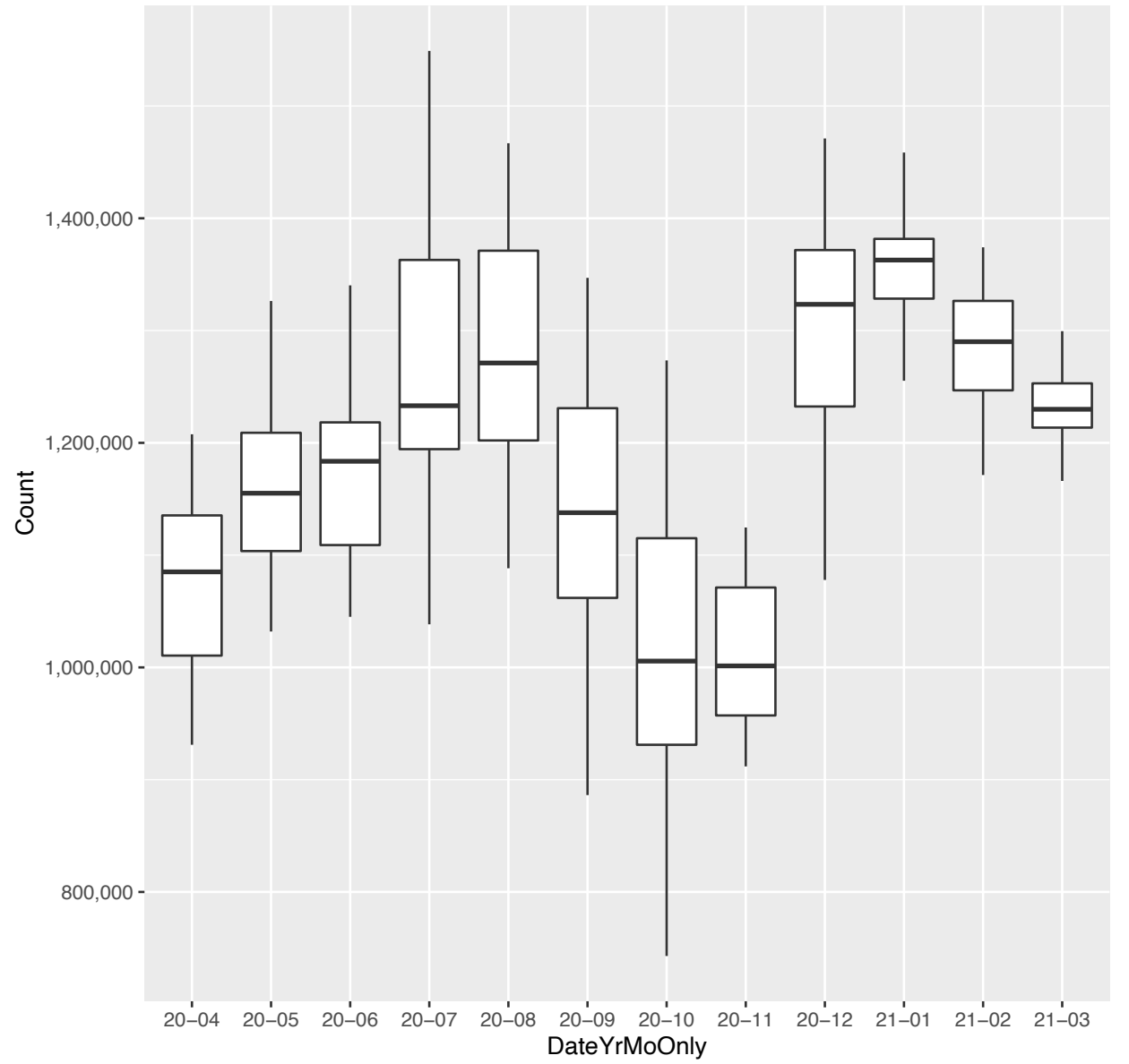
~

M

*. wish.com (day-by-day counts and 28 day moving average)



*. wish.com (monthly boxplots (outliers trimmed))



I) Pets

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85 *.chewy.com



86 *.petco.com



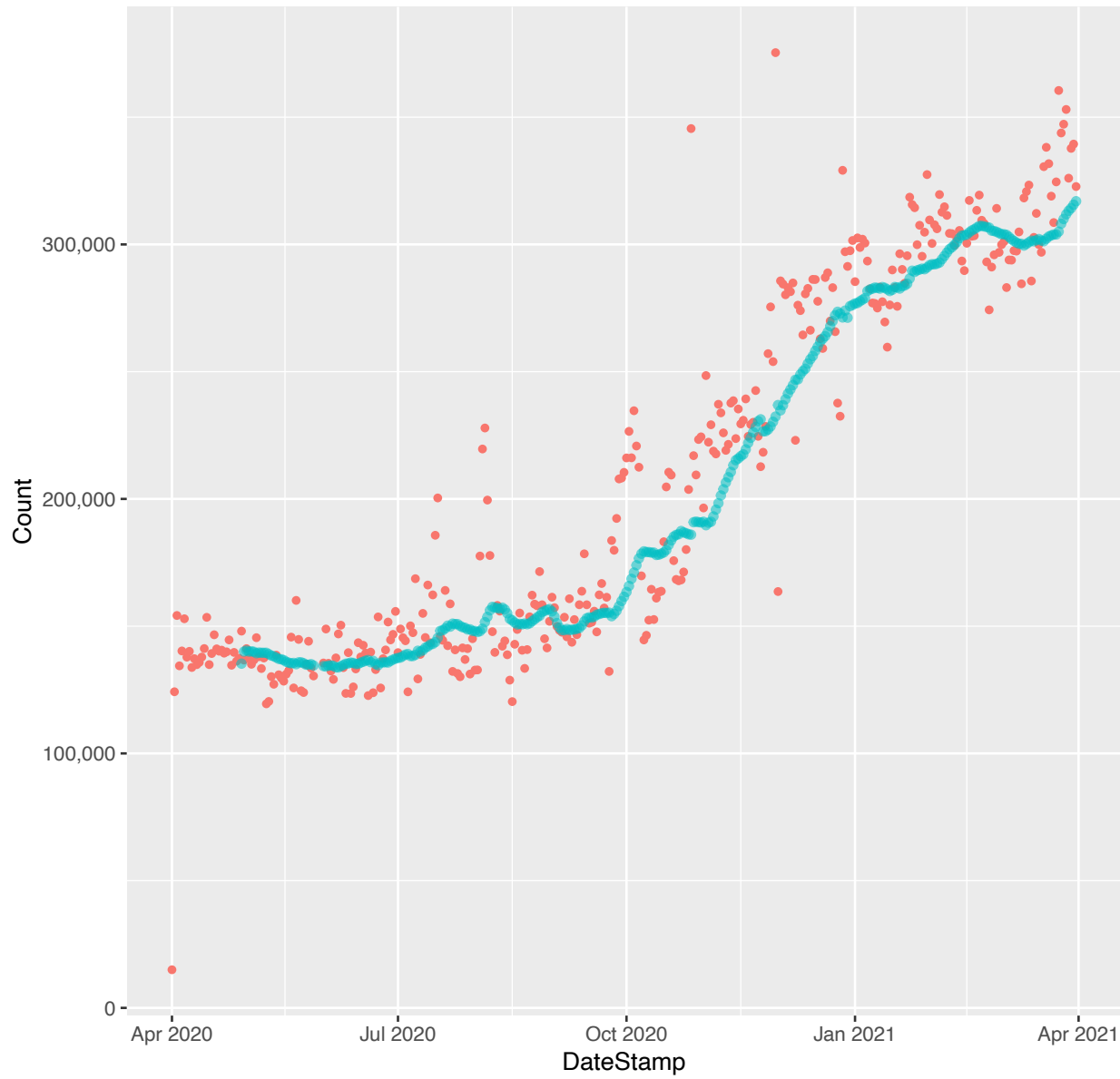
87 *.petsmart.com



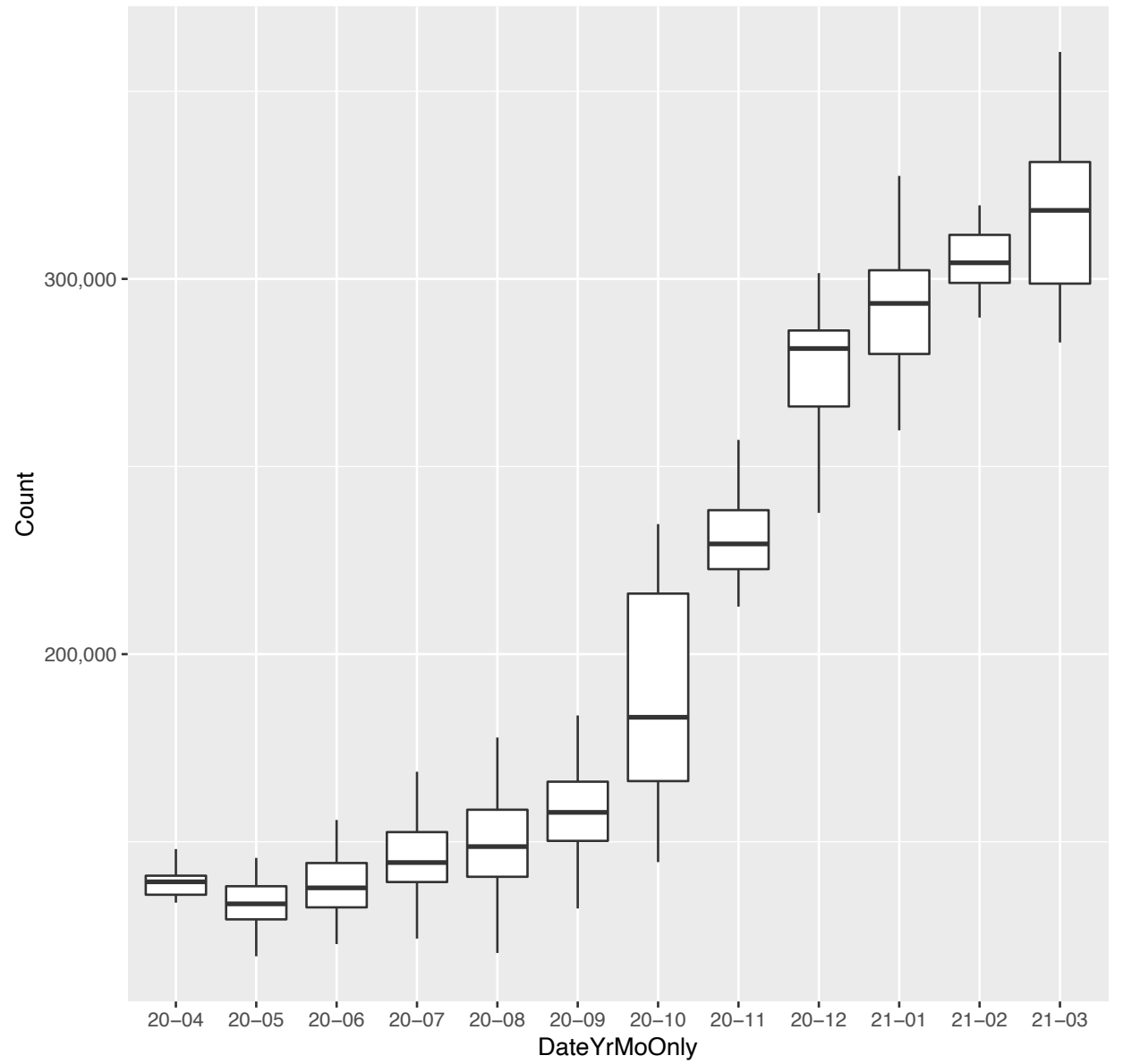
85. chewy.com:



*. chewy.com (day-by-day counts and 28 day moving average)



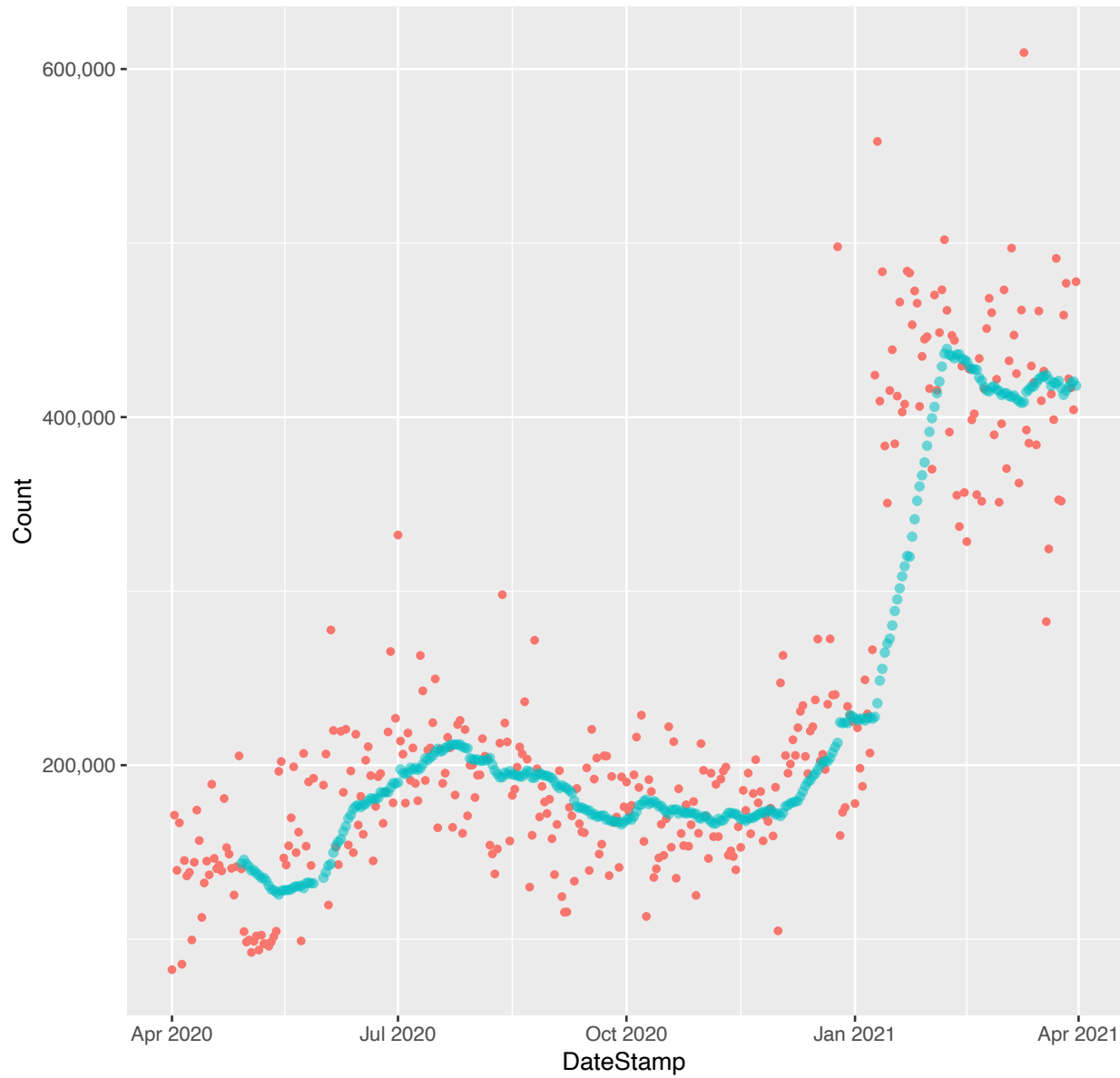
*. chewy.com (monthly boxplots (outliers trimmed))



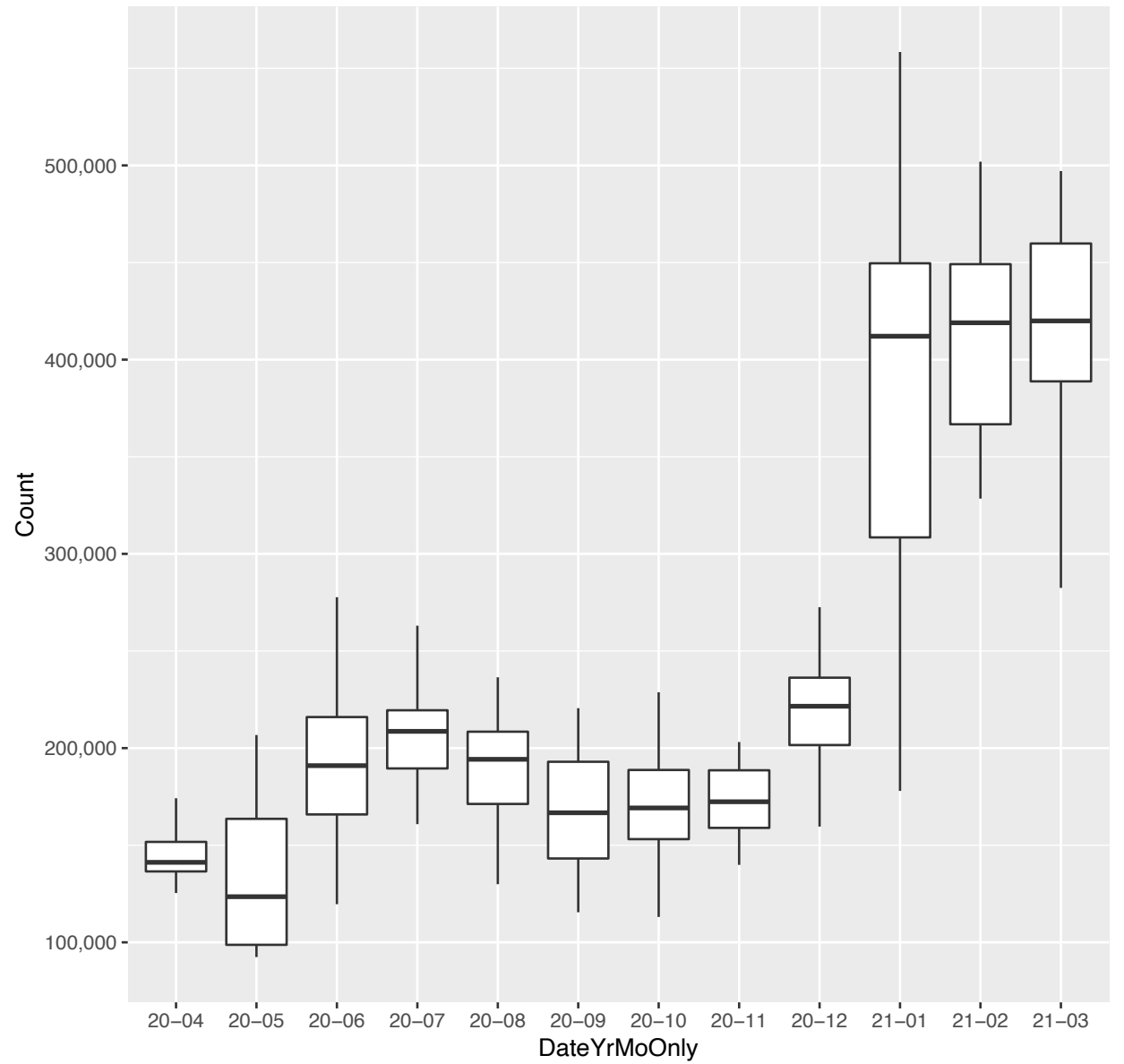
86. petco.com:



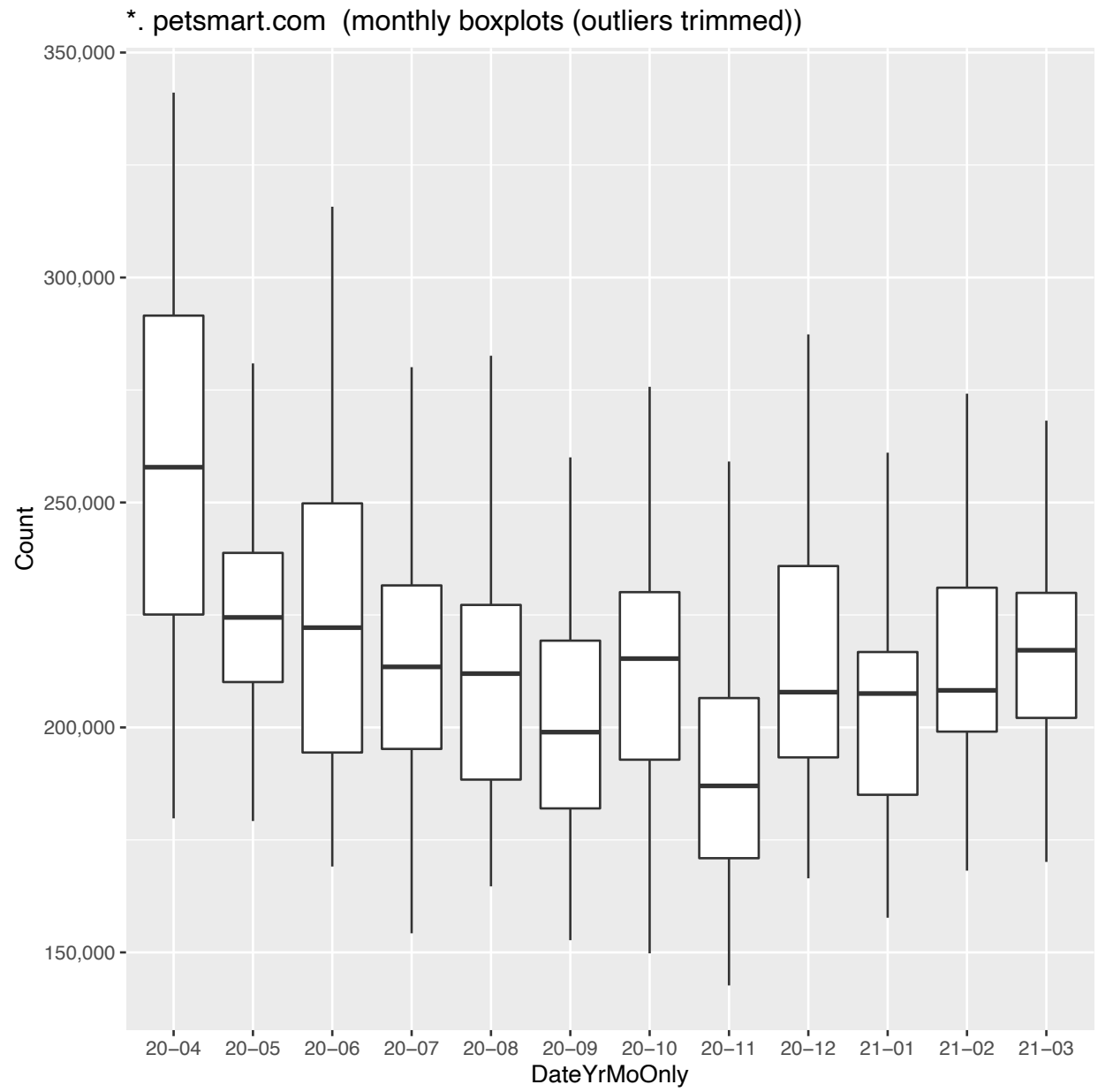
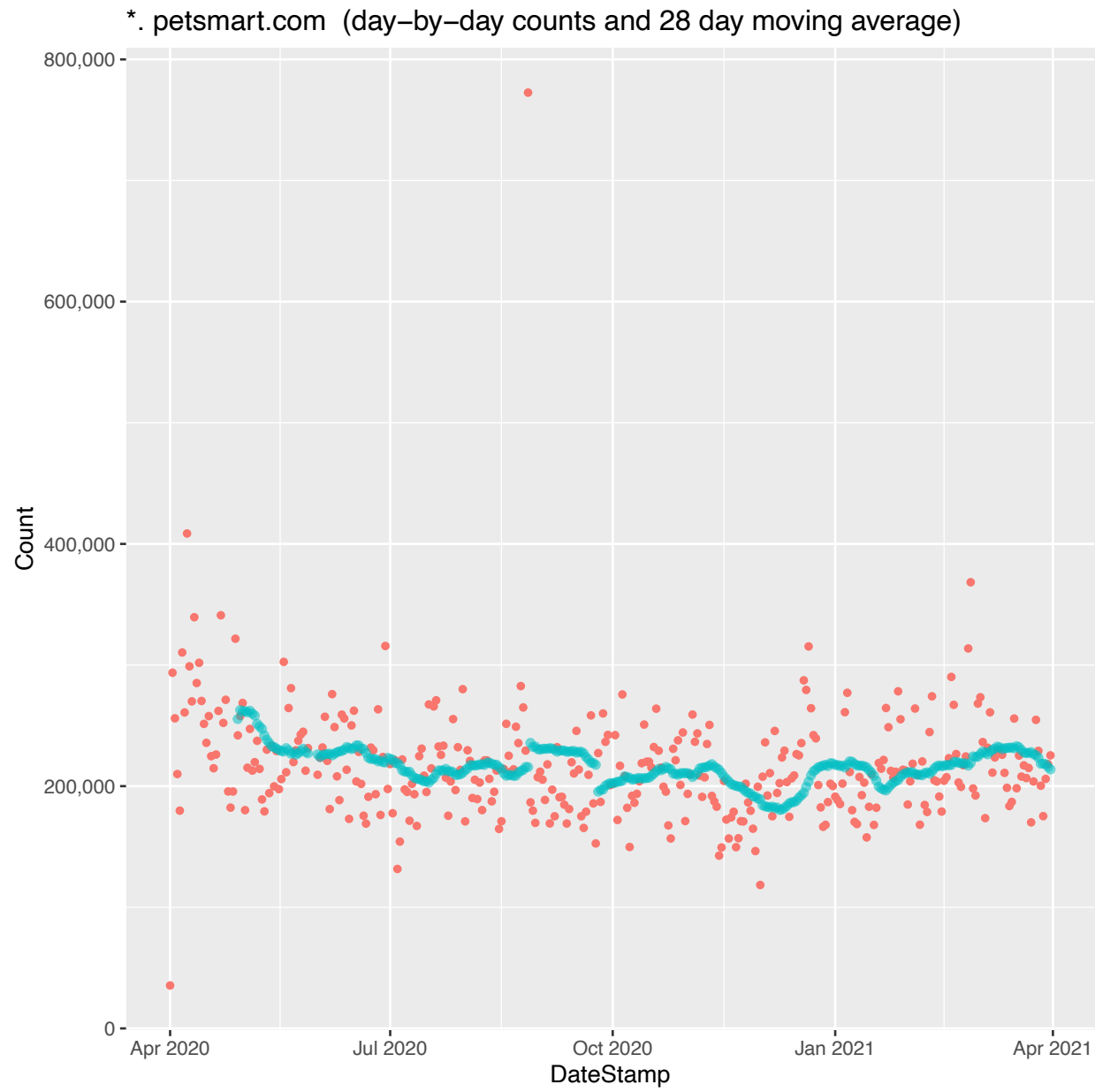
*. petco.com (day-by-day counts and 28 day moving average)



*. petco.com (monthly boxplots (outliers trimmed))



87. petsmart.com: ~



m) Warehouse Clubs

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88 *.costco.com



89 *.samsclub.com



M

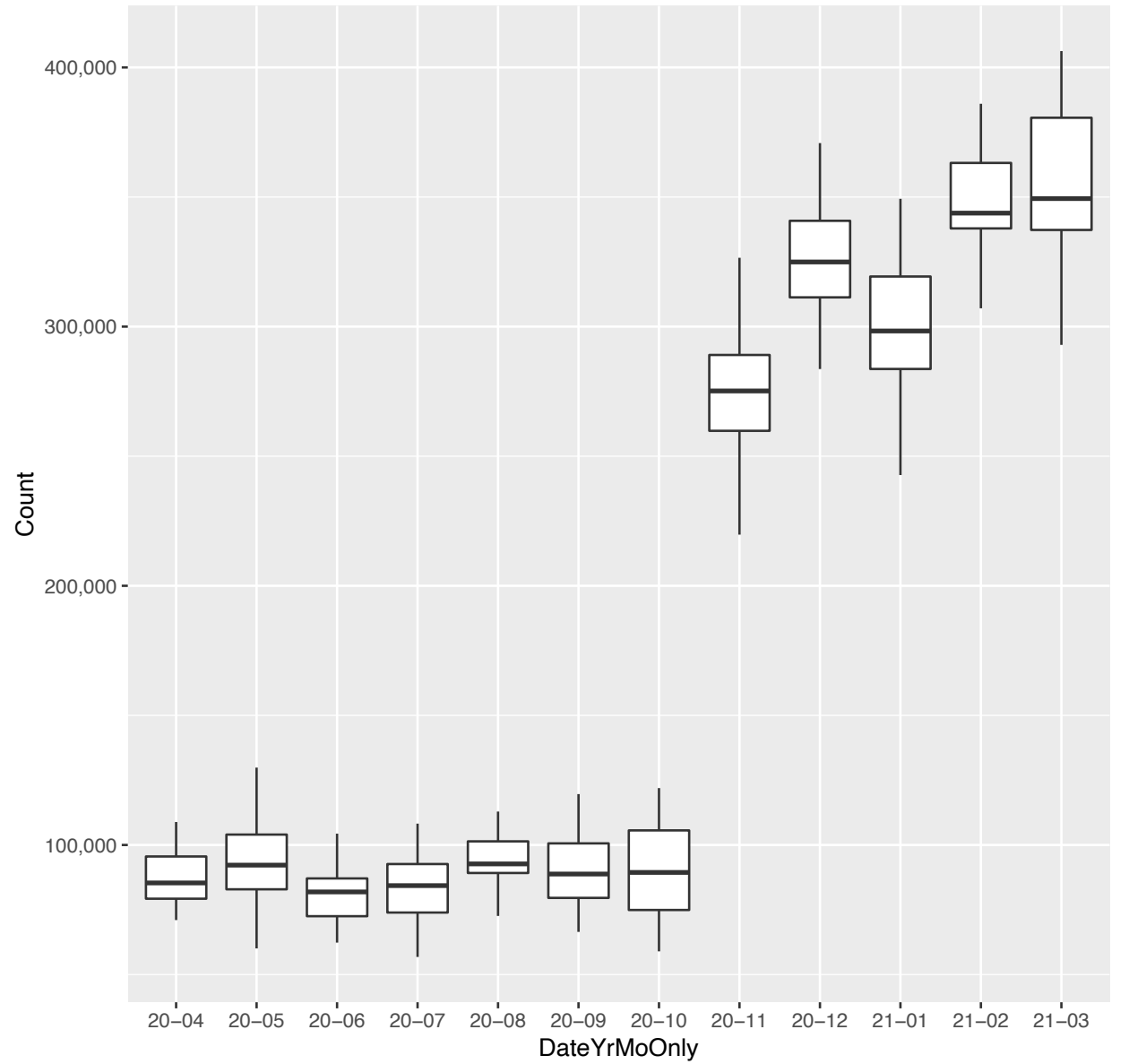
88. costco.com:



*. costco.com (day-by-day counts and 28 day moving average)

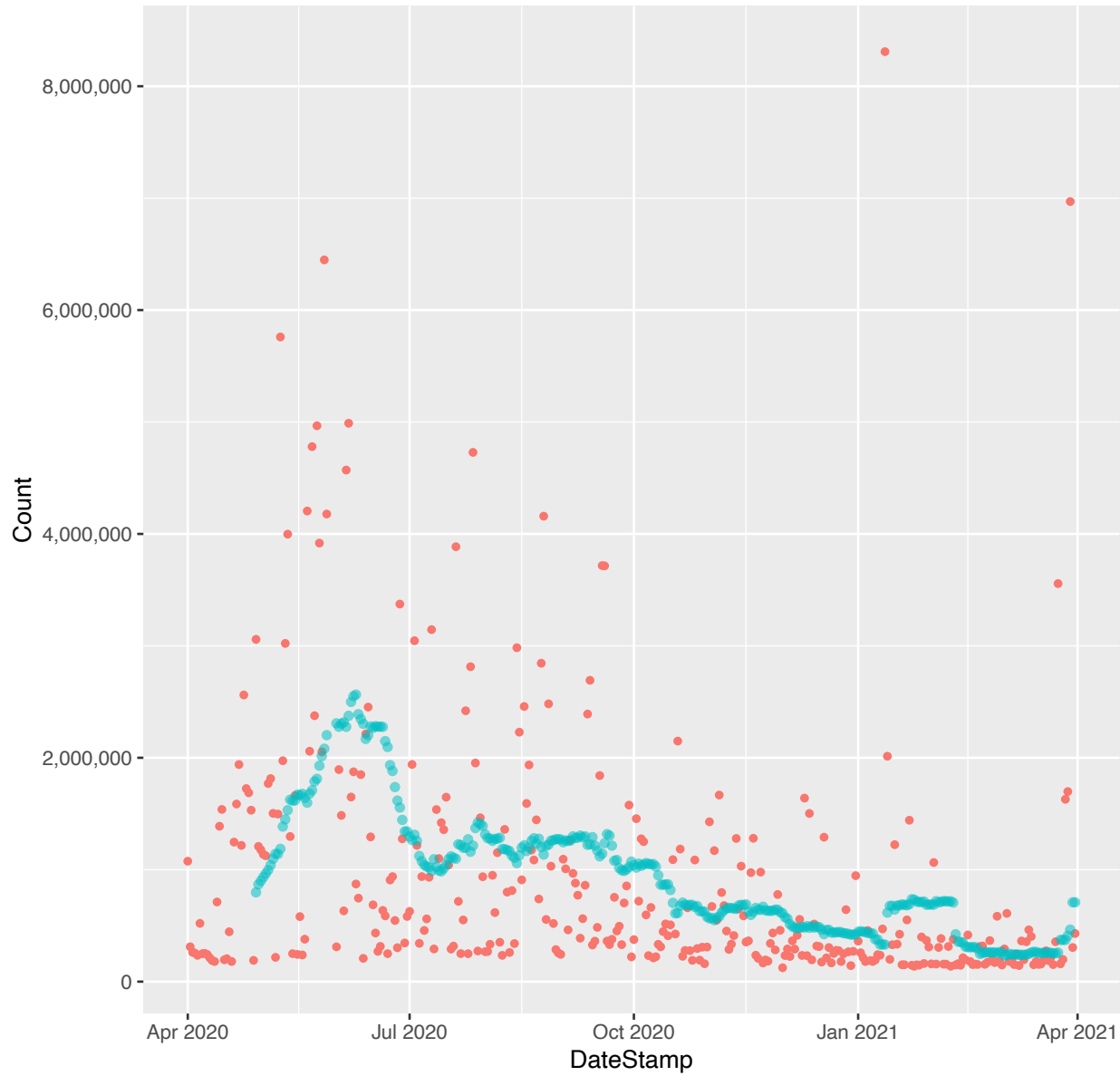


*. costco.com (monthly boxplots (outliers trimmed))

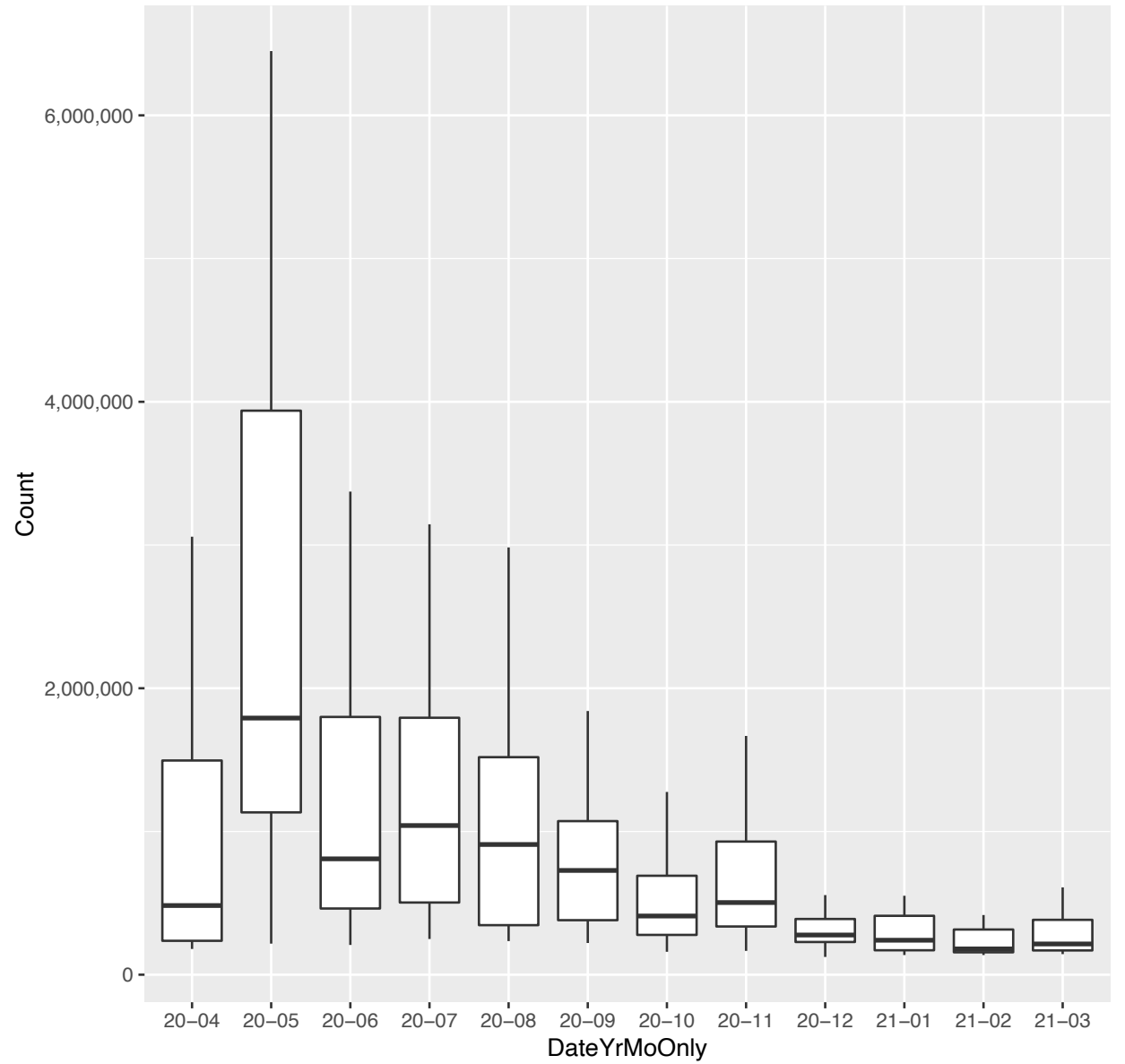




*. samsclub.com (day-by-day counts and 28 day moving average)



*. samsclub.com (monthly boxplots (outliers trimmed))



n) Weddings

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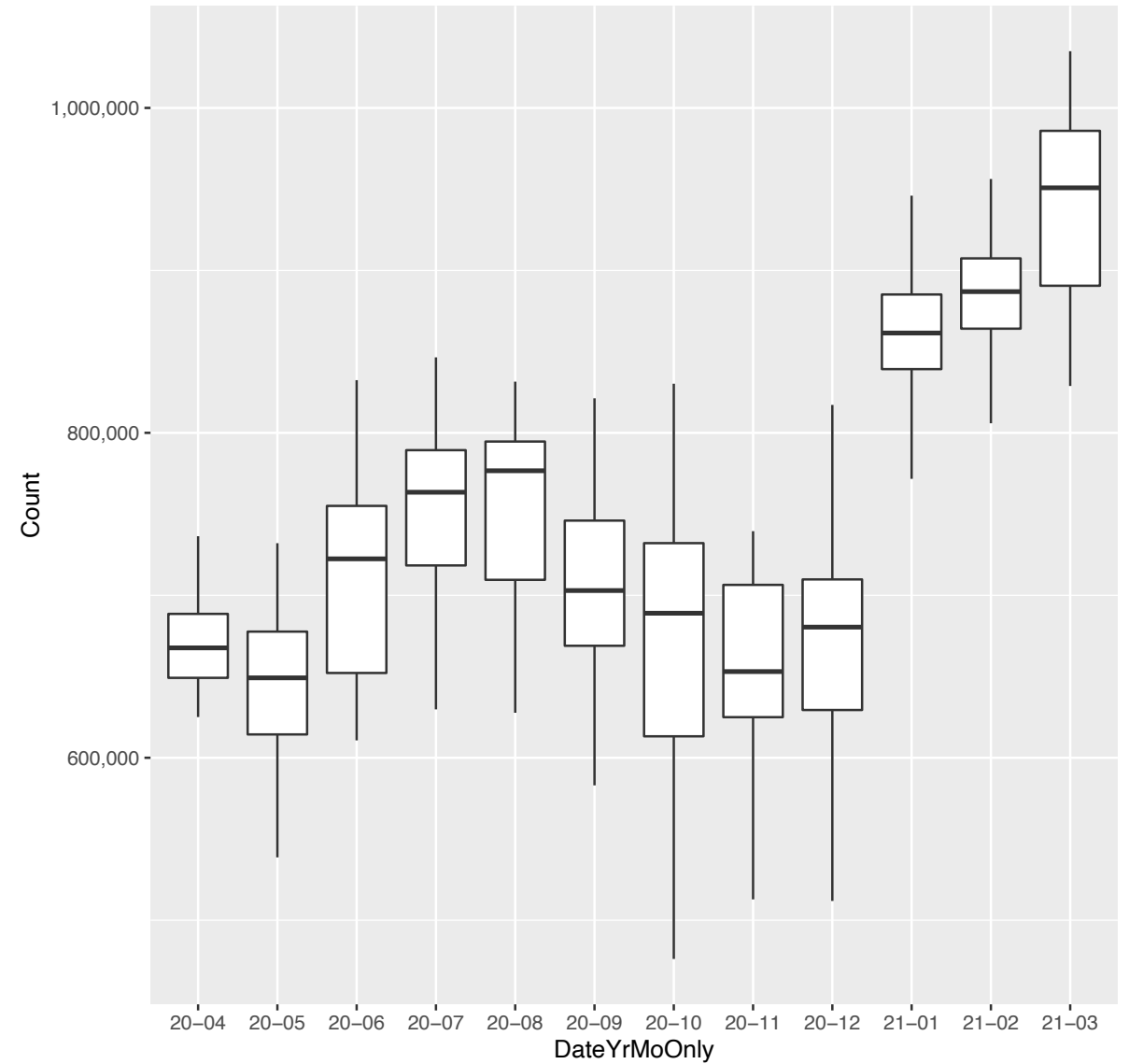
90. theknot.com:

~

*. theknot.com (day-by-day counts and 28 day moving average)



*. theknot.com (monthly boxplots (outliers trimmed))



IX. Social Media Sites

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1	facebook.com	✳	~	MM
2	instagram.com	✳	∩	M
3	linkedin.com	✳	~	M
4	parler.com	✳	~	
5	pinterest.com	✳	~	M
6	qq.com	✳	~	MM
7	reddit.com	✳	~	M
8	snapchat.com	✳	~	M
9	tumblr.com		~	M
10	twitter.com	✳	↗	MM
11	vk.com	✳	↗	M

1. facebook.com:

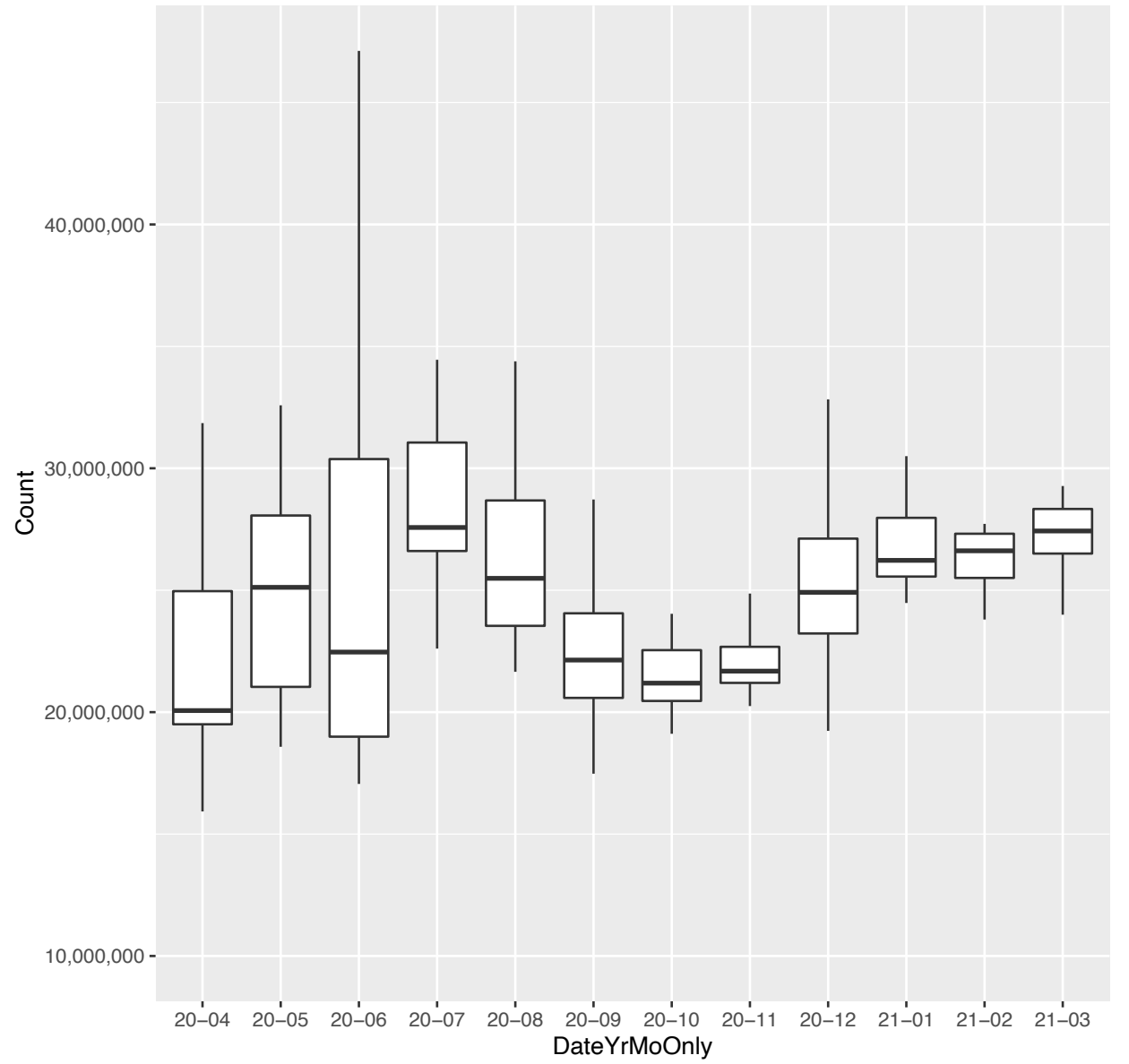


MM

*. facebook.com (day-by-day counts and 28 day moving average)



*. facebook.com (monthly boxplots (outliers trimmed))

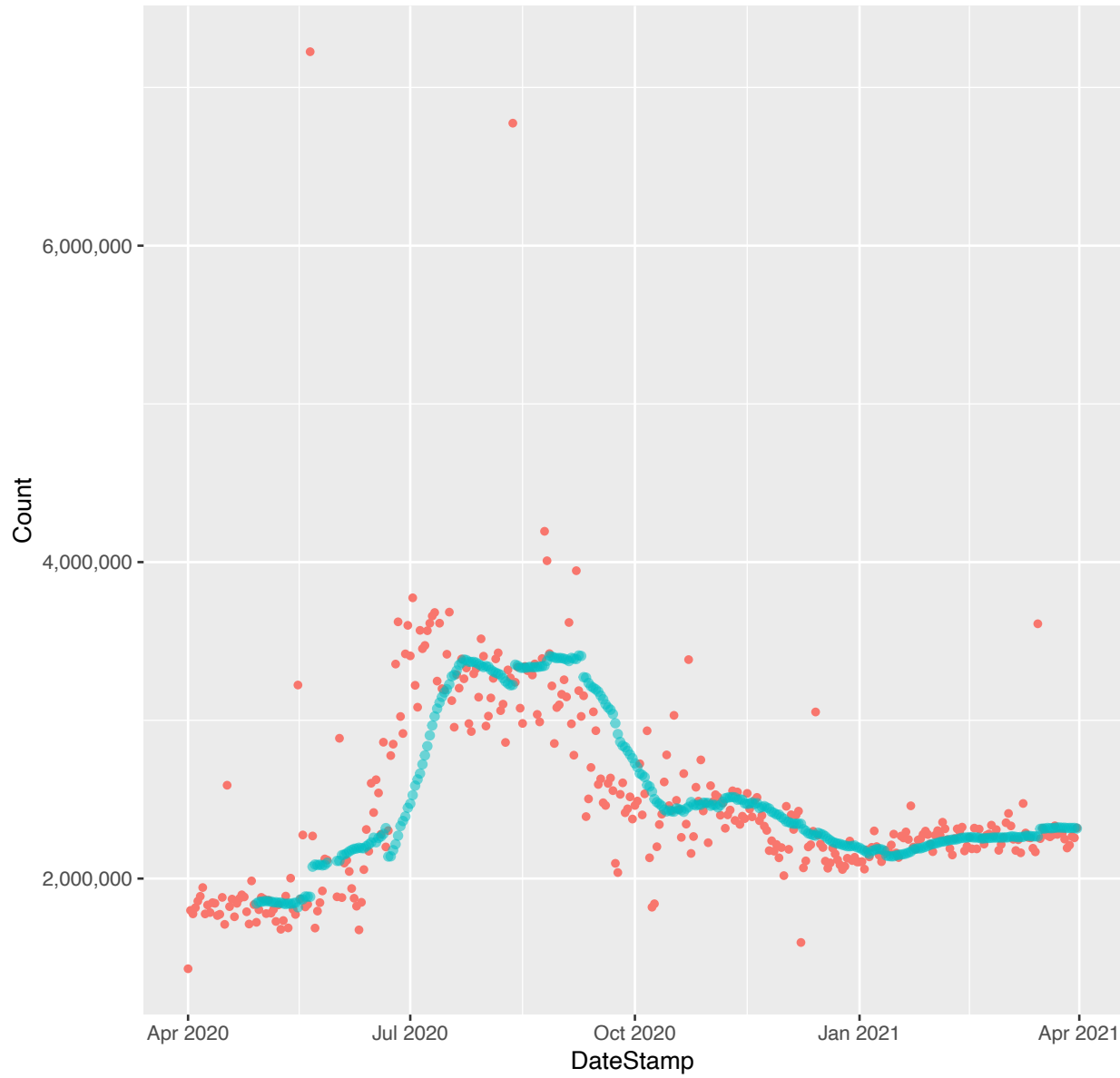


2. instagram.com:

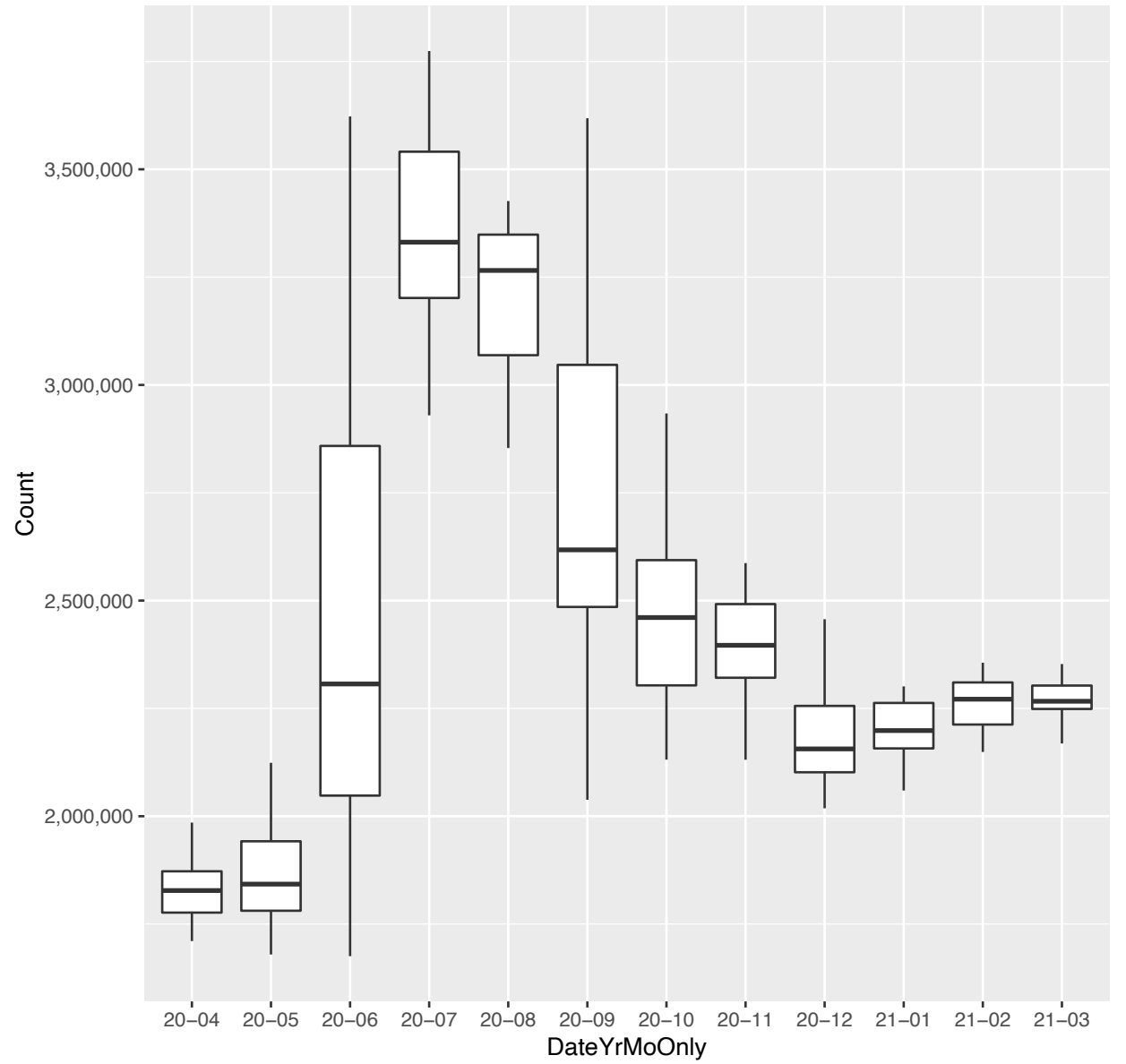


M

*. instagram.com (day-by-day counts and 28 day moving average)



*. instagram.com (monthly boxplots (outliers trimmed))



3. linkedin.com:

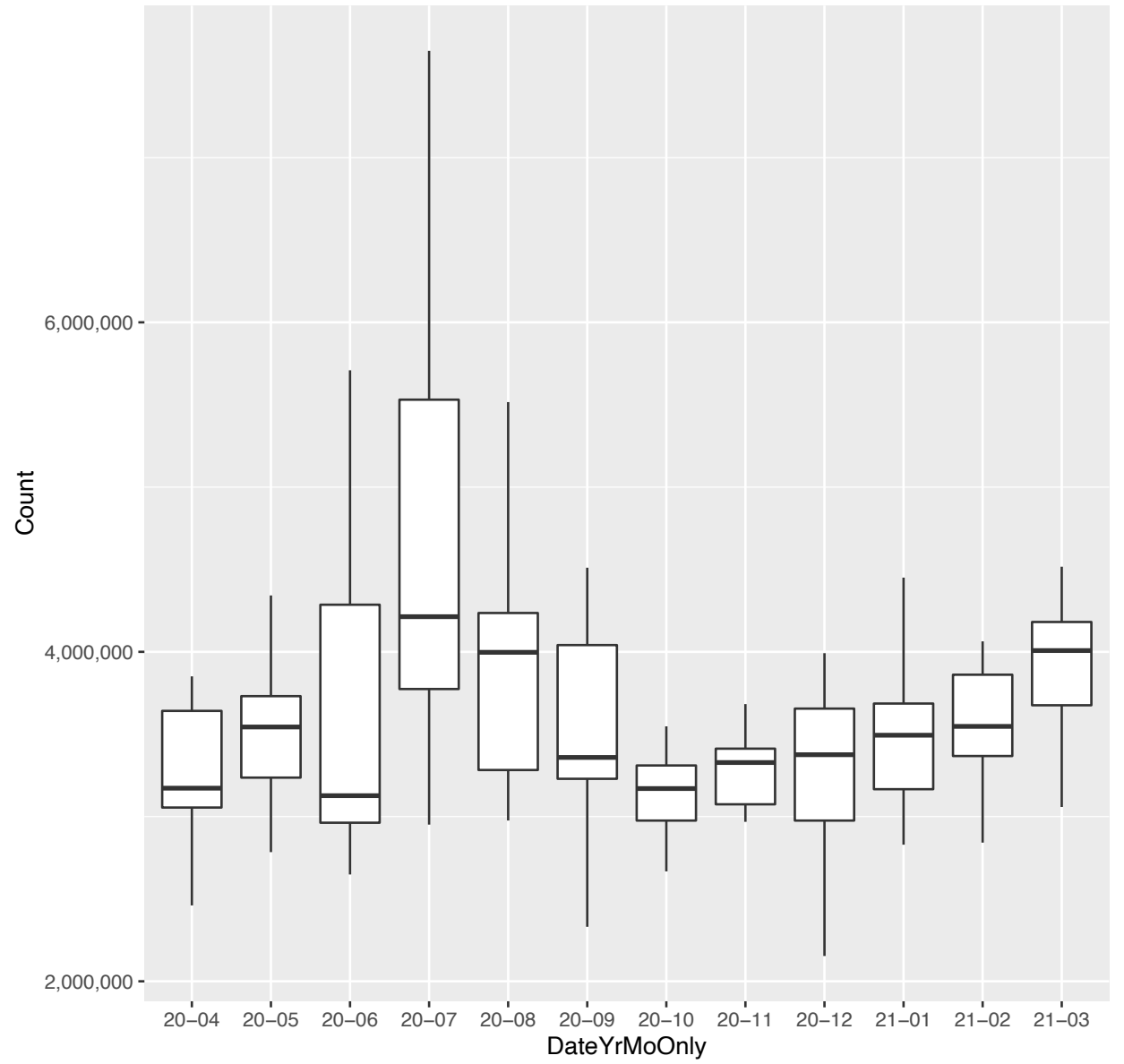


M

*. linkedin.com (day-by-day counts and 28 day moving average)



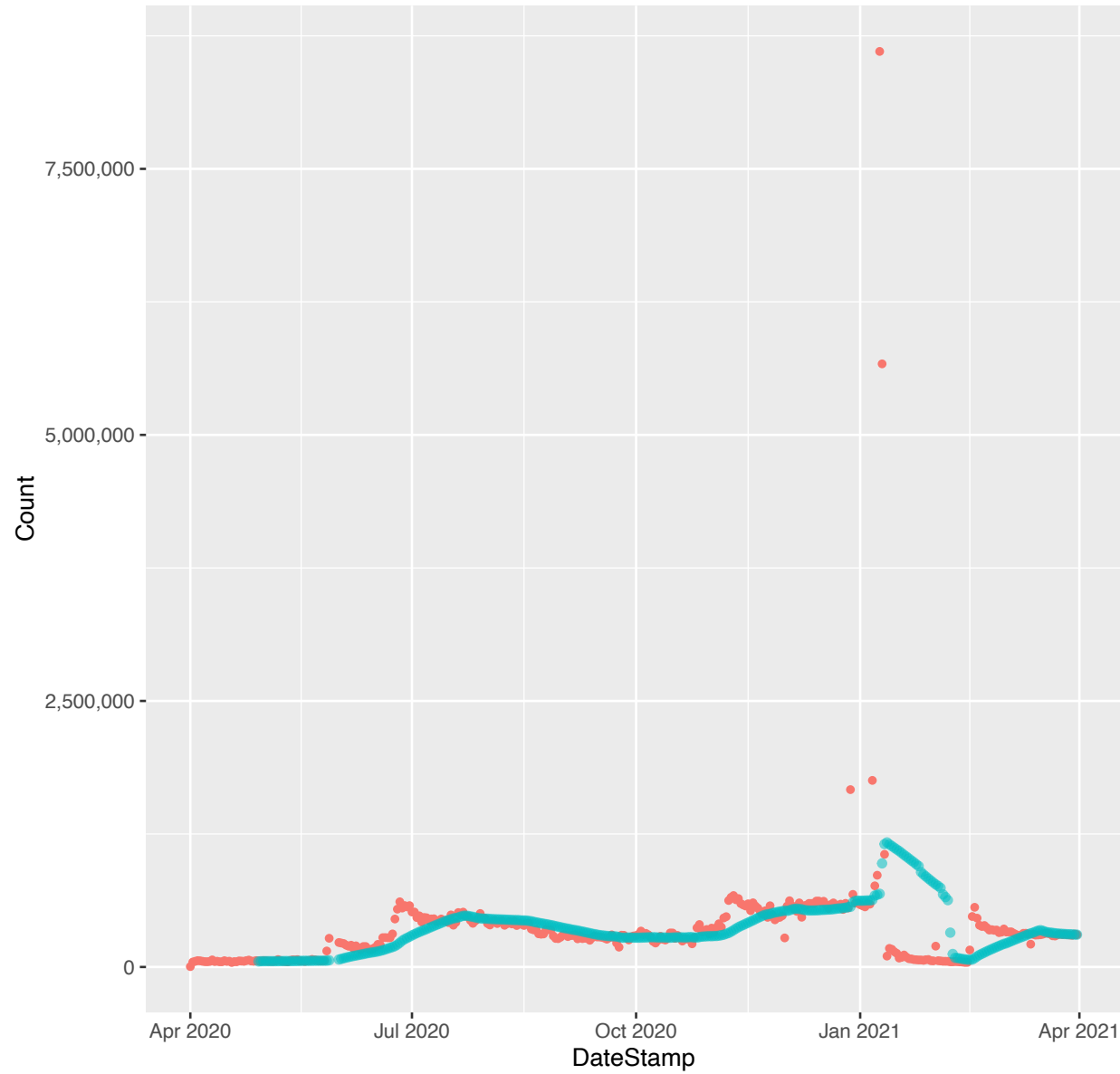
*. linkedin.com (monthly boxplots (outliers trimmed))



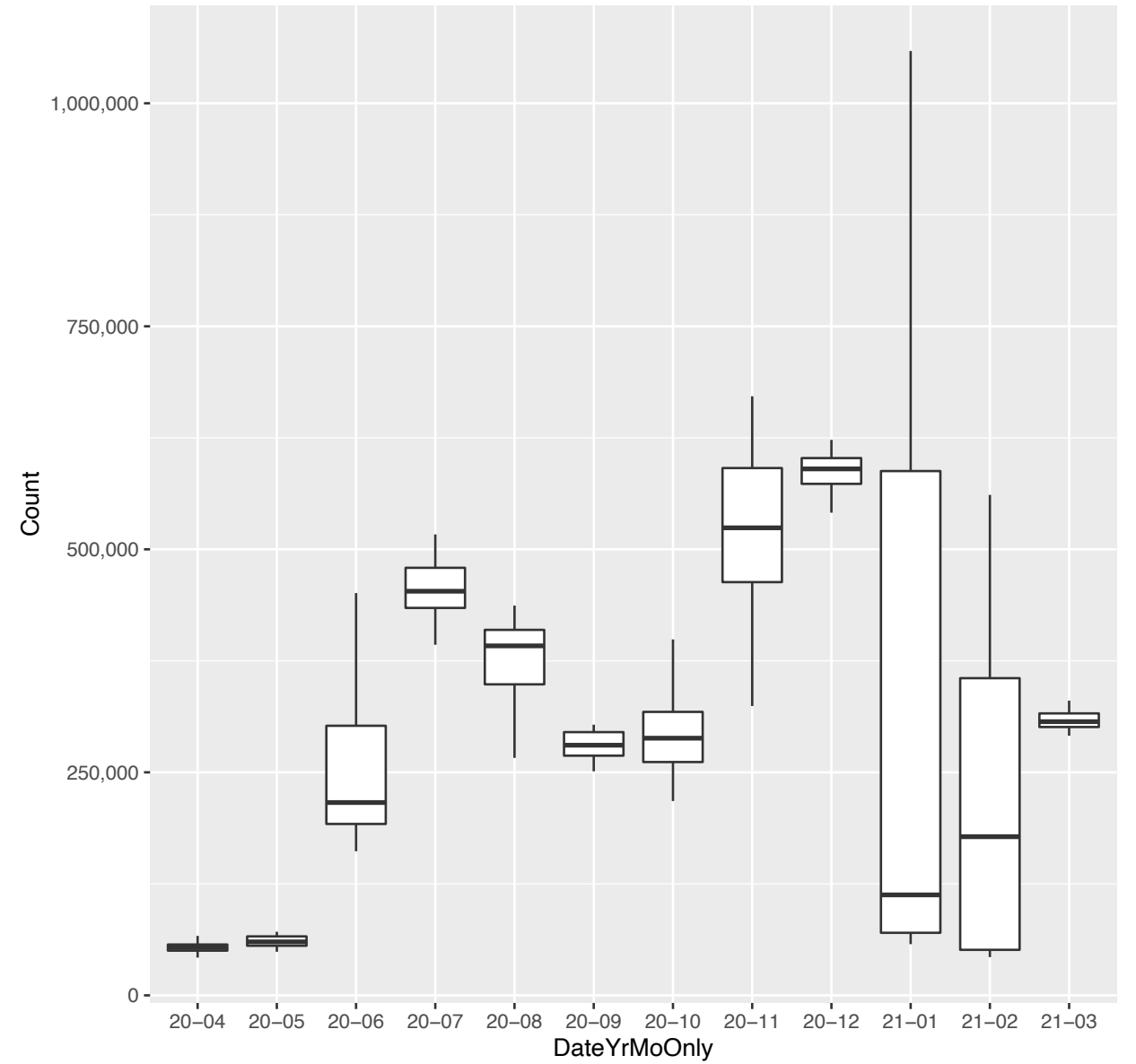
4. parler.com:



*. parler.com (day-by-day counts and 28 day moving average)



*. parler.com (monthly boxplots (outliers trimmed))



5. pinterest.com:

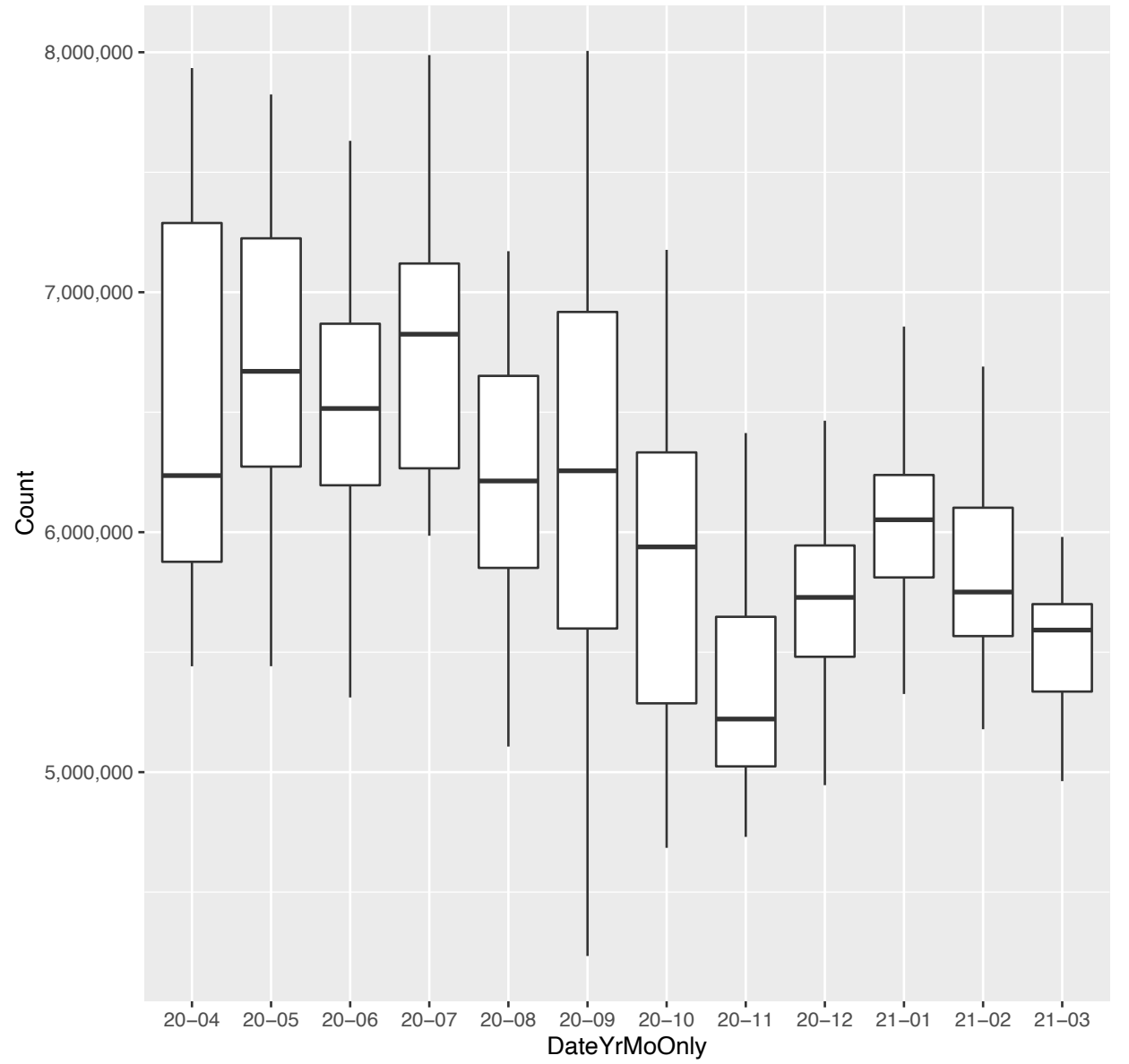


M

*. pinterest.com (day-by-day counts and 28 day moving average)



*. pinterest.com (monthly boxplots (outliers trimmed))

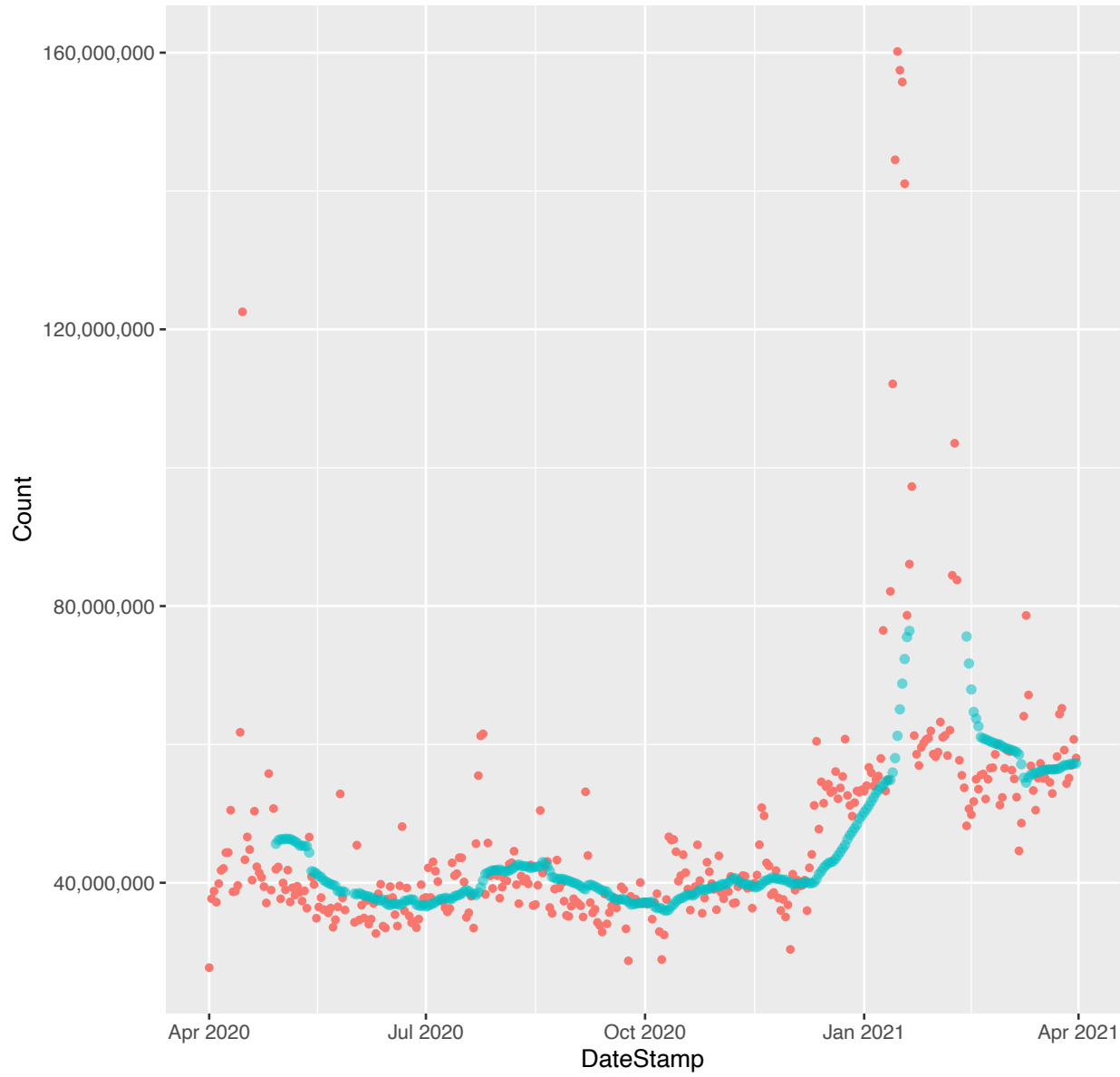


6. qq.com:

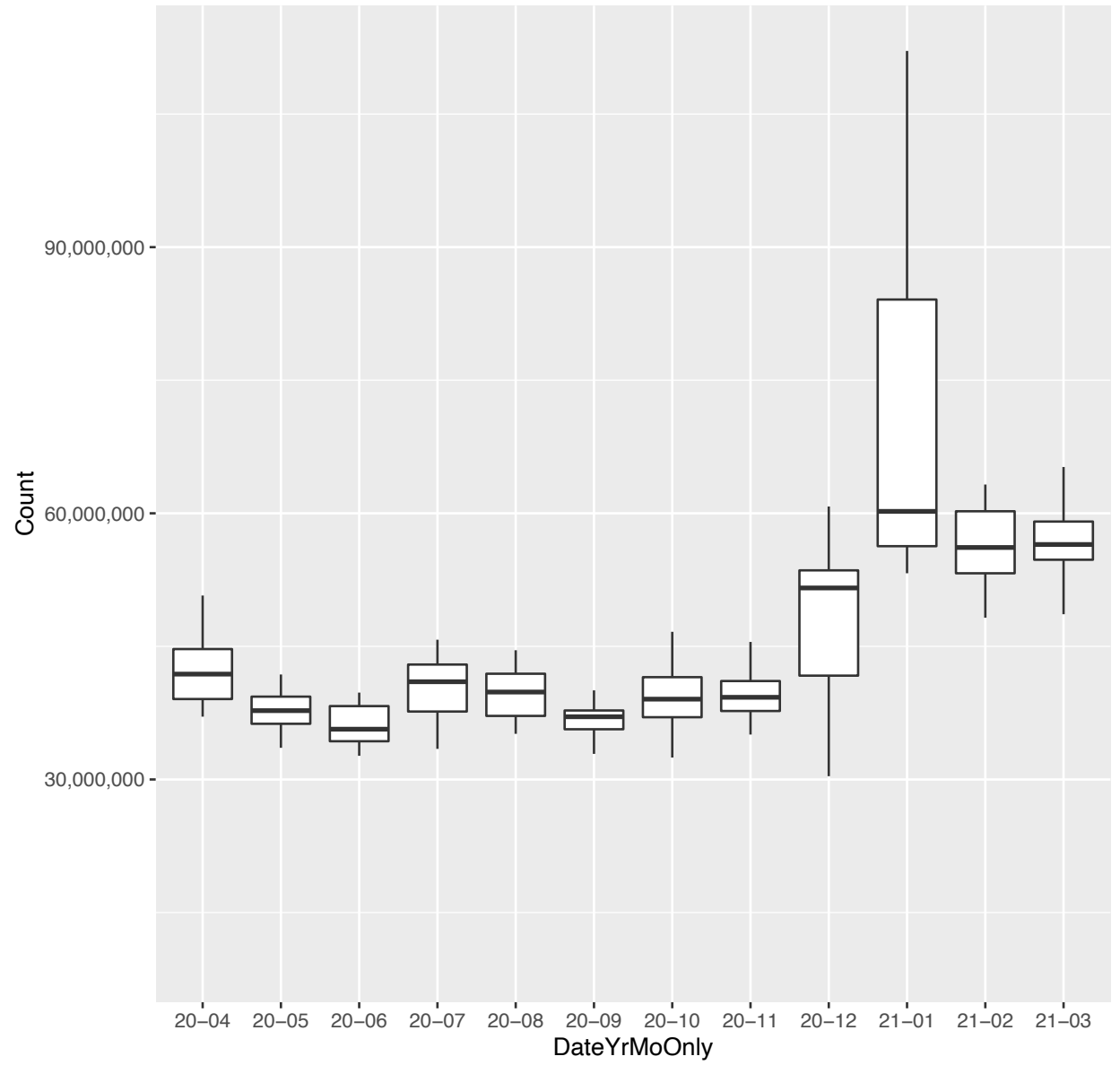


MM

*. qq.com (day-by-day counts and 28 day moving average)



*. qq.com (monthly boxplots (outliers trimmed))

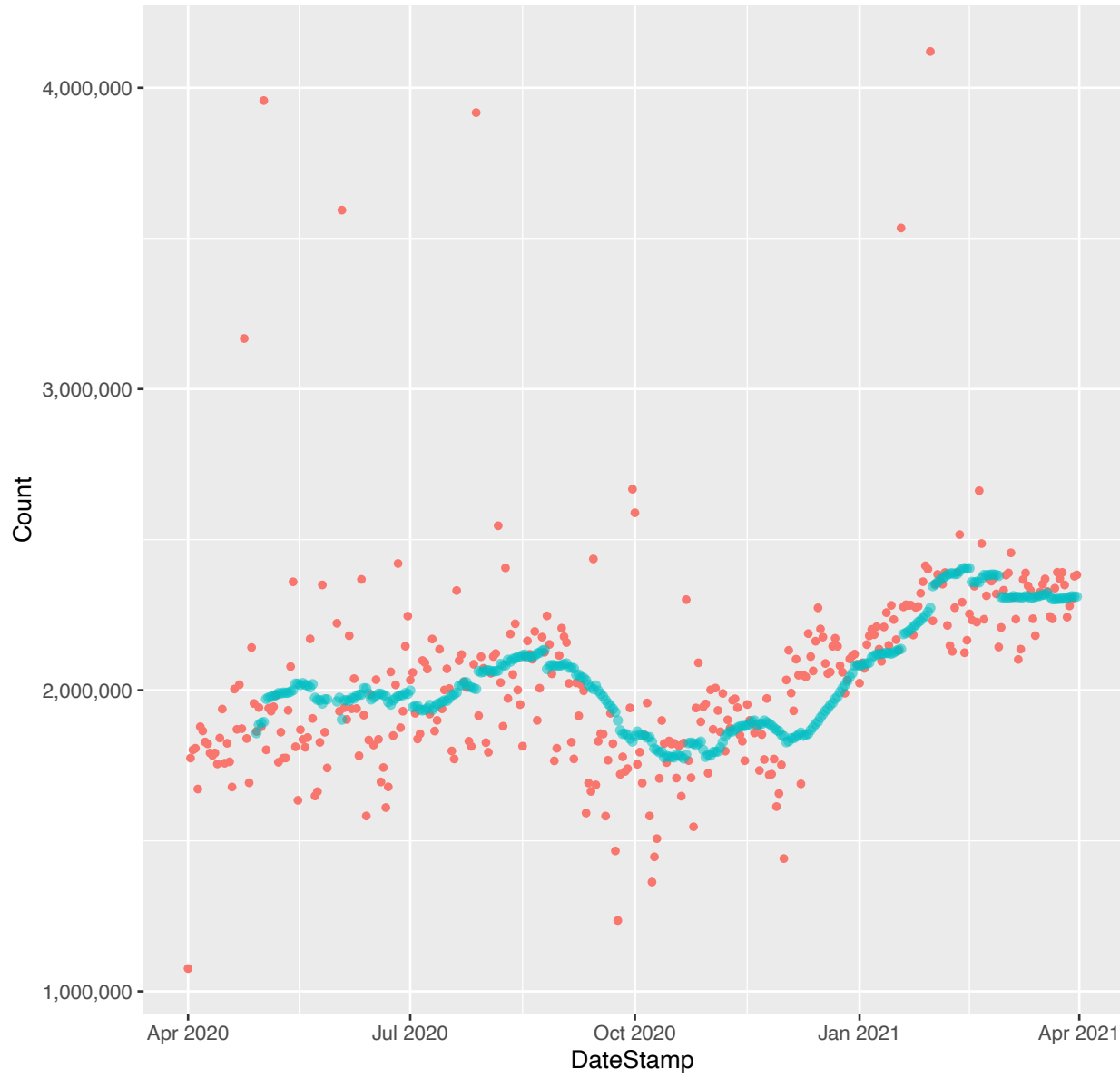


7. reddit.com:

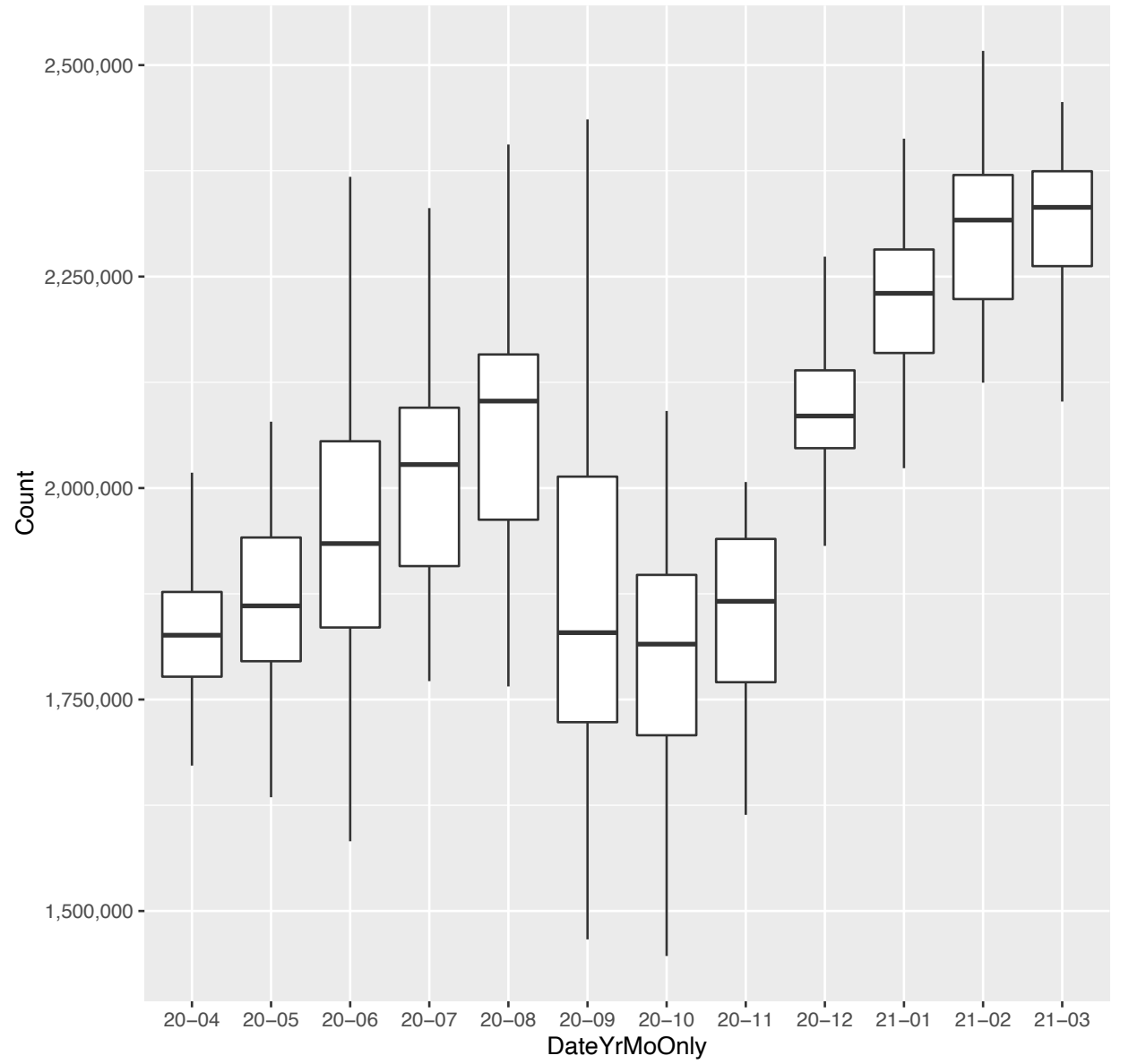


M

*. reddit.com (day-by-day counts and 28 day moving average)



*. reddit.com (monthly boxplots (outliers trimmed))

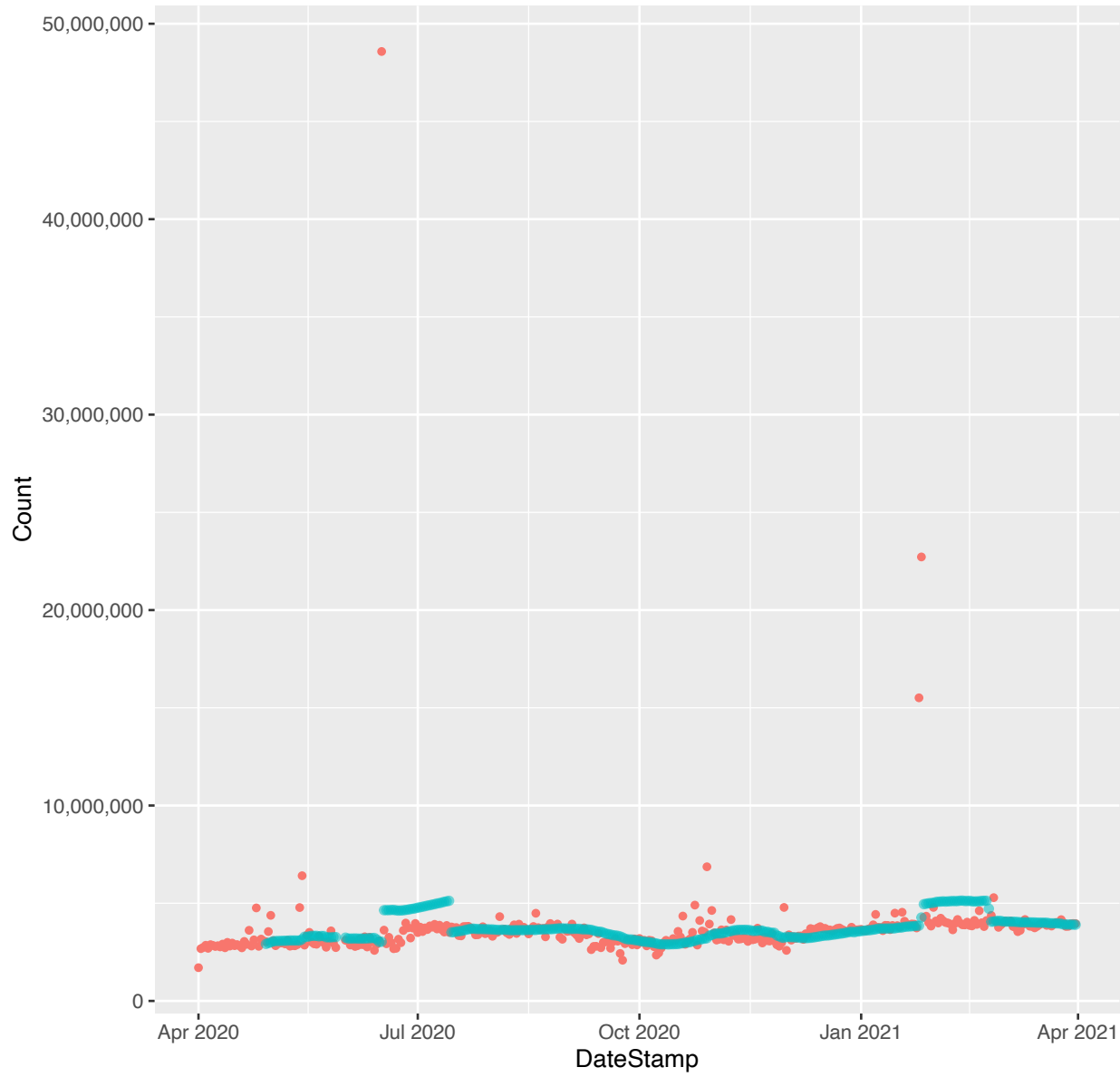


8. snapchat.com:

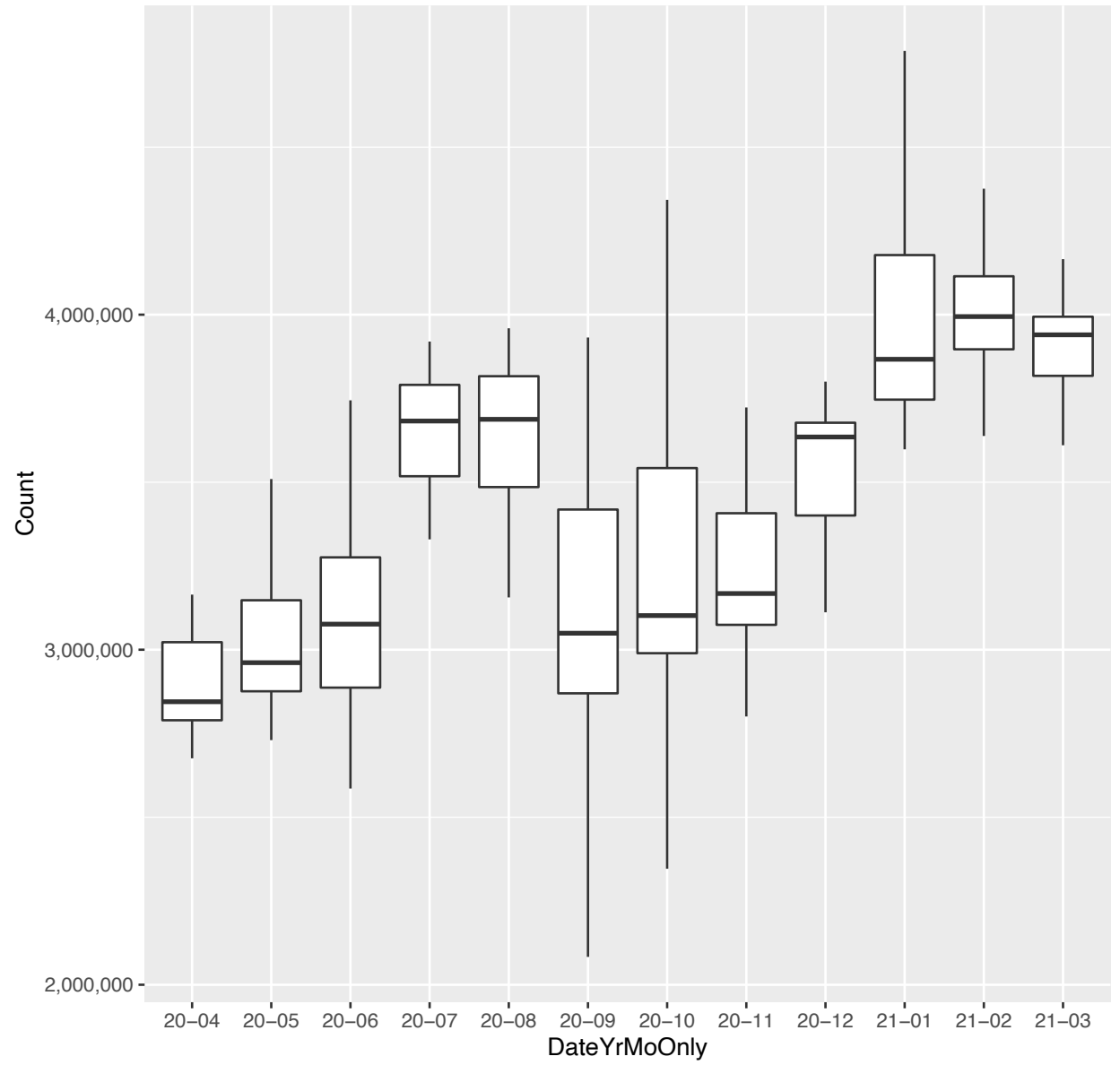


M

*. snapchat.com (day-by-day counts and 28 day moving average)



*. snapchat.com (monthly boxplots (outliers trimmed))



9. tumblr.com:

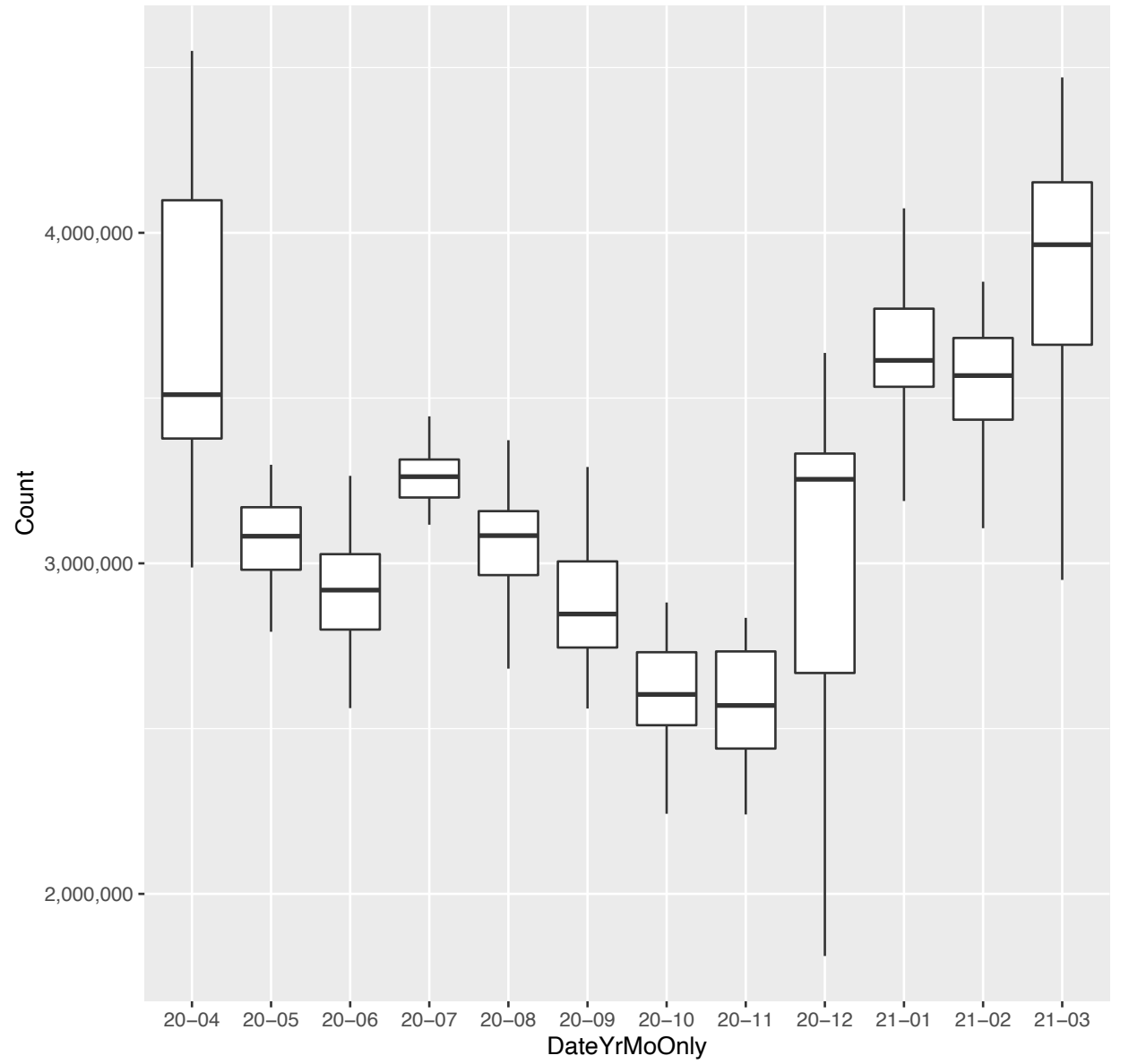
~

M

*. tumblr.com (day-by-day counts and 28 day moving average)



*. tumblr.com (monthly boxplots (outliers trimmed))



10. twitter.com:

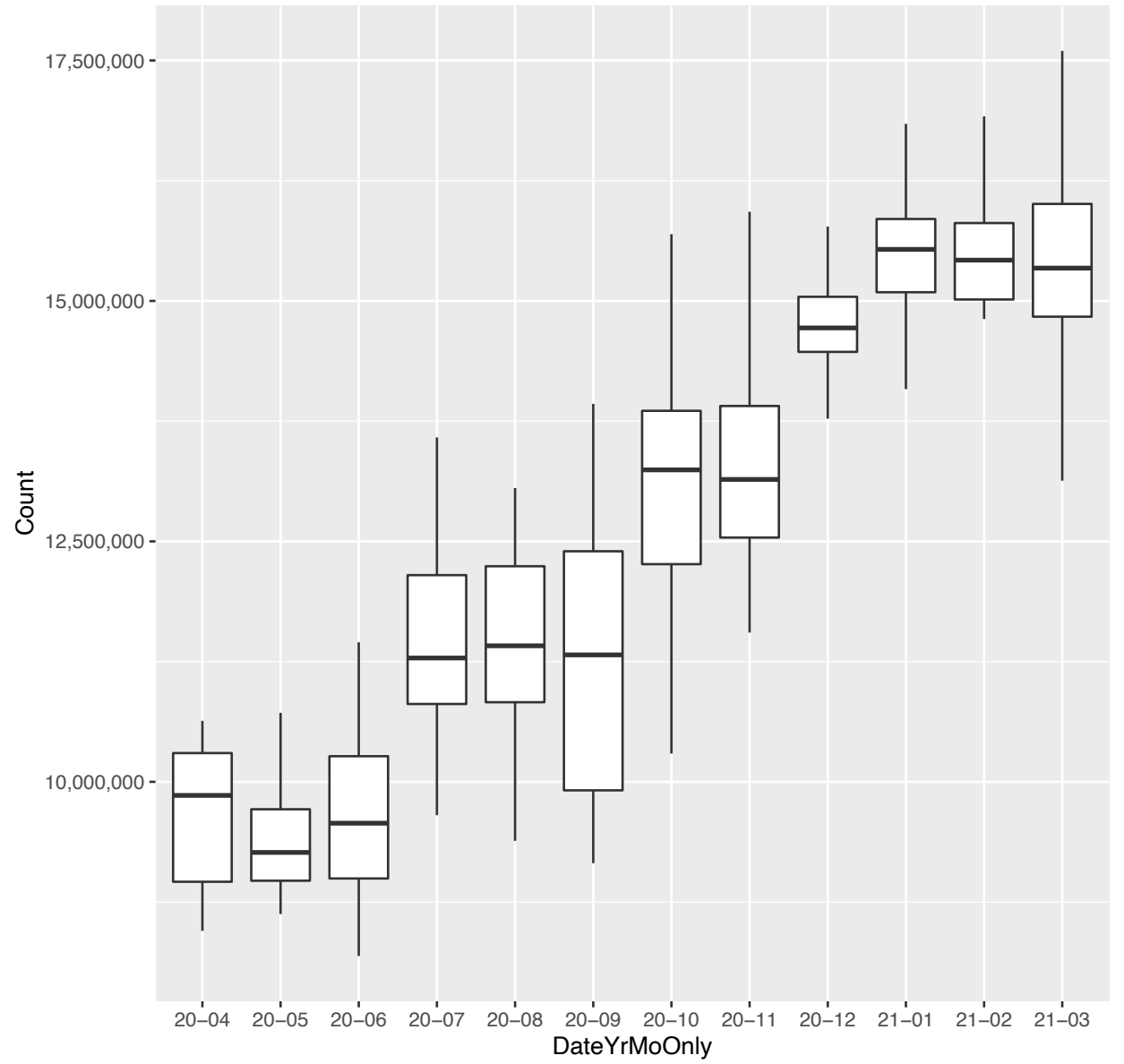


MM

*. twitter.com (day-by-day counts and 28 day moving average)



*. twitter.com (monthly boxplots (outliers trimmed))

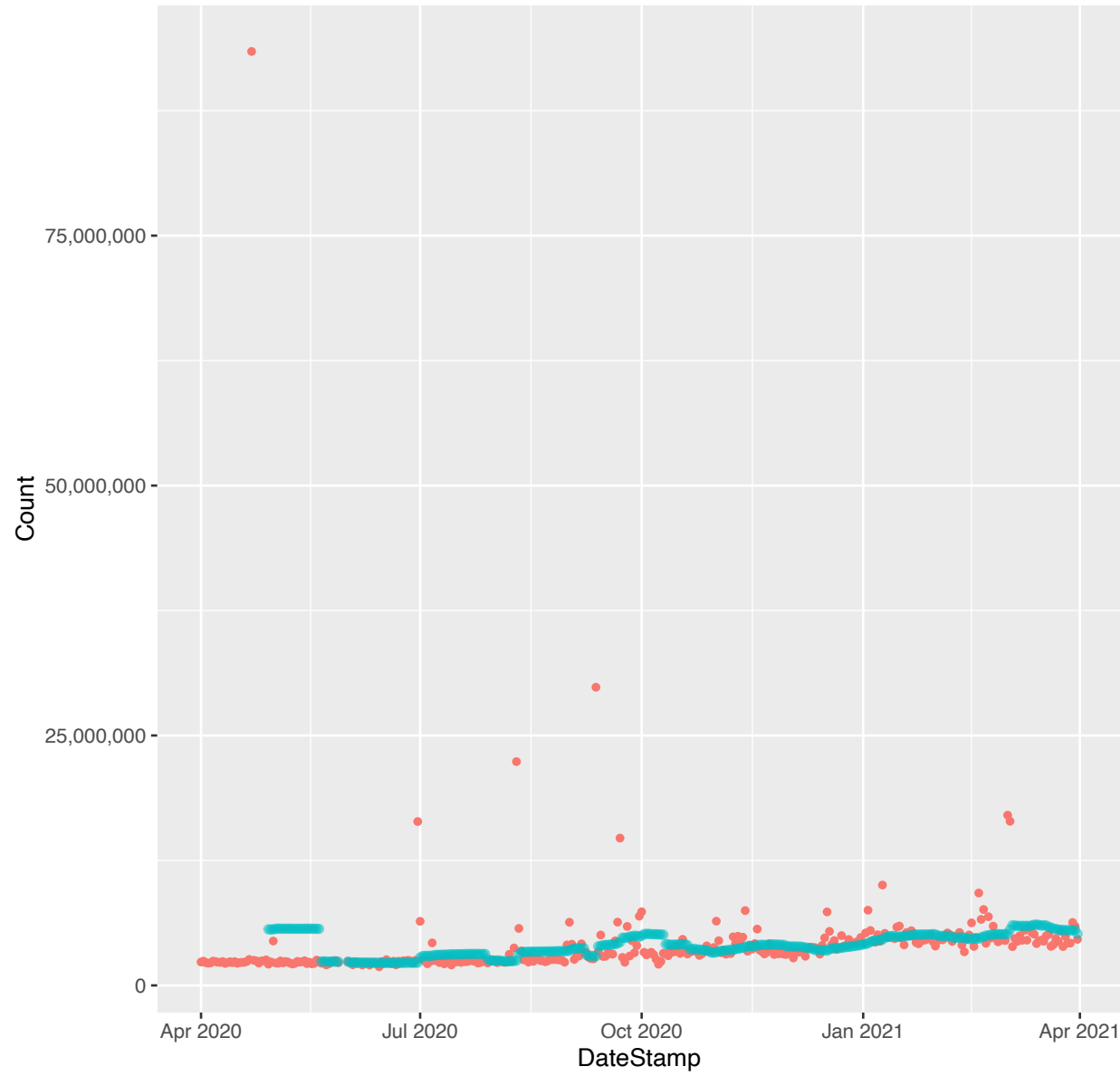


11. vk.com:

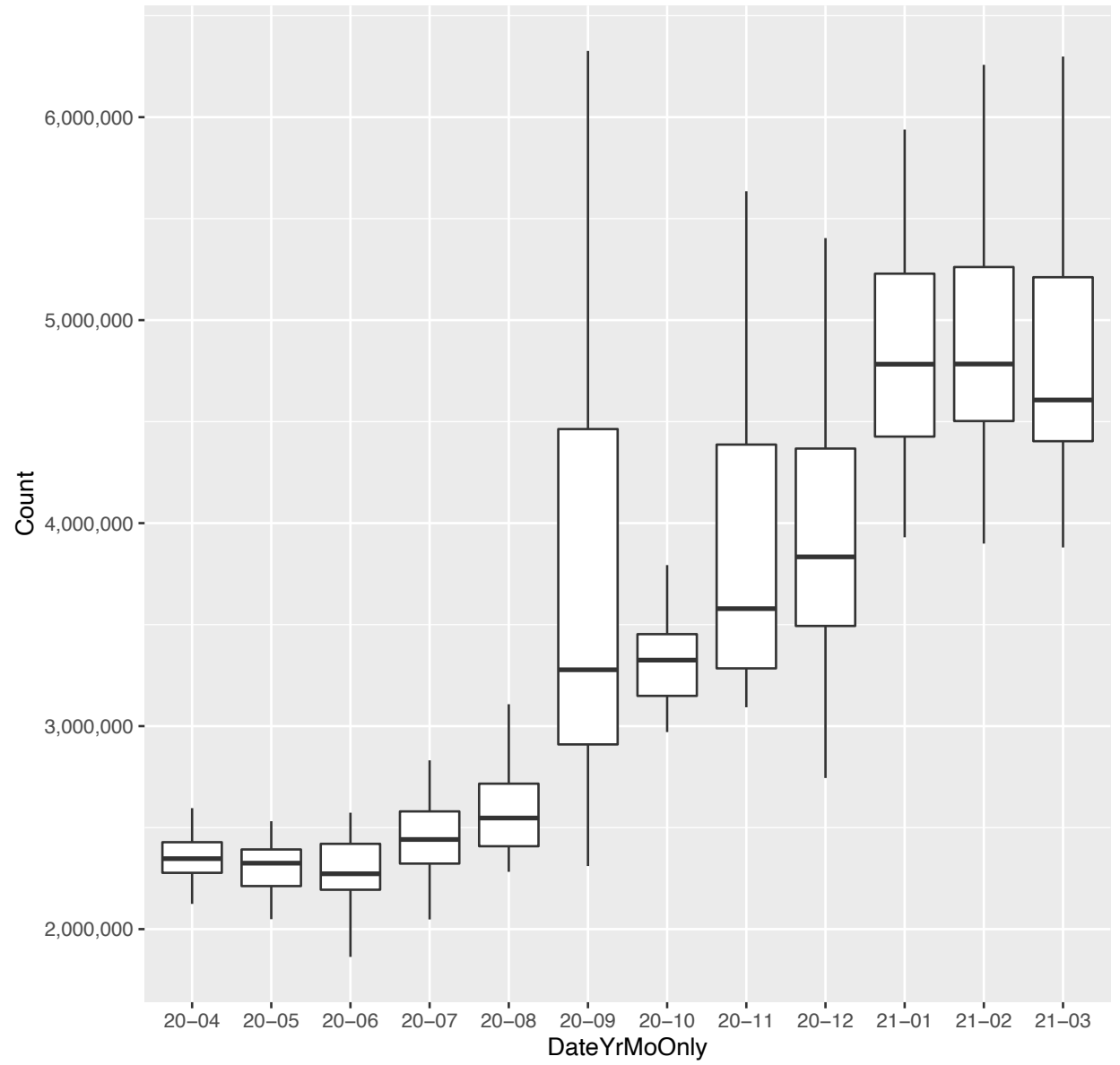


M

*. vk.com (day-by-day counts and 28 day moving average)



*. vk.com (monthly boxplots (outliers trimmed))



X. Social Services Sites

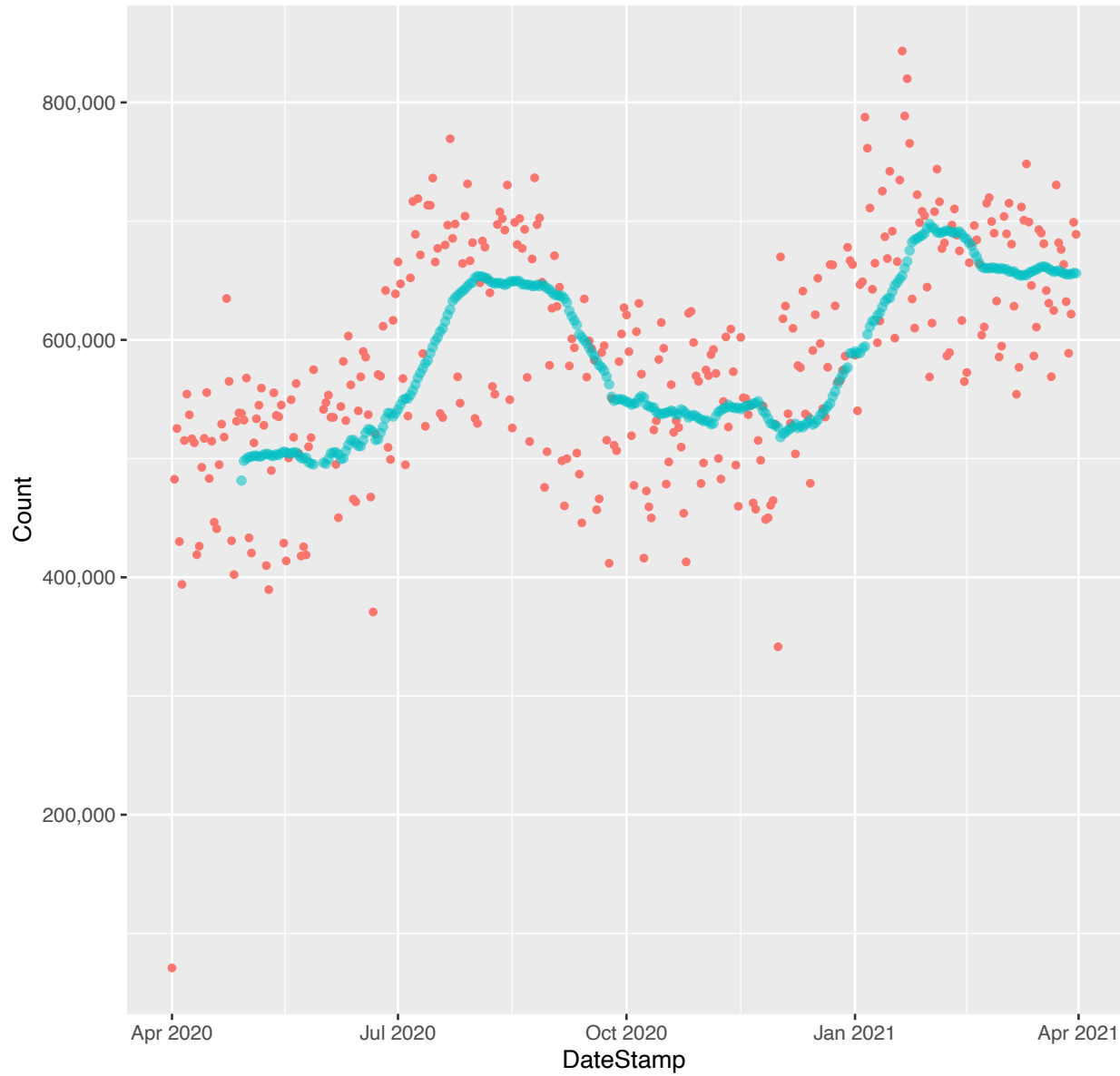
[\[back to TOC\]](#)

This section is divided into two parts: the first section is for Federal or transnational social services organizations; the second part is for state social services.

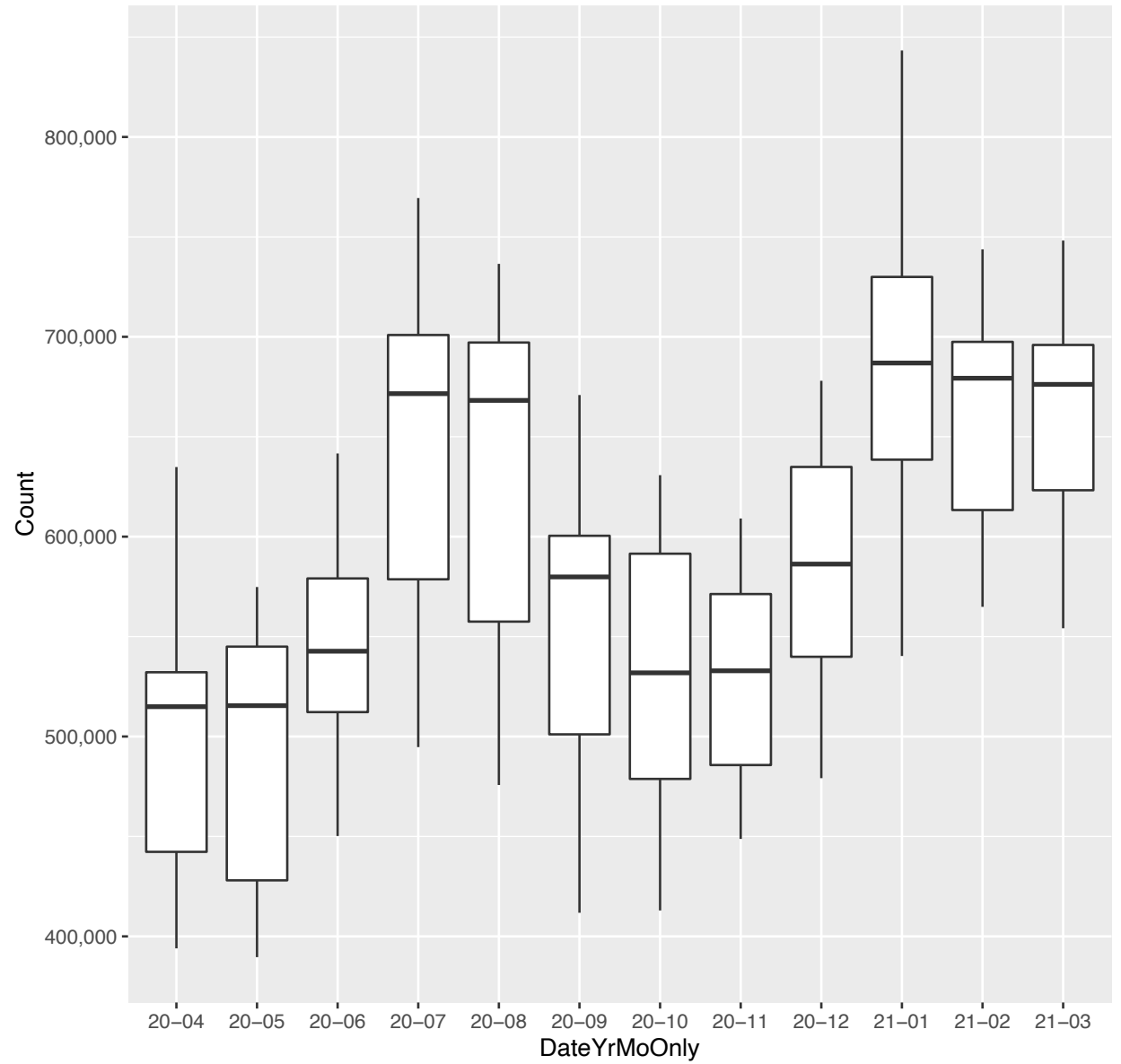
1	hud.gov		~	
2	medicaid.gov		∪ shaped	
3	medicare.gov		↗	
4	savethechildren.net		L shaped	
5	ssa.gov		↗	M
6	unicef.org	✱	∪ shaped (ending lower)	
7	usaid.gov	✱	~	
8	des.az.gov		~	
9	cdss.ca.gov		~	
10	myflfamilies.com		↗	
11	dcf.ks.gov		↗	
12	dcfs.louisiana.gov		~	
13	hsd.state.nm.us		↗	
14	jfs.ohio.gov		∪ shaped ending higher	
15	hs.utah.gov		↗	

1. **hud.gov** (Department of Housing and Urban Development): ~

*. hud.gov (day-by-day counts and 28 day moving average)

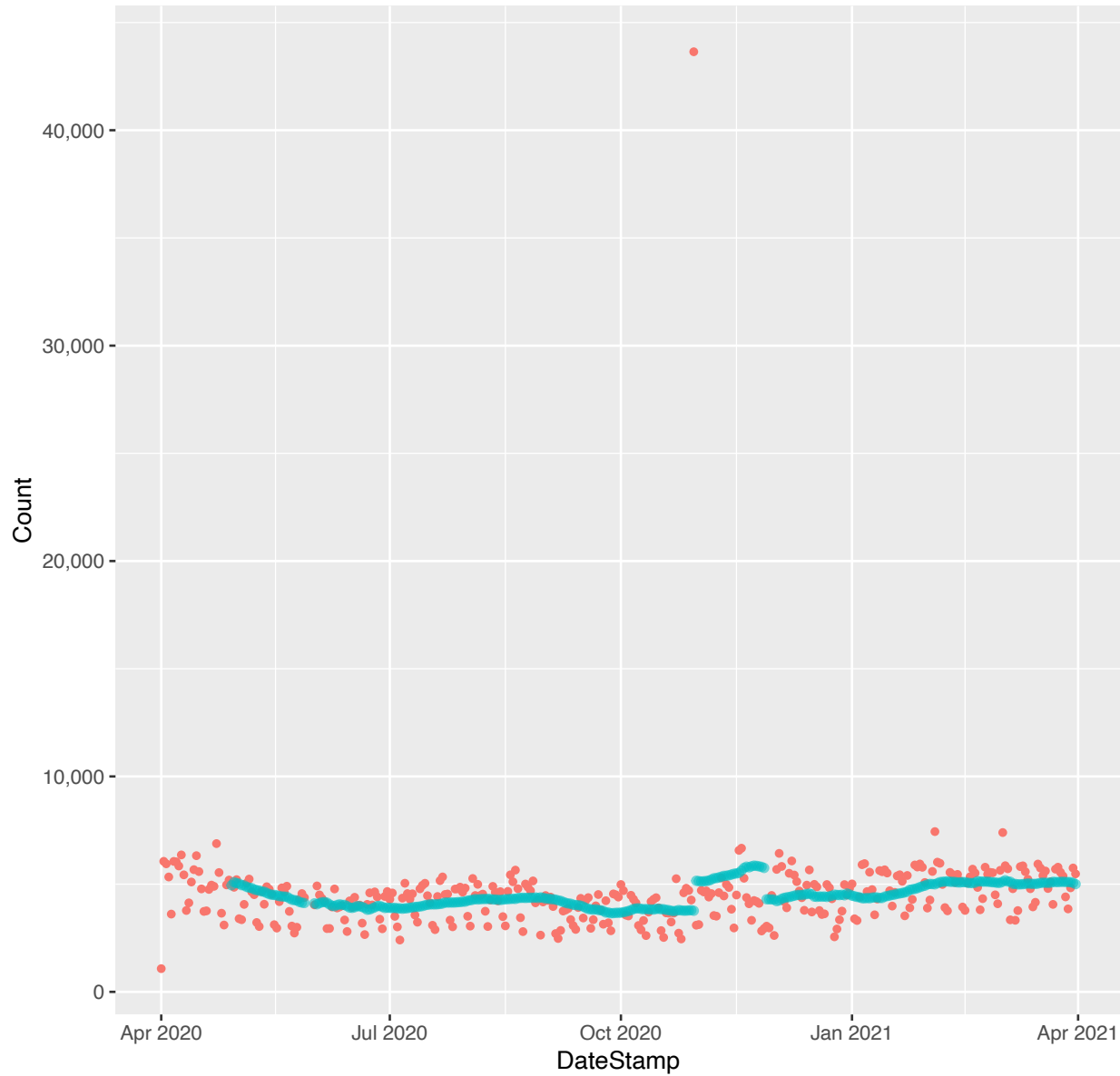


*. hud.gov (monthly boxplots (outliers trimmed))

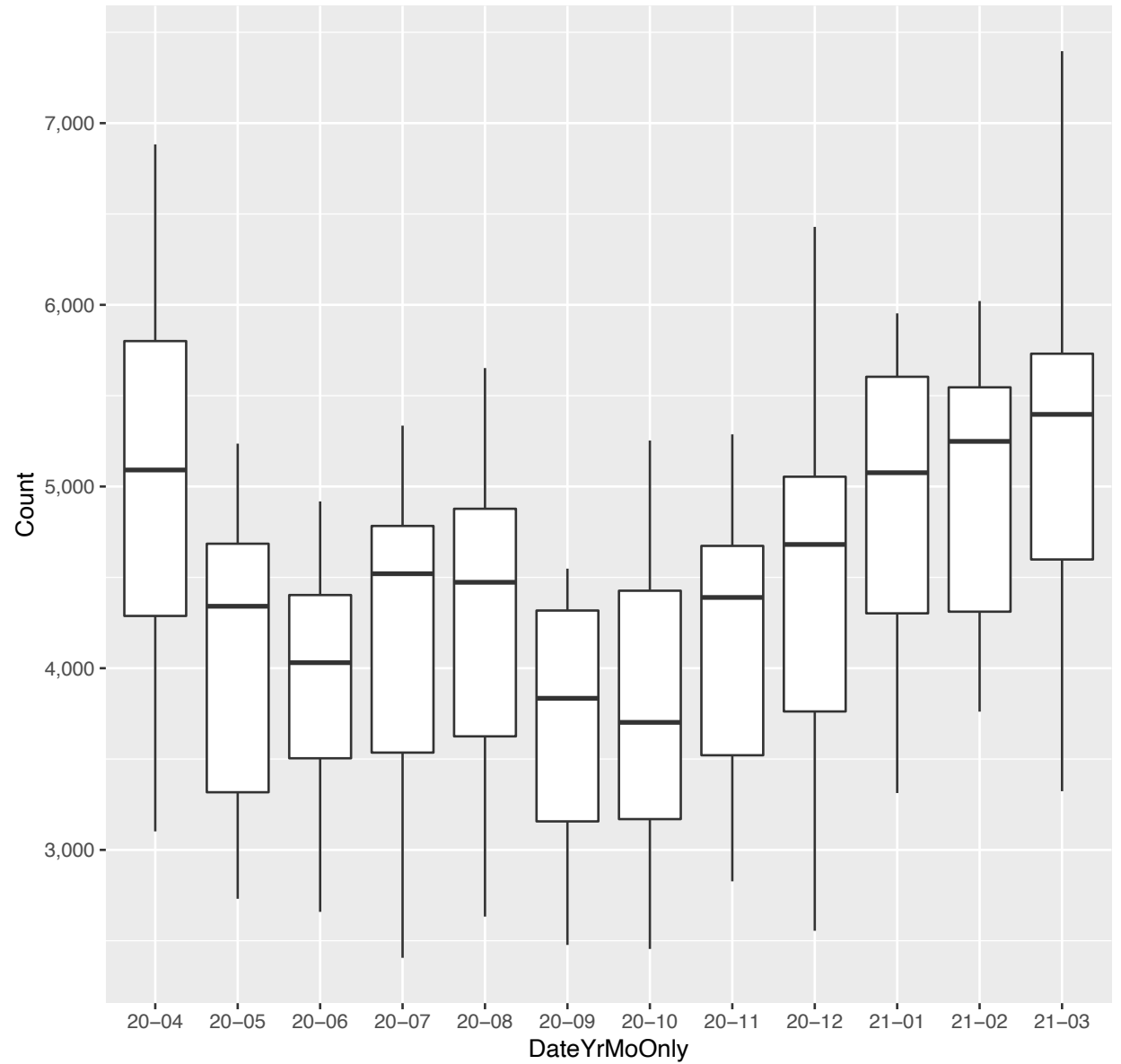


2. medicaid.gov ("All states, the District of Columbia, and the U.S. territories have Medicaid programs designed to provide health coverage for low-income people."): U shaped

*. medicaid.gov (day-by-day counts and 28 day moving average)

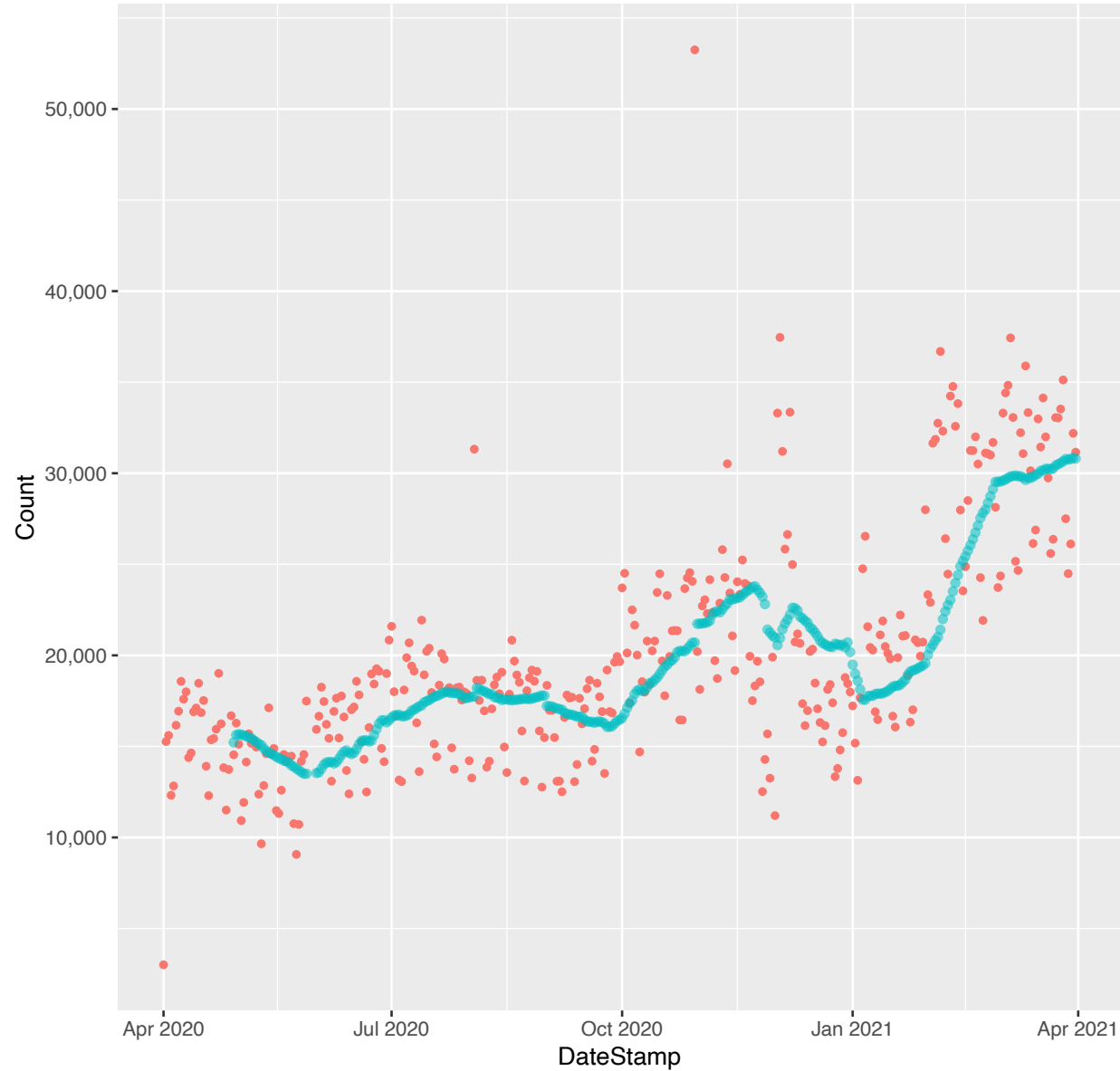


*. medicaid.gov (monthly boxplots (outliers trimmed))

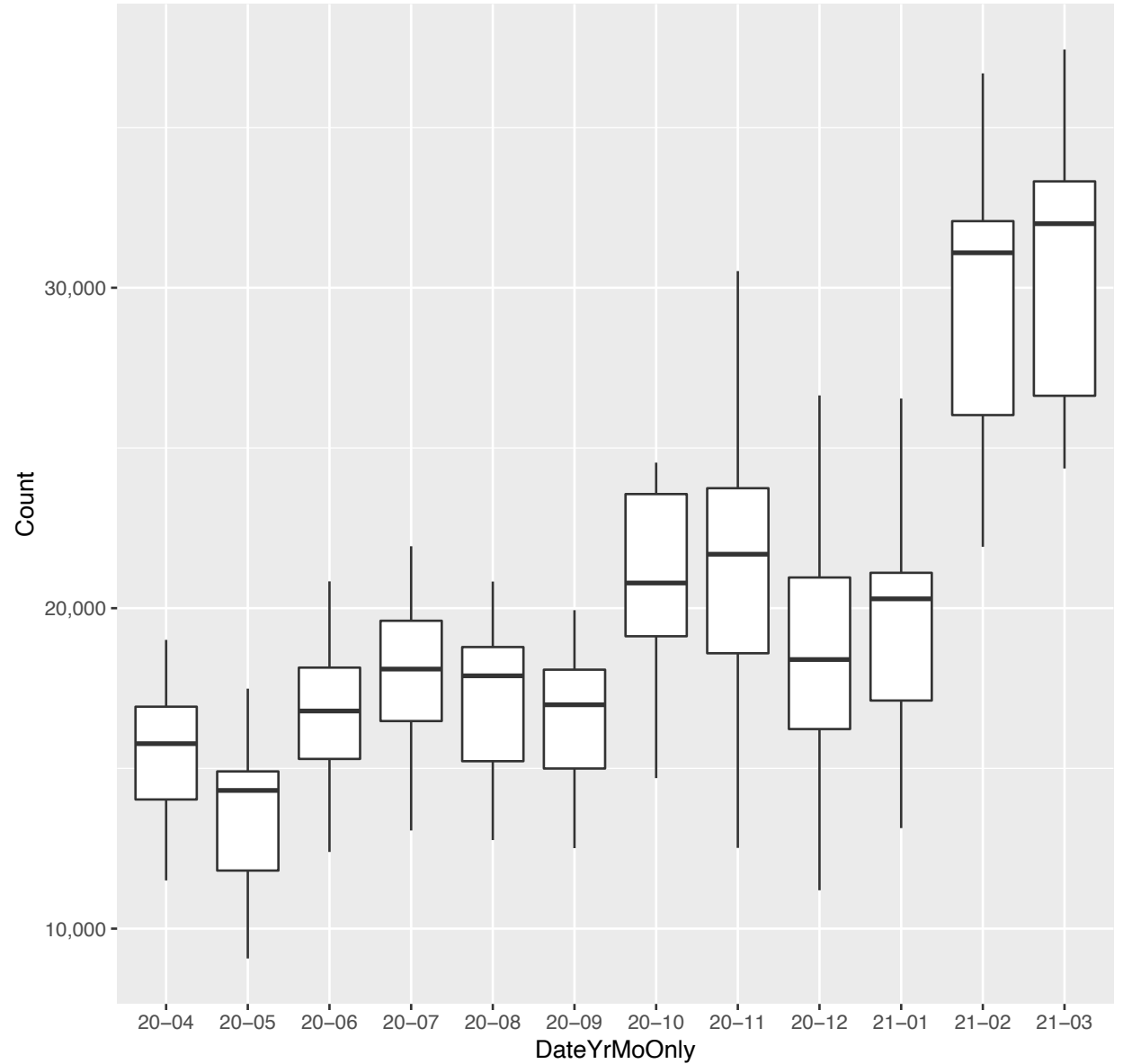


3. medicare.gov ("Medicare is the federal health insurance program for: People who are 65 or older; certain younger people with disabilities; people with End-Stage Renal Disease (permanent kidney failure requiring dialysis or a transplant, sometimes called ESRD)"): ↗

*. medicare.gov (day-by-day counts and 28 day moving average)

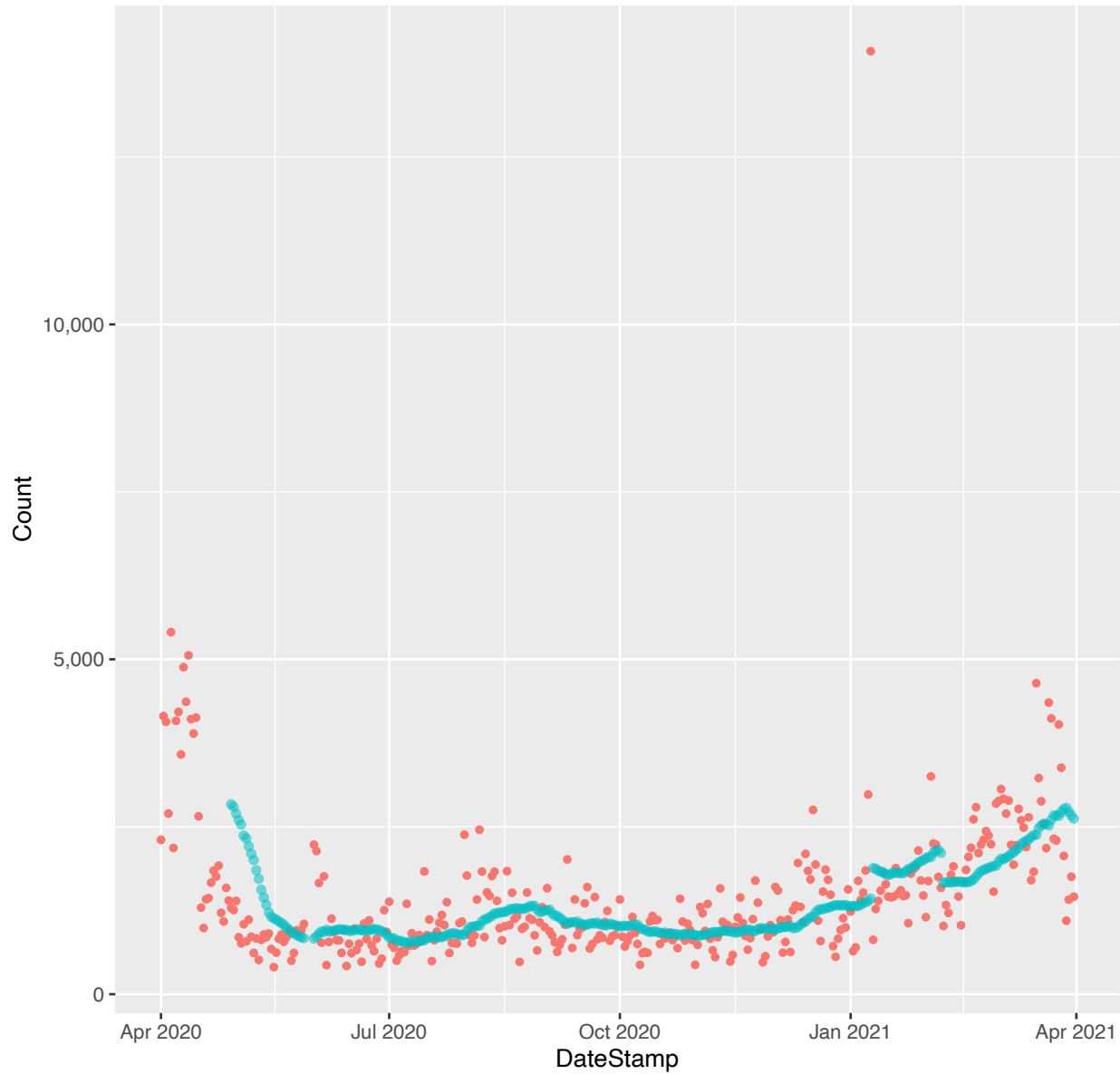


*. medicare.gov (monthly boxplots (outliers trimmed))

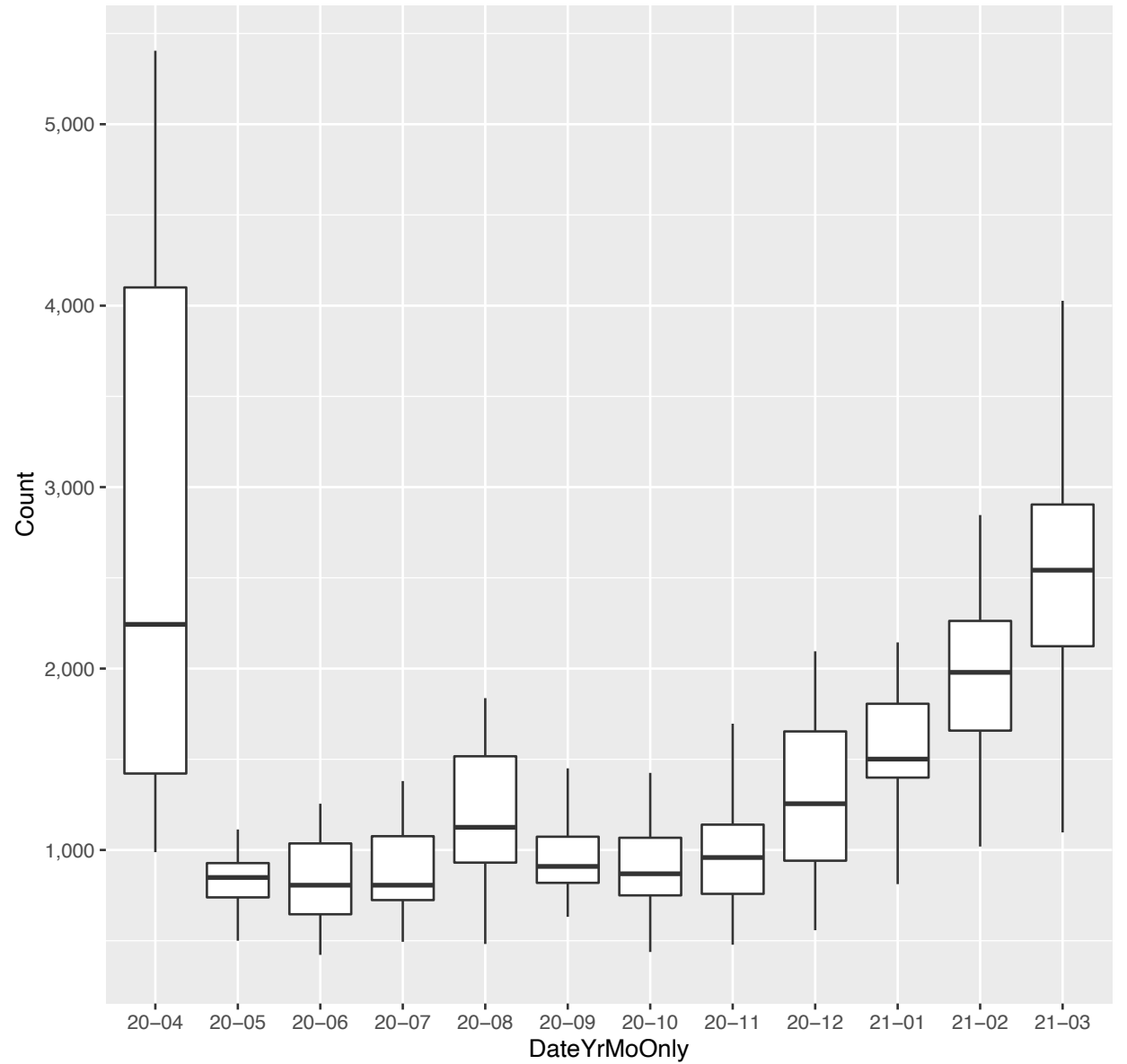


4. savethechildren.net: L shaped

*. savethechildren.net (day-by-day counts and 28 day moving average)



*. savethechildren.net (monthly boxplots (outliers trimmed))



5. ssa.gov (Social Security Administration):

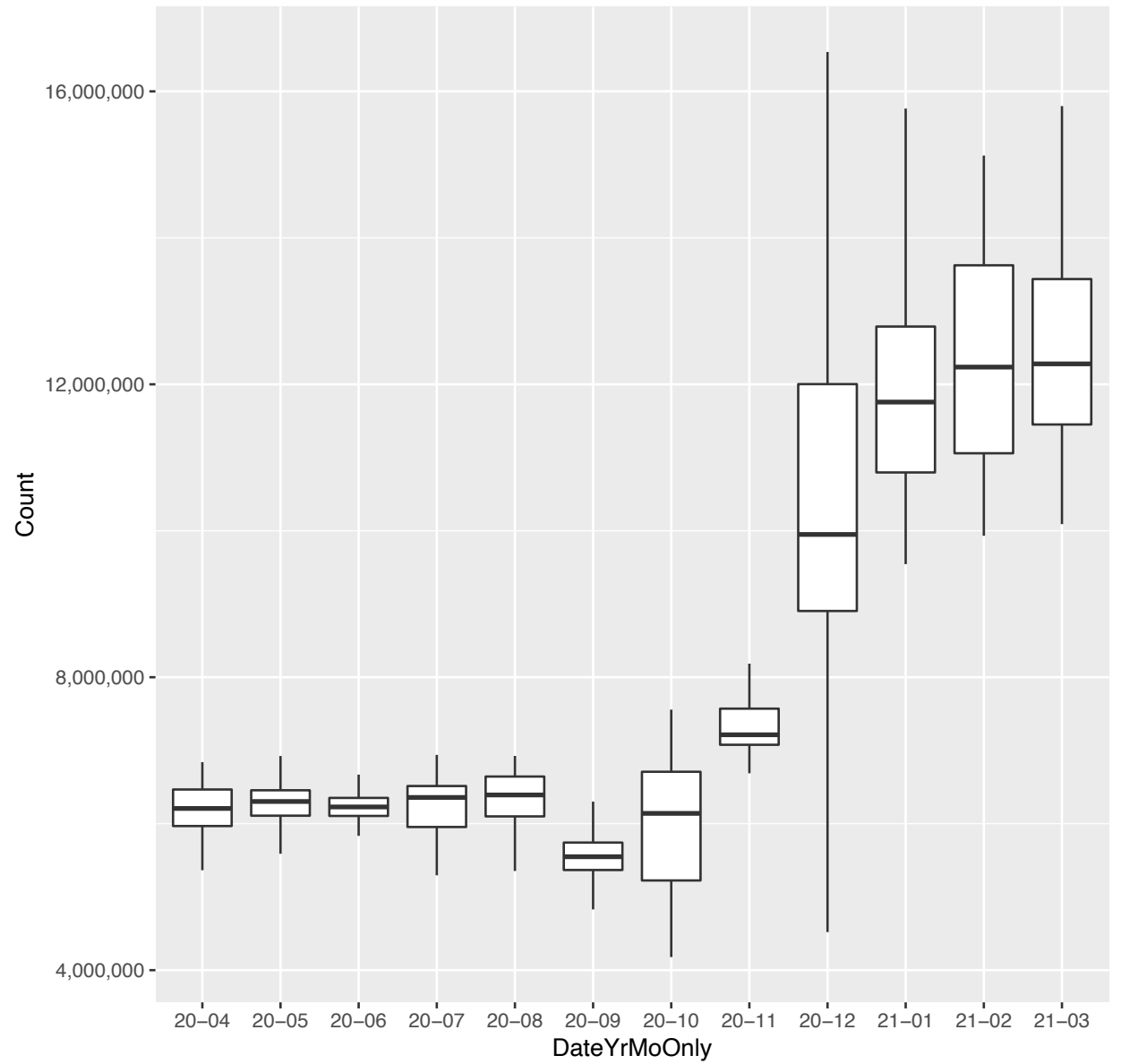


M

*. ssa.gov (day-by-day counts and 28 day moving average)



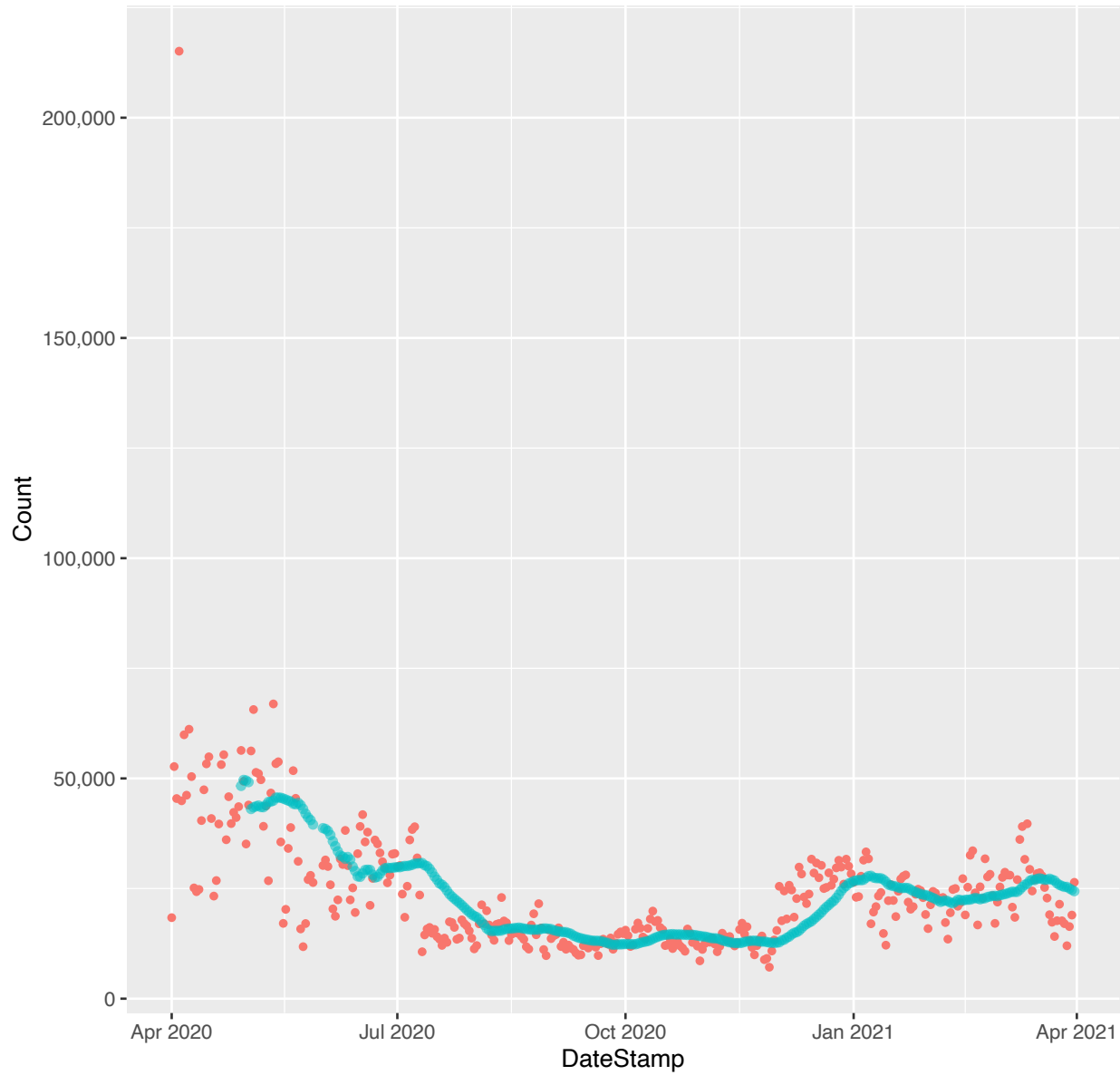
*. ssa.gov (monthly boxplots (outliers trimmed))



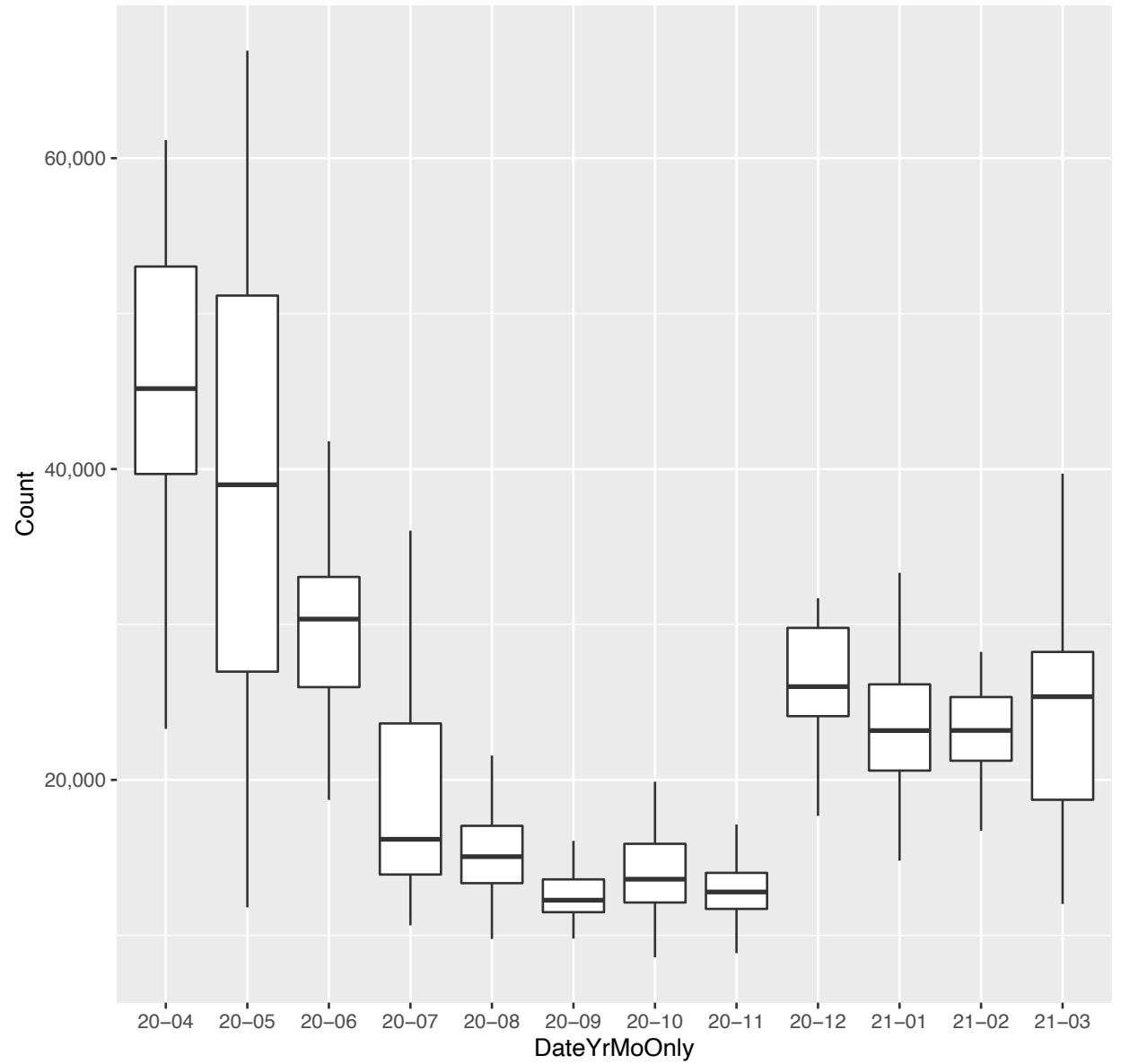
6. unicef.org:



★ ◡ shaped (ending lower)

*. unicef.org (day-by-day counts and 28 day moving average)

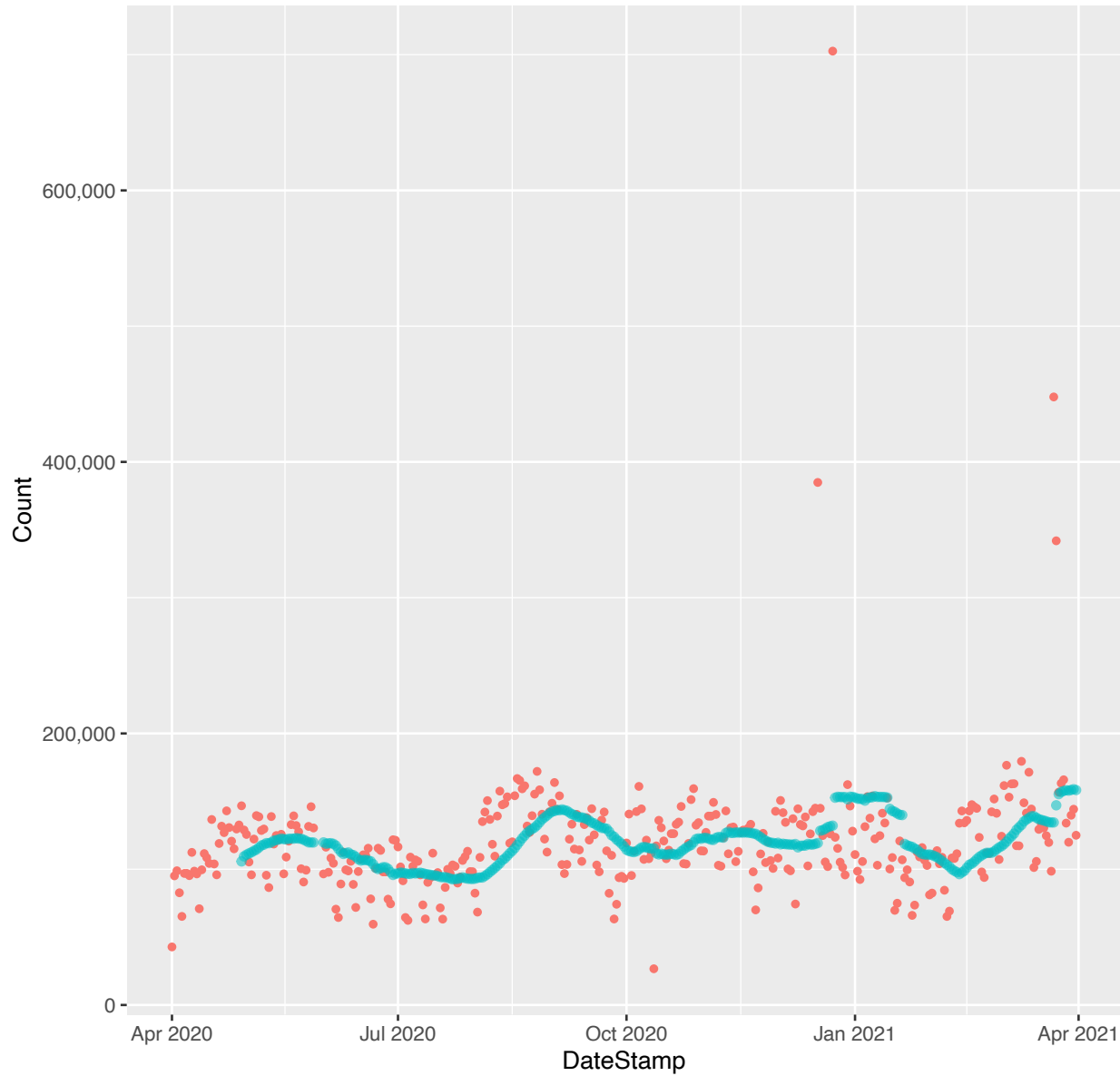


*. unicef.org (monthly boxplots (outliers trimmed))

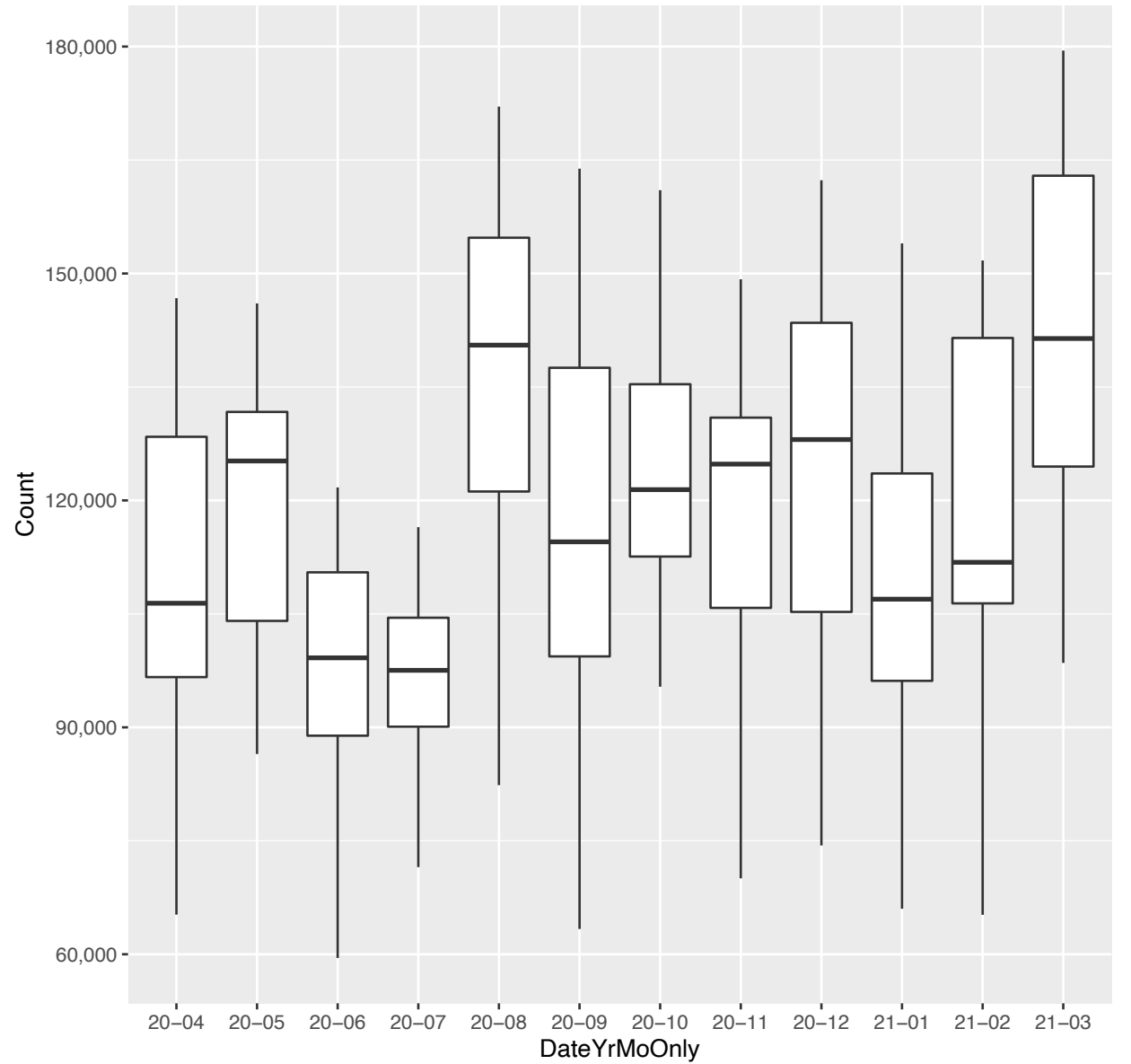


7. **usaid.gov** ("USAID leads international development and humanitarian efforts to save lives, reduce poverty, [etc]"):  

*. usaid.gov (day-by-day counts and 28 day moving average)

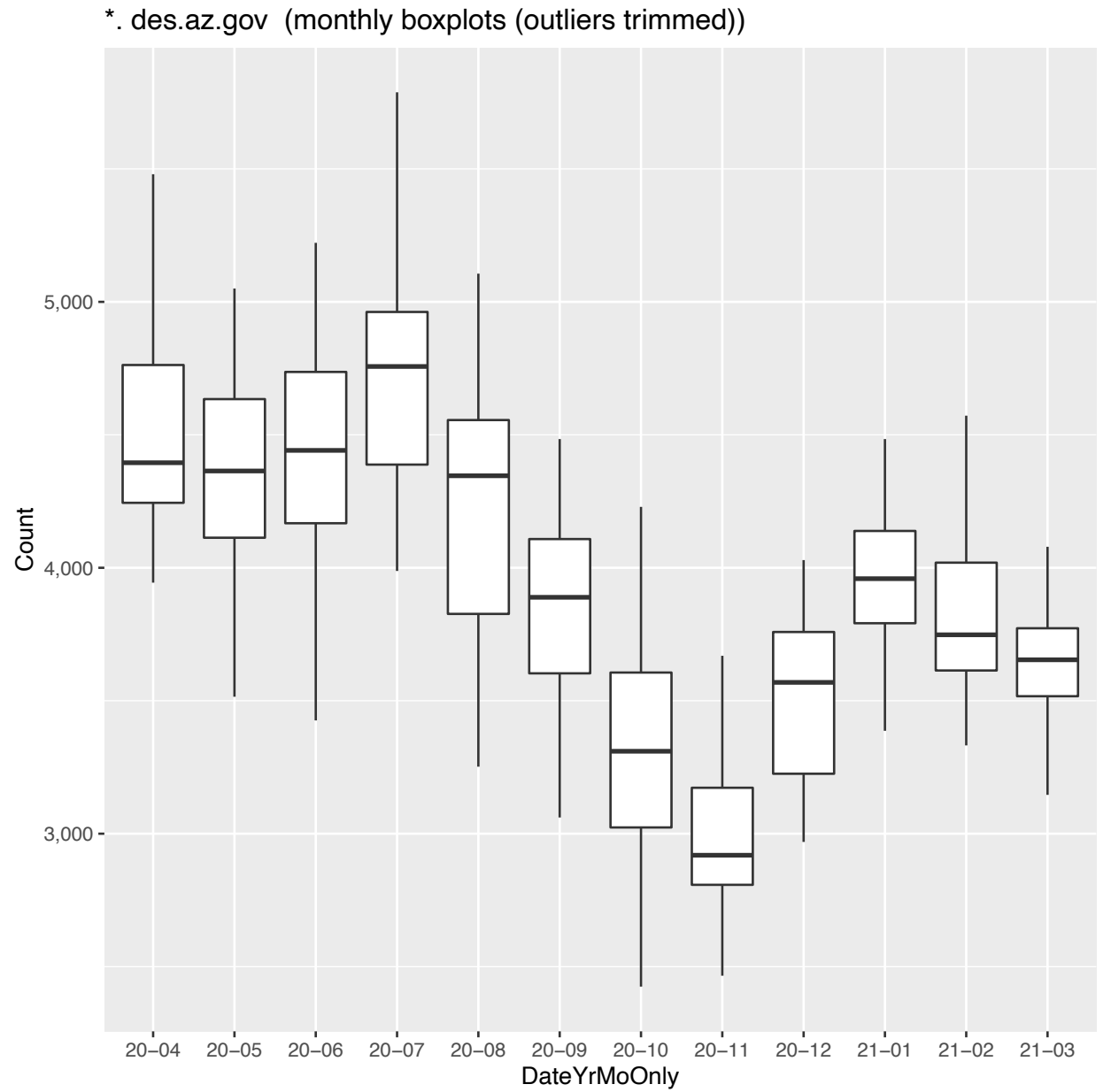
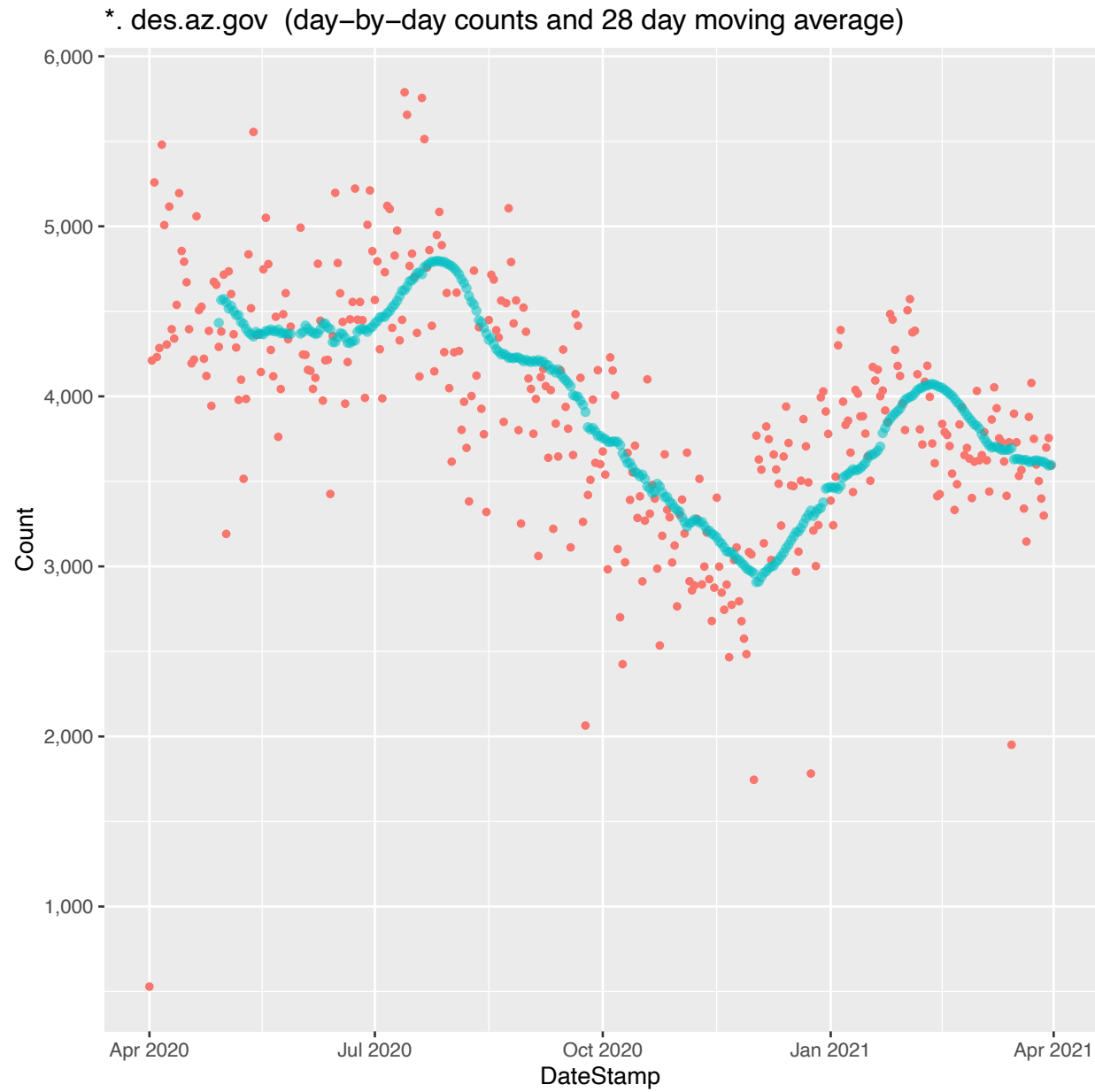


*. usaid.gov (monthly boxplots (outliers trimmed))



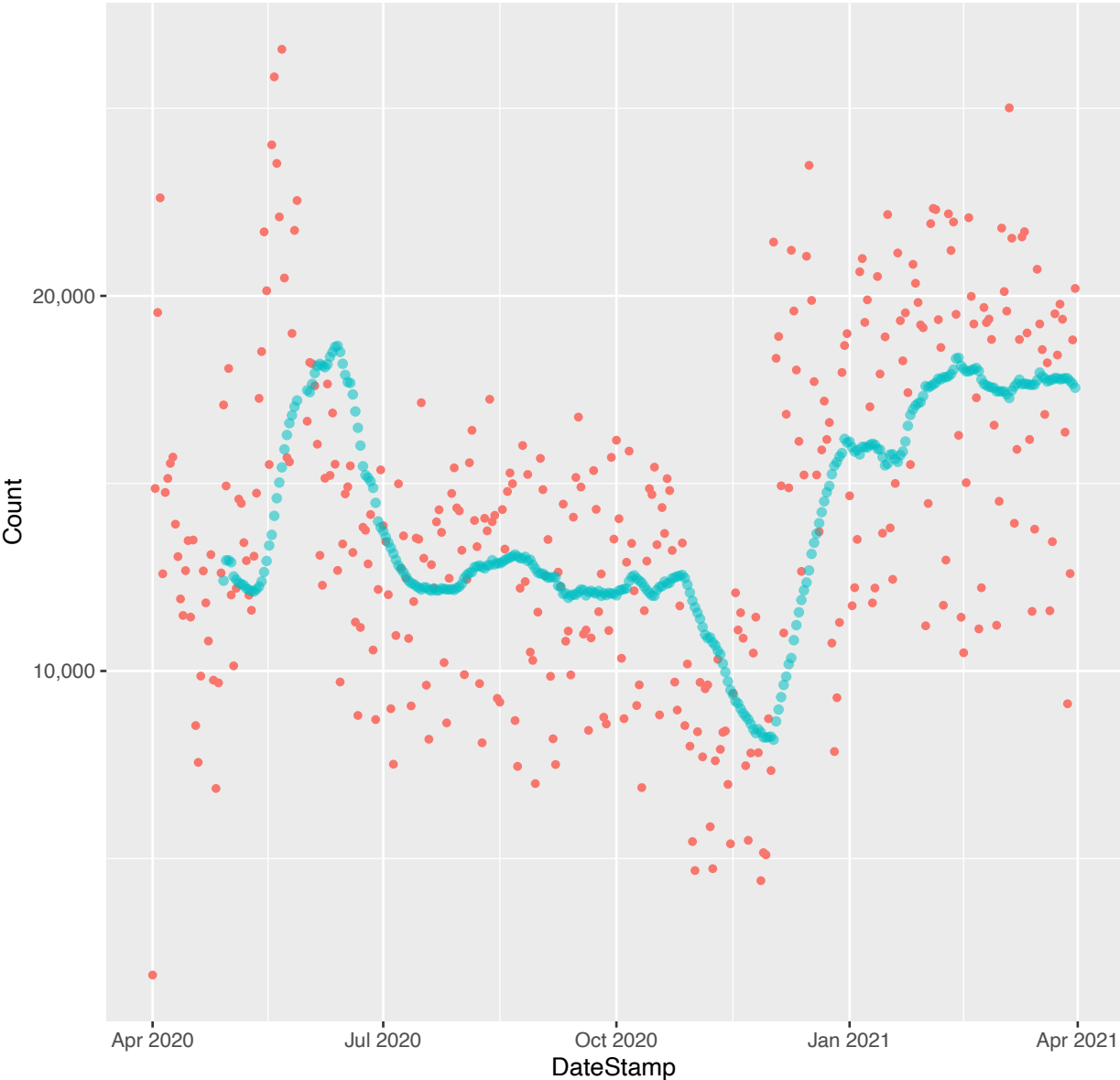
8. **des.az.gov** (Arizona Department of Economic Security):

~

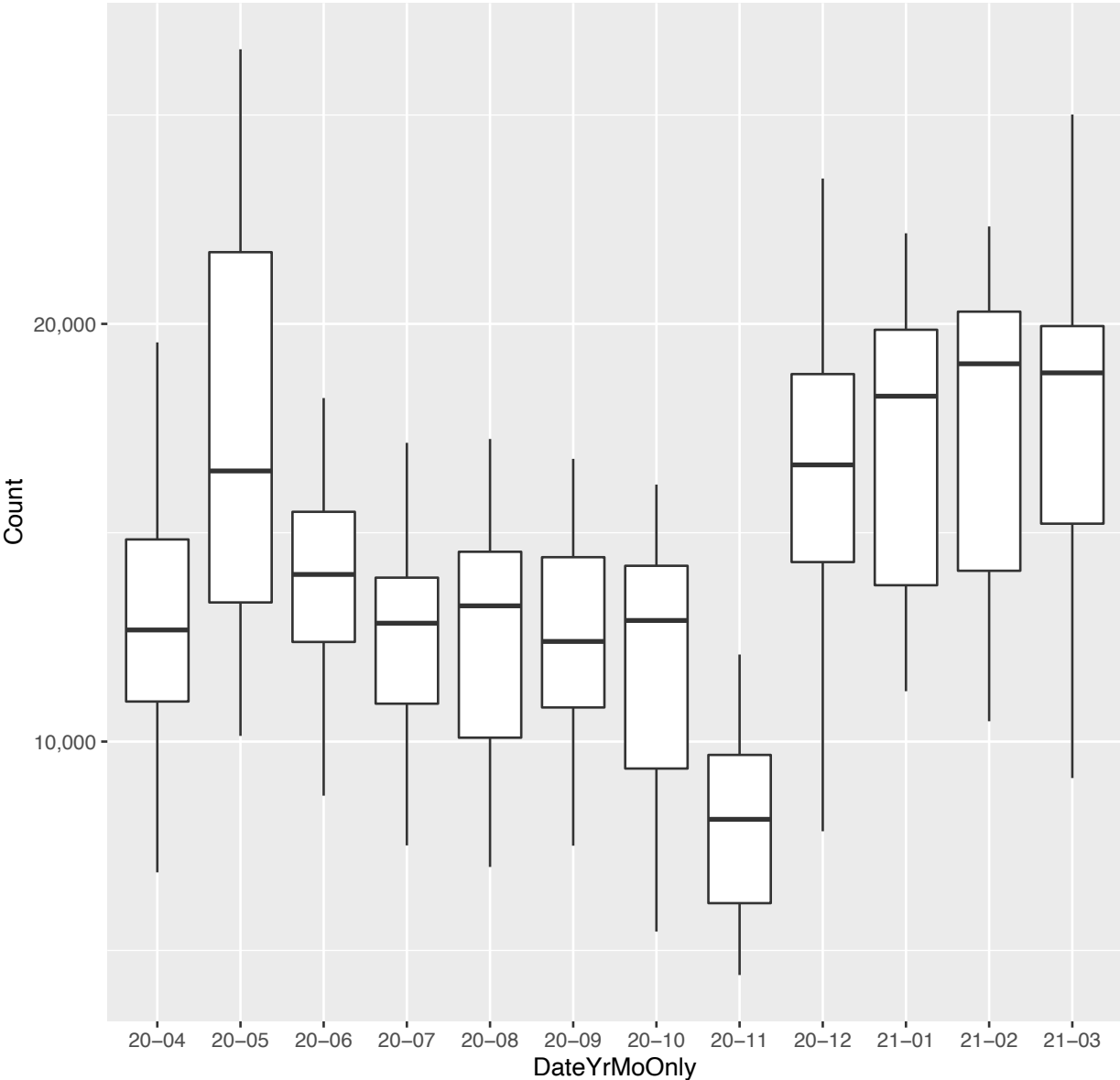


9. cdss.ca.gov (California Department of Social Services): ~

*. cdss.ca.gov (day-by-day counts and 28 day moving average)



*. cdss.ca.gov (monthly boxplots (outliers trimmed))



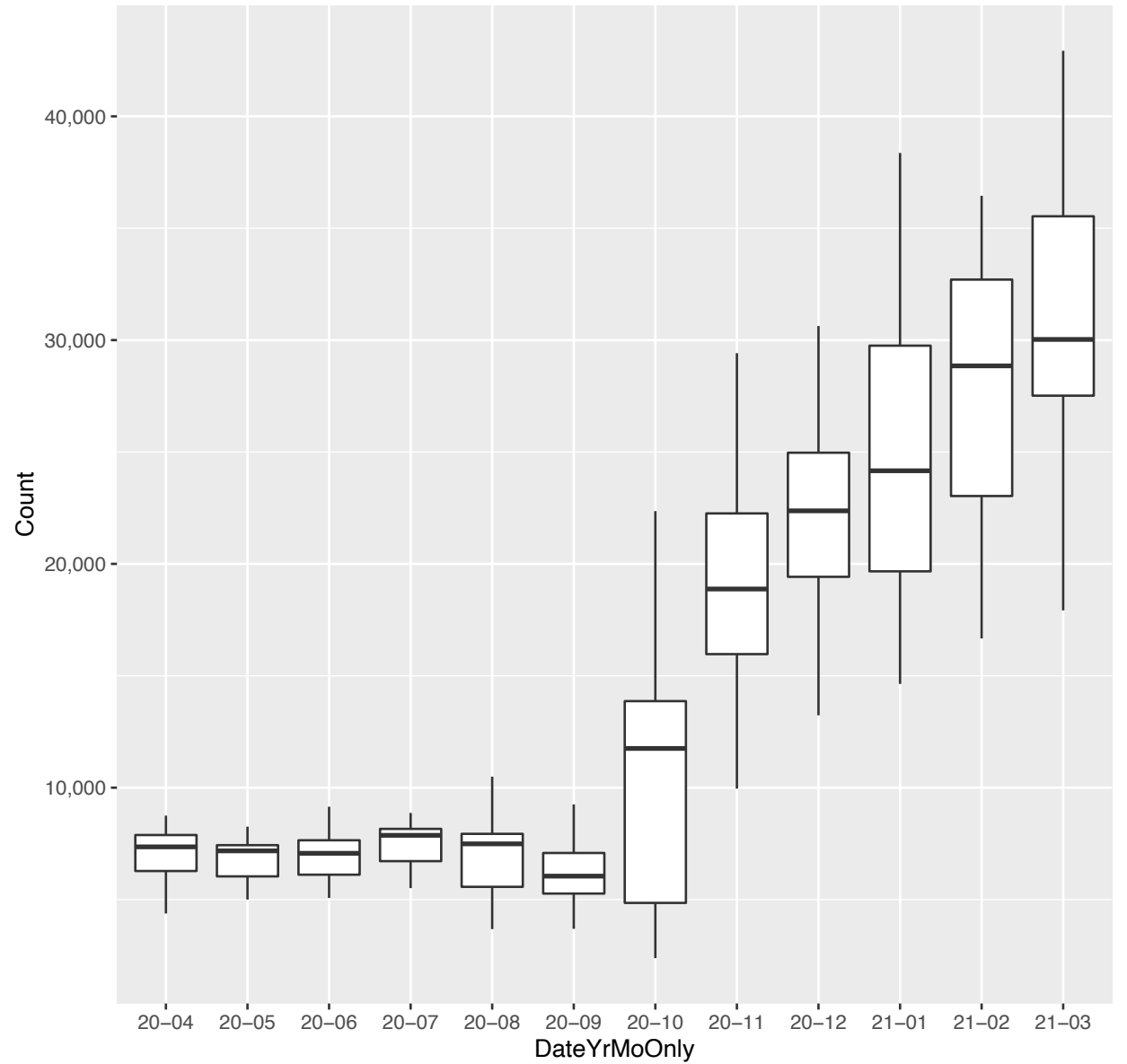
10. myflfamilies.com (Florida Department of Children and Families):



*. myflfamilies.com (day-by-day counts and 28 day moving average)

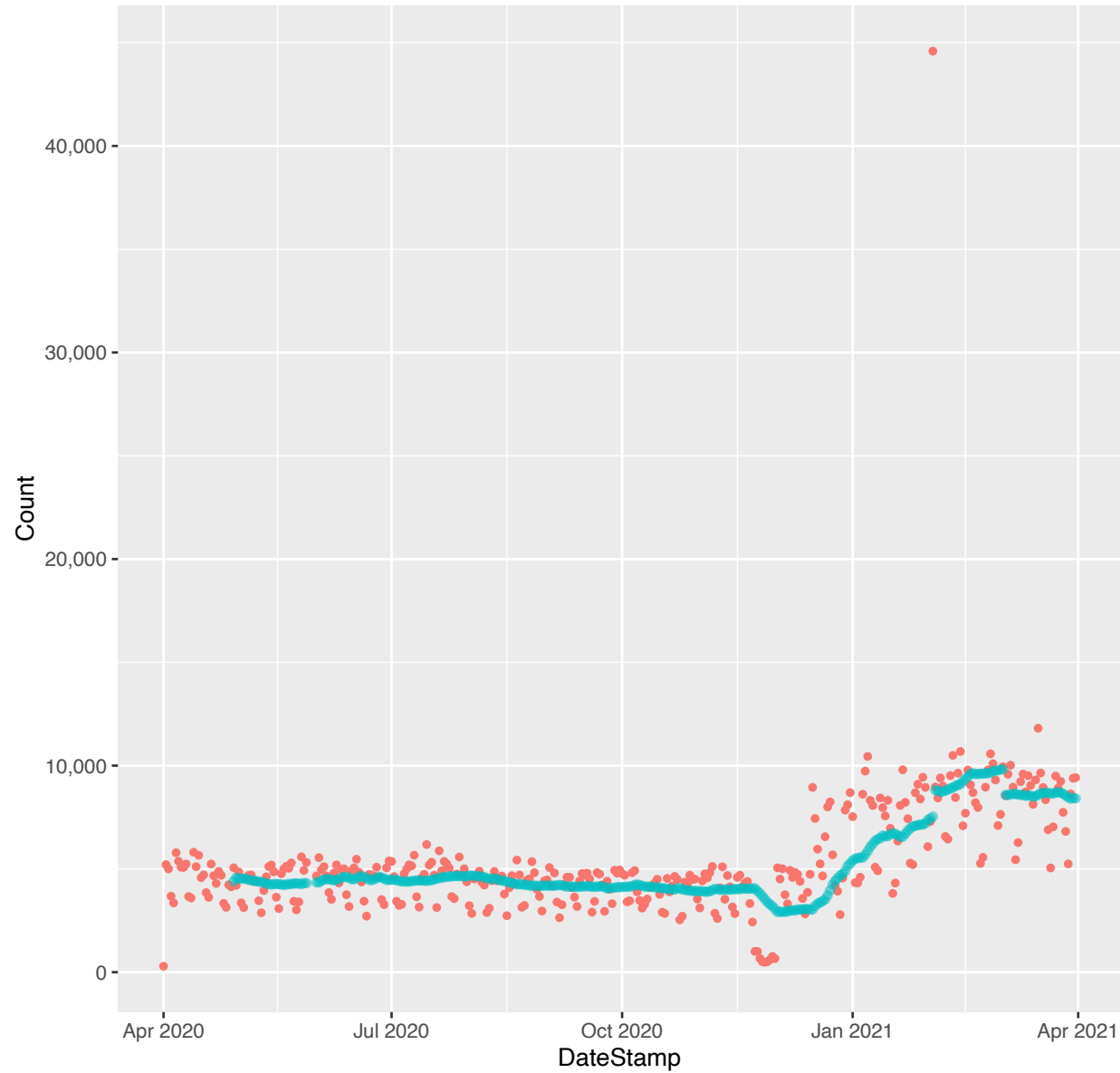


*. myflfamilies.com (monthly boxplots (outliers trimmed))

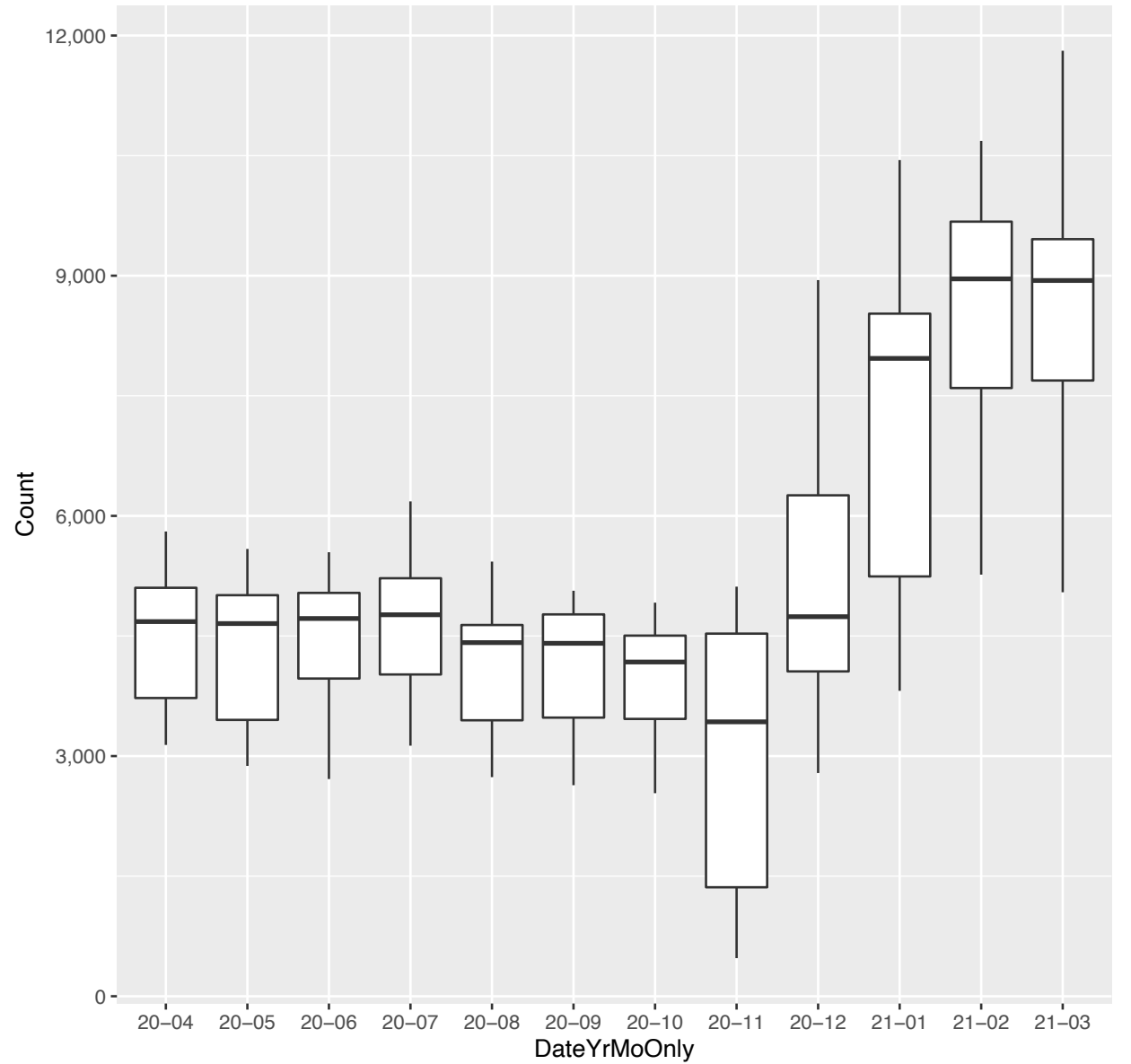


11. dcf.ks.gov (Kansas Department for Children and Families): ↗

*. dcf.ks.gov (day-by-day counts and 28 day moving average)



*. dcf.ks.gov (monthly boxplots (outliers trimmed))



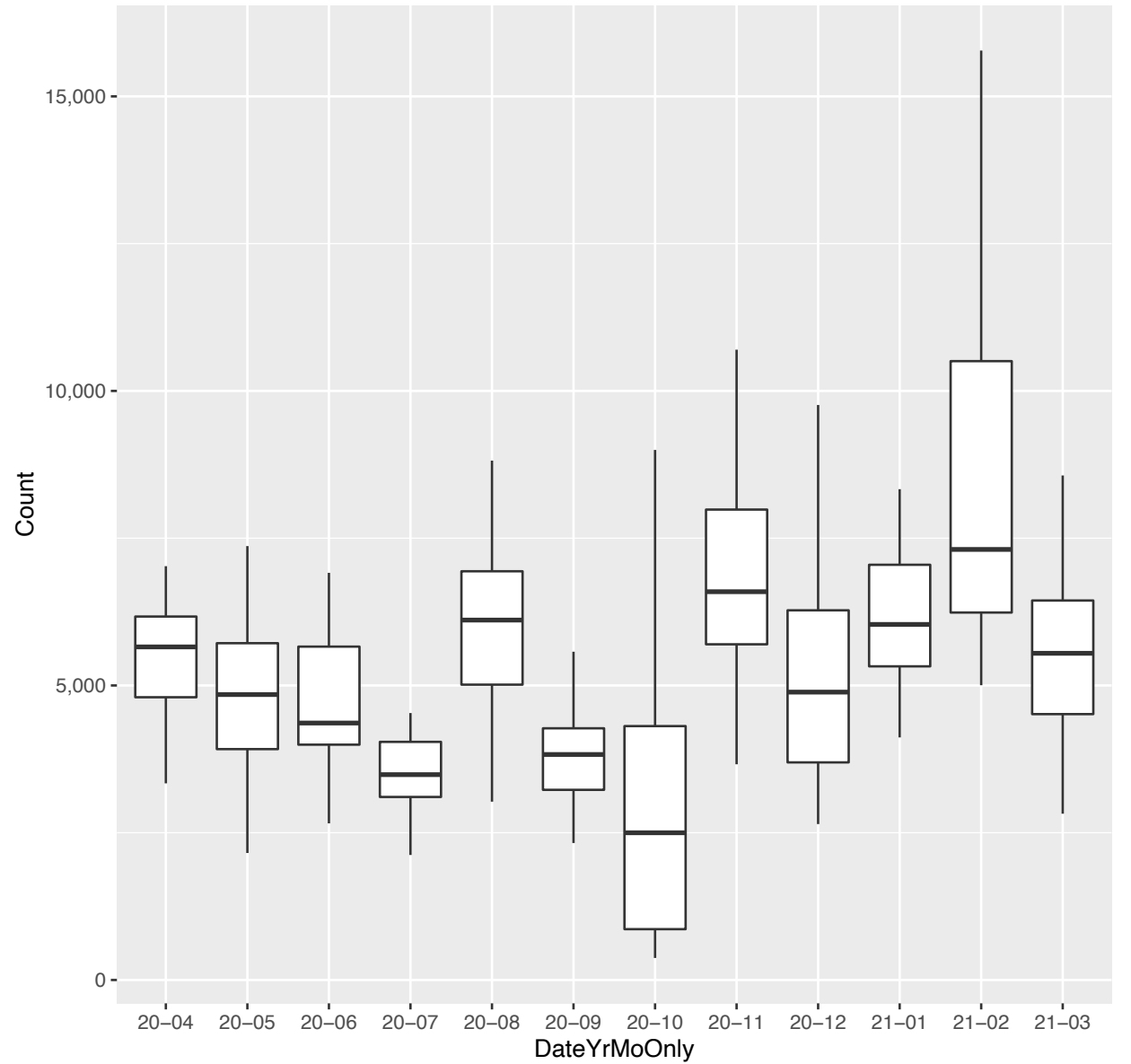
12. **dcfs.louisiana.gov** (Louisiana Department of Children and Family Services):

~

*. dcfs.louisiana.gov (day-by-day counts and 28 day moving average)



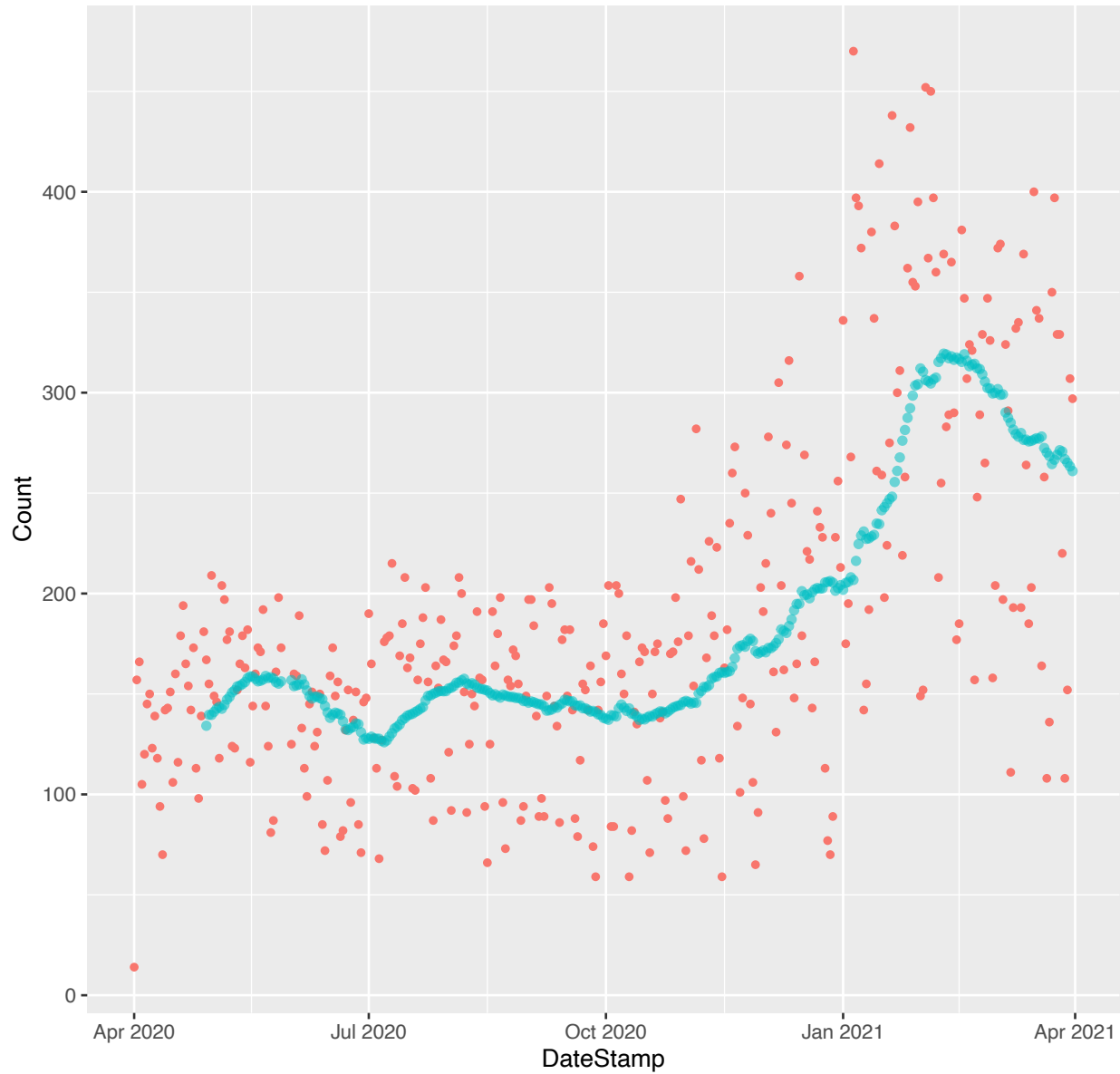
*. dcfs.louisiana.gov (monthly boxplots (outliers trimmed))



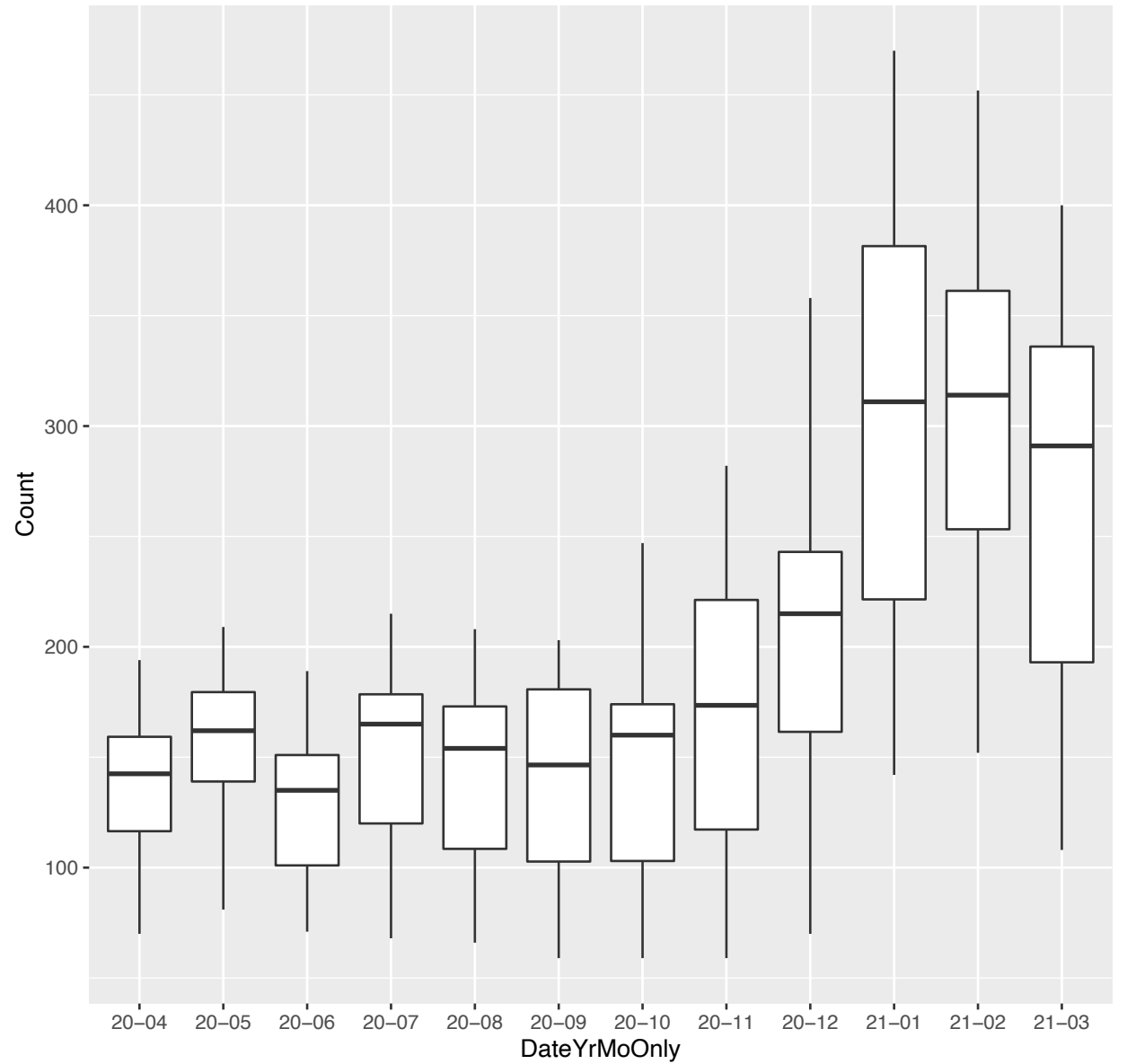
13. hsd.state.nm.us (New Mexico Human Services Department):



*. hsd.state.nm.us (day-by-day counts and 28 day moving average)



*. hsd.state.nm.us (monthly boxplots (outliers trimmed))

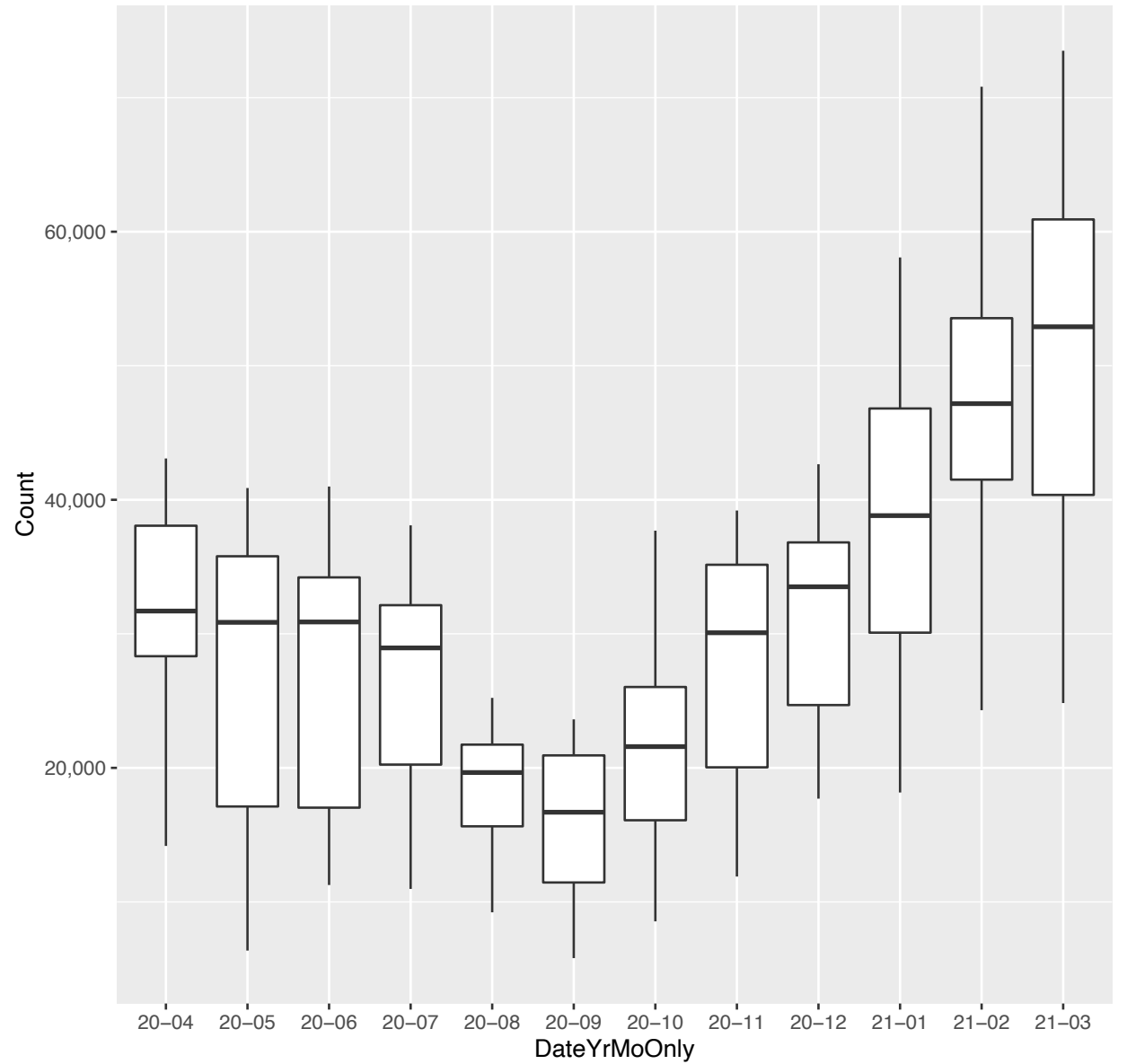


14. **jfs.ohio.gov** (Ohio Department of Job and Family Services): U shaped ending higher

*. jfs.ohio.gov (day-by-day counts and 28 day moving average)



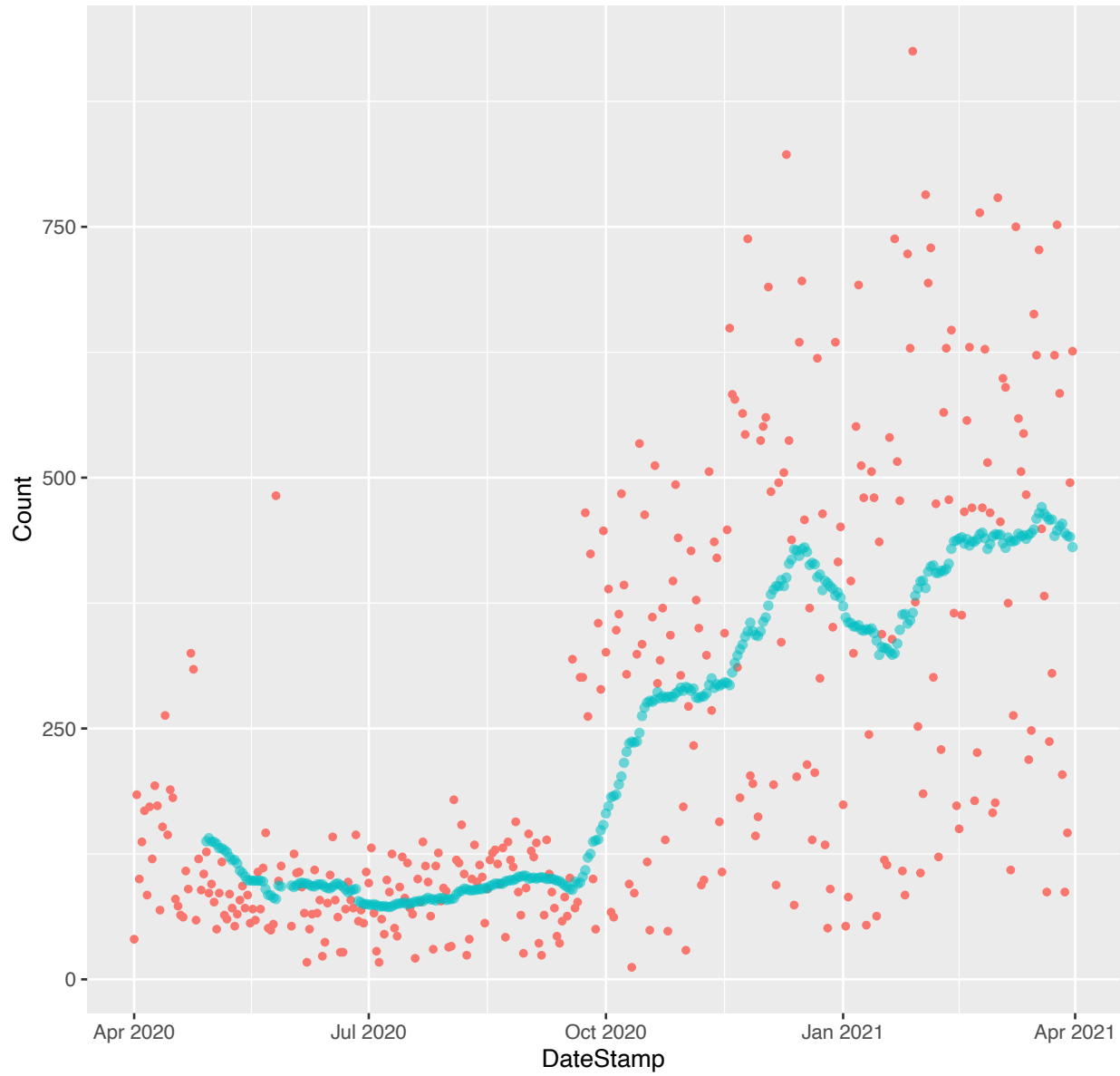
*. jfs.ohio.gov (monthly boxplots (outliers trimmed))



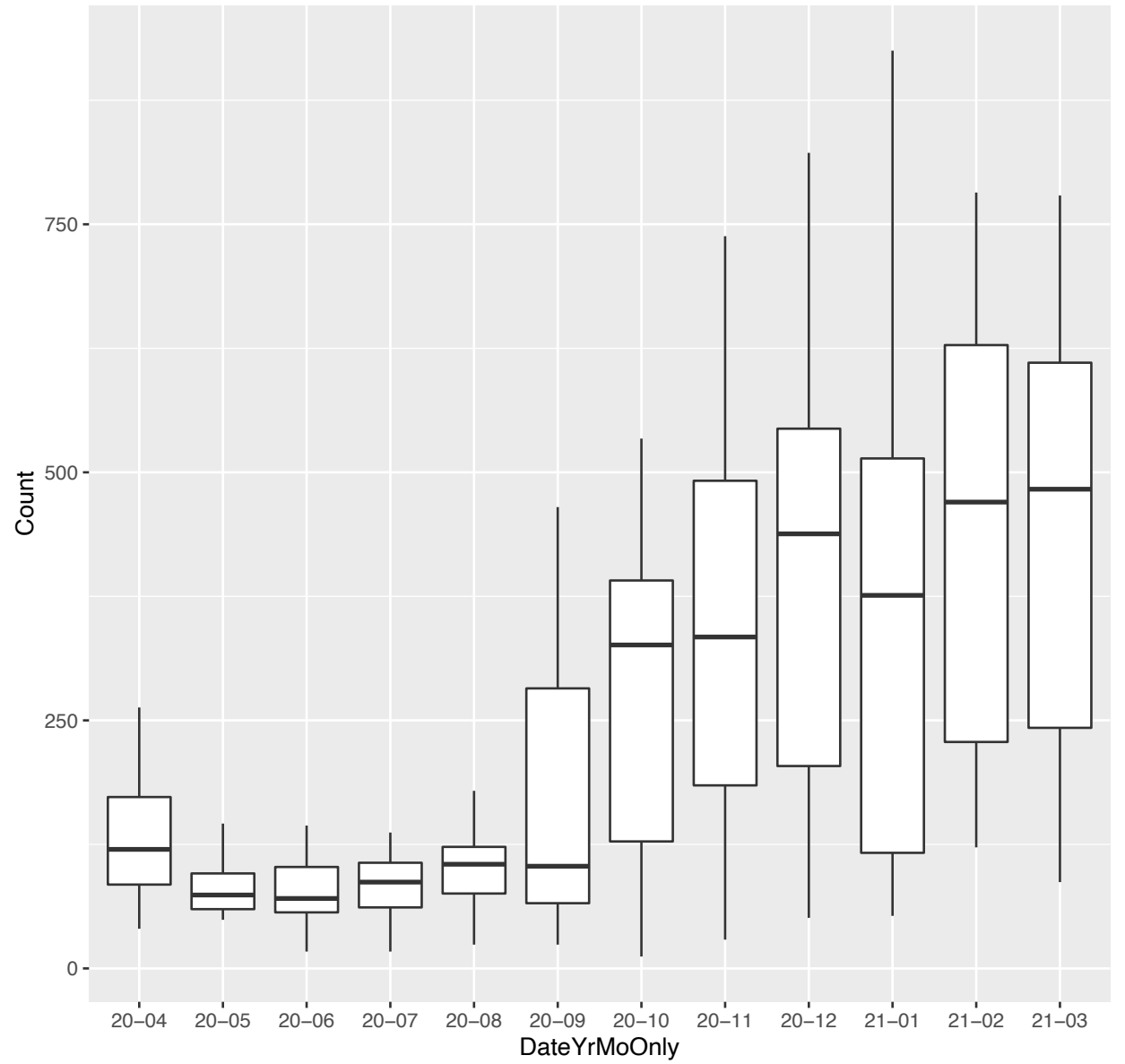
15. hs.utah.gov (Utah Department of Human Services):



*. hs.utah.gov (day-by-day counts and 28 day moving average)



*. hs.utah.gov (monthly boxplots (outliers trimmed))



XI. Sports Sites

[\[back to TOC\]](#)

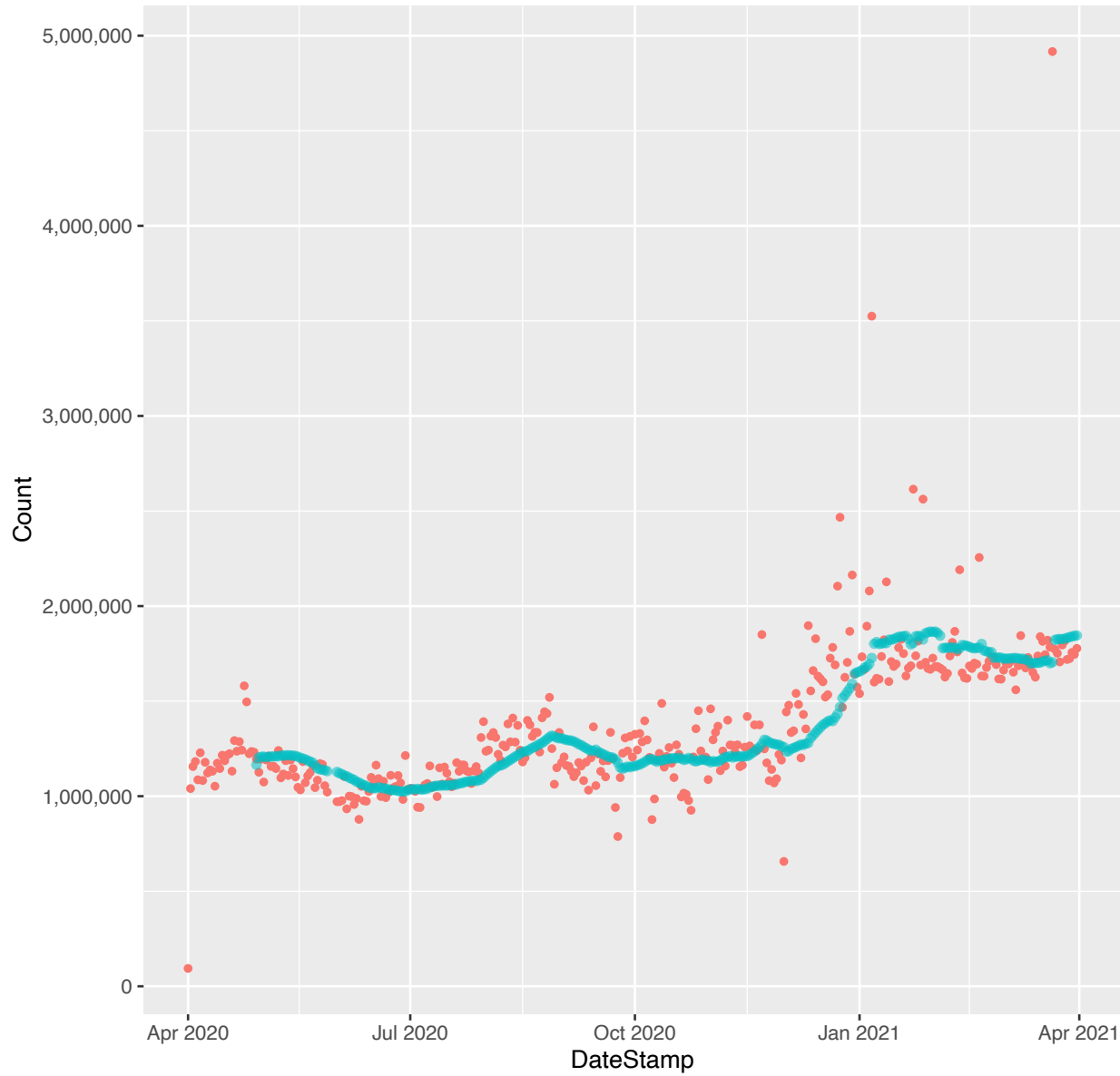
1	bleacherreport.com	✱	~	M
2	espn.com		~	M
3	mlb.com		~	
4	nba.com	✱	~	M
5	nbcsports.com		~	
6	nhl.com	✱	~	
7	rivals.com	✱	~	M
8	sports.yahoo.com	✱	⌋	M

1. bleacherreport.com:

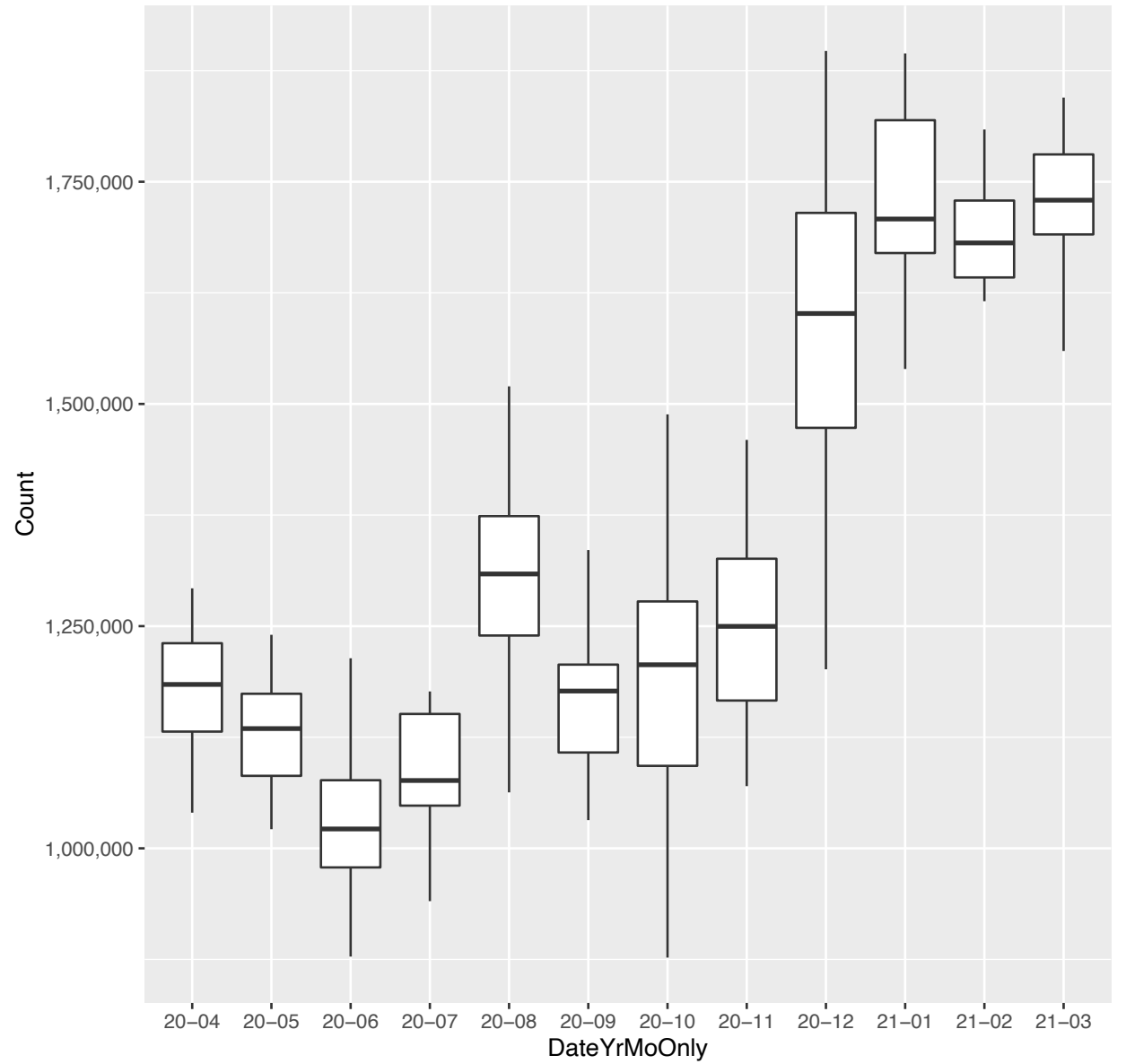


M

*. bleacherreport.com (day-by-day counts and 28 day moving average)



*. bleacherreport.com (monthly boxplots (outliers trimmed))



2. espn.com:

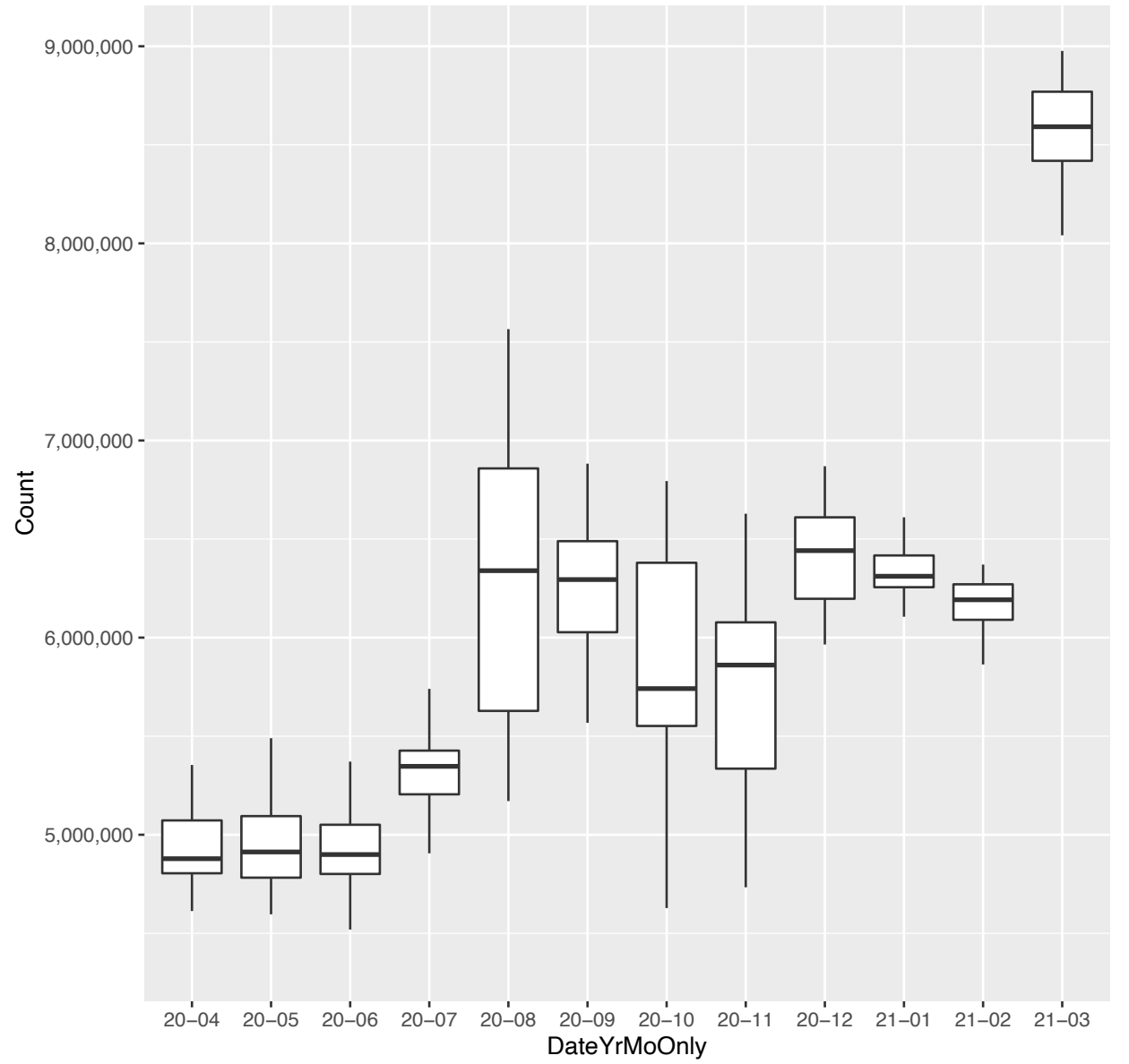
~

M

*. espn.com (day-by-day counts and 28 day moving average)



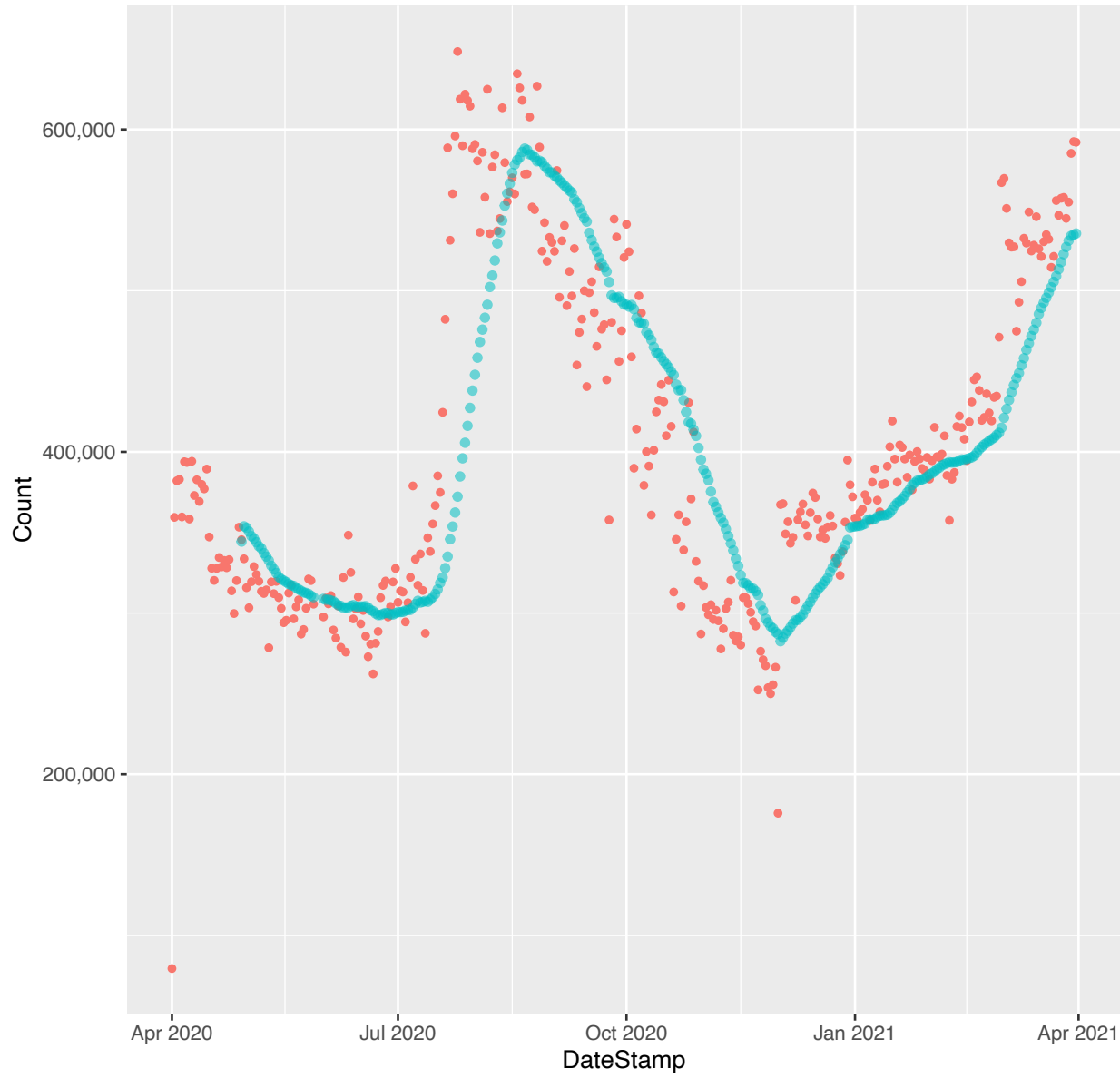
*. espn.com (monthly boxplots (outliers trimmed))



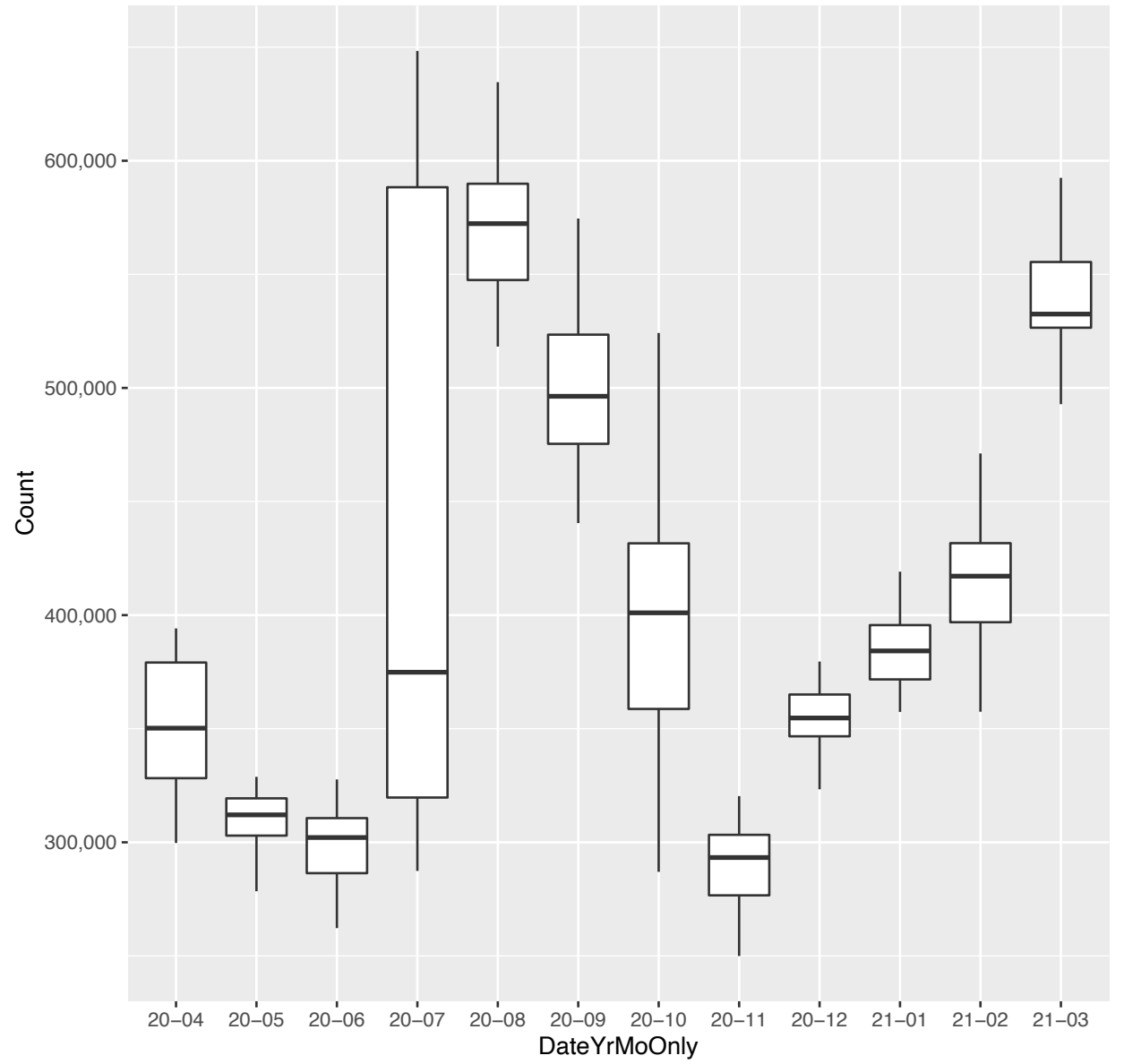
3. mlb.com:

~

*. mlb.com (day-by-day counts and 28 day moving average)



*. mlb.com (monthly boxplots (outliers trimmed))

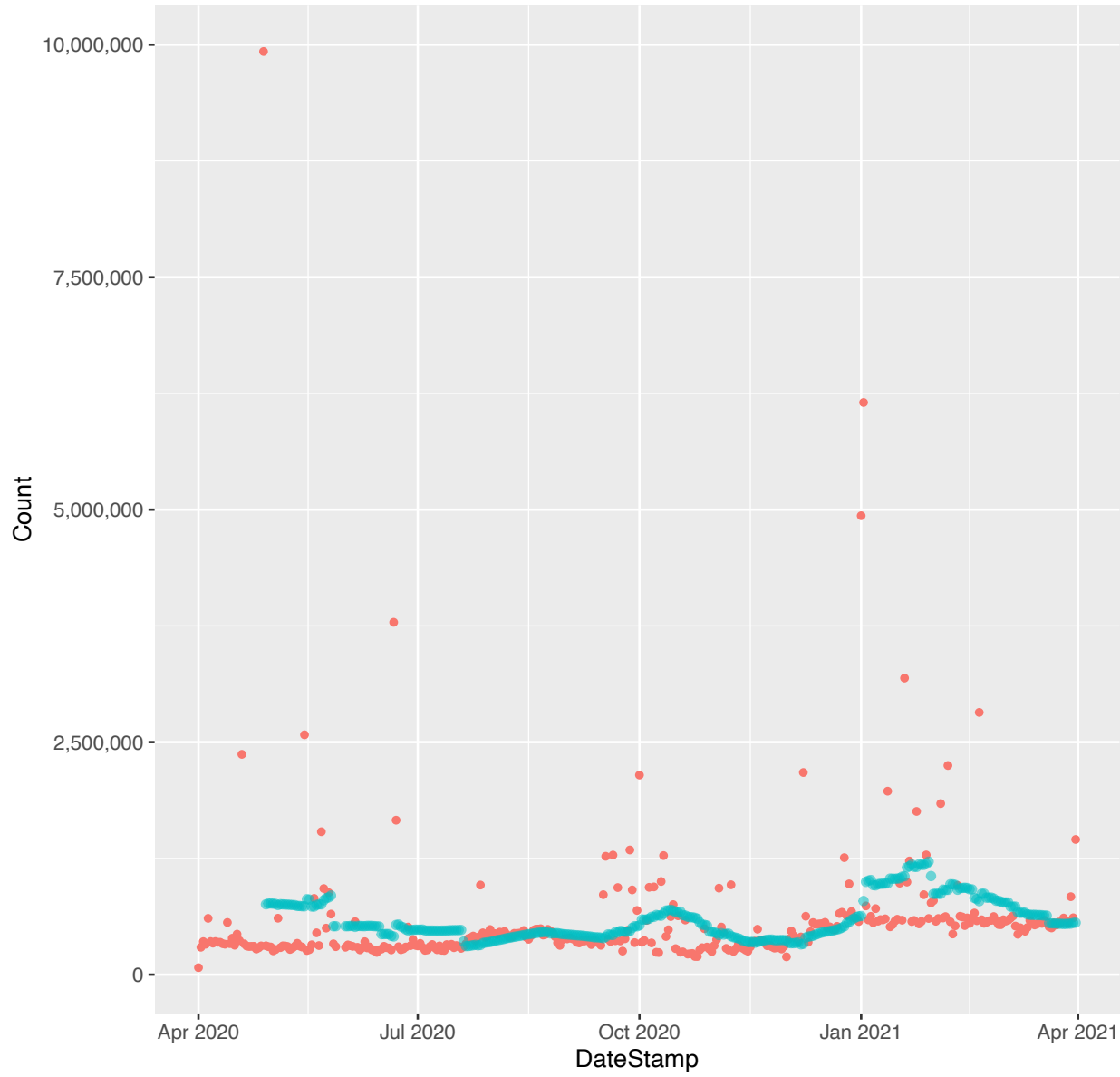


4. nba.com:

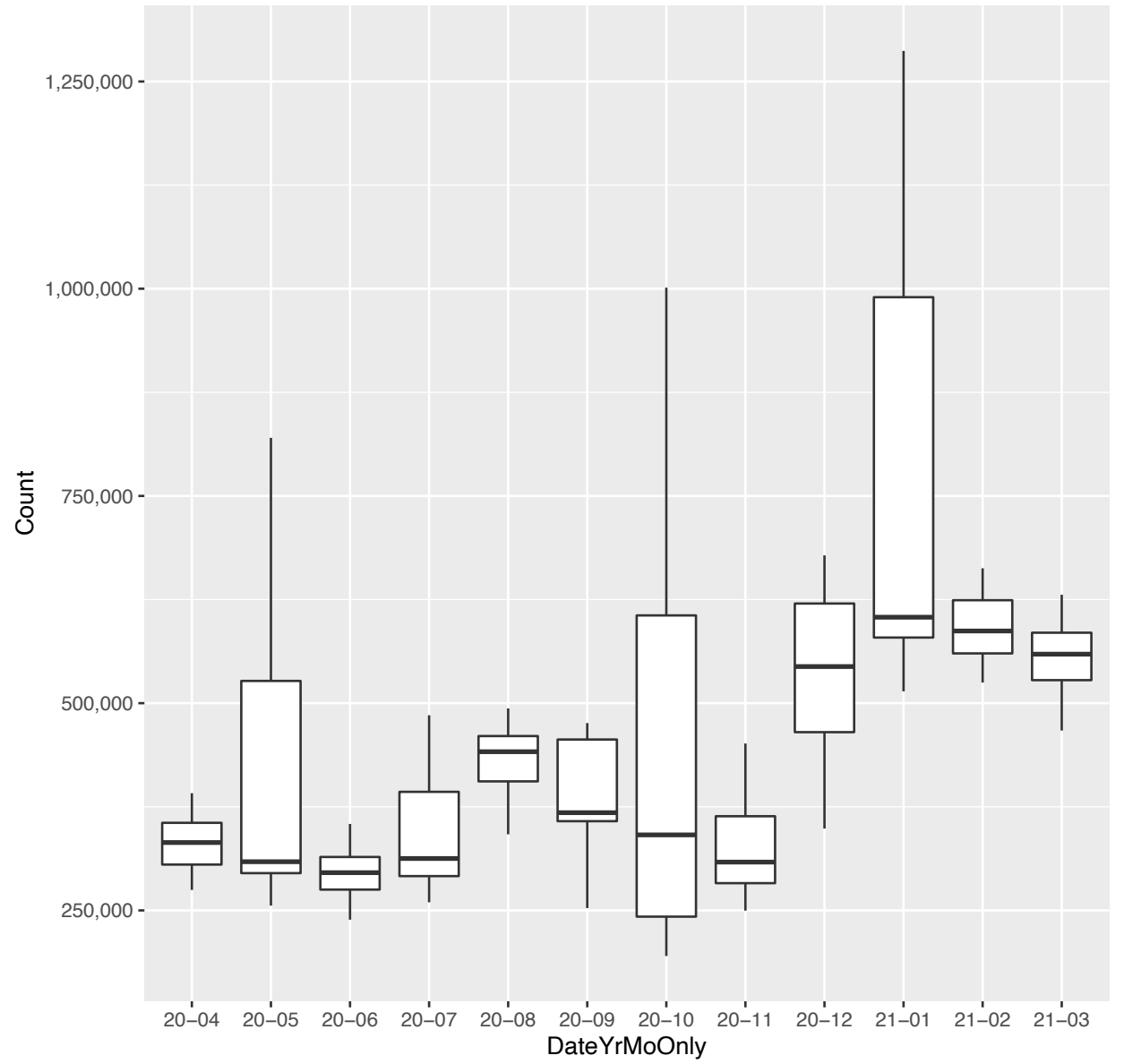


M

*. nba.com (day-by-day counts and 28 day moving average)



*. nba.com (monthly boxplots (outliers trimmed))



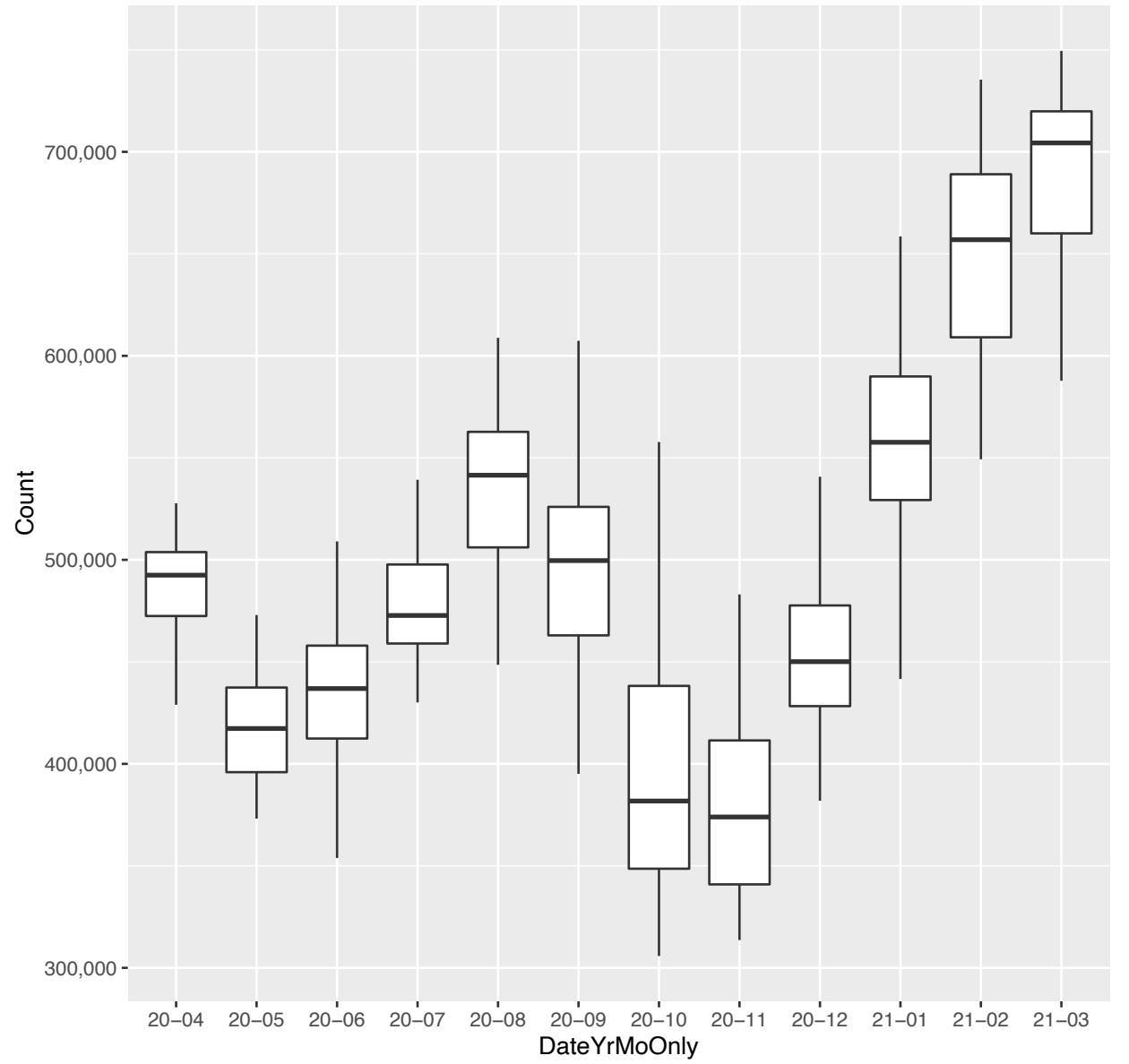
5. nbcports.com:

~

*. nbcports.com (day-by-day counts and 28 day moving average)



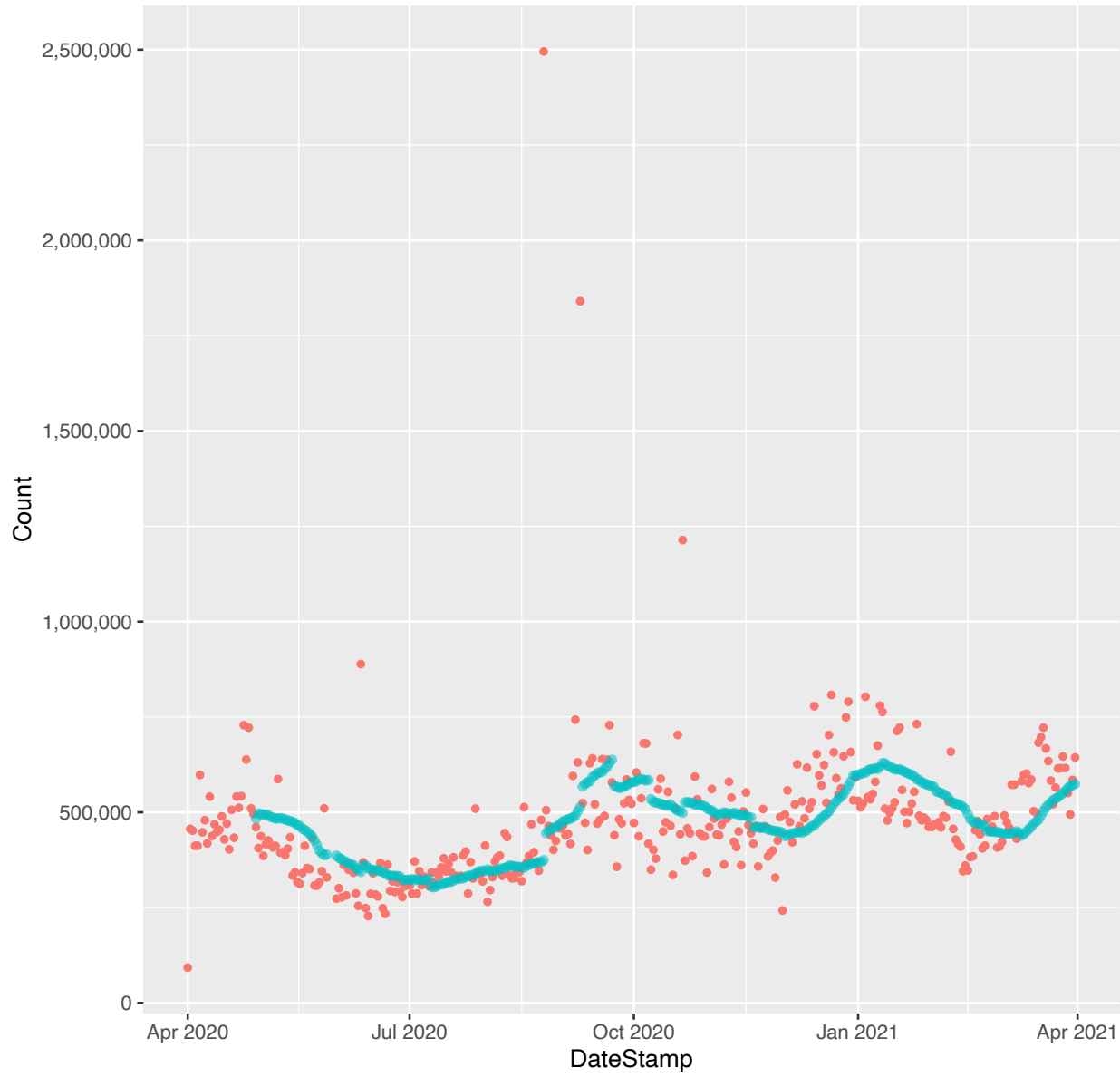
*. nbcports.com (monthly boxplots (outliers trimmed))



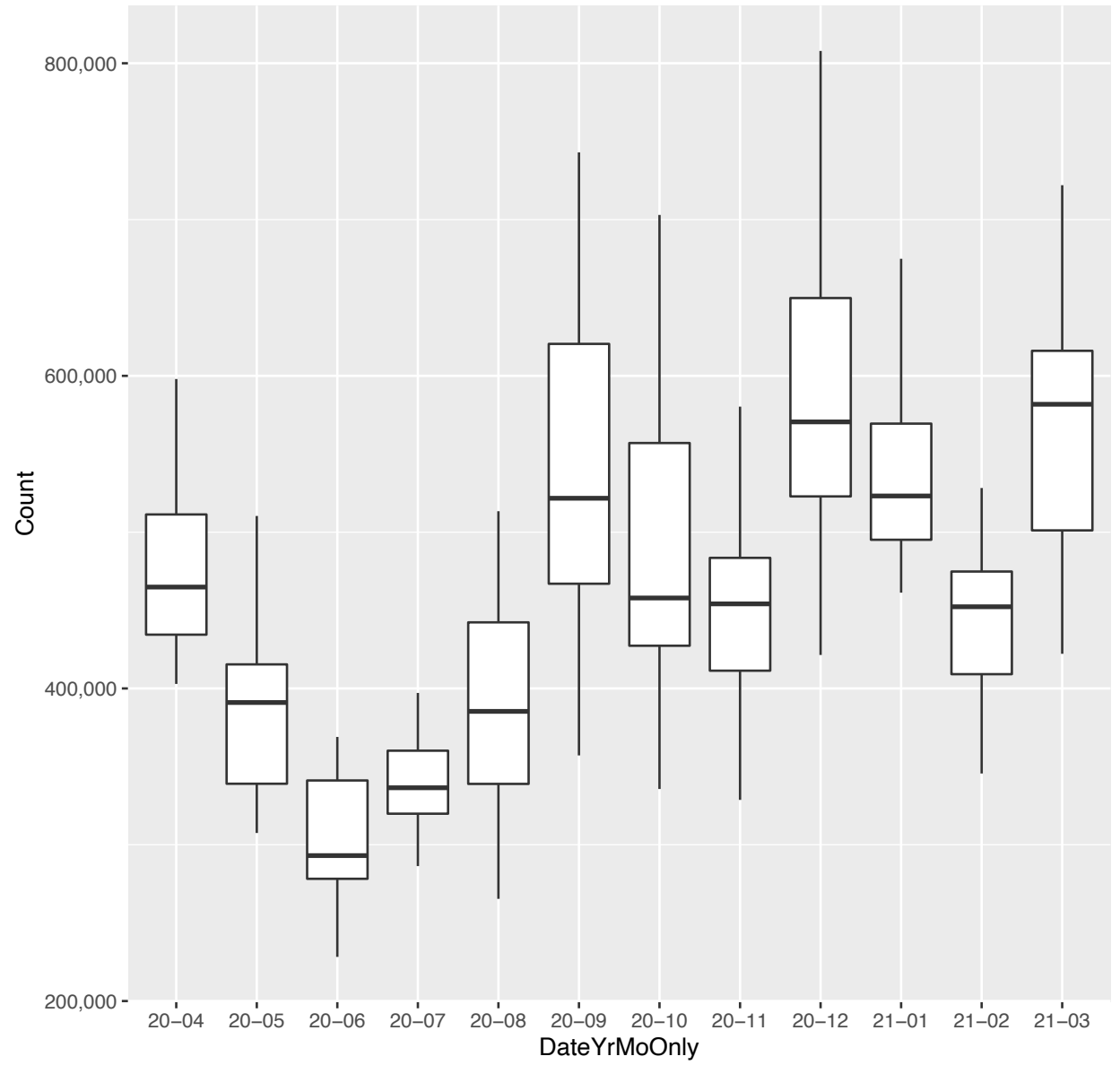
6. nfl.com:



*. nfl.com (day-by-day counts and 28 day moving average)



*. nfl.com (monthly boxplots (outliers trimmed))

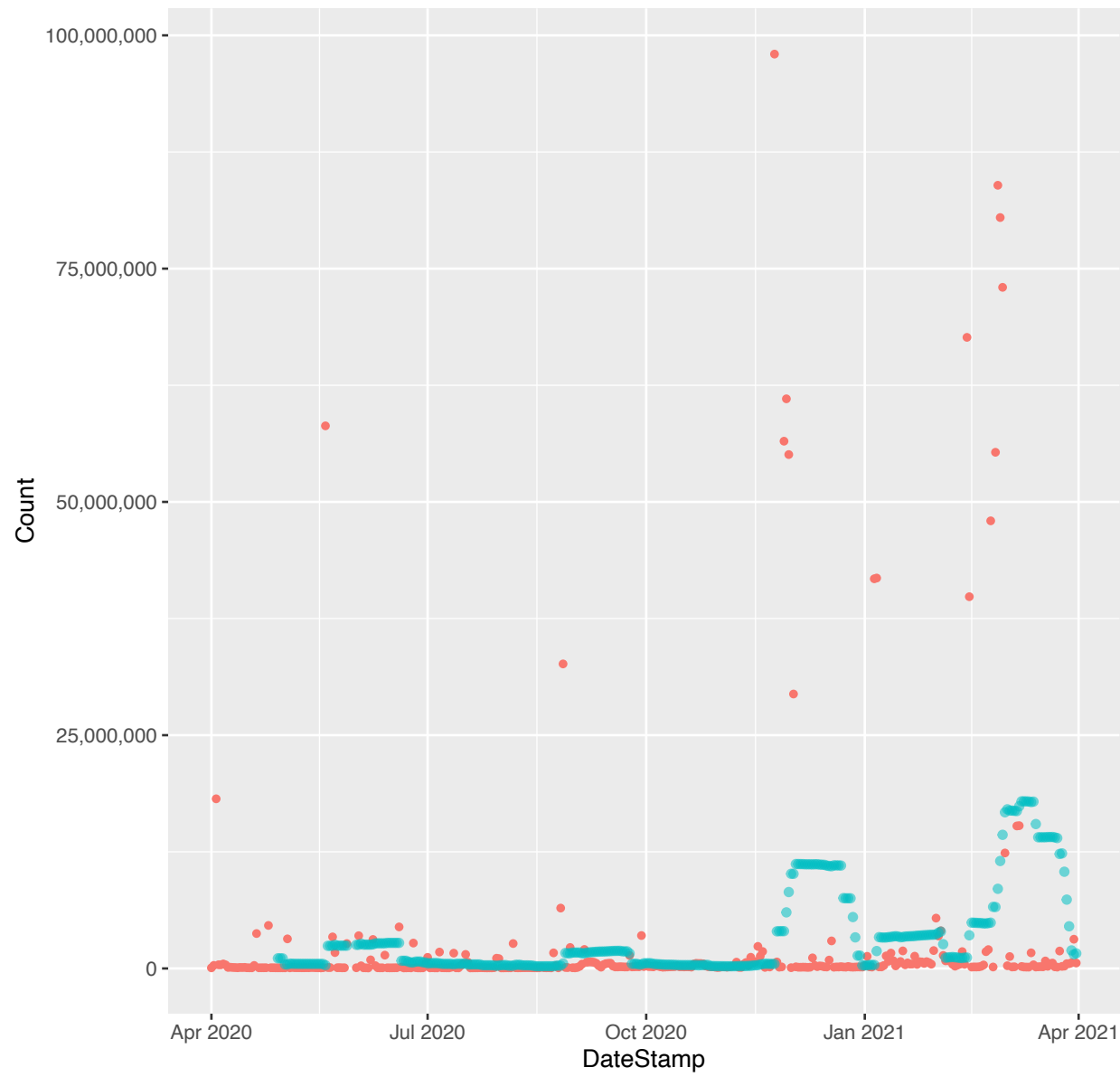


7. rivals.com:

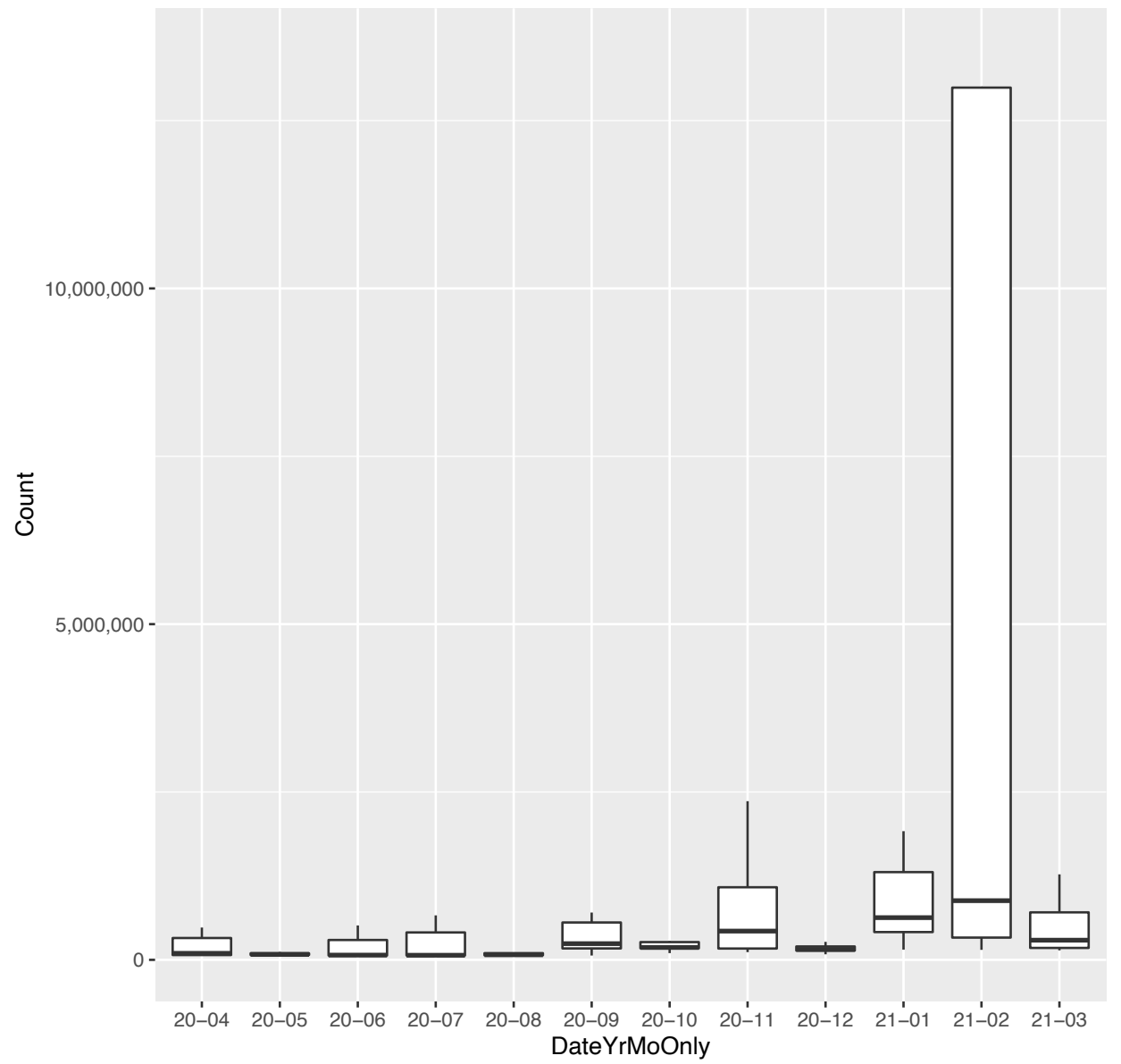


M

*. rivals.com (day-by-day counts and 28 day moving average)



*. rivals.com (monthly boxplots (outliers trimmed))

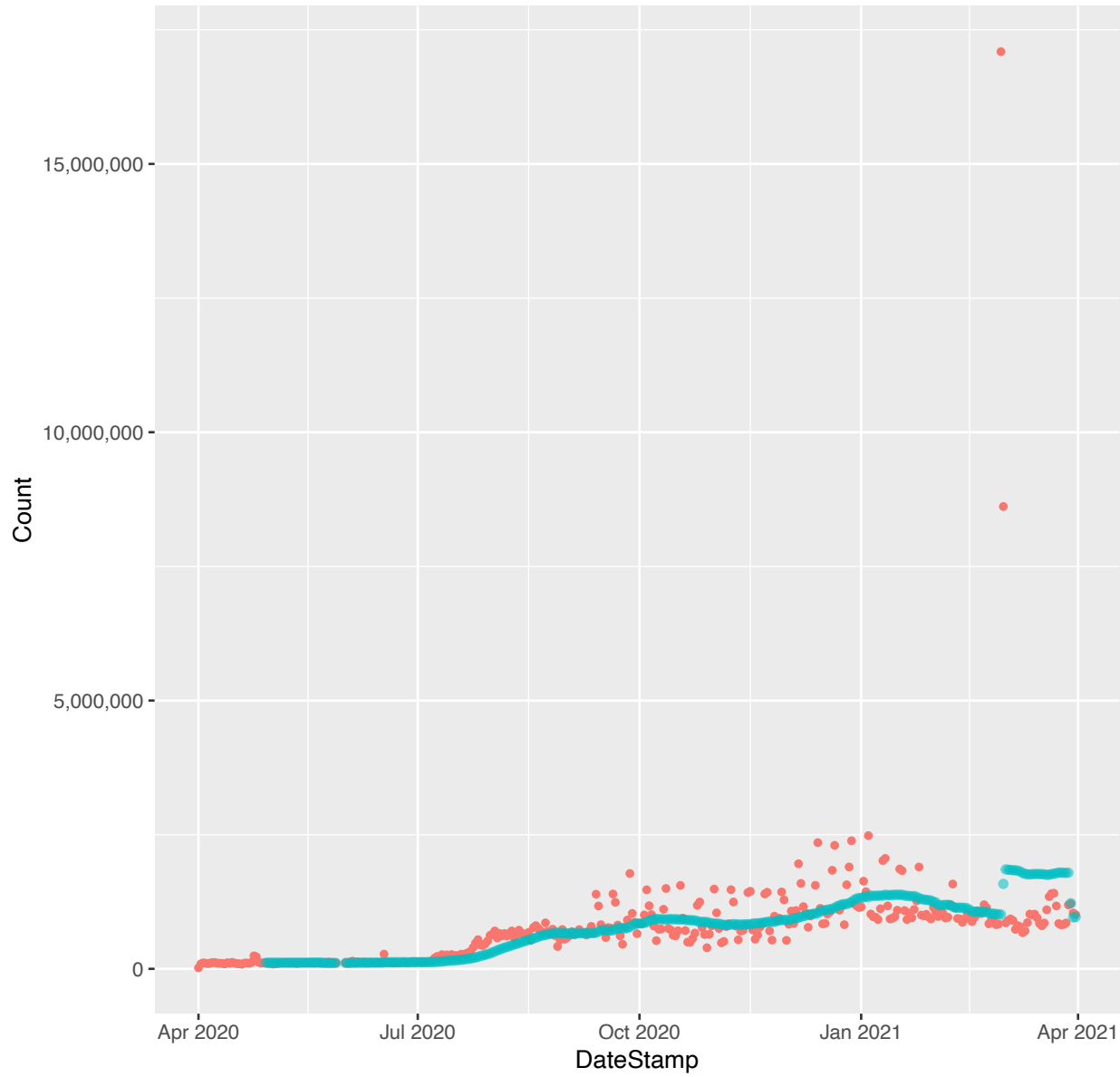


8. sports.yahoo.com:

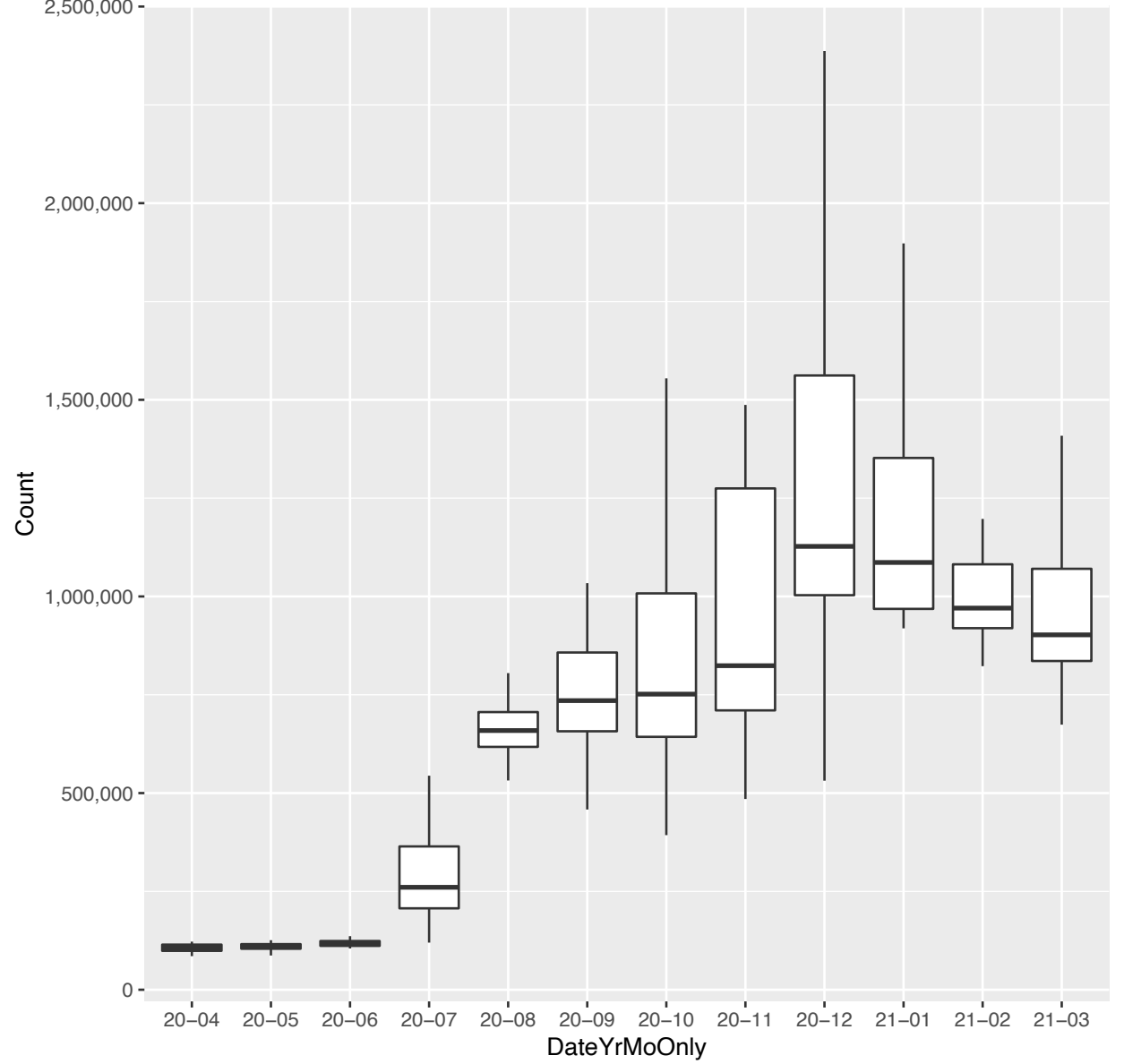


M

*. sports.yahoo.com (day-by-day counts and 28 day moving average)



*. sports.yahoo.com (monthly boxplots (outliers trimmed))



XII. Streaming Video Sites

[\[back to TOC\]](#)

1	acorn.tv		~					
2	bilibili.com	☀	∪ shaped (ending lower)	M				
3	britbox.com		↗					
4	disneyplus.com	☀	~					
5	hbomax.com		~	M				
6	hotstar.com		↗					
7	hulu.com	☀	~	M				
8	huya.com	☀	∪ shaped (ending higher)	M				
9	iq.com		↗					
10	itv.com	☀	↗					
11	ixigua.com	☀	∩					
12	netflix.com	☀	∩					MMM
13	nowtv.com		↗					
14	paramountplus.com		↗					
15	peacocktv.com		↗					M
16	sling.com	☀	~					
17	starz.com		~					
18	tiktok.com	☀	↗					M
19	tv.apple.com		↗					
20	twitch.tv	☀	↘					M
21	youku.com	☀	~					
22	youtube.com	☀	↗					M

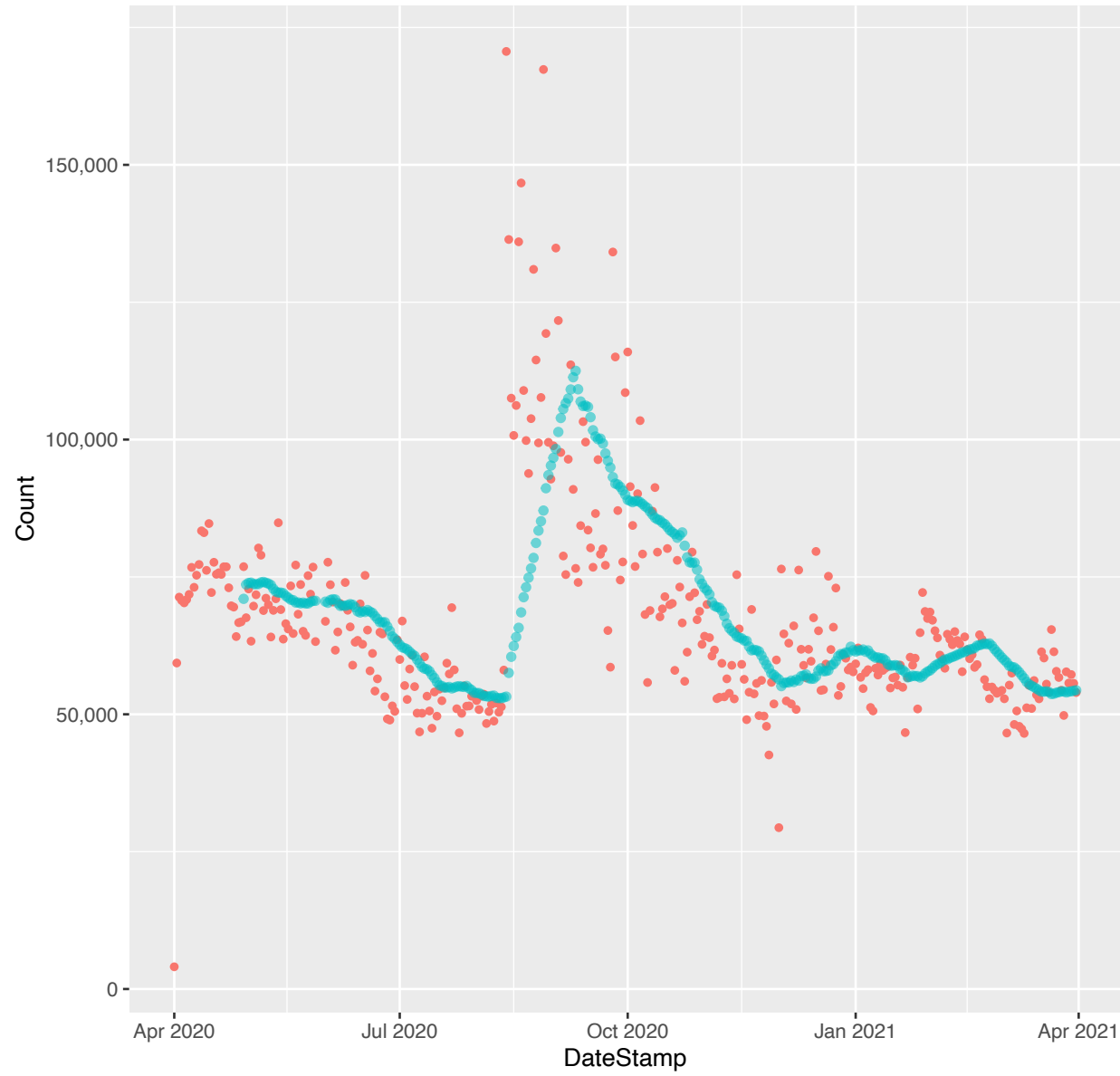
While Netflix, Hulu and Youtube have always seemed to define this category, we've expanded our coverage this time to include a wider range of streaming video providers, including both new US and international streaming service providers:

- Britain: Acorn, Britbox, ITV, NowTV
- China: Bilibili, Huya, IQ, Ixigua, Tiktok, Youku
- India: Hotstar
- US: Disney+, HBO Max, Paramount+, PeacockTV, Sling, Starz, tv.apple.com, Twitch

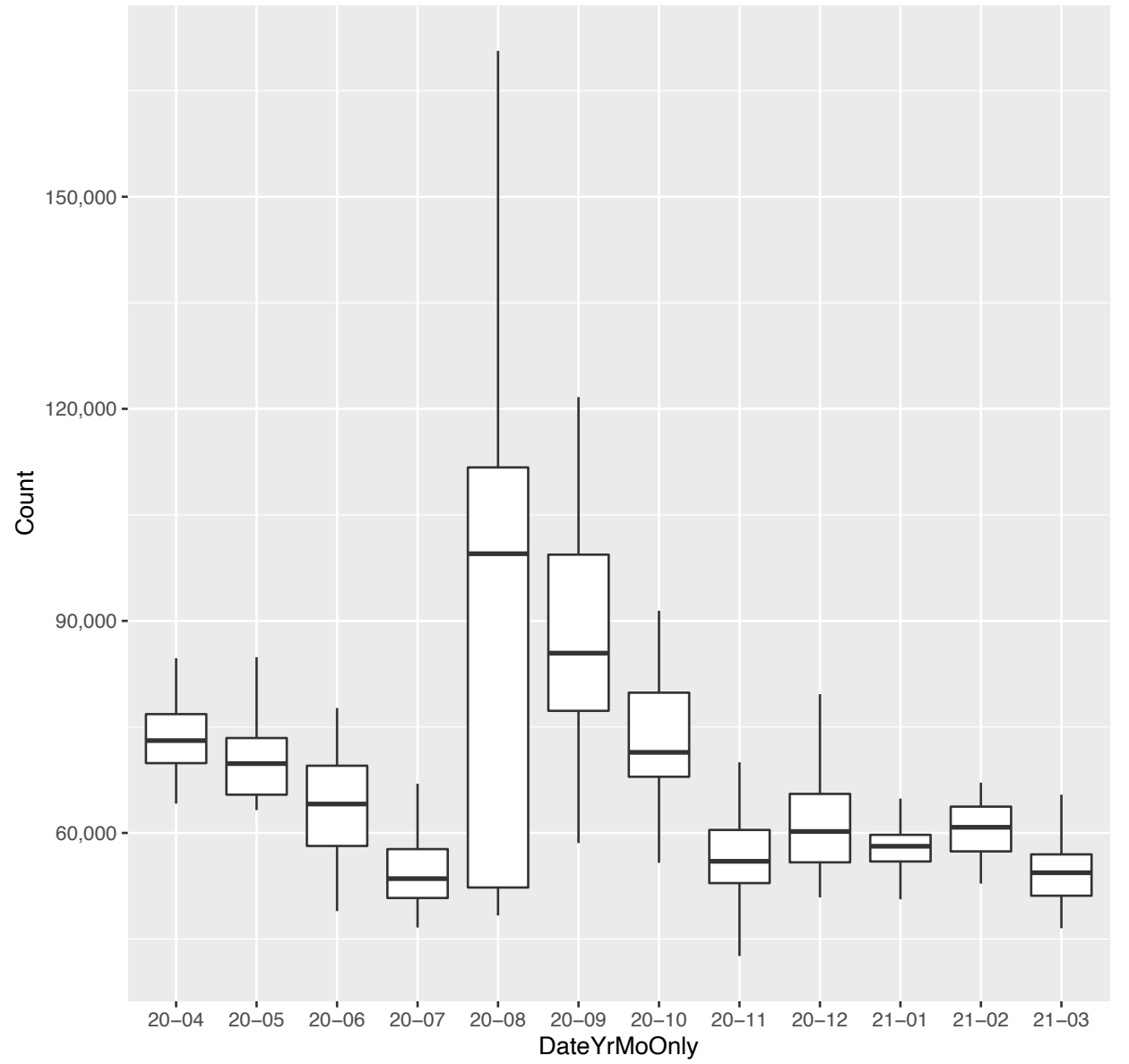
1. acorn.tv:

~

*. acorn.tv (day-by-day counts and 28 day moving average)



*. acorn.tv (monthly boxplots (outliers trimmed))

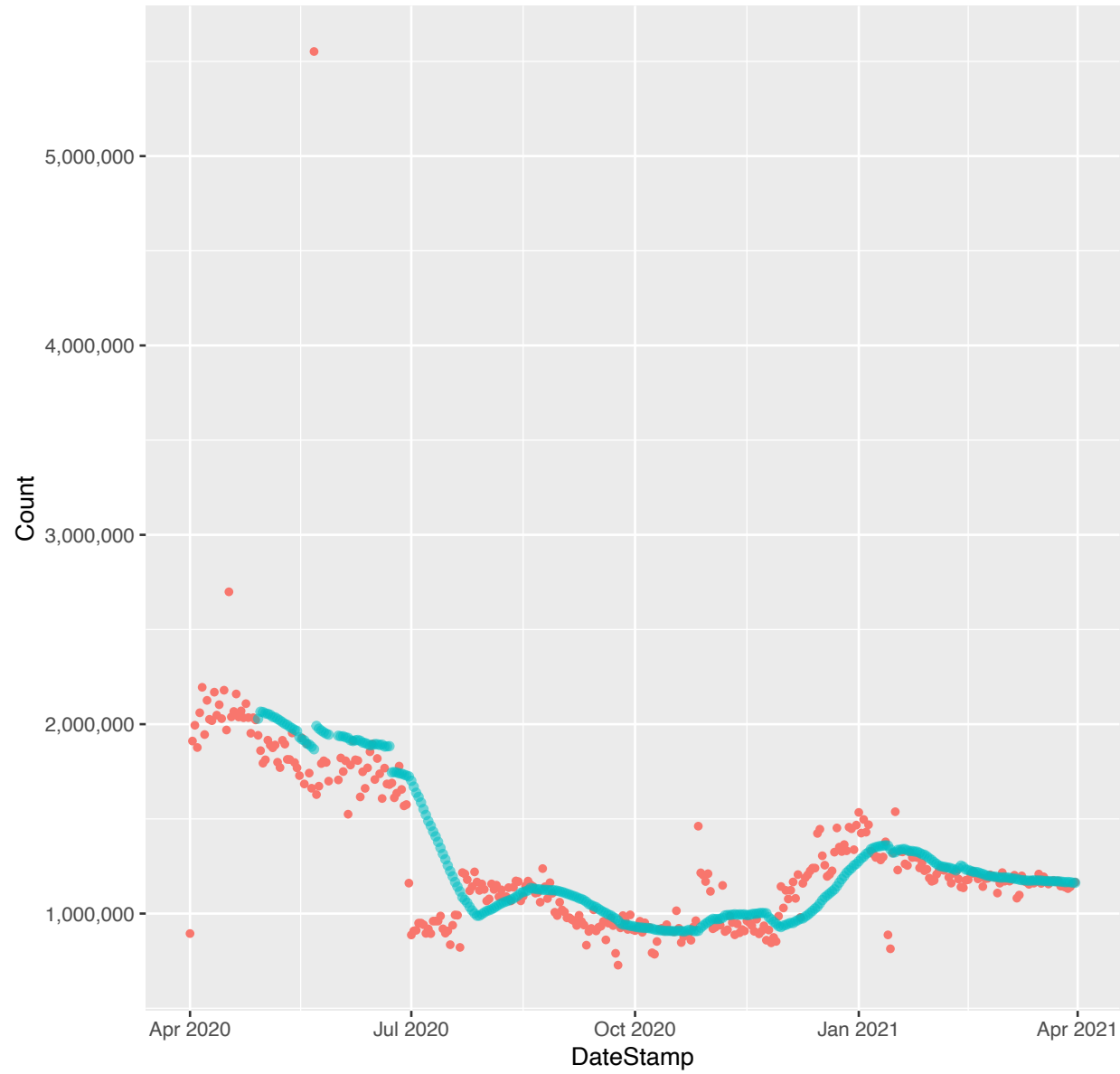


2. bilibili.com:

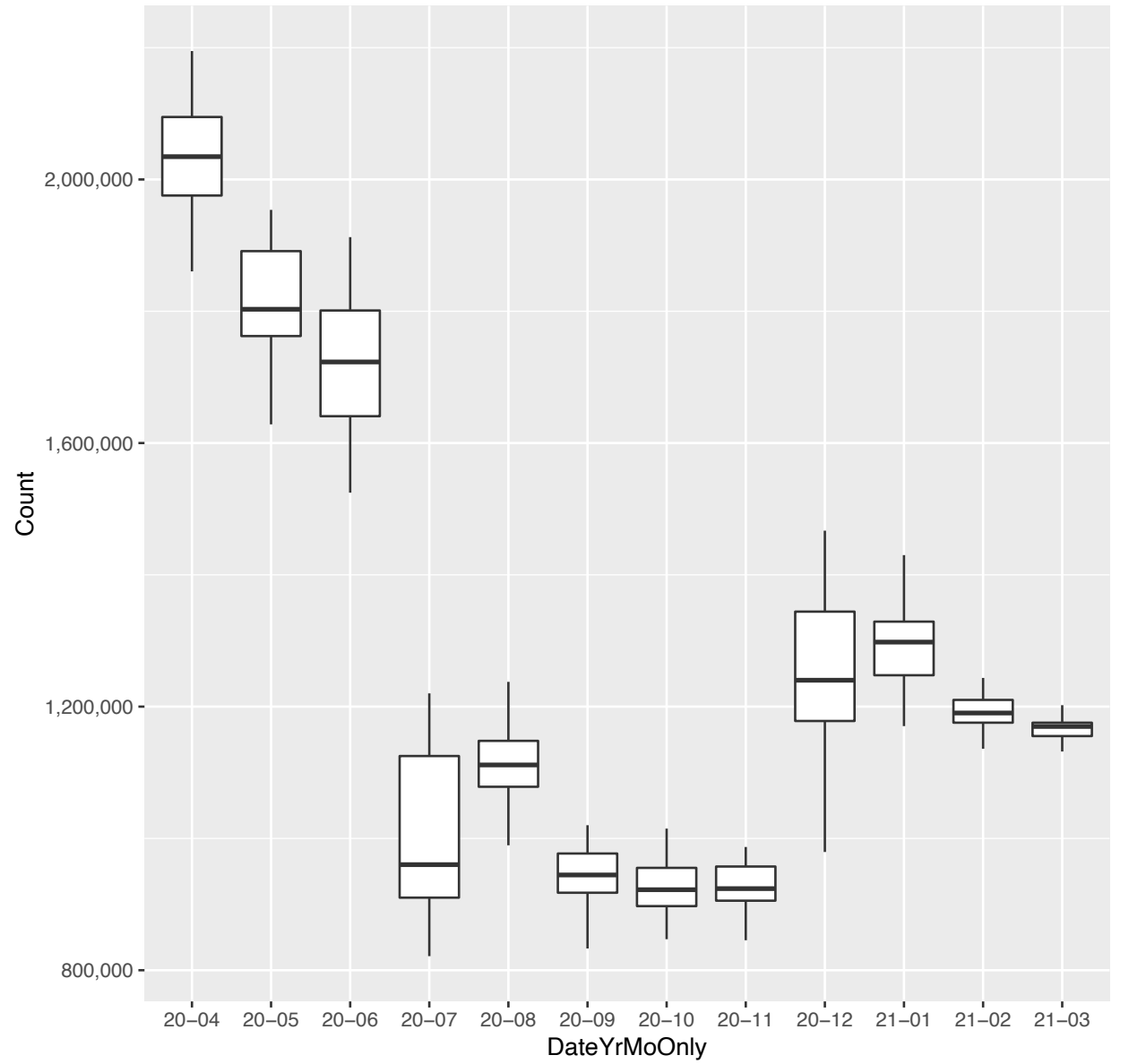
✱ ◡ shaped (ending lower) M

M

*. bilibili.com (day-by-day counts and 28 day moving average)



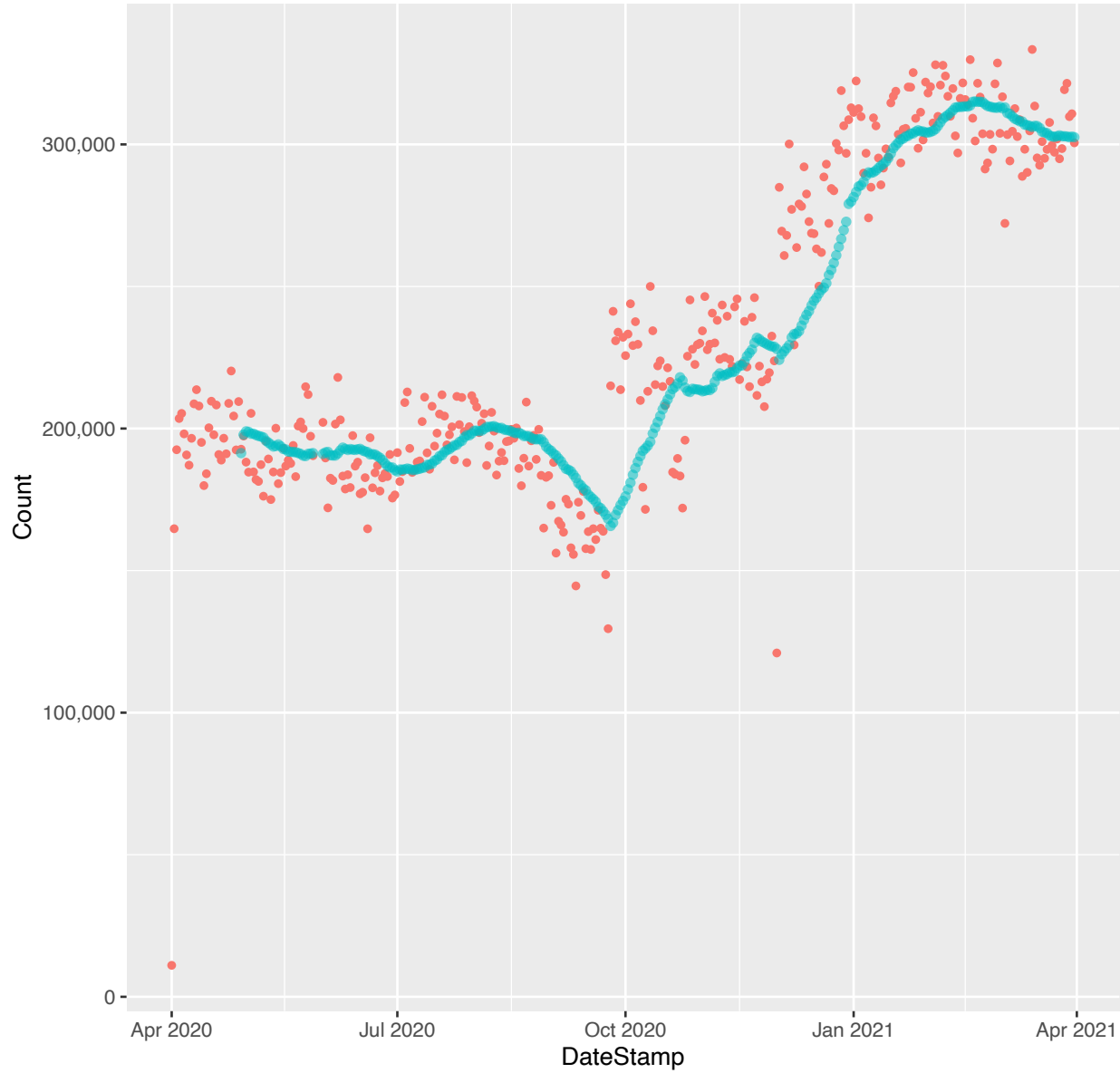
*. bilibili.com (monthly boxplots (outliers trimmed))



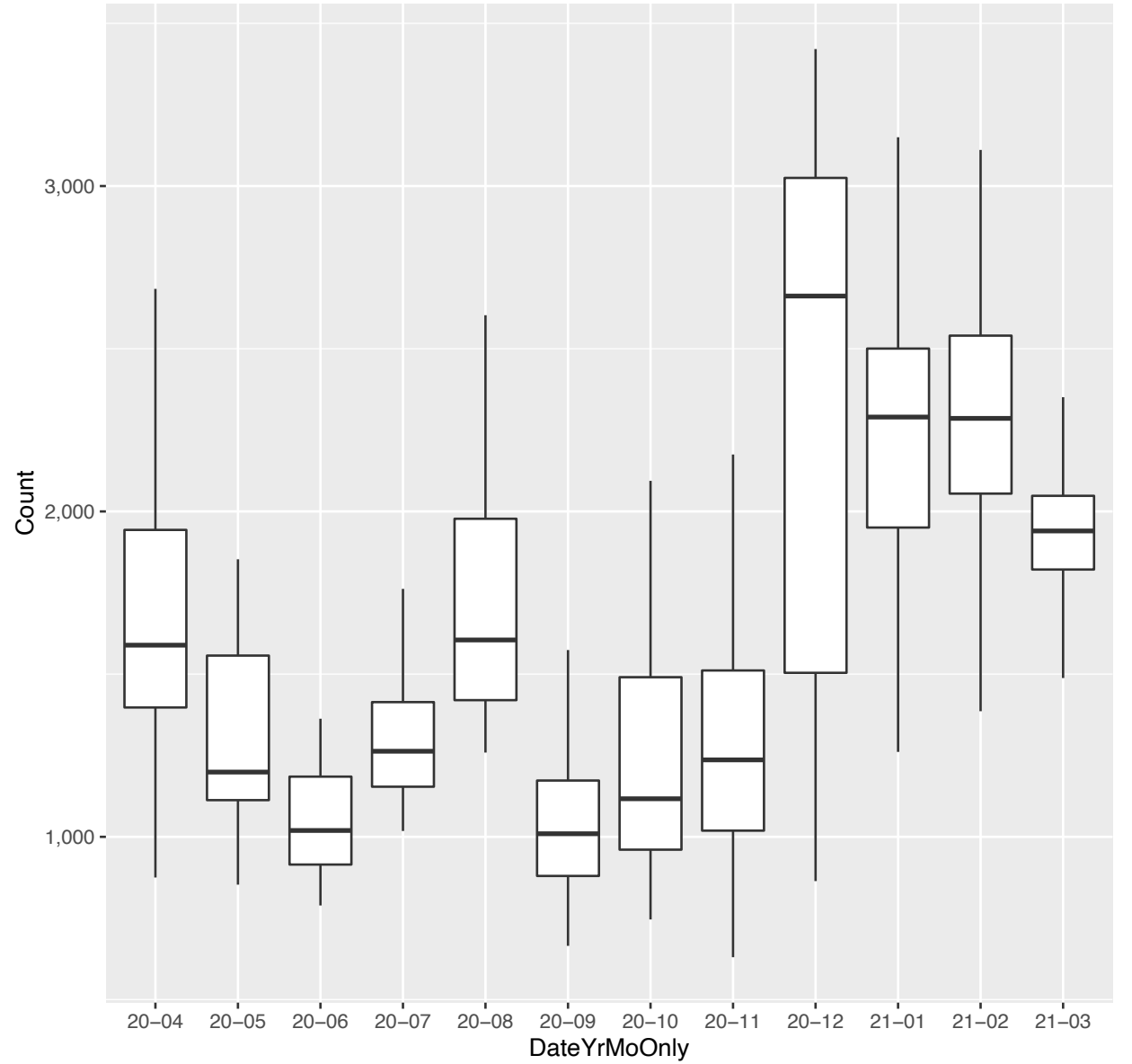
3. britbox.com:



*. britbox.com (day-by-day counts and 28 day moving average)



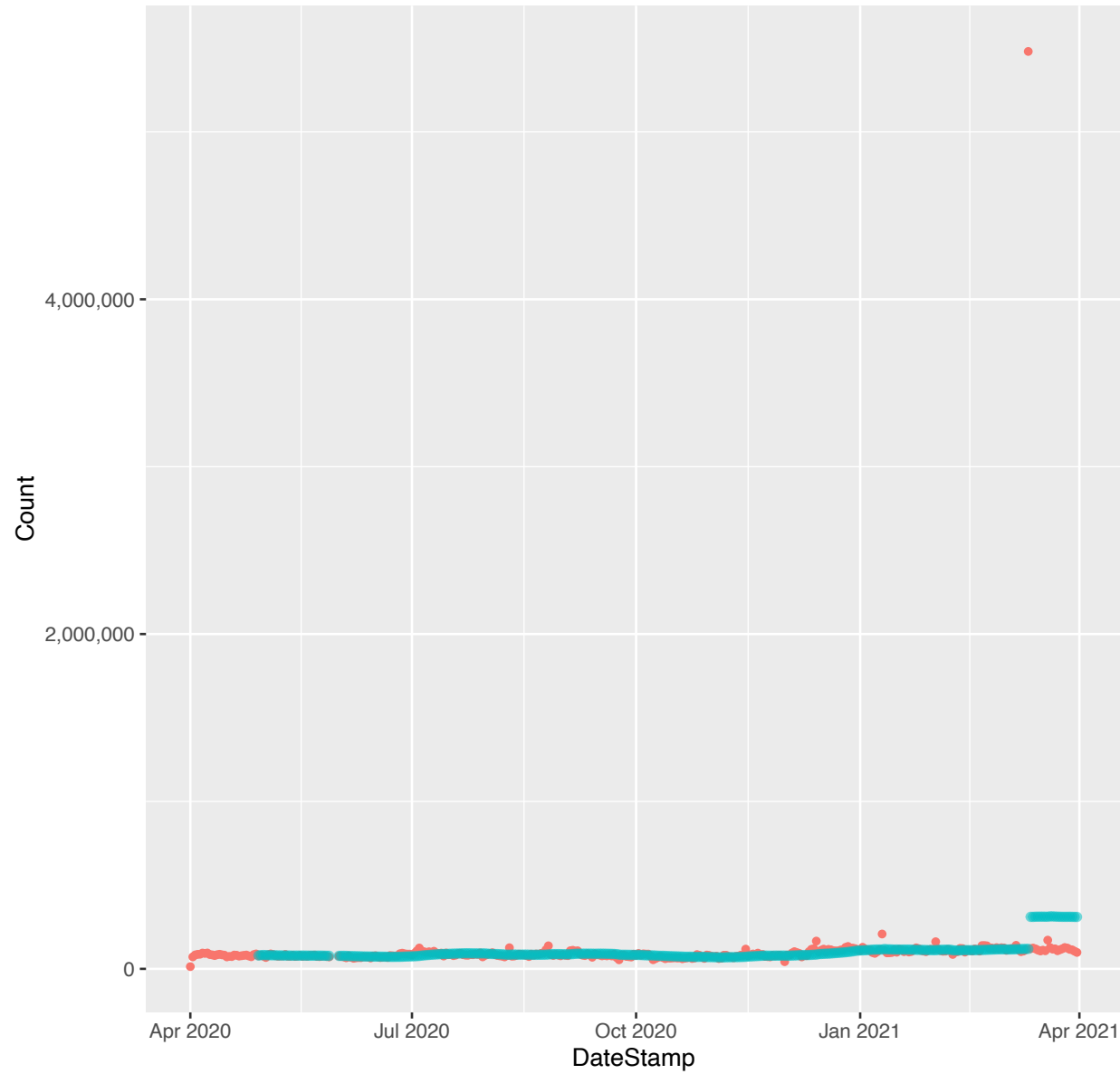
*. britbox.co.uk (monthly boxplots (outliers trimmed))



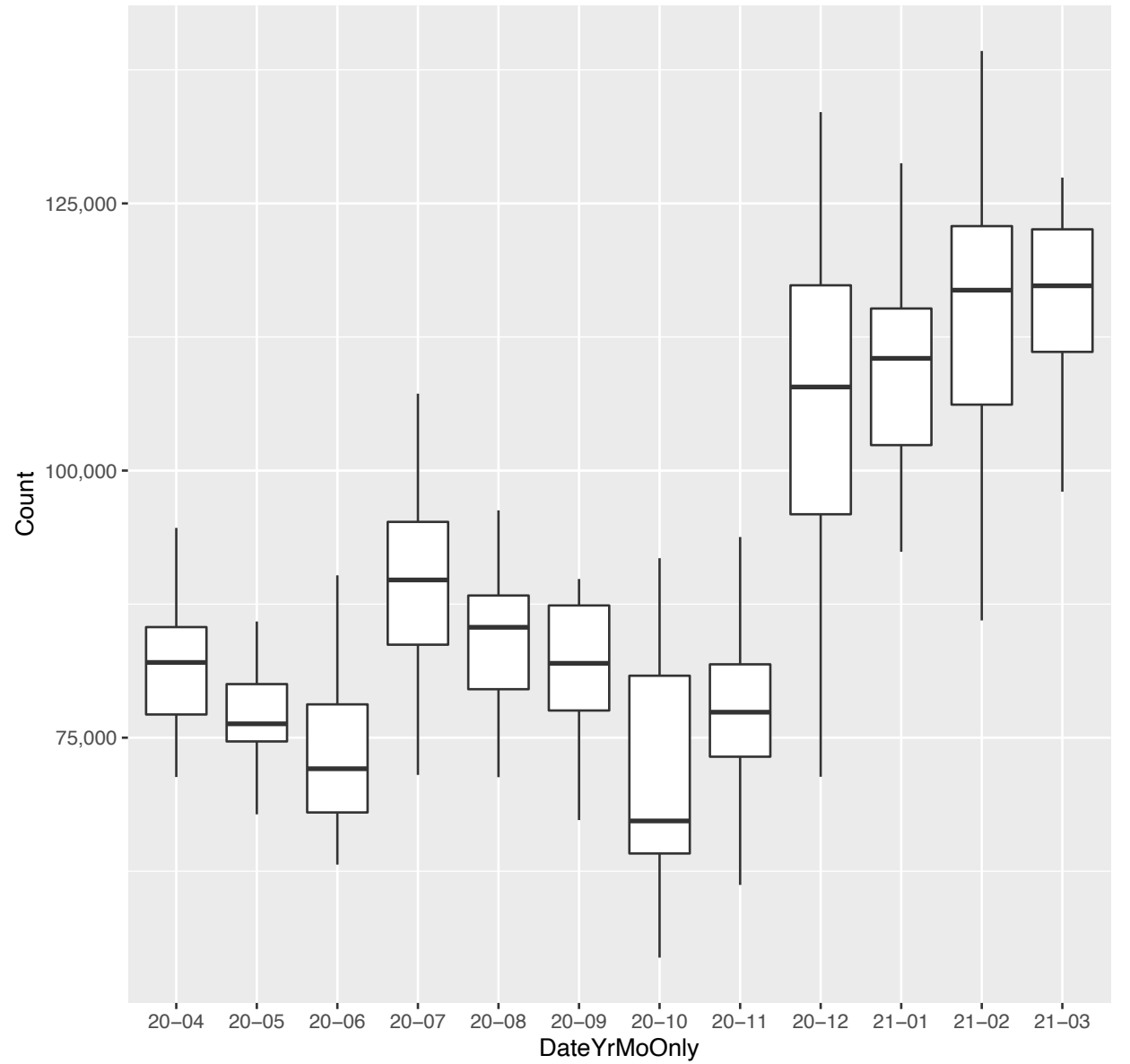
4. disneyplus.com:



*. disneyplus.com (day-by-day counts and 28 day moving average)

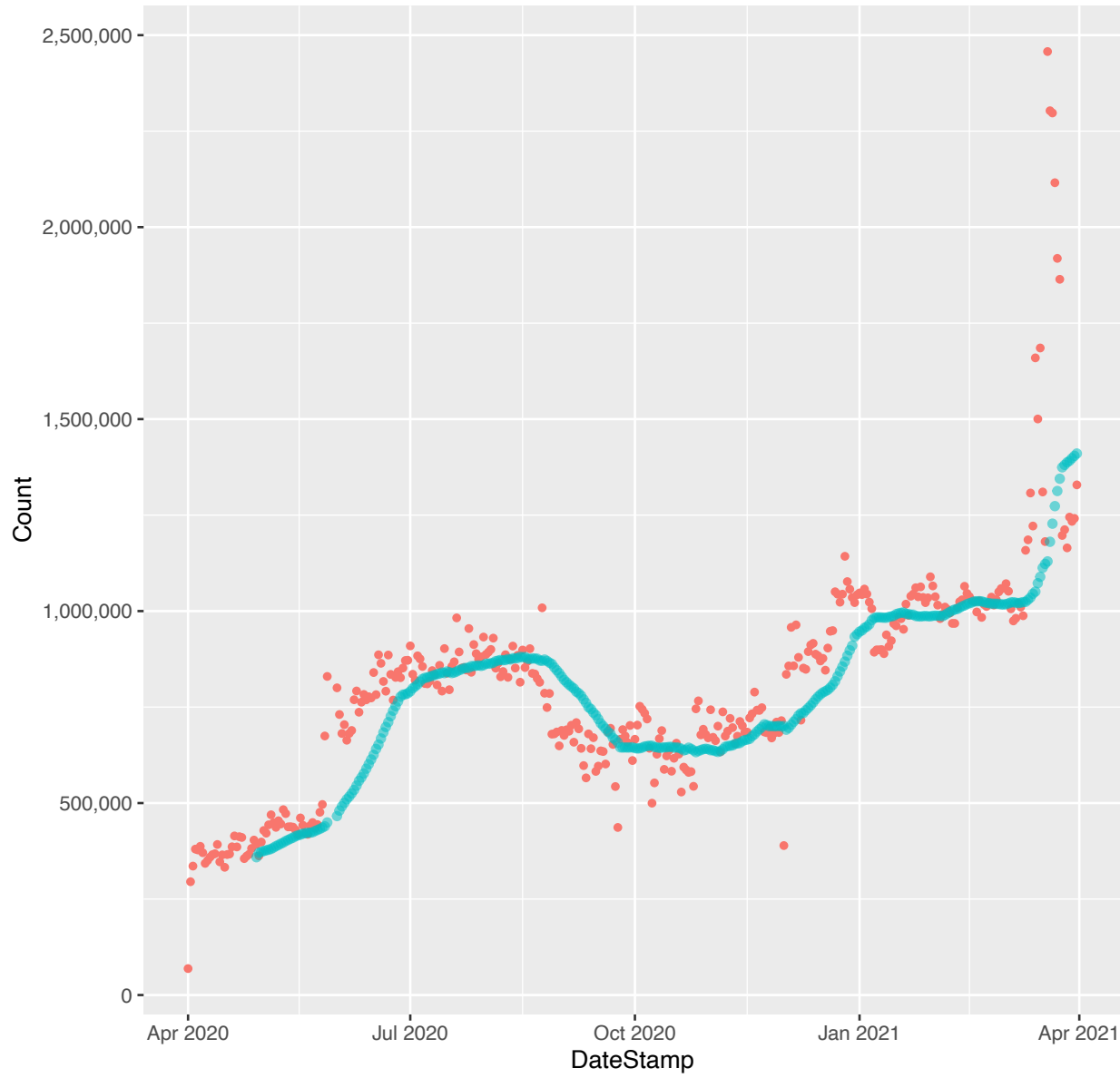


*. disneyplus.com (monthly boxplots (outliers trimmed))

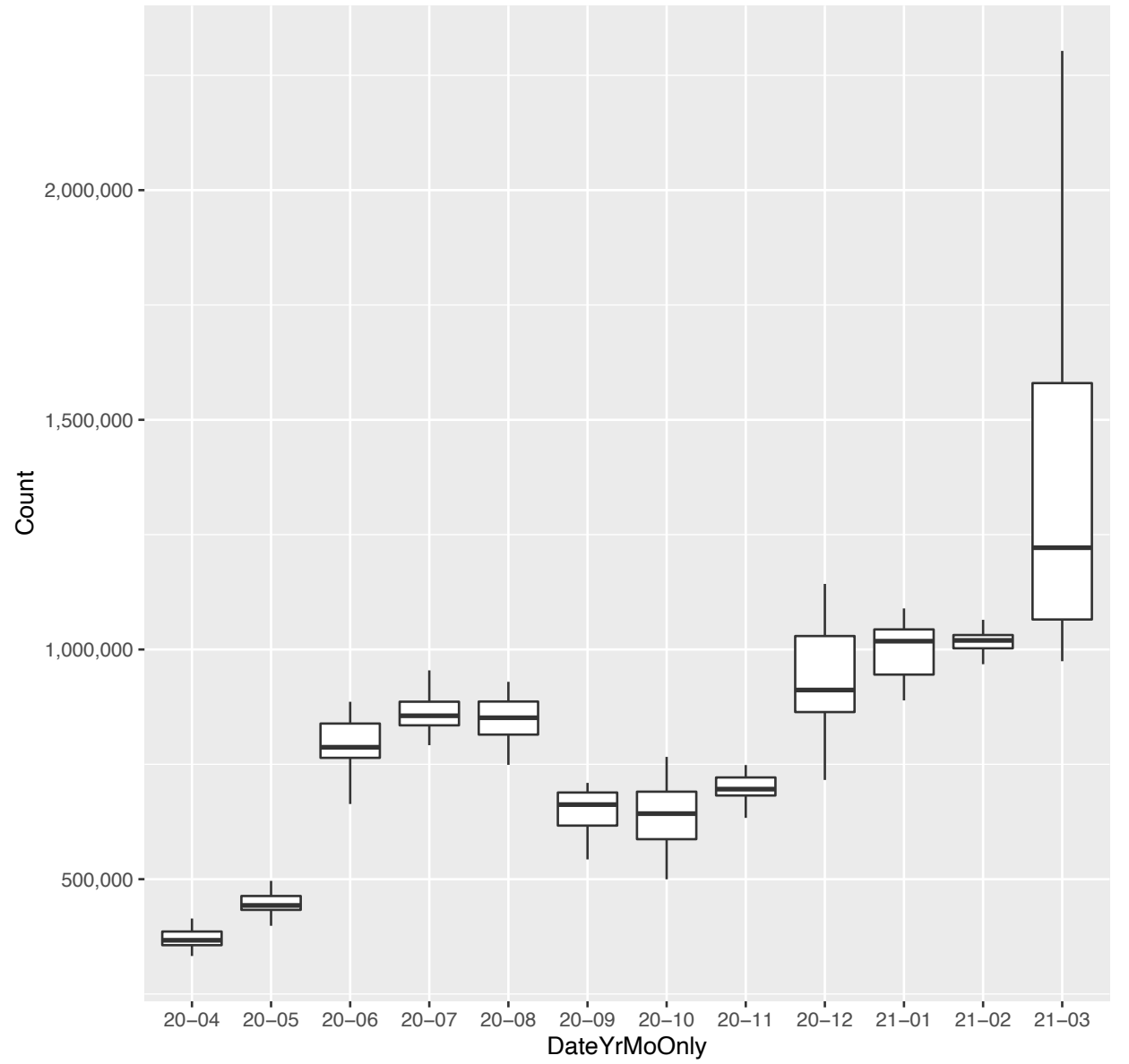


5. hbomax.com: ~ M

*. hbomax.com (day-by-day counts and 28 day moving average)



*. hbomax.com (monthly boxplots (outliers trimmed))



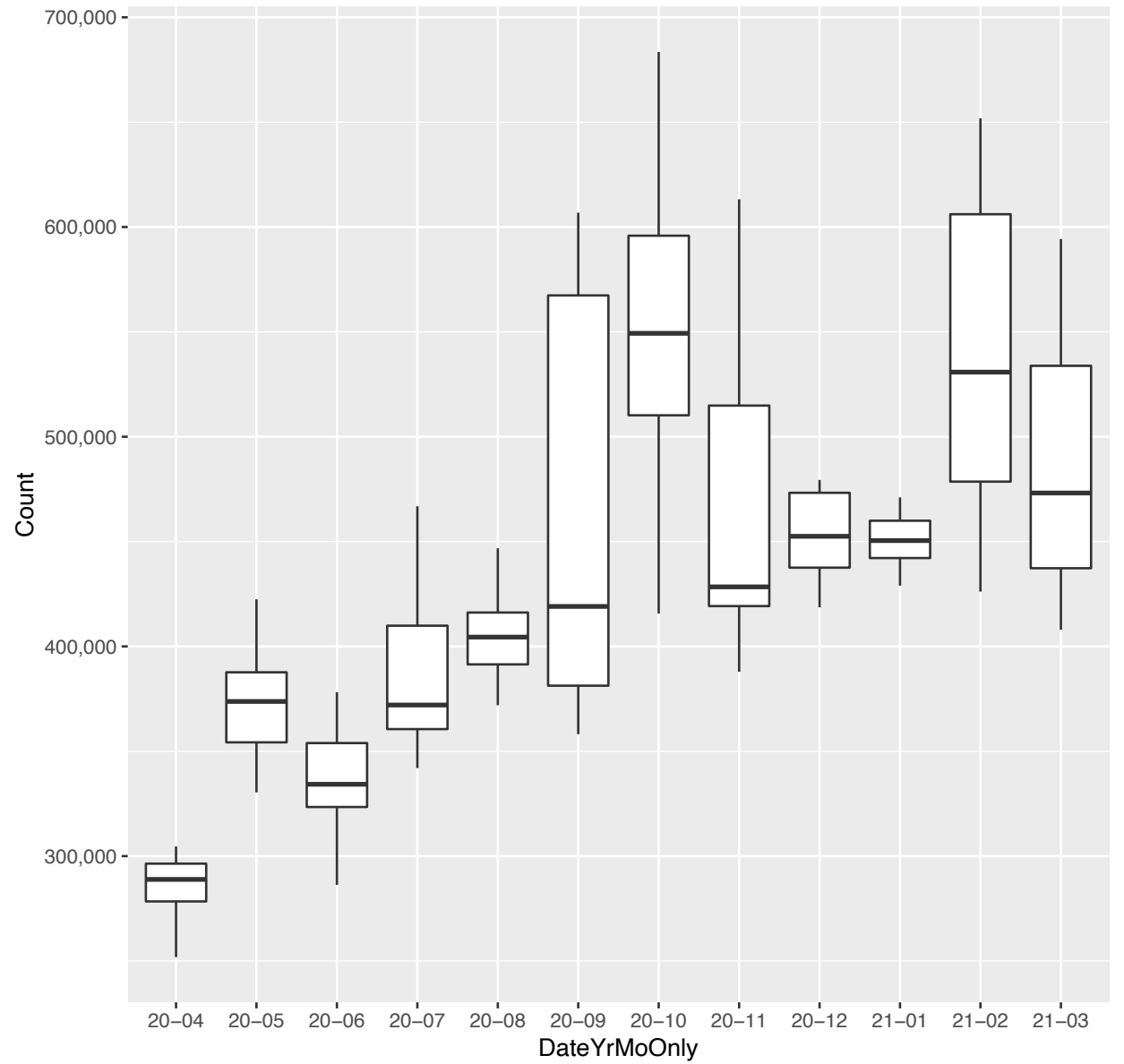
6. hotstar.com:



*. hotstar.com (day-by-day counts and 28 day moving average)



*. hotstar.com (monthly boxplots (outliers trimmed))

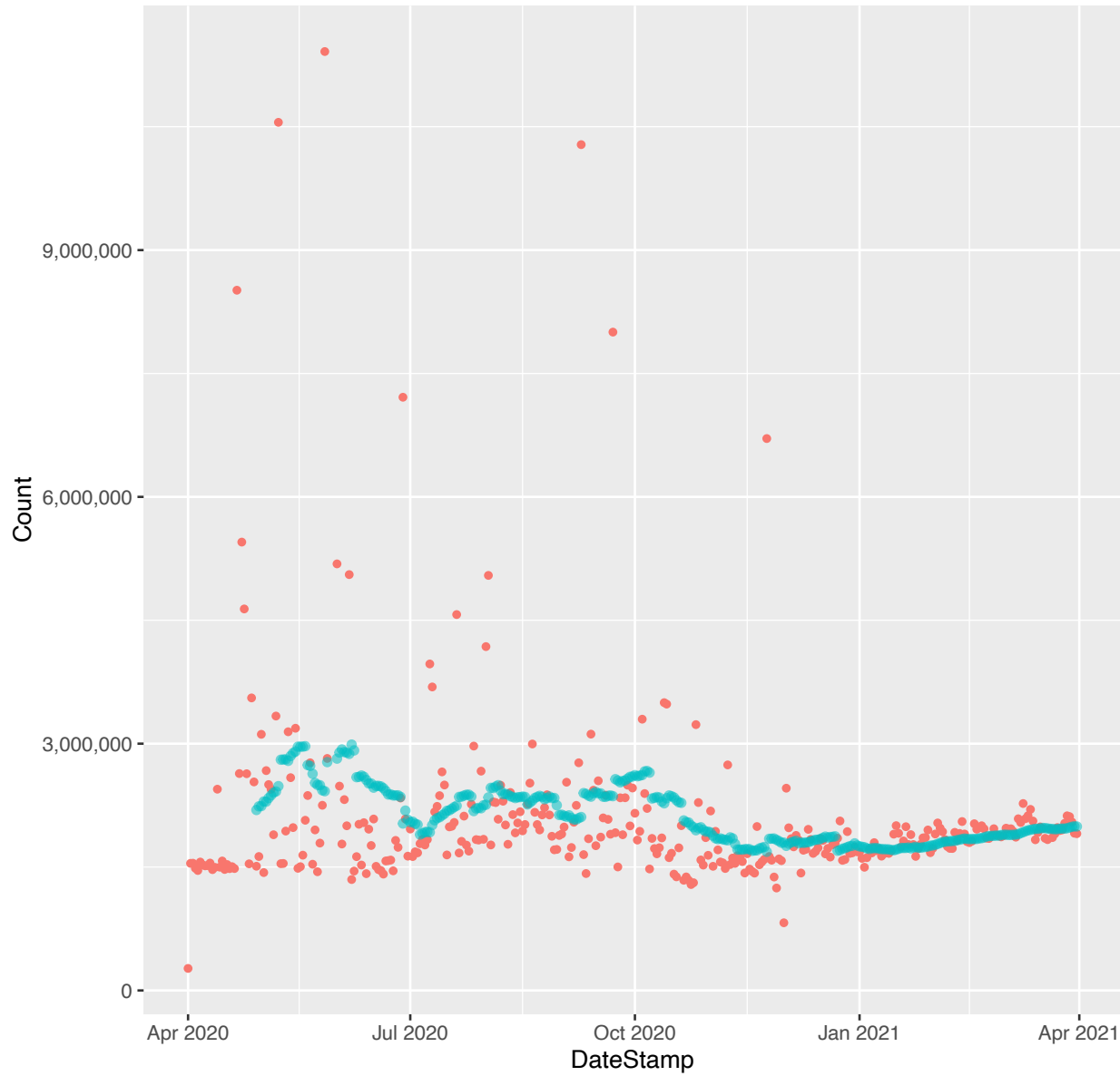


7. hulu.com:

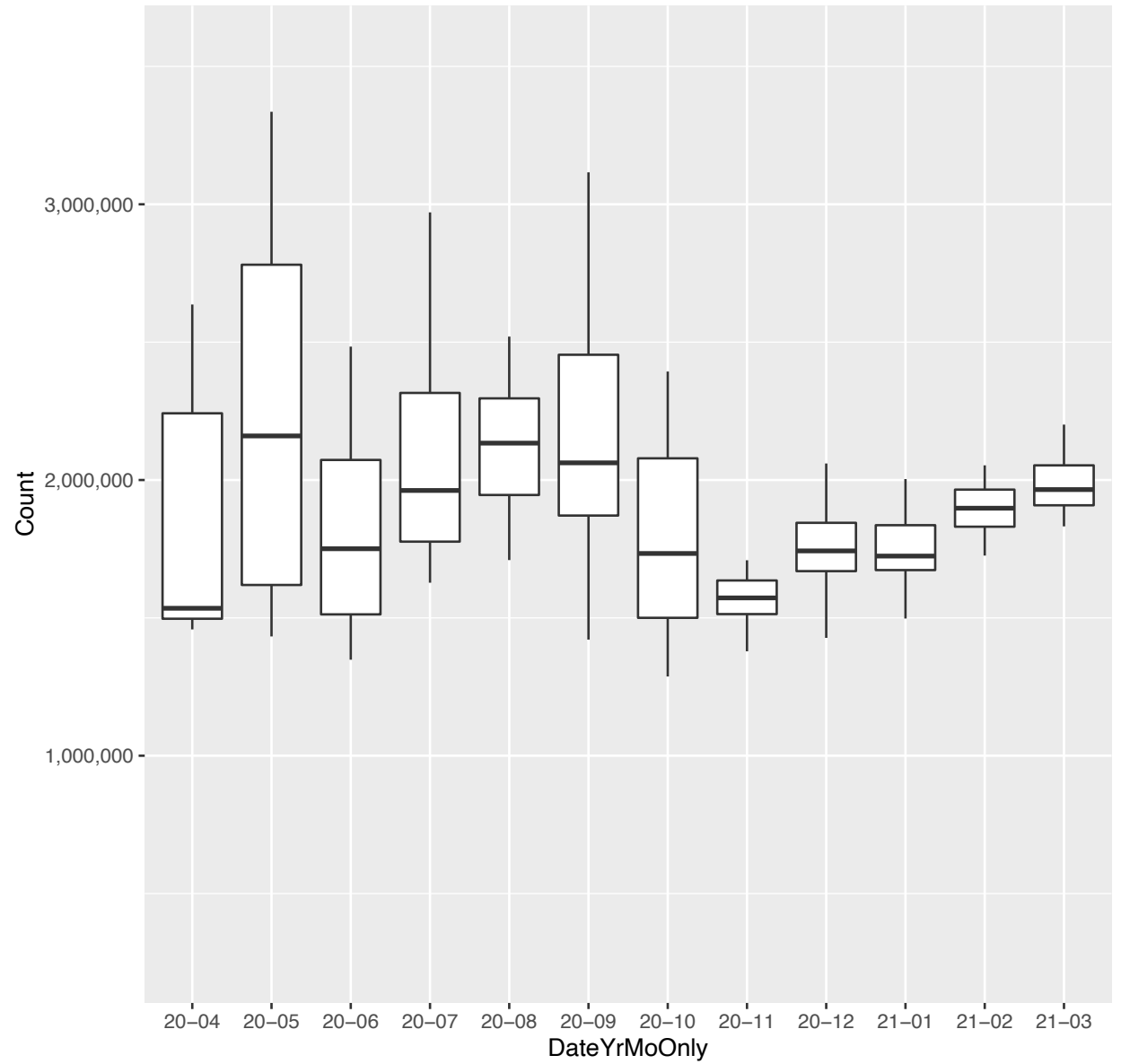


M

*. hulu.com (day-by-day counts and 28 day moving average)



*. hulu.com (monthly boxplots (outliers trimmed))

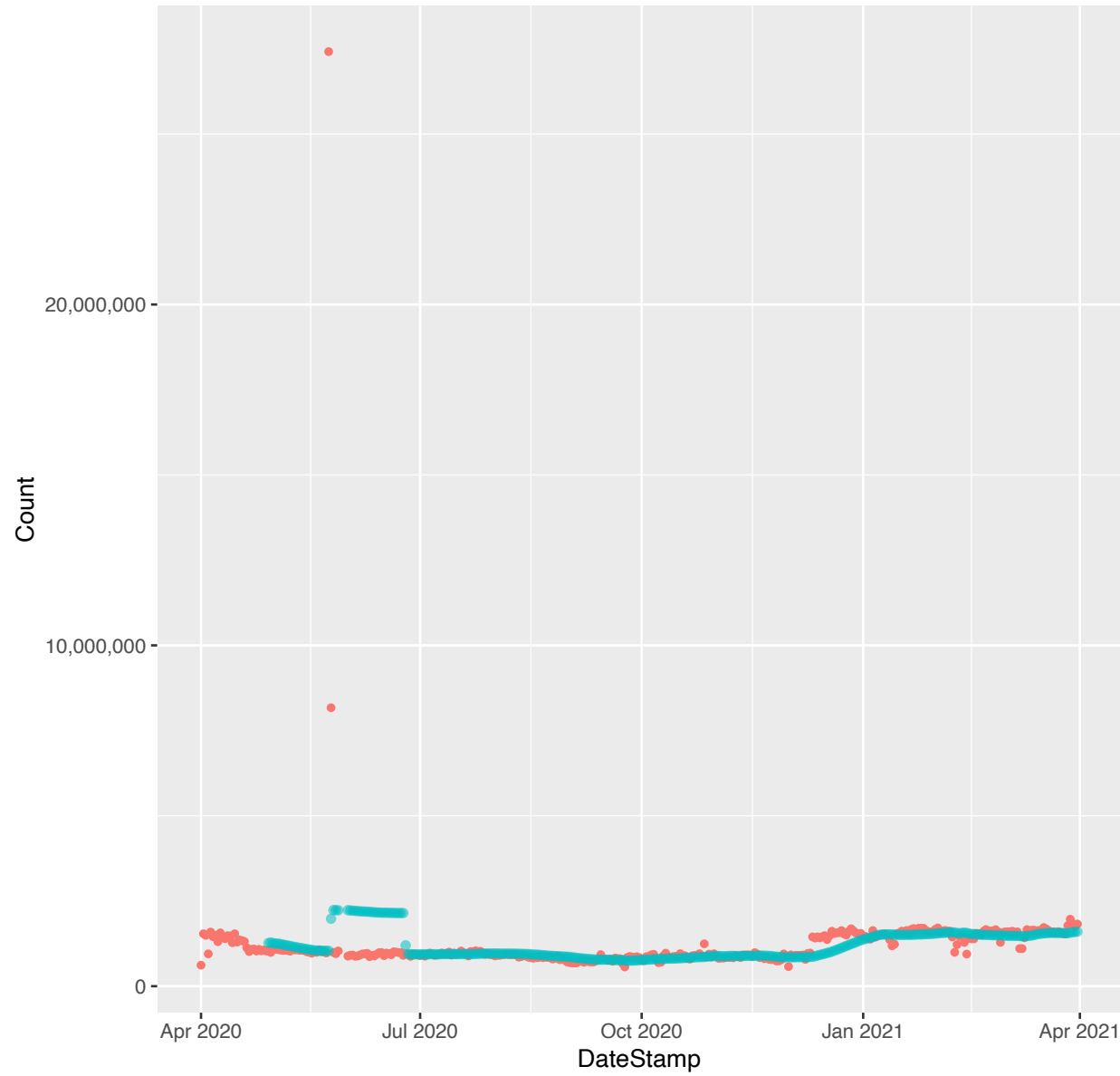


8. huya.com:

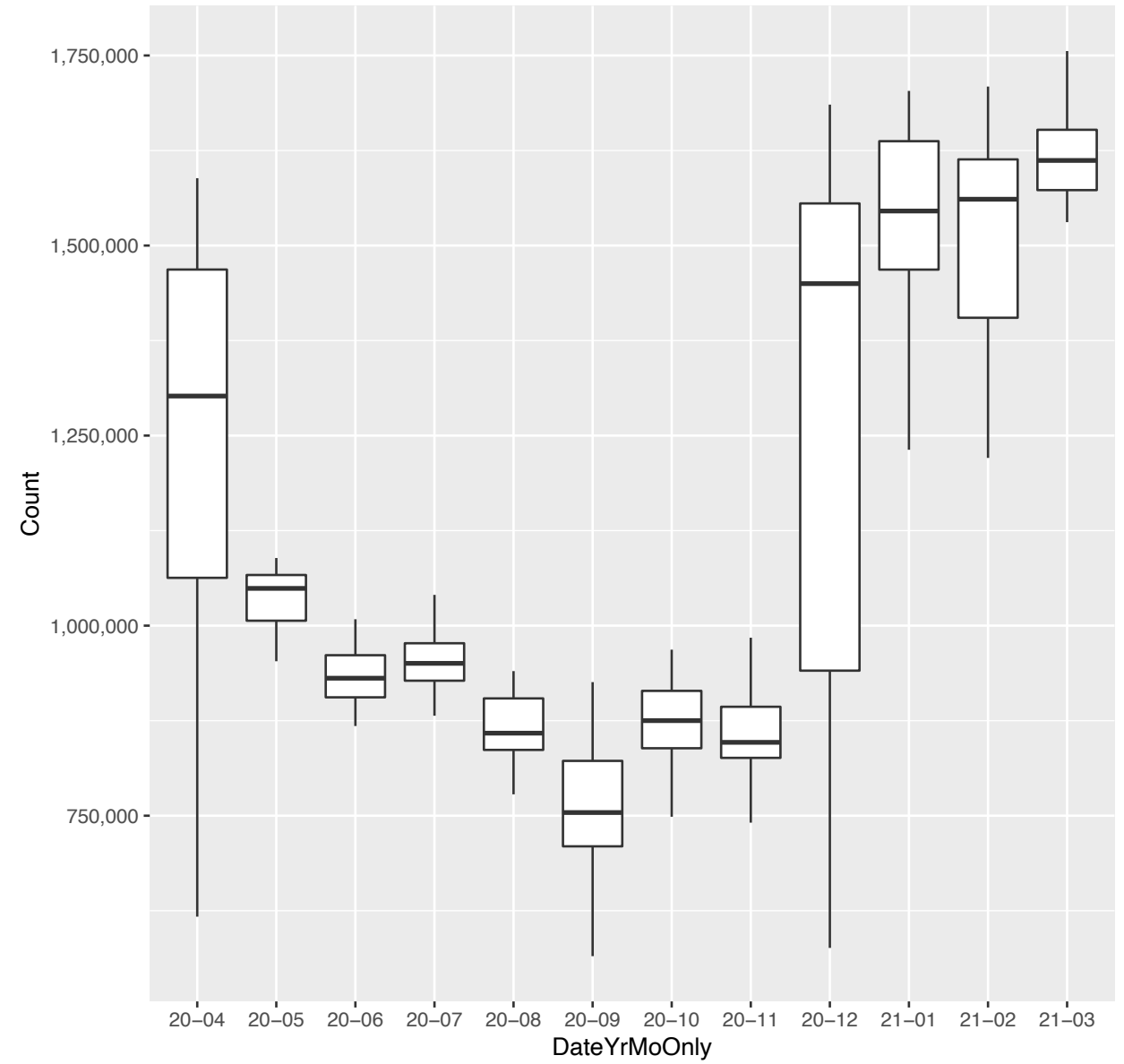
★ U shaped (ending higher)

M

*. huya.com (day-by-day counts and 28 day moving average)



*. huya.com (monthly boxplots (outliers trimmed))



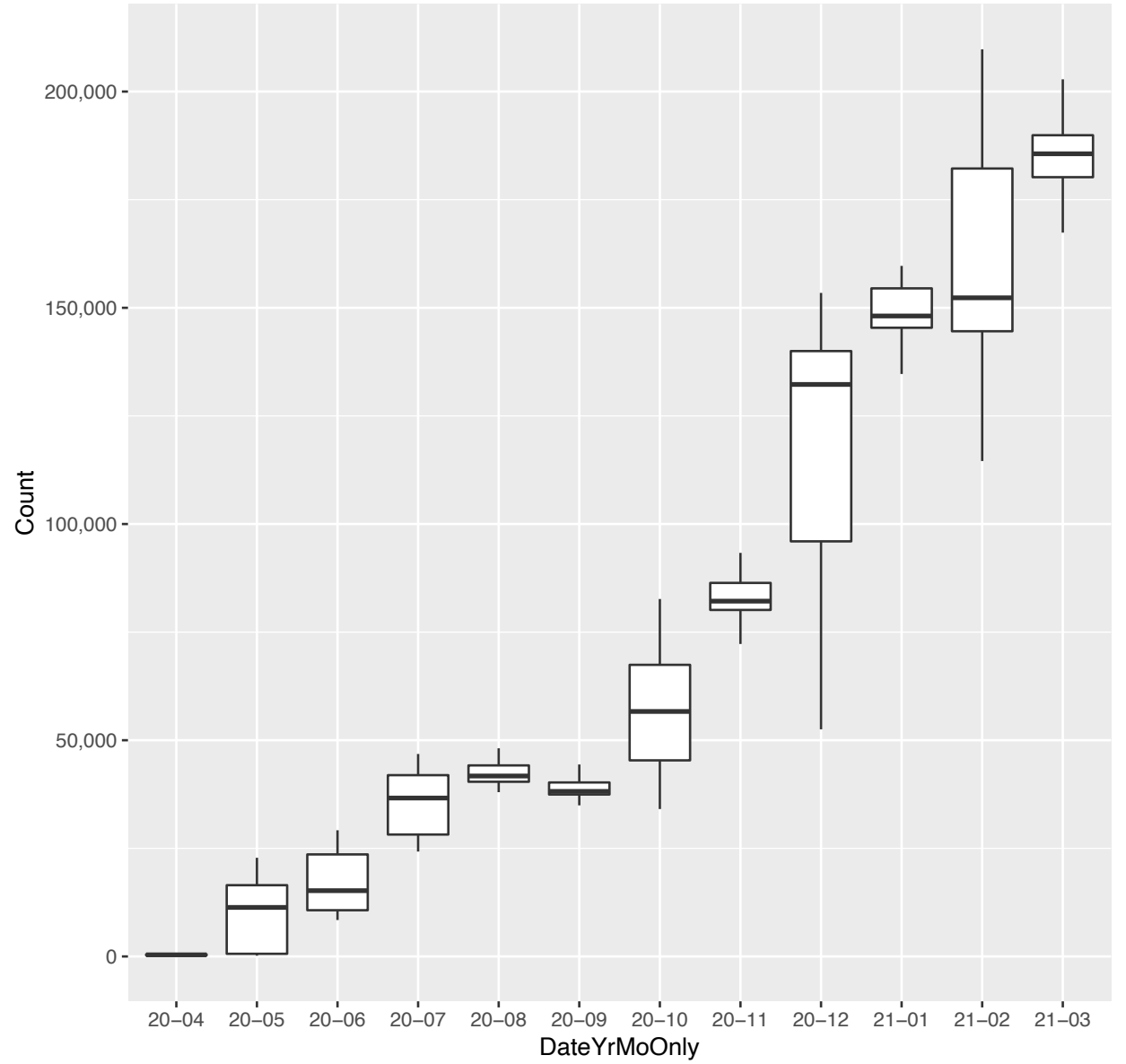
9. iq.com:



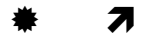
*. iq.com (day-by-day counts and 28 day moving average)



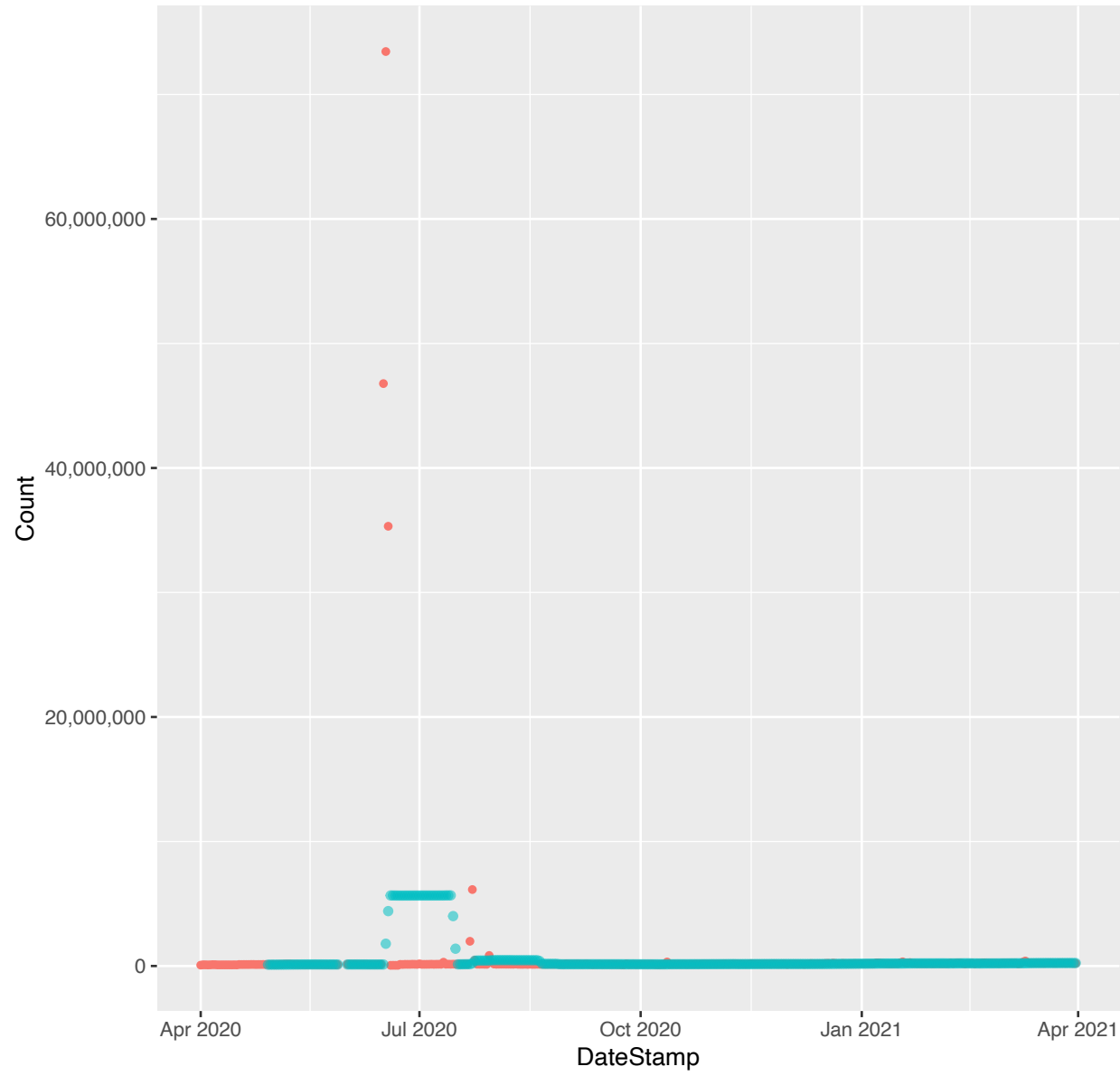
*. iq.com (monthly boxplots (outliers trimmed))



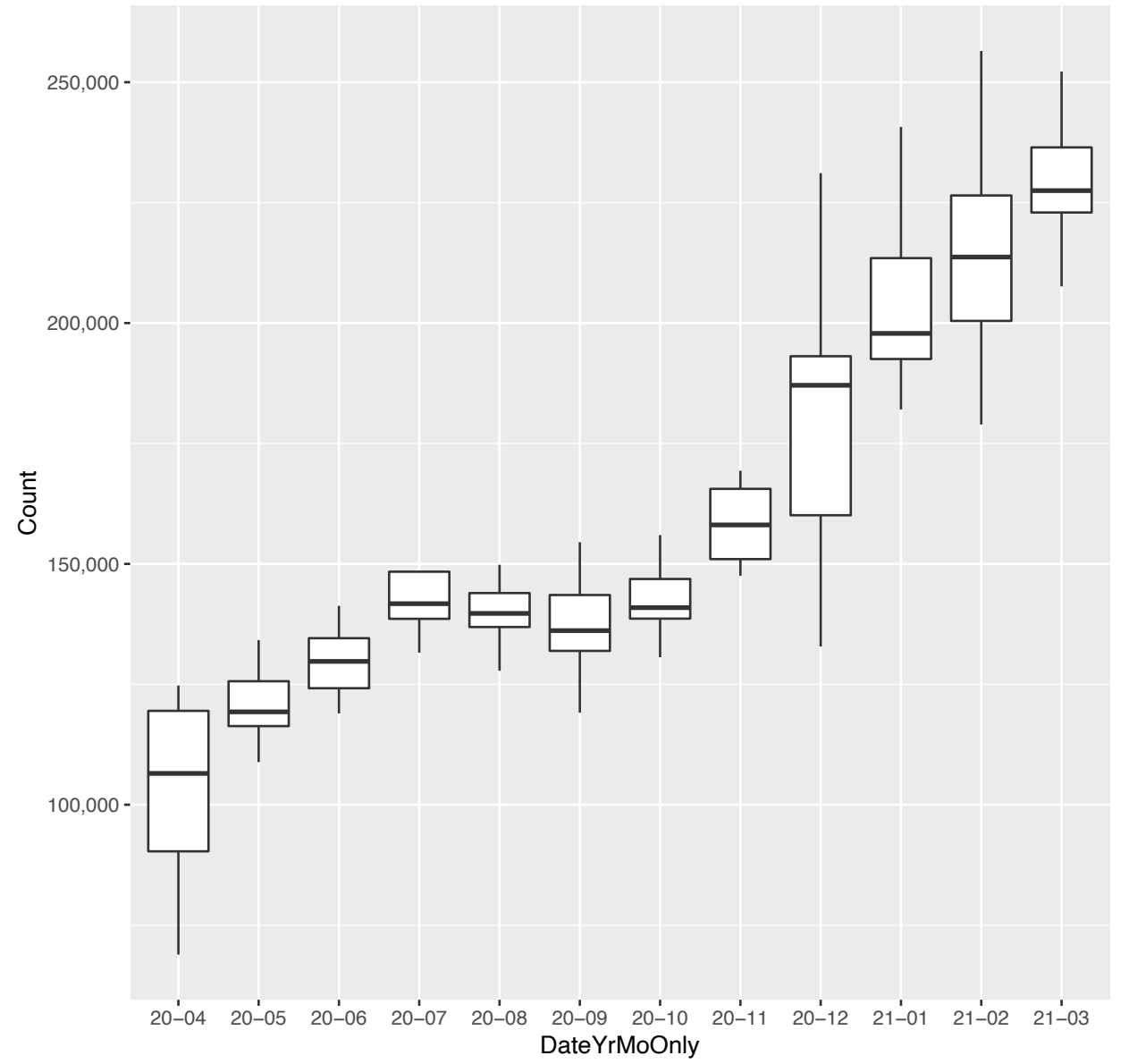
10. itv.com:



*. itv.com (day-by-day counts and 28 day moving average)



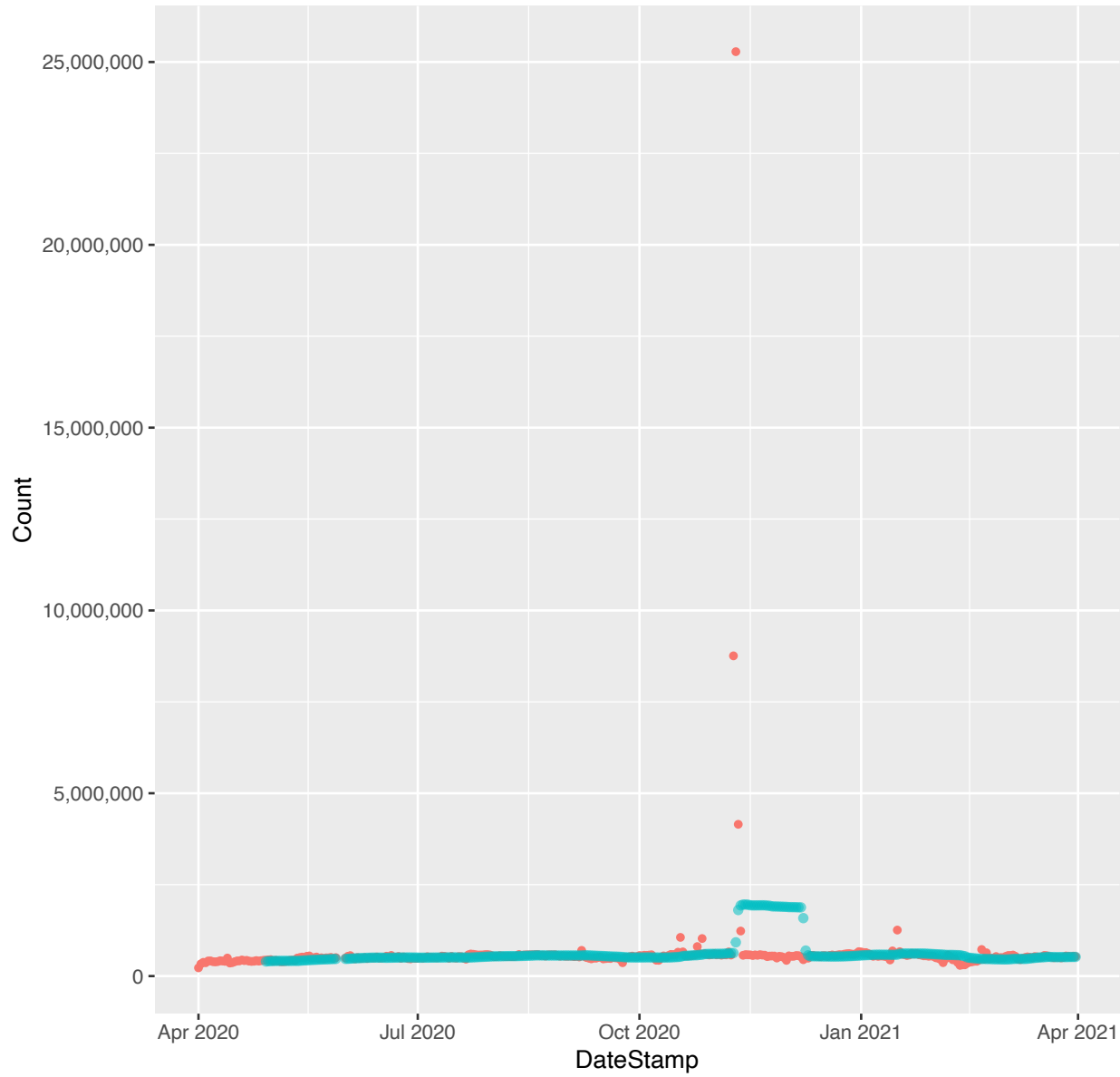
*. itv.com (monthly boxplots (outliers trimmed))



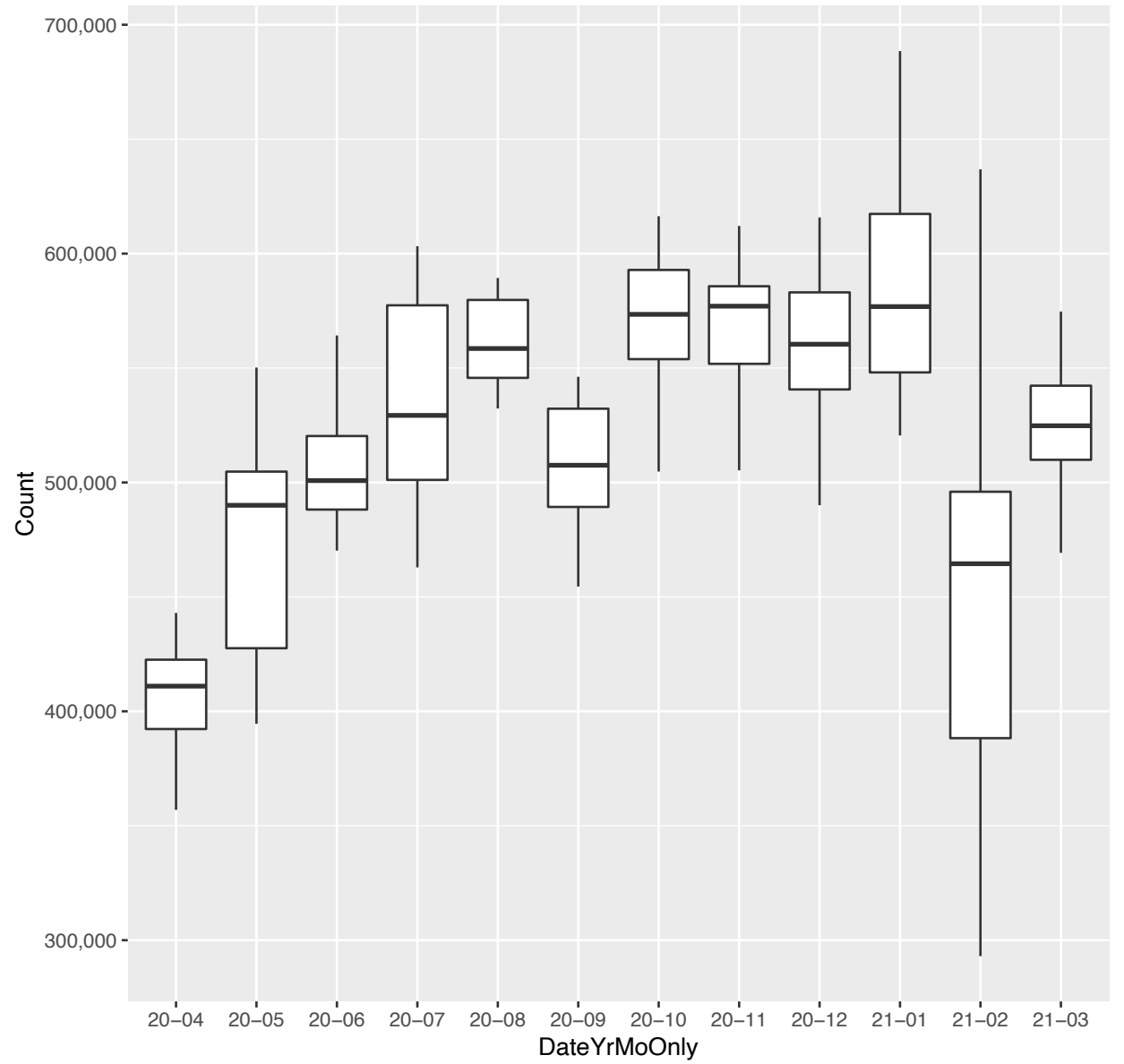
11. ixigua.com:



*. ixigua.com (day-by-day counts and 28 day moving average)



*. ixigua.com (monthly boxplots (outliers trimmed))

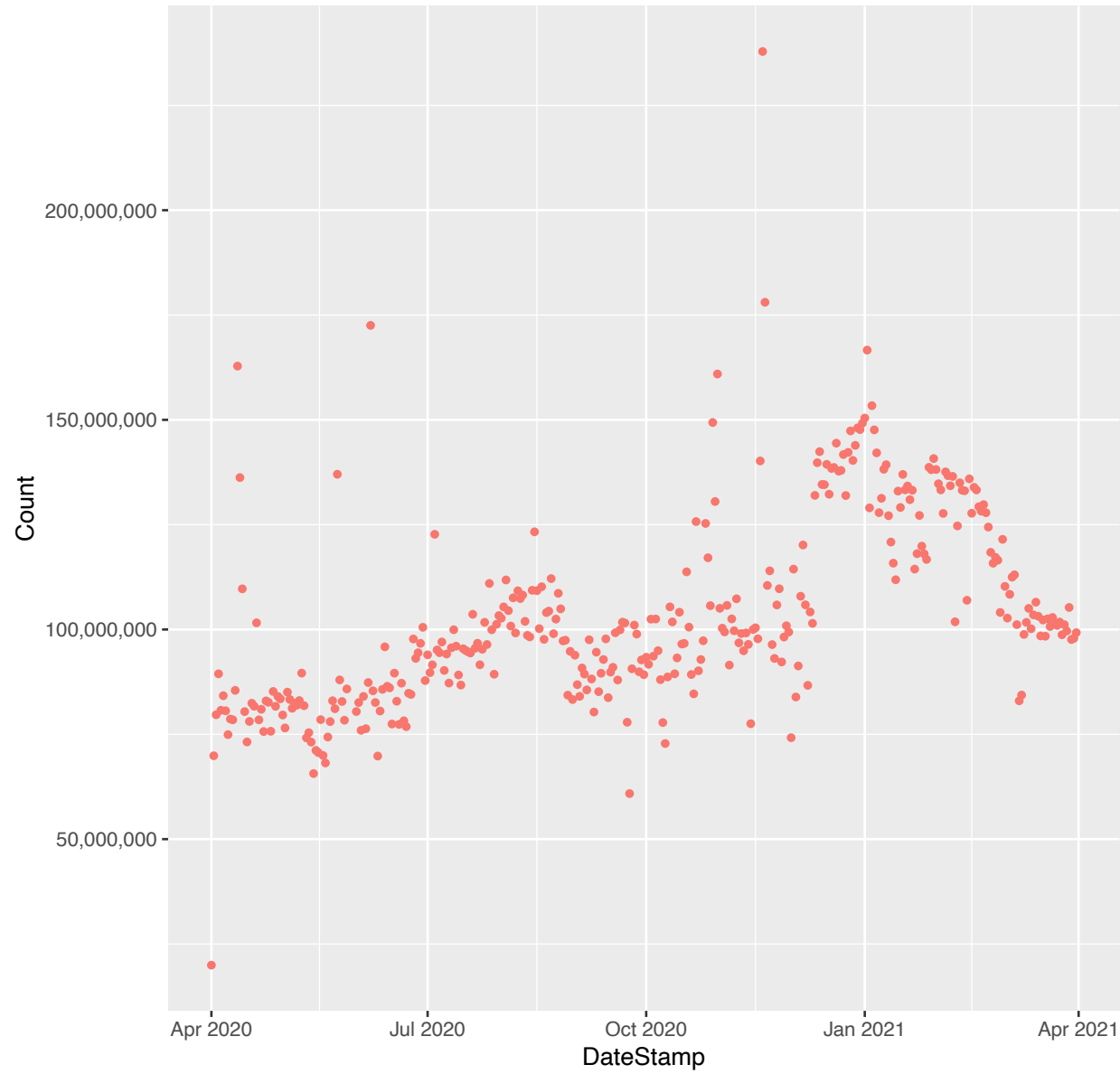


12. netflix.com:

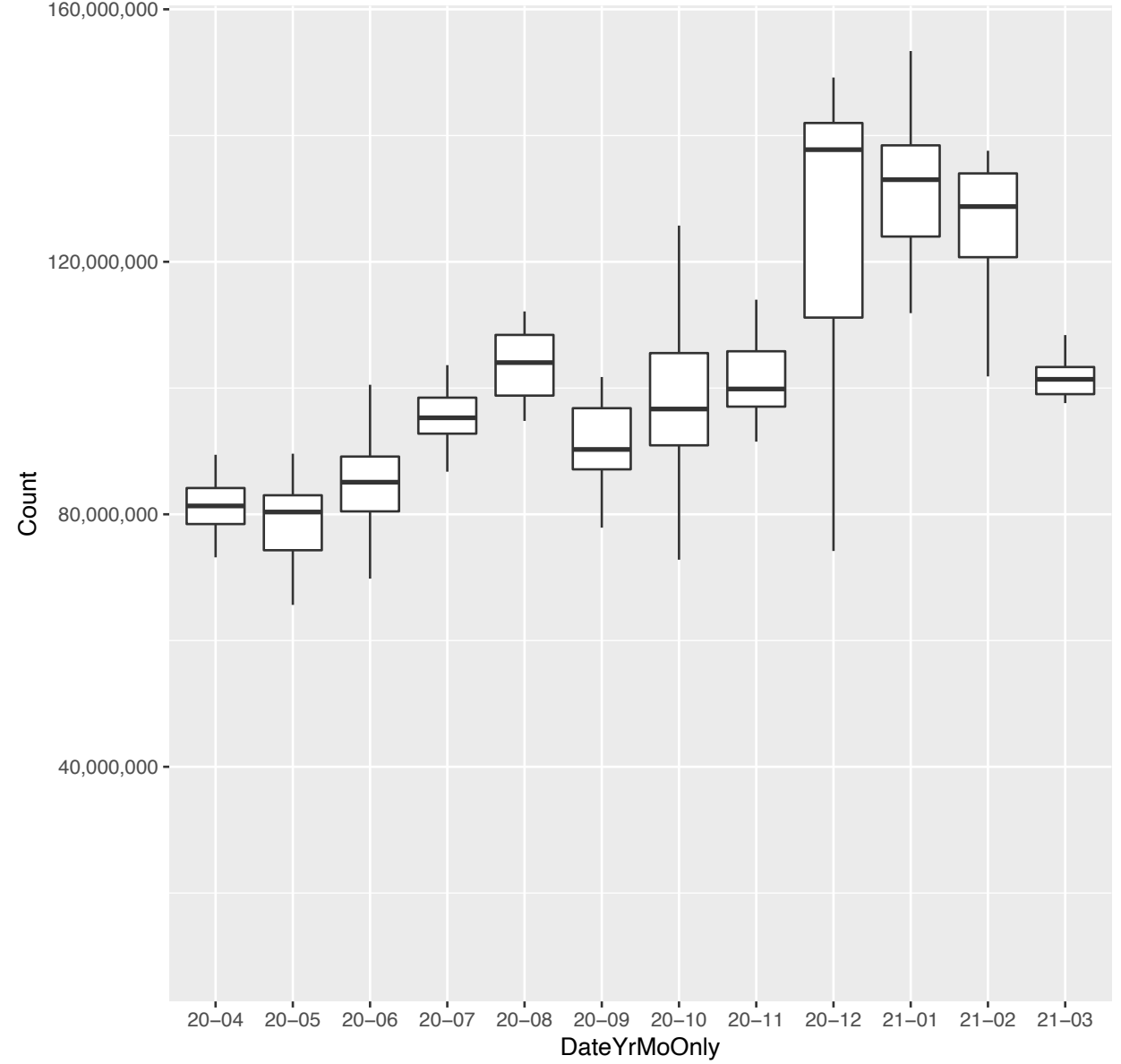


MMM

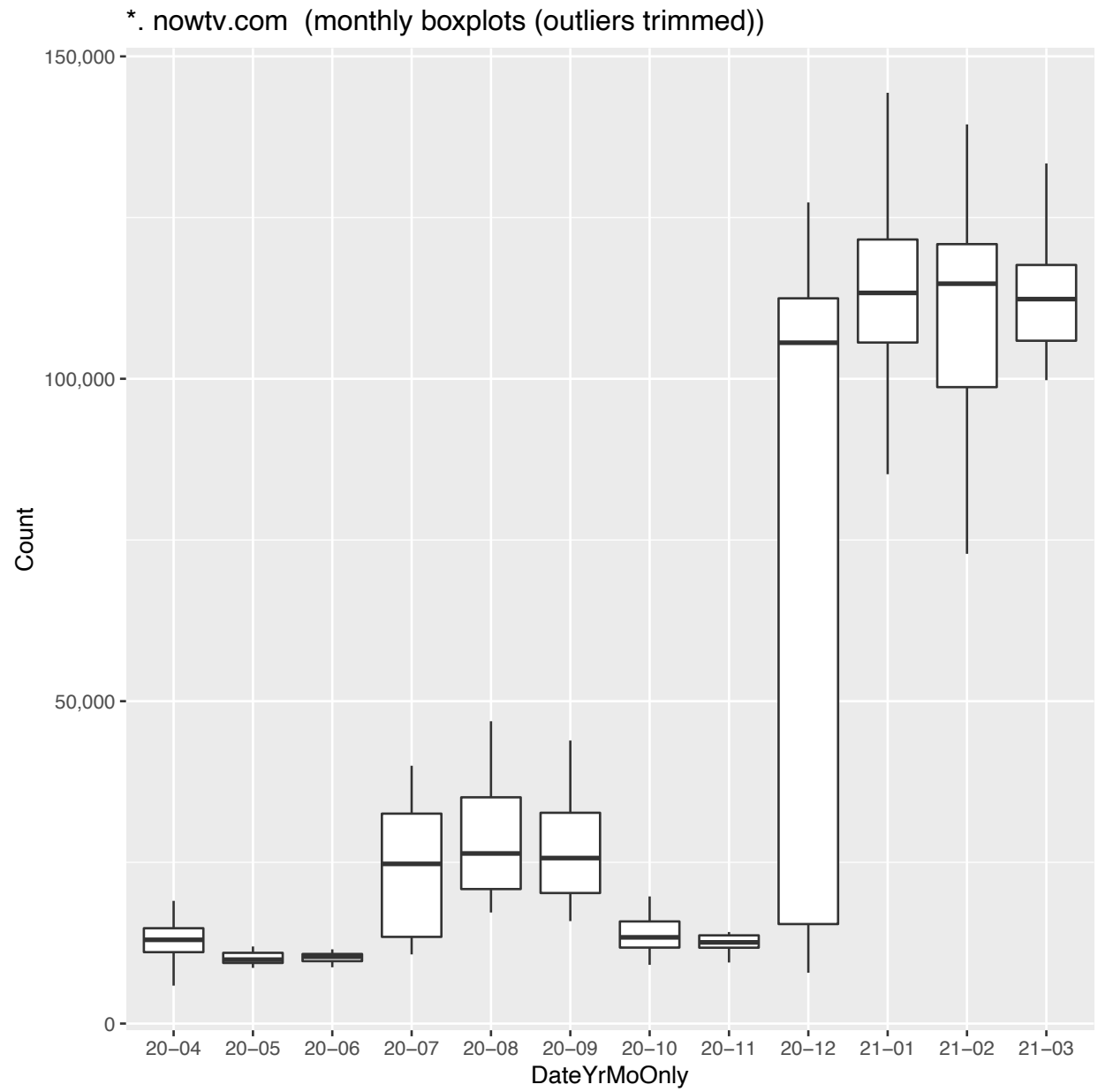
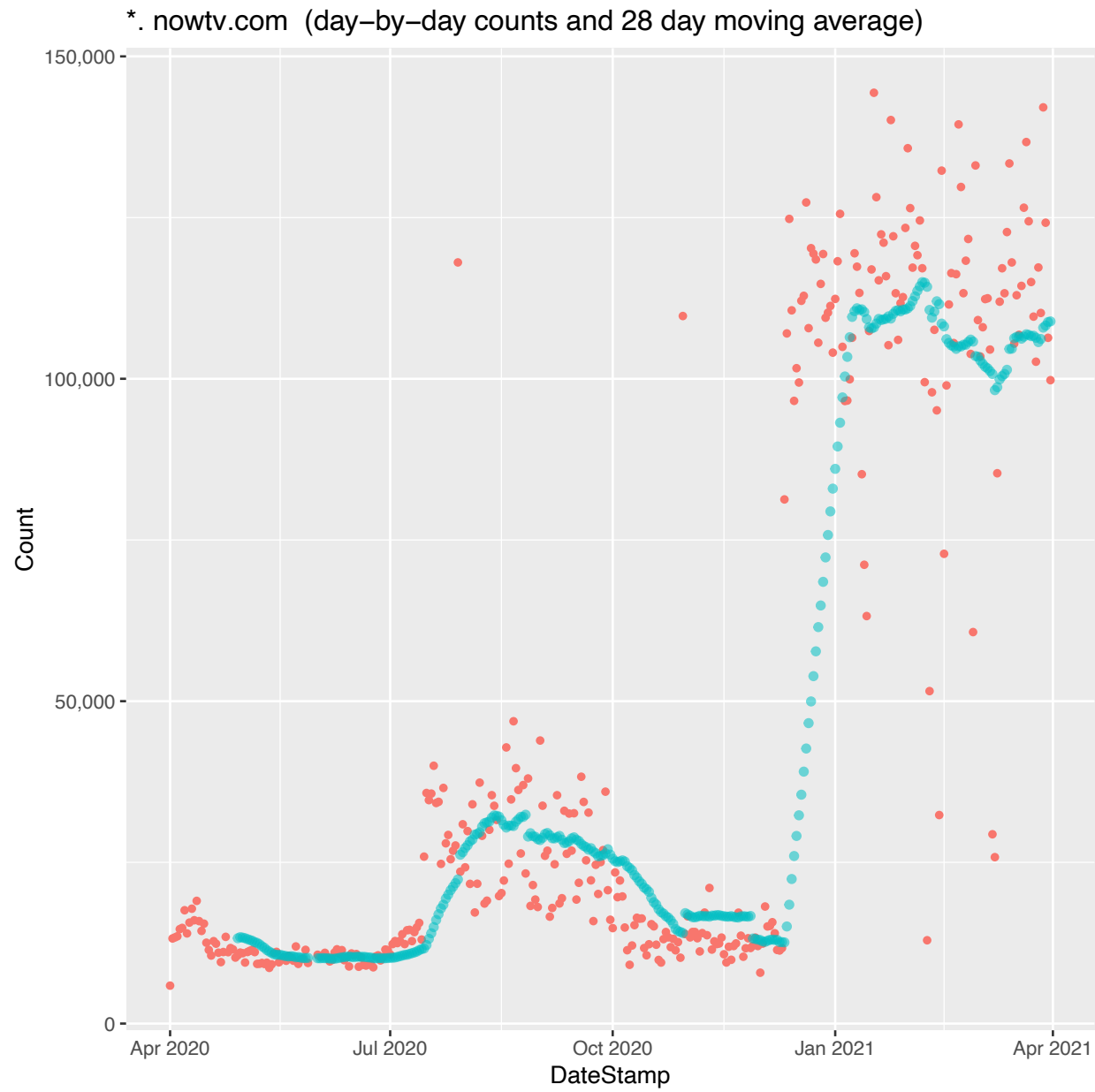
*. netflix.com (day-by-day counts and 28 day moving average)



*. netflix.com (monthly boxplots (outliers trimmed))

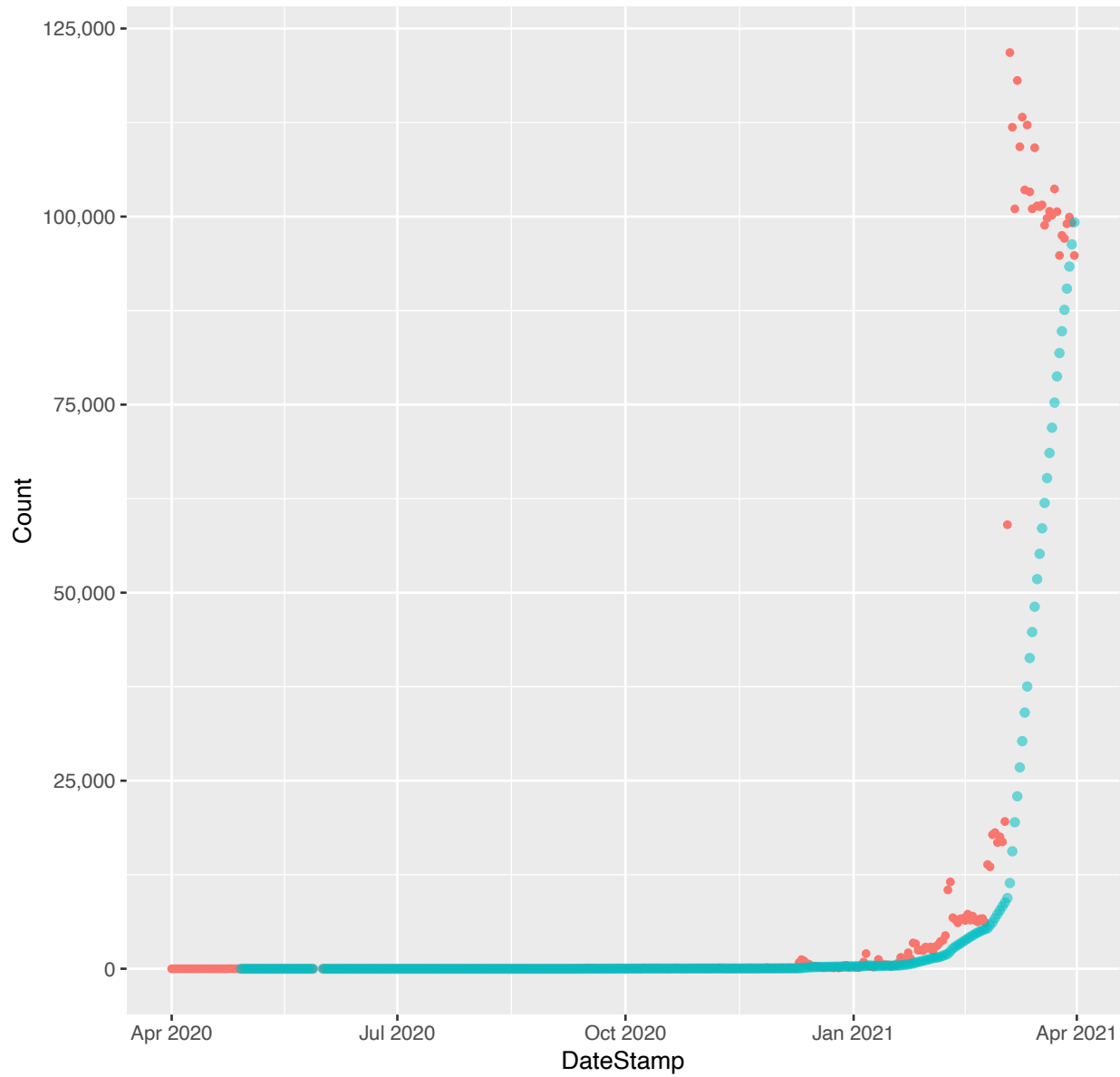


13. nowtv.com:

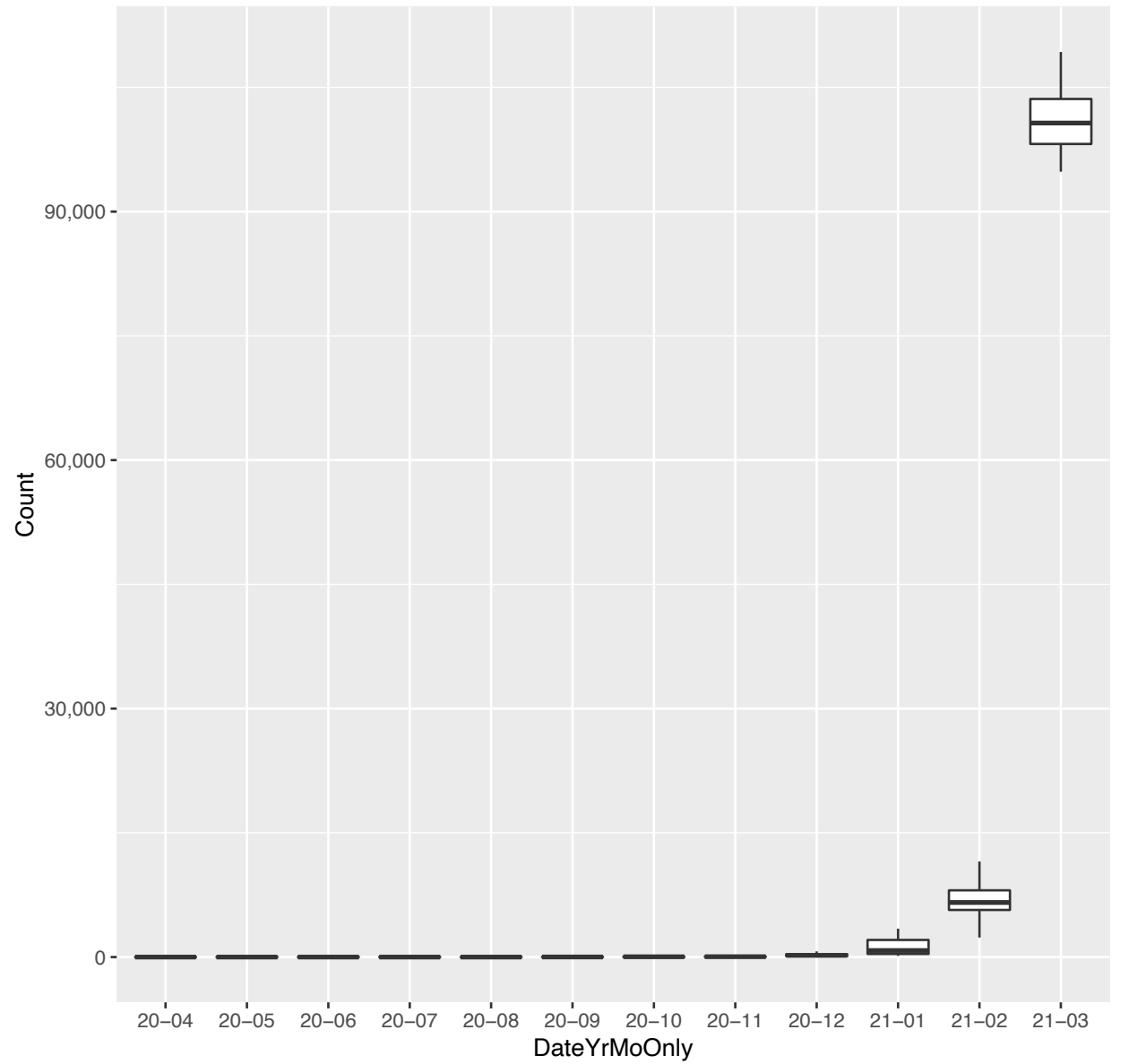


14. paramountplus.com: ↗

*. paramountplus.com (day-by-day counts and 28 day moving average)



*. paramountplus.com (monthly boxplots (outliers trimmed))

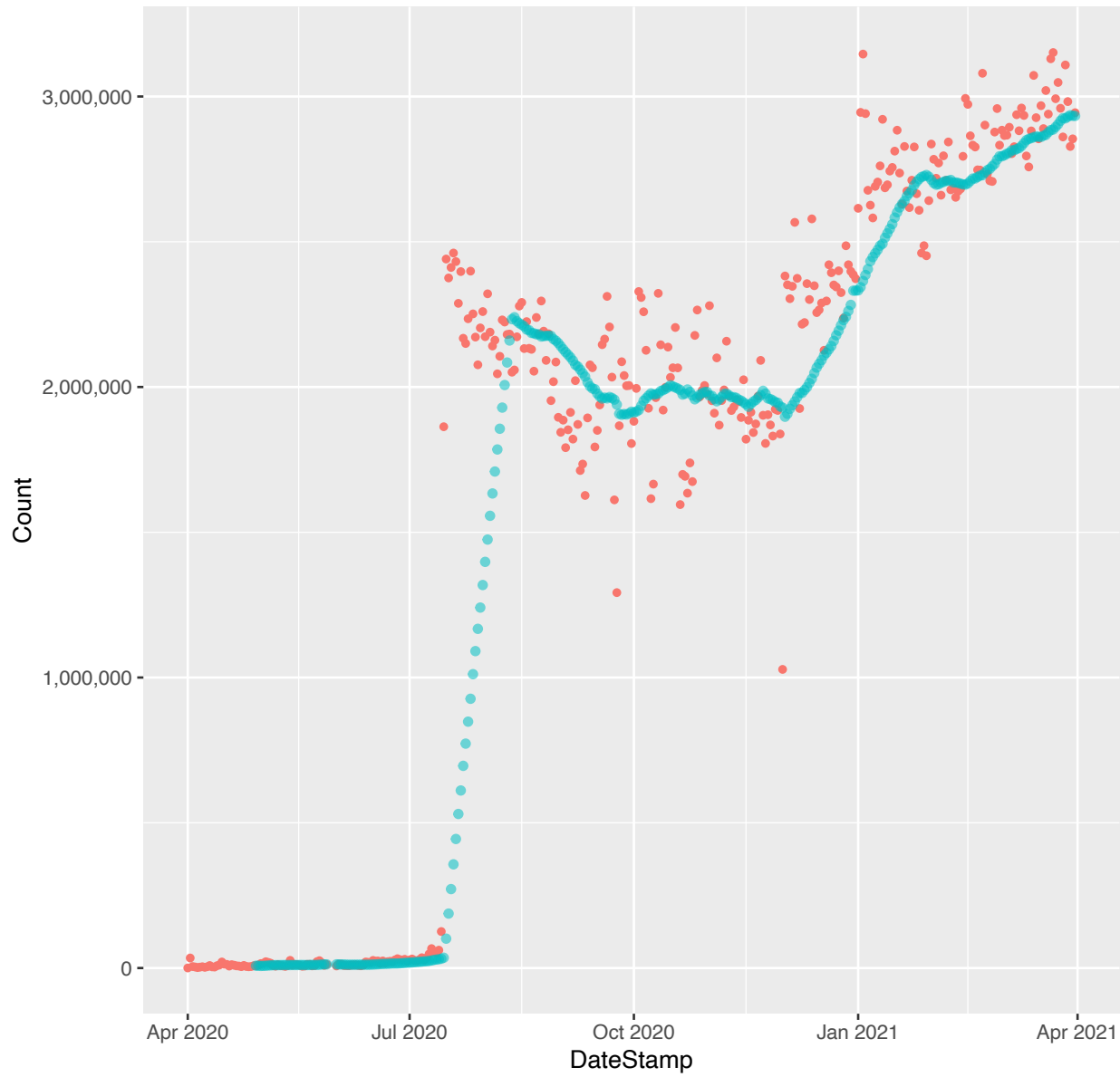


15. peacocktv.com:

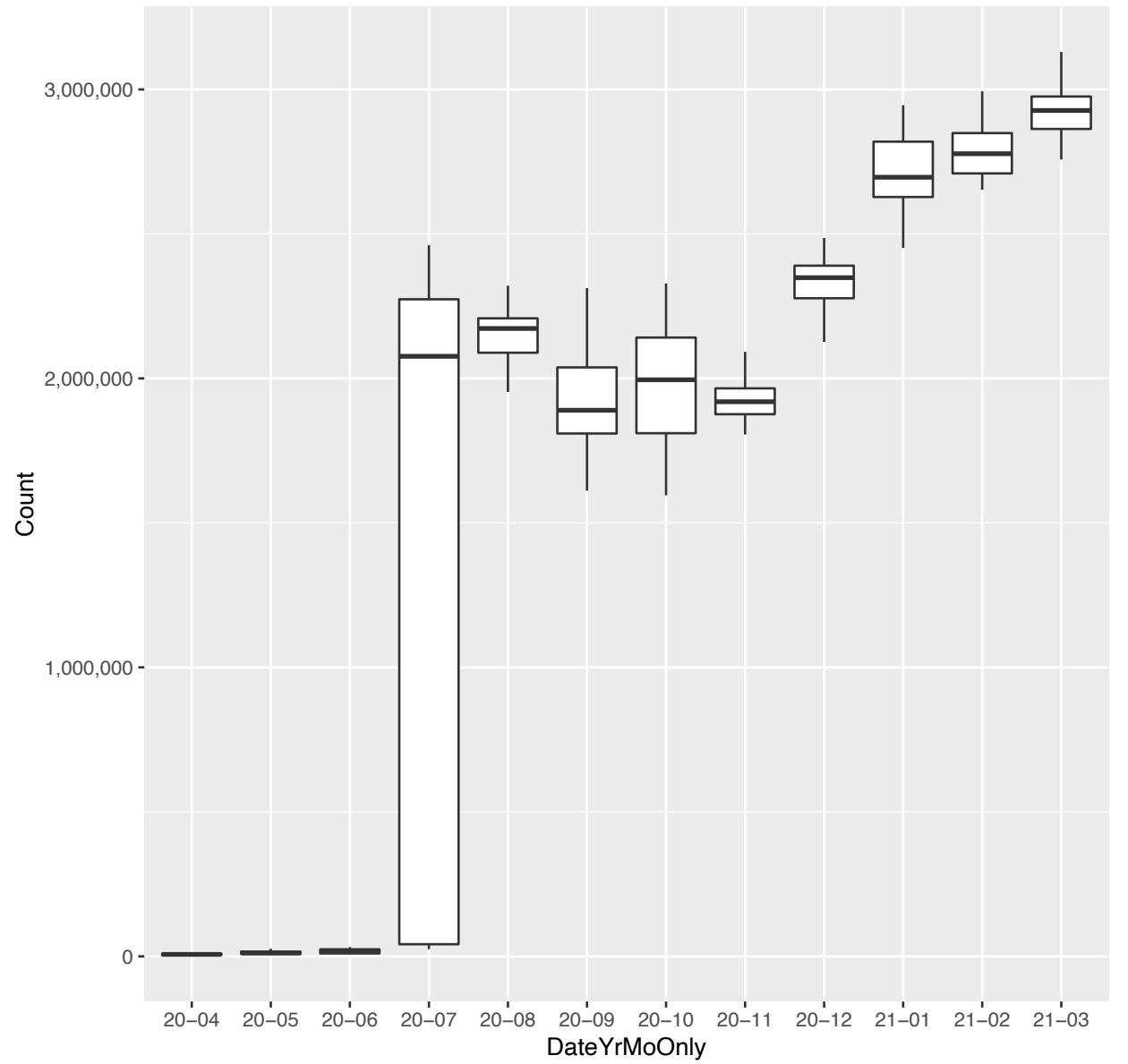


M

*. peacocktv.com (day-by-day counts and 28 day moving average)



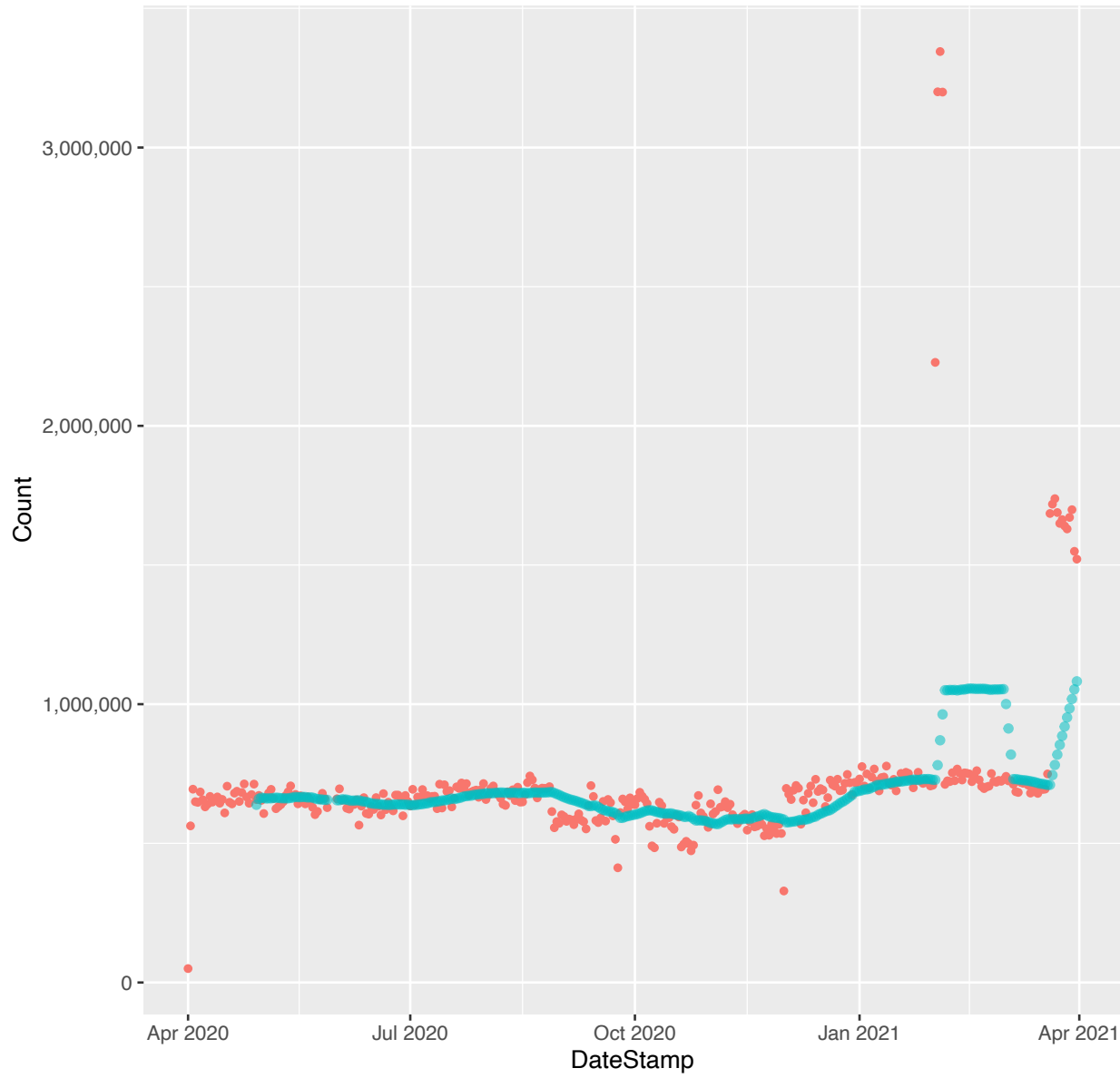
*. peacocktv.com (monthly boxplots (outliers trimmed))



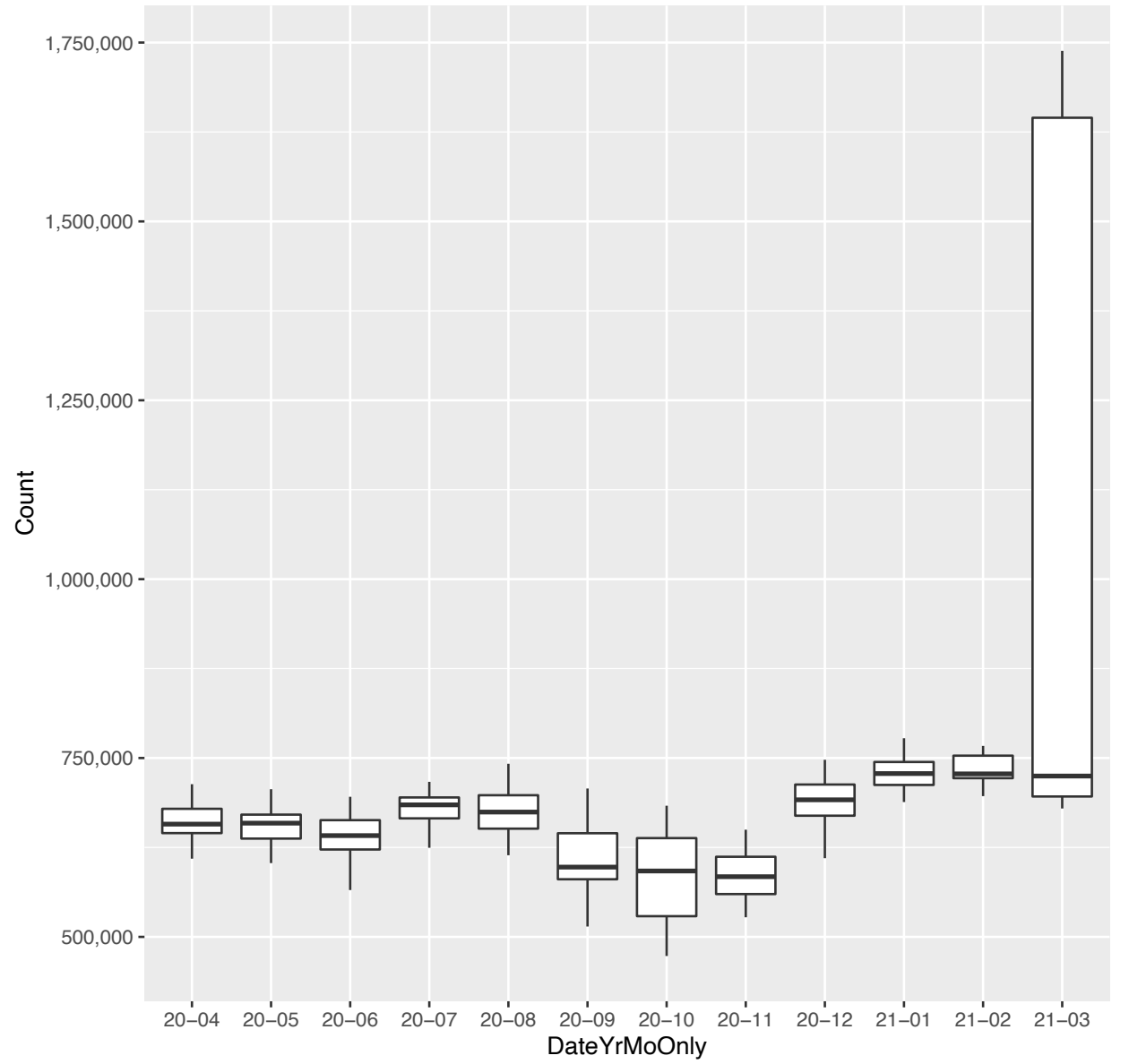
16. sling.com:



*. sling.com (day-by-day counts and 28 day moving average)



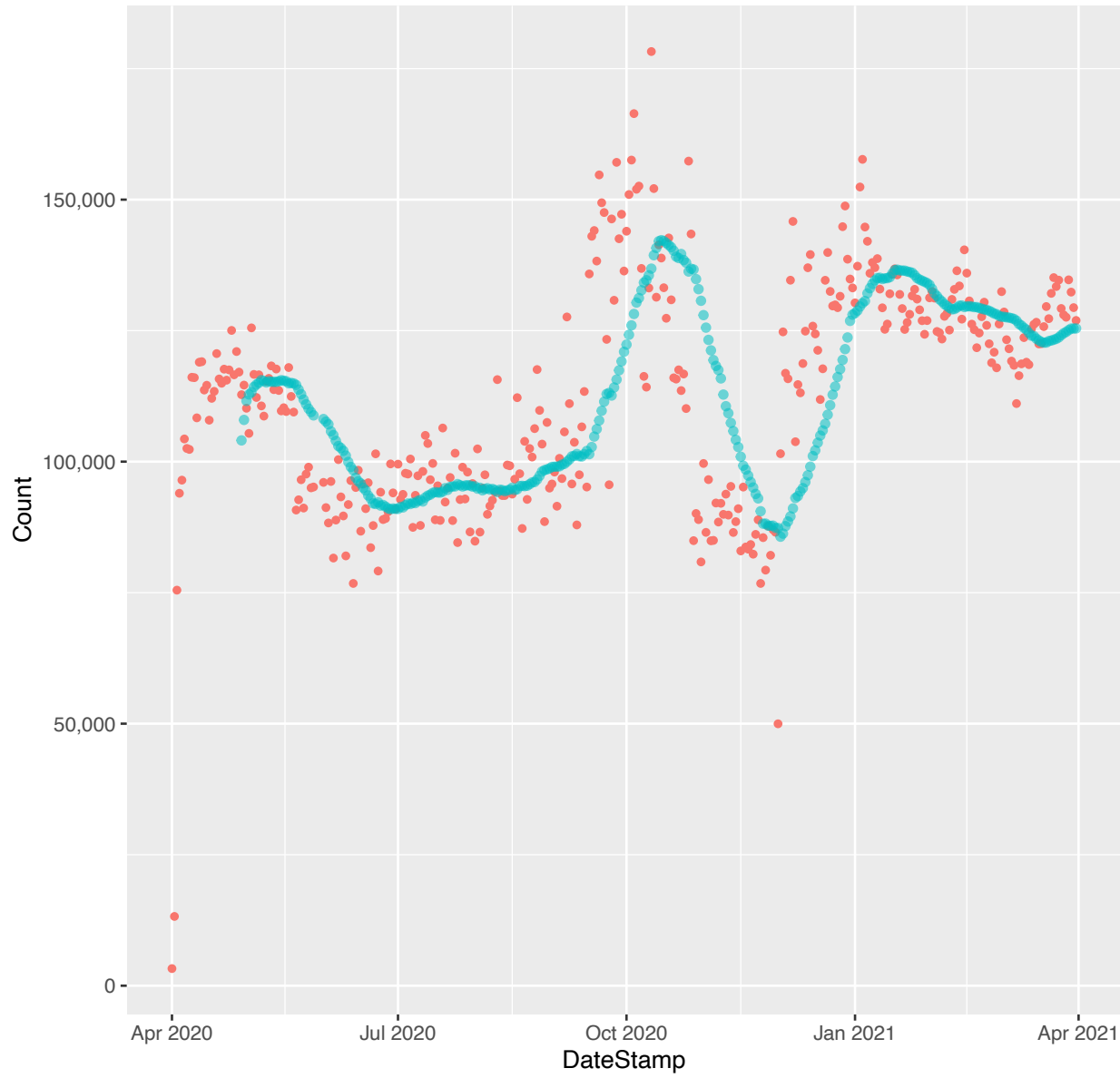
*. sling.com (monthly boxplots (outliers trimmed))



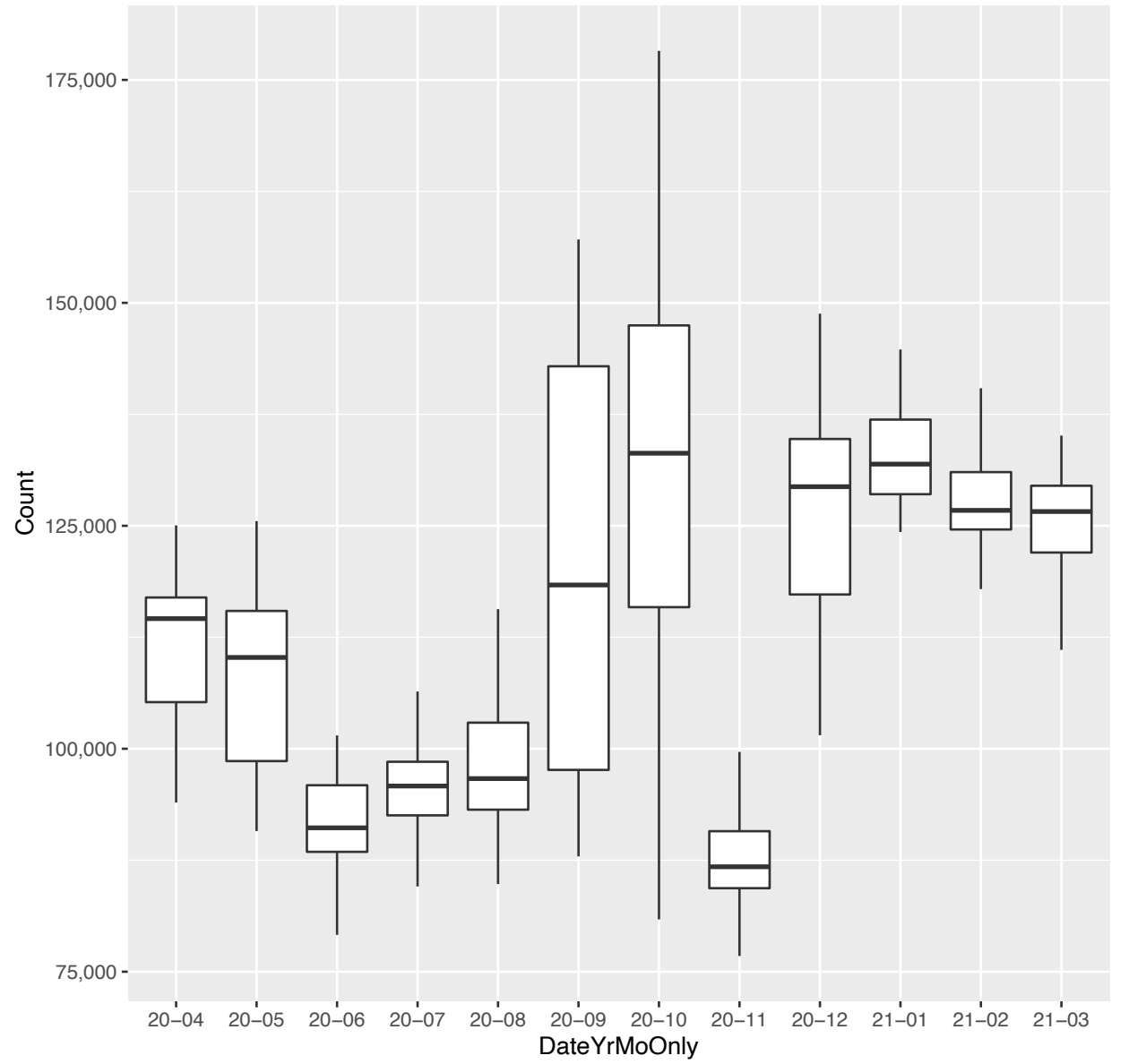
17. starz.com:

~

*. starz.com (day-by-day counts and 28 day moving average)



*. starz.com (monthly boxplots (outliers trimmed))



18. tiktok.com:

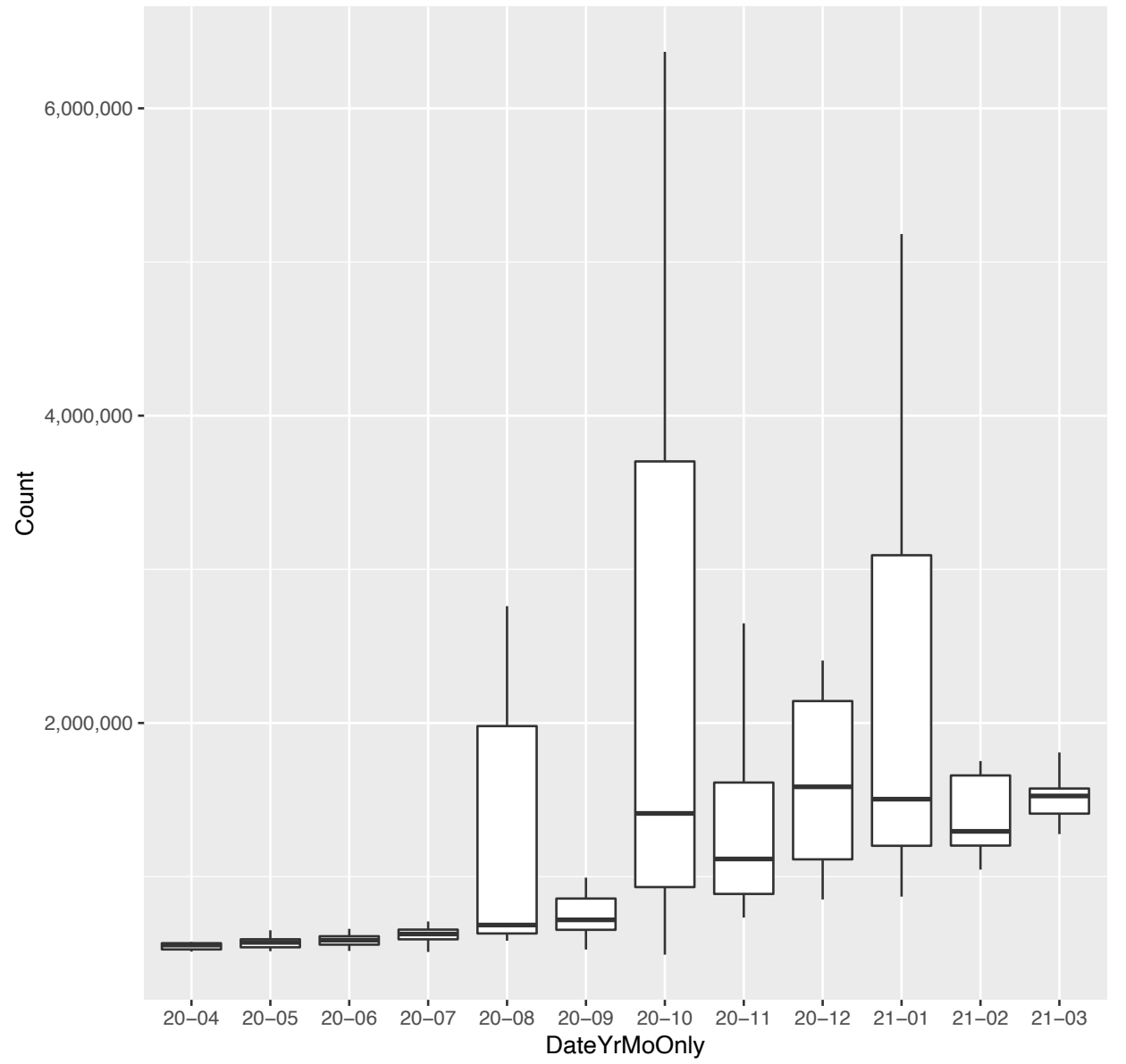


M

*. tiktok.com (day-by-day counts and 28 day moving average)



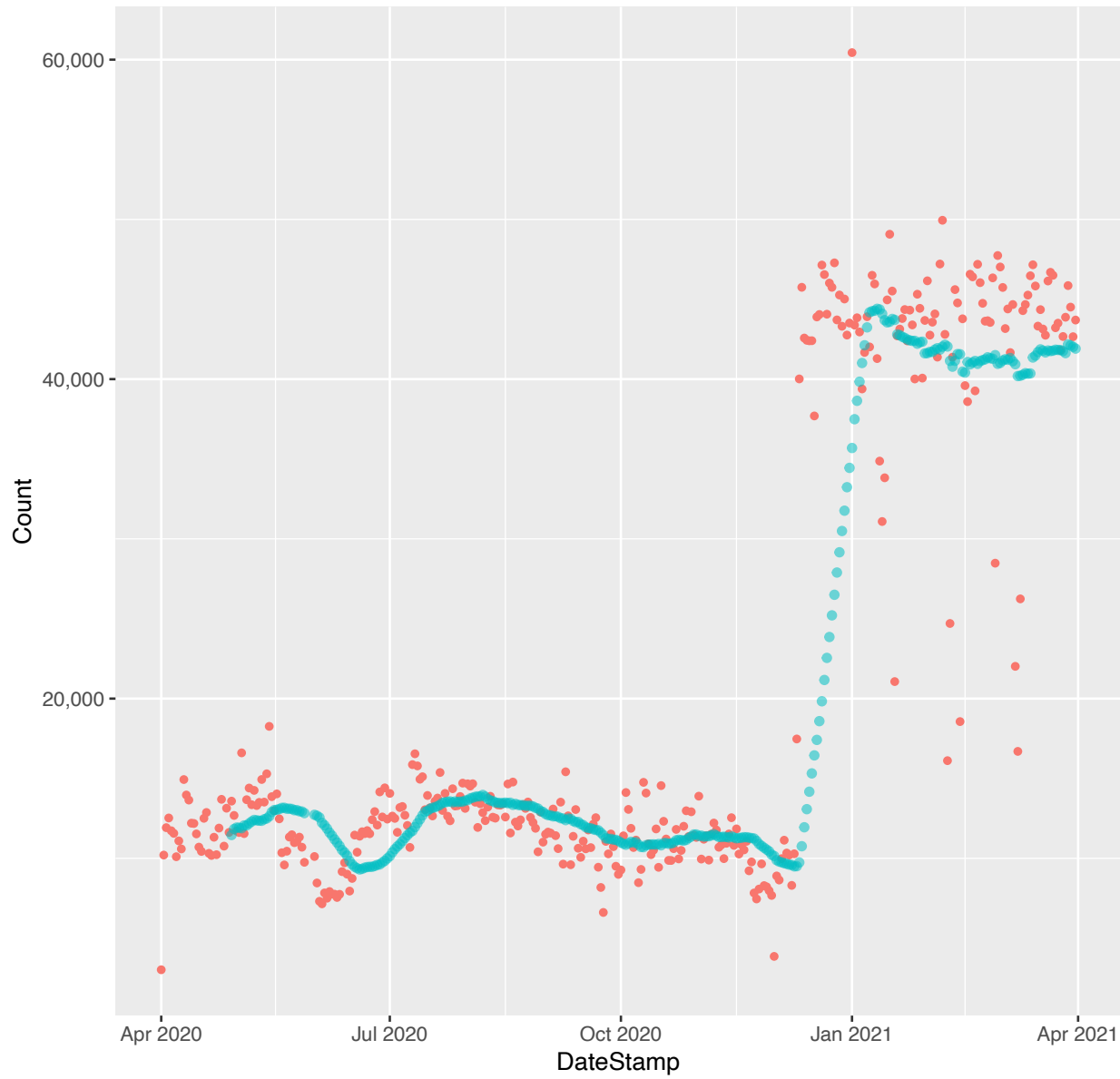
*. tiktok.com (monthly boxplots (outliers trimmed))



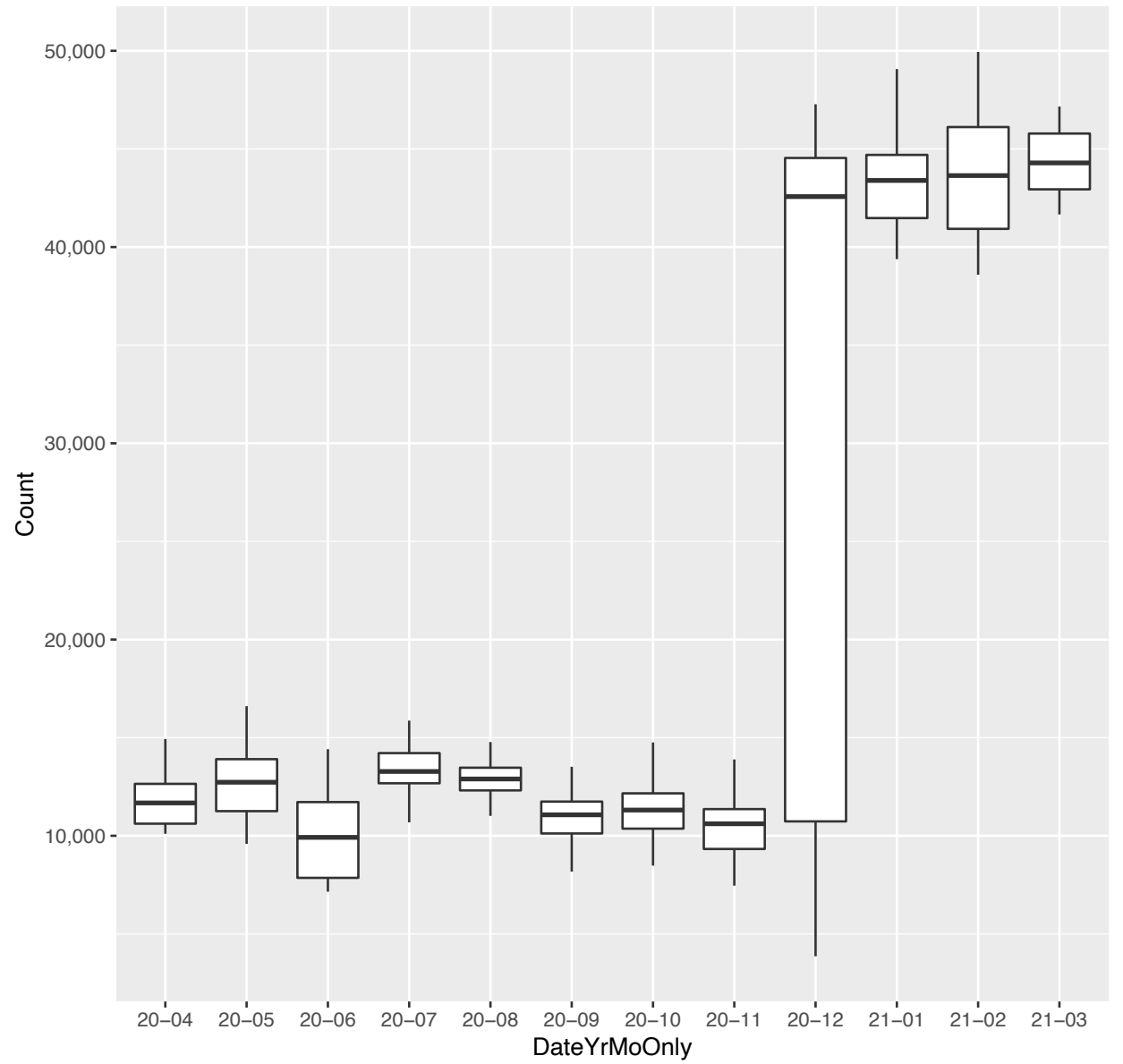
19. tv.apple.com:



*. tv.apple.com (day-by-day counts and 28 day moving average)



*. tv.apple.com (monthly boxplots (outliers trimmed))

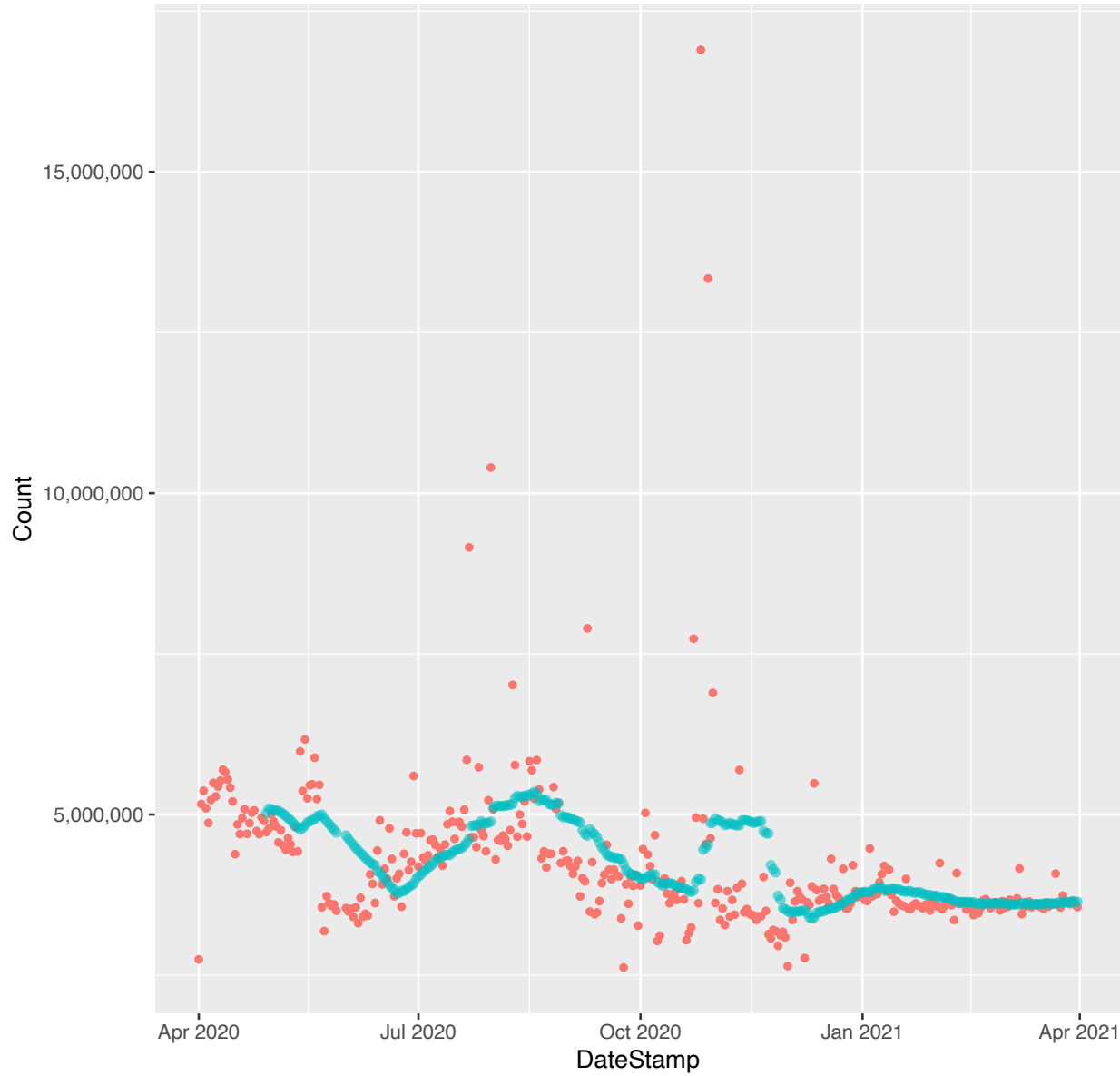


20. twitch.tv:

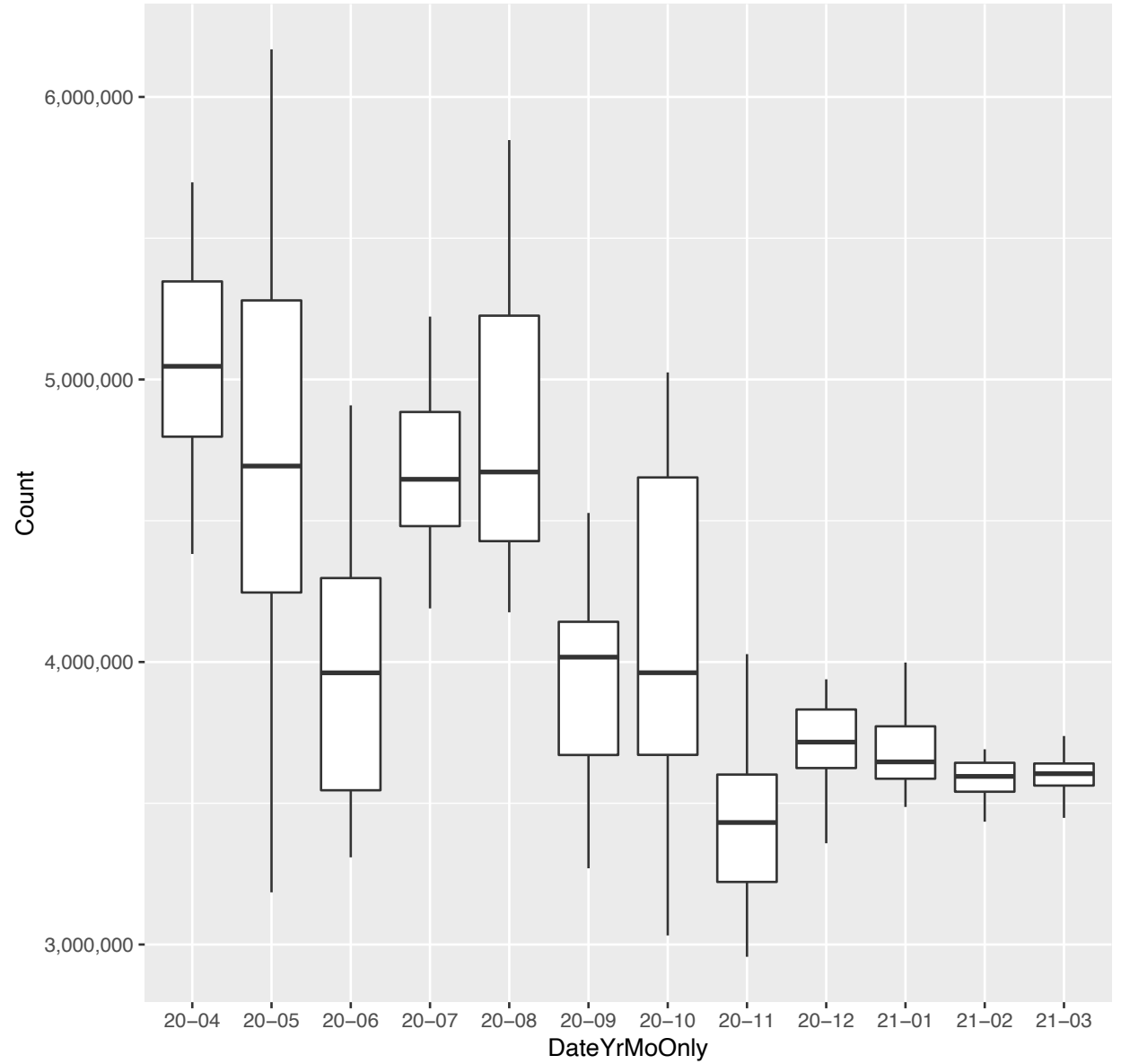


M

*. twitch.tv (day-by-day counts and 28 day moving average)



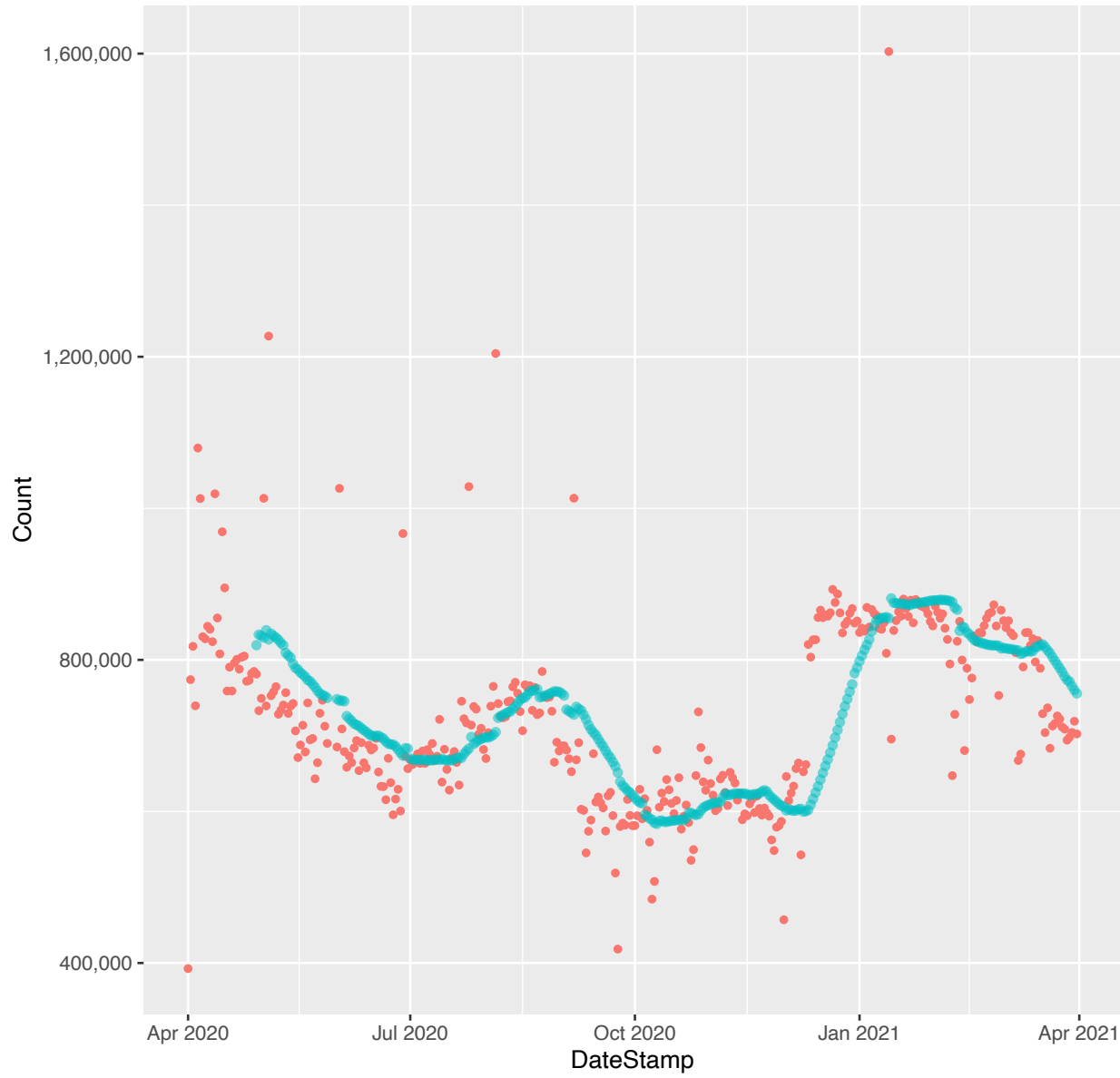
*. twitch.tv (monthly boxplots (outliers trimmed))



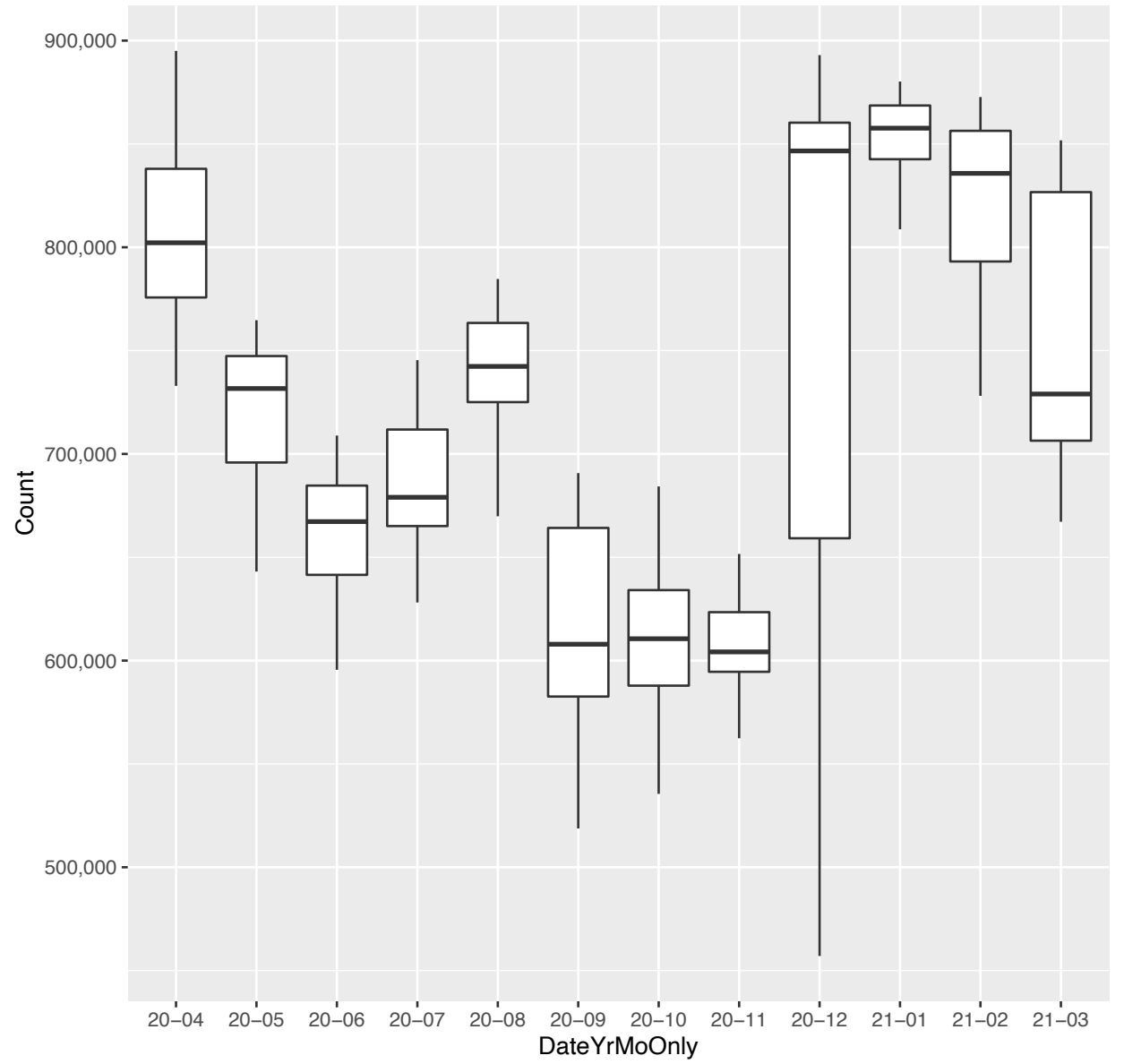
21. youku.com:



*. youku.com (day-by-day counts and 28 day moving average)



*. youku.com (monthly boxplots (outliers trimmed))



22. youtube.com:

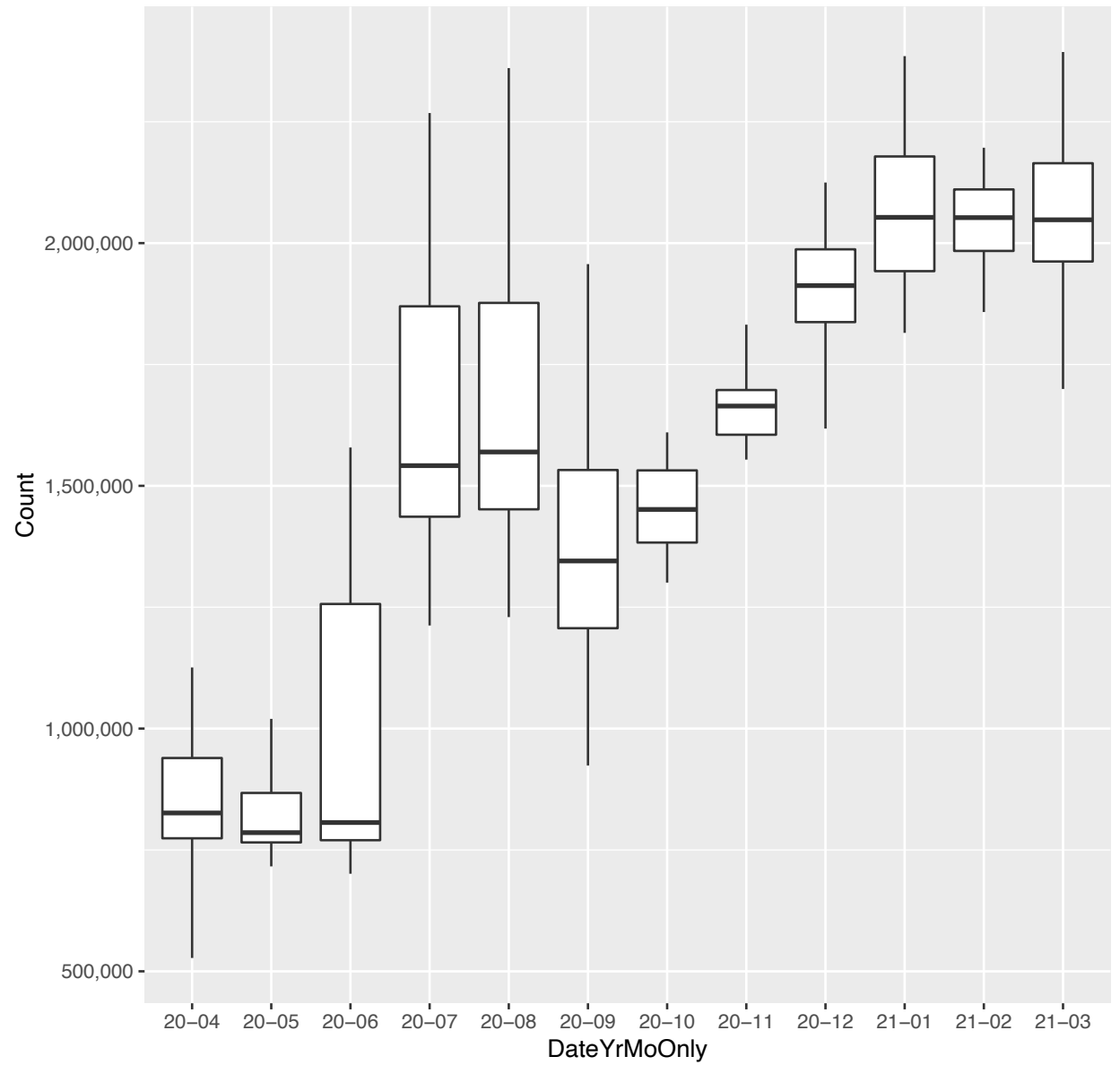


M

*. youtube.com (day-by-day counts and 28 day moving average)



*. youtube.com (monthly boxplots (outliers trimmed))



XIII. Travel/Tourism/Transportation Sites

[\[back to TOC\]](#)

- a) [Airlines \(1-17\)](#)
- b) [Bus Lines \(18\)](#)
- c) [Car Rentals \(19-20\)](#)
- d) [Cruise Lines \(21-23\)](#)
- e) [Lodging \(24-31\)](#)
- f) [Package Transport \(32-35\)](#)
- g) [Railroads \(36\)](#)
- h) [Ride Sharing \(37-38\)](#)

If at least some retail establishments have figured out the trick to thriving online during the pandemic, some travel, tourism and transportation sites may simply be enduring. We've dropped a number of previous-investigated domains from this category, largely international airlines where international travel has been prohibited by lockdown orders.

Besides airlines, another area that tends to attract notice is the performance of parcel shipping concerns. Fedex clearly appears down, while DHL.com and usps.com appear to be moving in the opposite direction. Among airlines, AlaskaAirlines.com, Emirates.com, Frontier, JetBlue, Pobeda.aero, Ryanair.com and Spiritair.com seem to be moving in the right direction even while Allegiant, Britishairways, CSair, Delta, Southwest, and United seem to be fighting a holding action at best.

a) Airlines

[\[back to Travel/Tourism/Transportation\]](#)

[\[back to TOC\]](#)

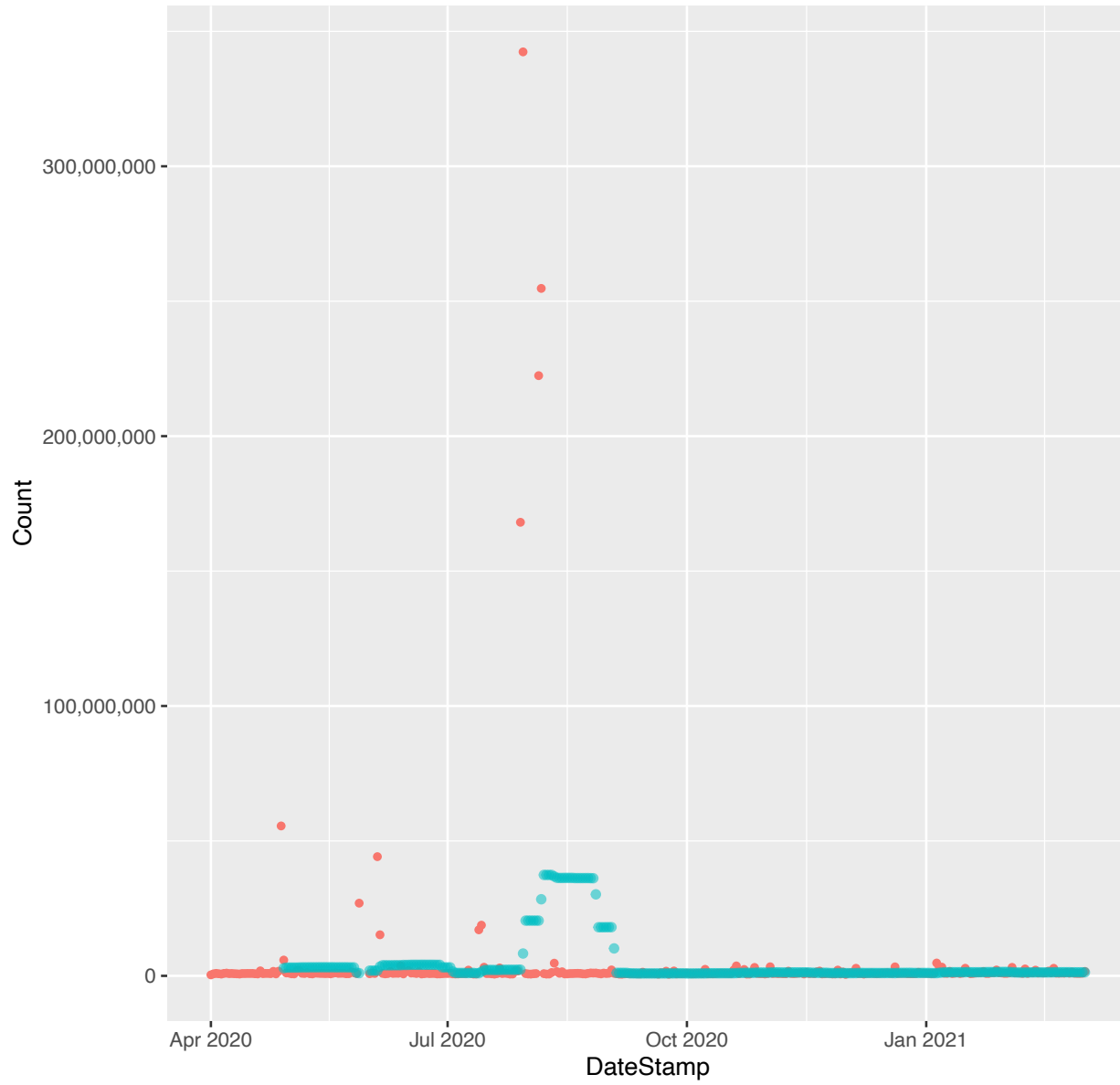
19	*.aa.com	✳	~	M
20	*.alaskaair.com	✳	➔	
21	*.allegiantair.com		➔	
22	*.britishairways.com		➔	
23	*.csair.com	✳	➔	
24	*.delta.com	✳	➔	
25	*.emirates.com	✳	➔	
26	*.flyfrontier.com		~	
27	*.hawaiianairlines.com		~	
28	*.jetblue.com		~	
29	*.pobeda.aero		~	
30	*.ryanair.com	✳	➔	
31	*.s7.ru	✳	~	
32	*.southwest.com	✳	~	
33	*.spirit.com		➔	
34	*.united.com	✳	~	
35	*.wizzair.com		~	

1. aa.com:

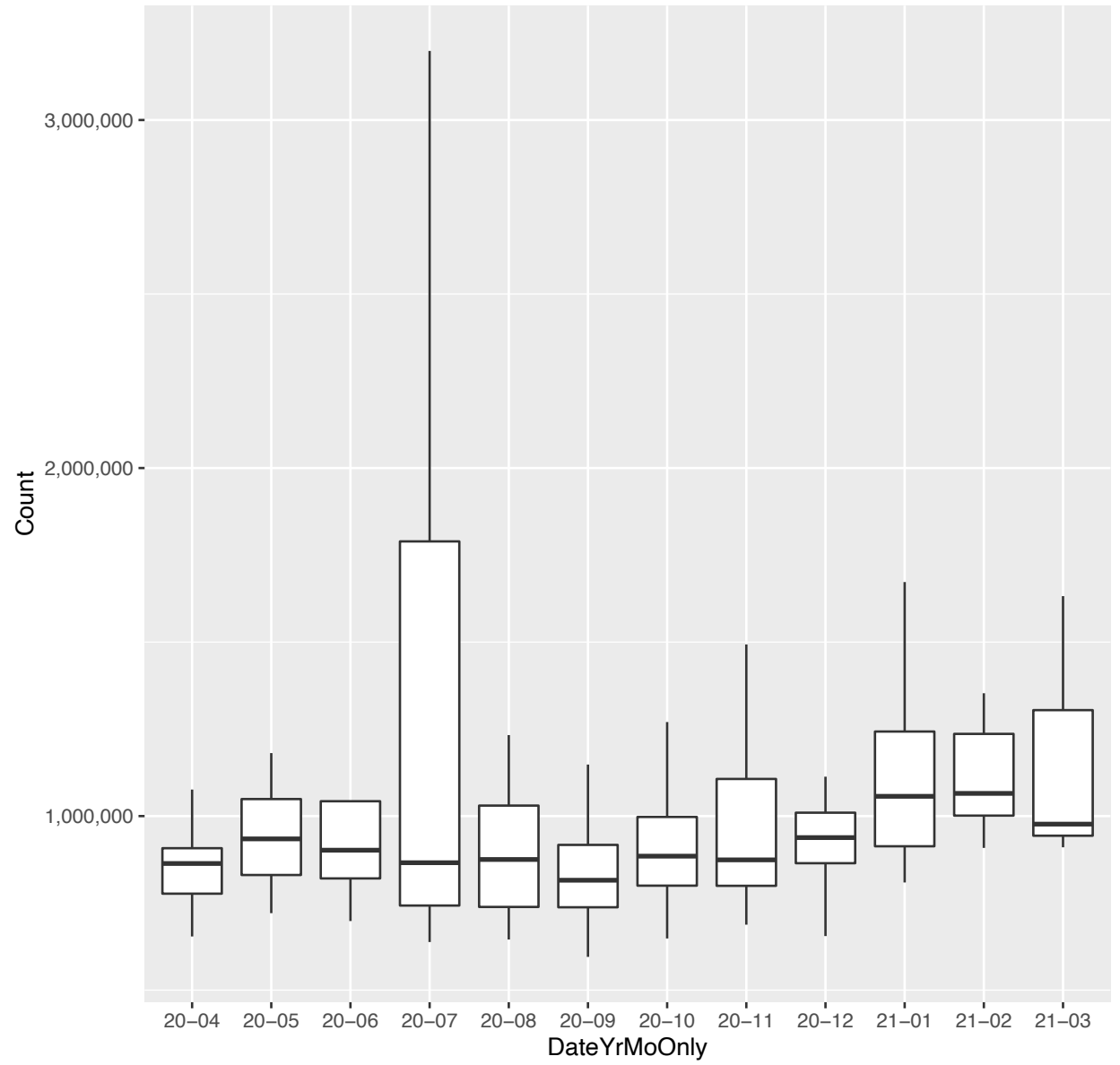


M

*. aa.com (day-by-day counts and 28 day moving average)



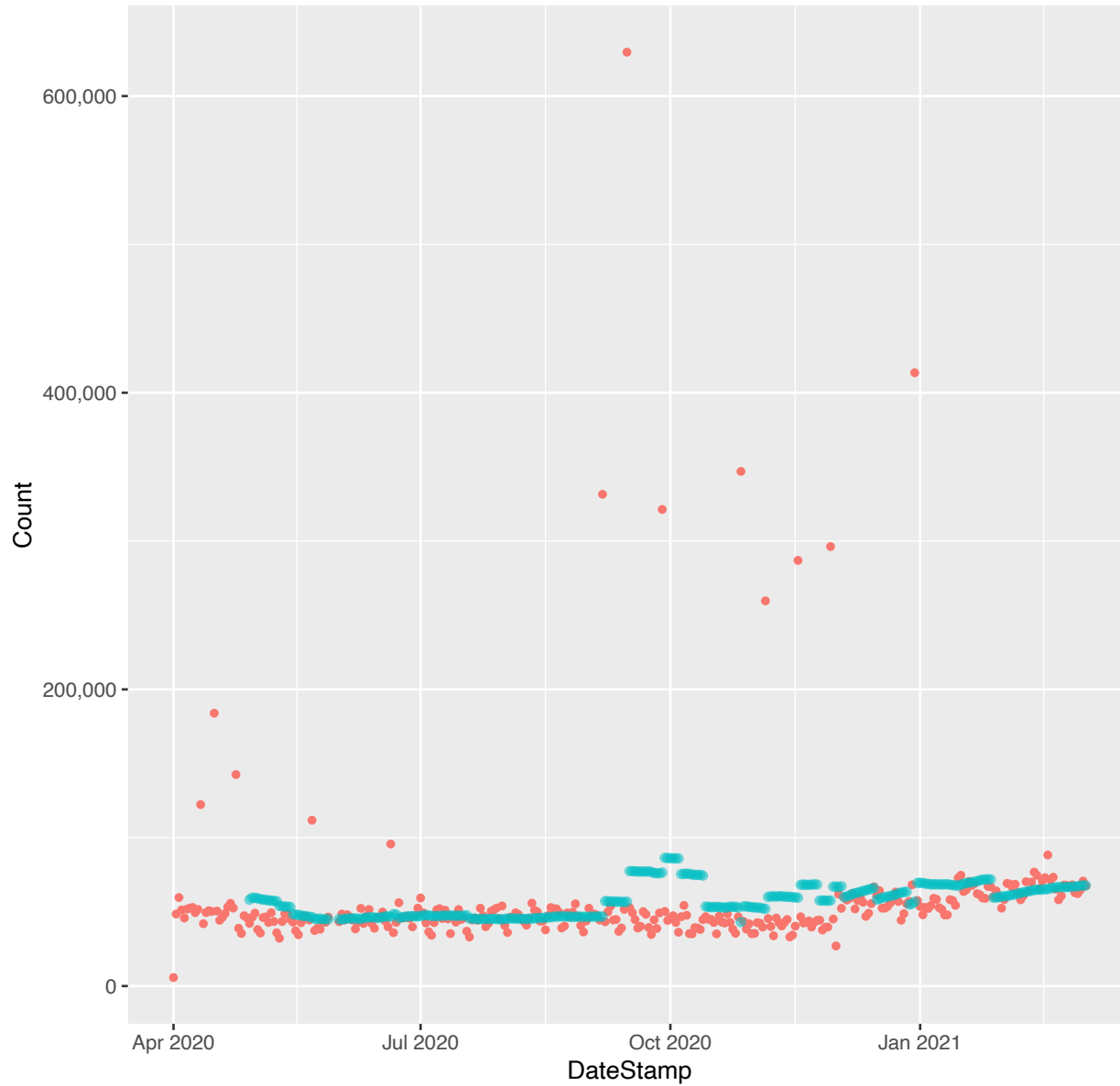
*. aa.com (monthly boxplots (outliers trimmed))



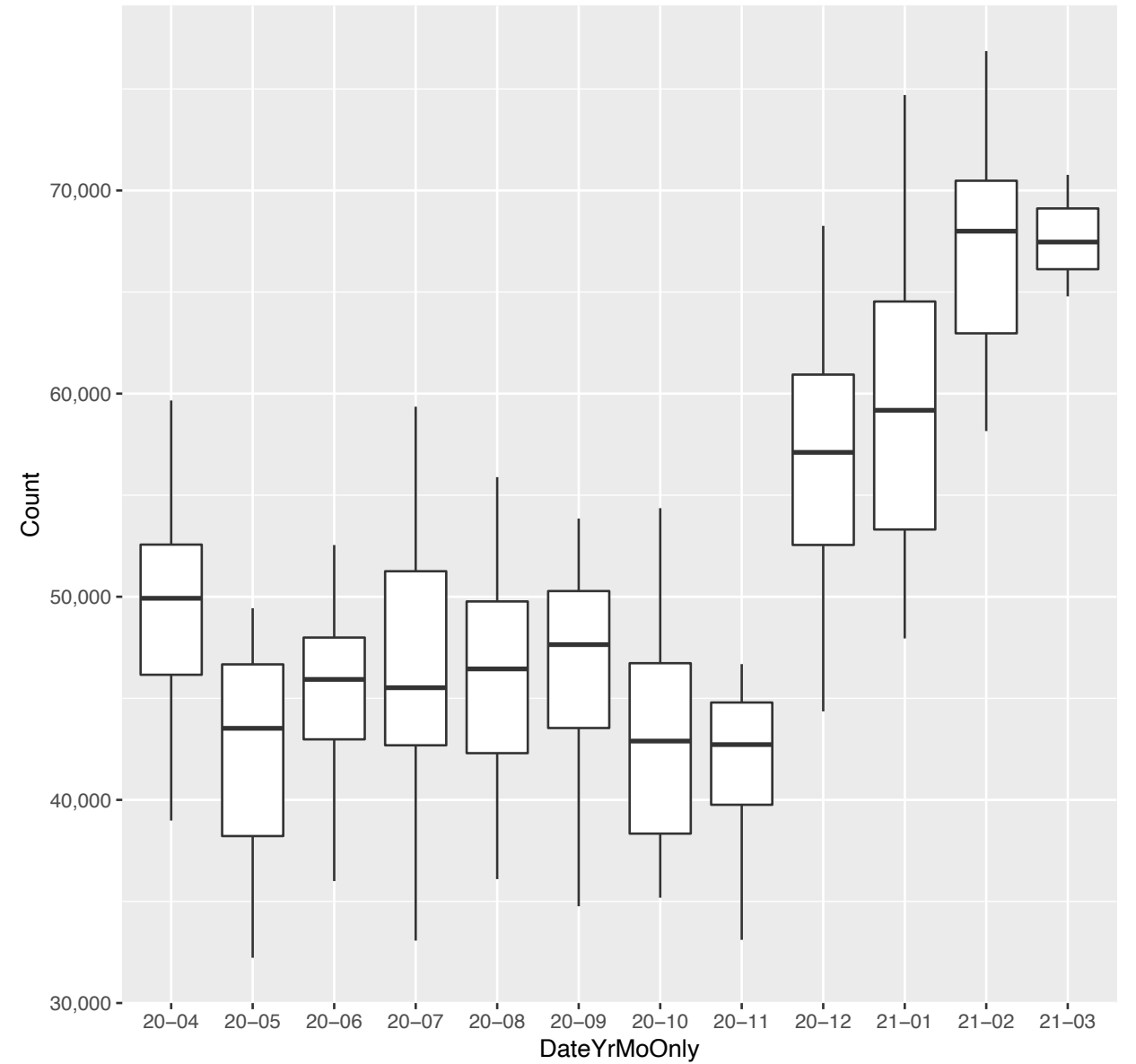
2. alaskaair.com:



*. alaskaair.com (day-by-day counts and 28 day moving average)

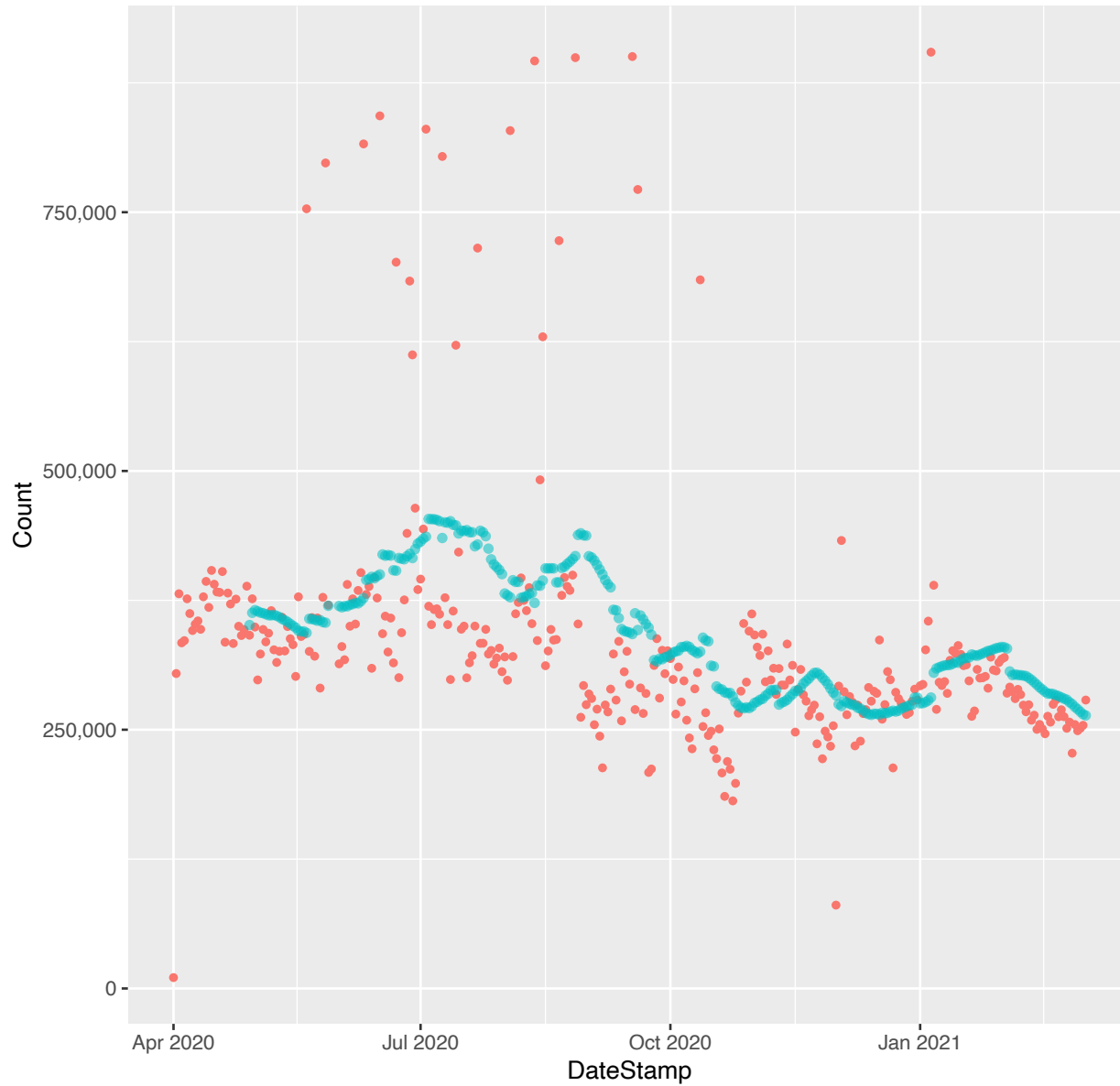


*. alaskaair.com (monthly boxplots (outliers trimmed))

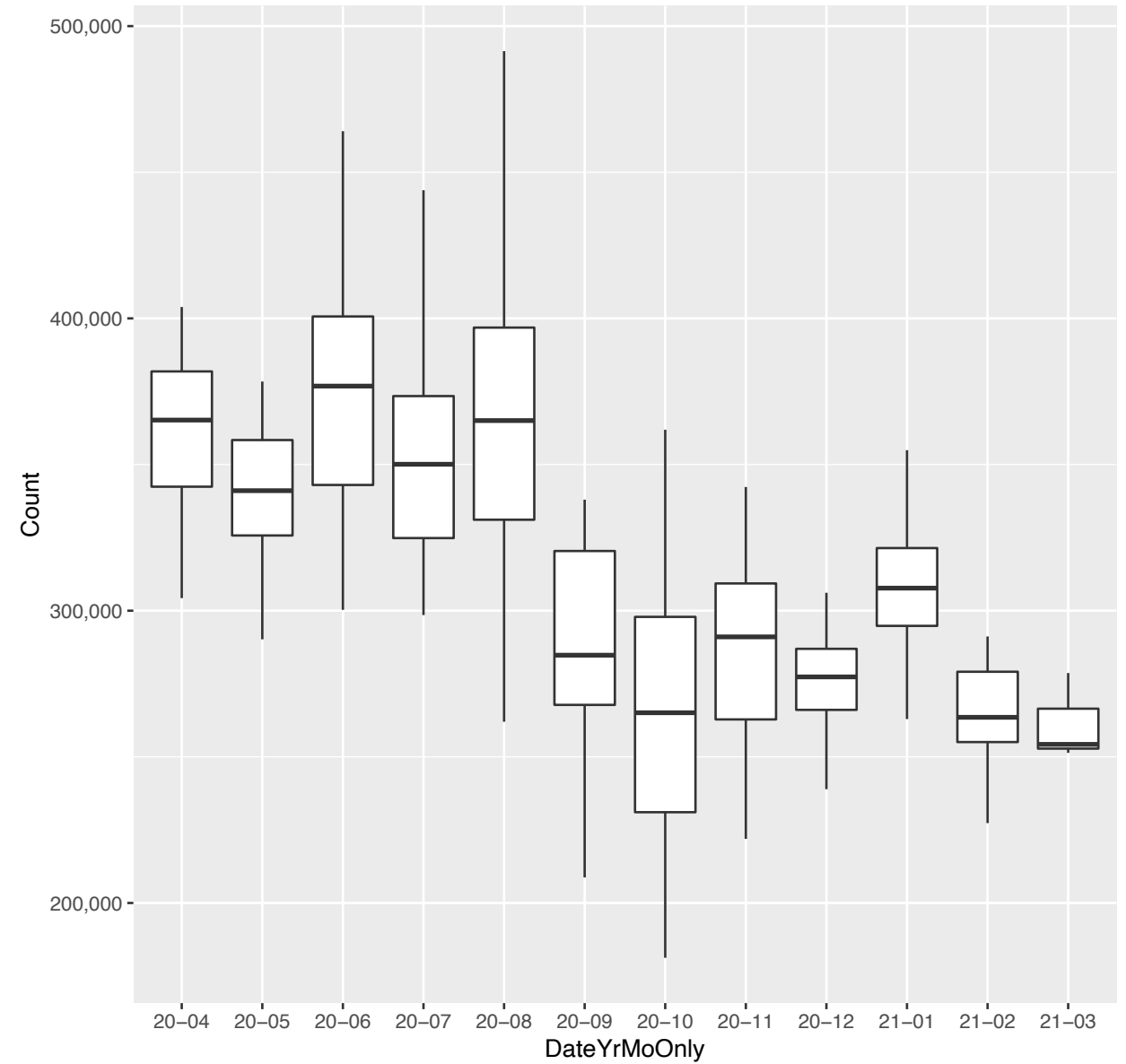


3. allegiantair.com:

*. allegiantair.com (day-by-day counts and 28 day moving average)



*. allegiantair.com (monthly boxplots (outliers trimmed))

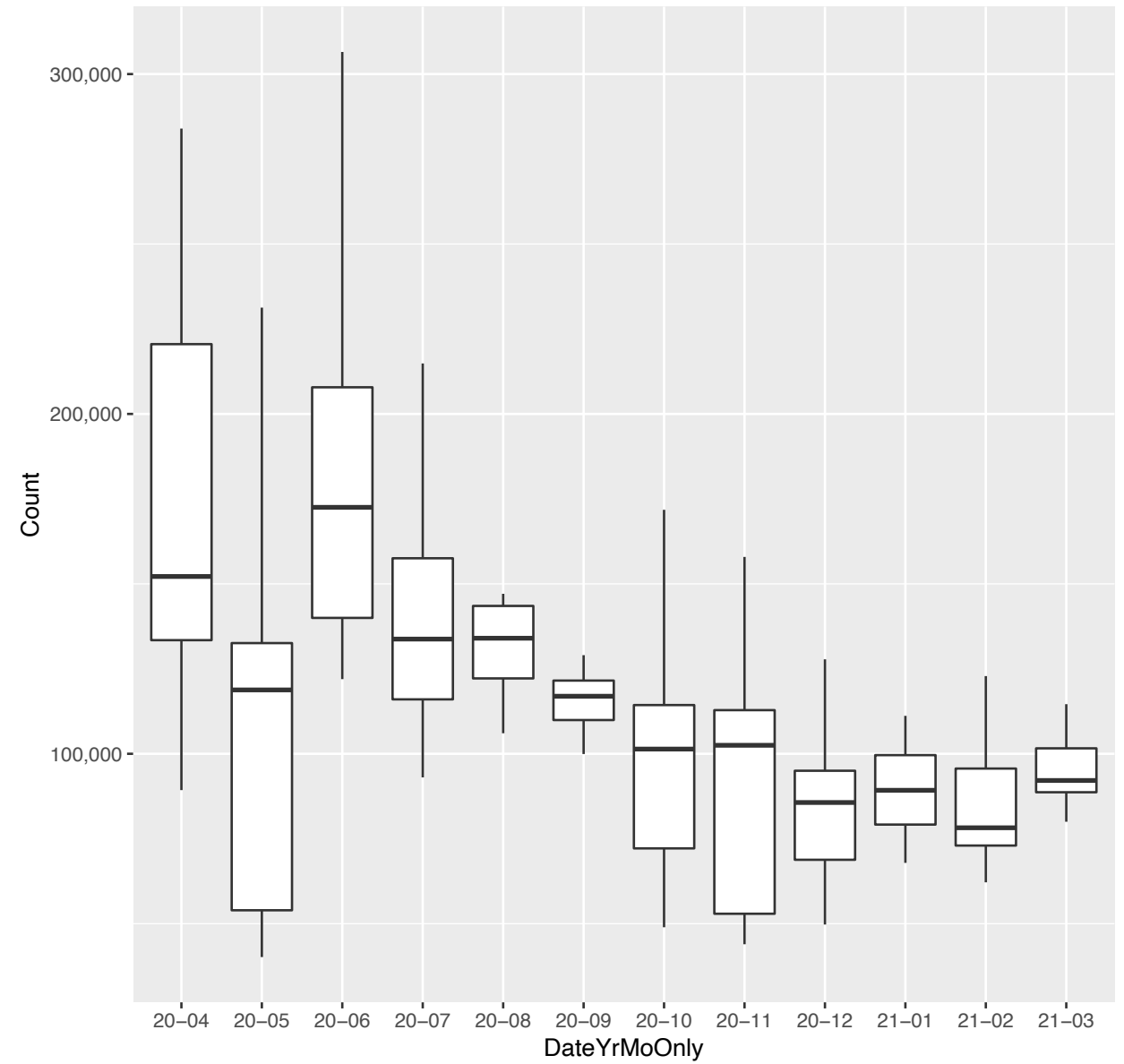


4. britishairways.com:

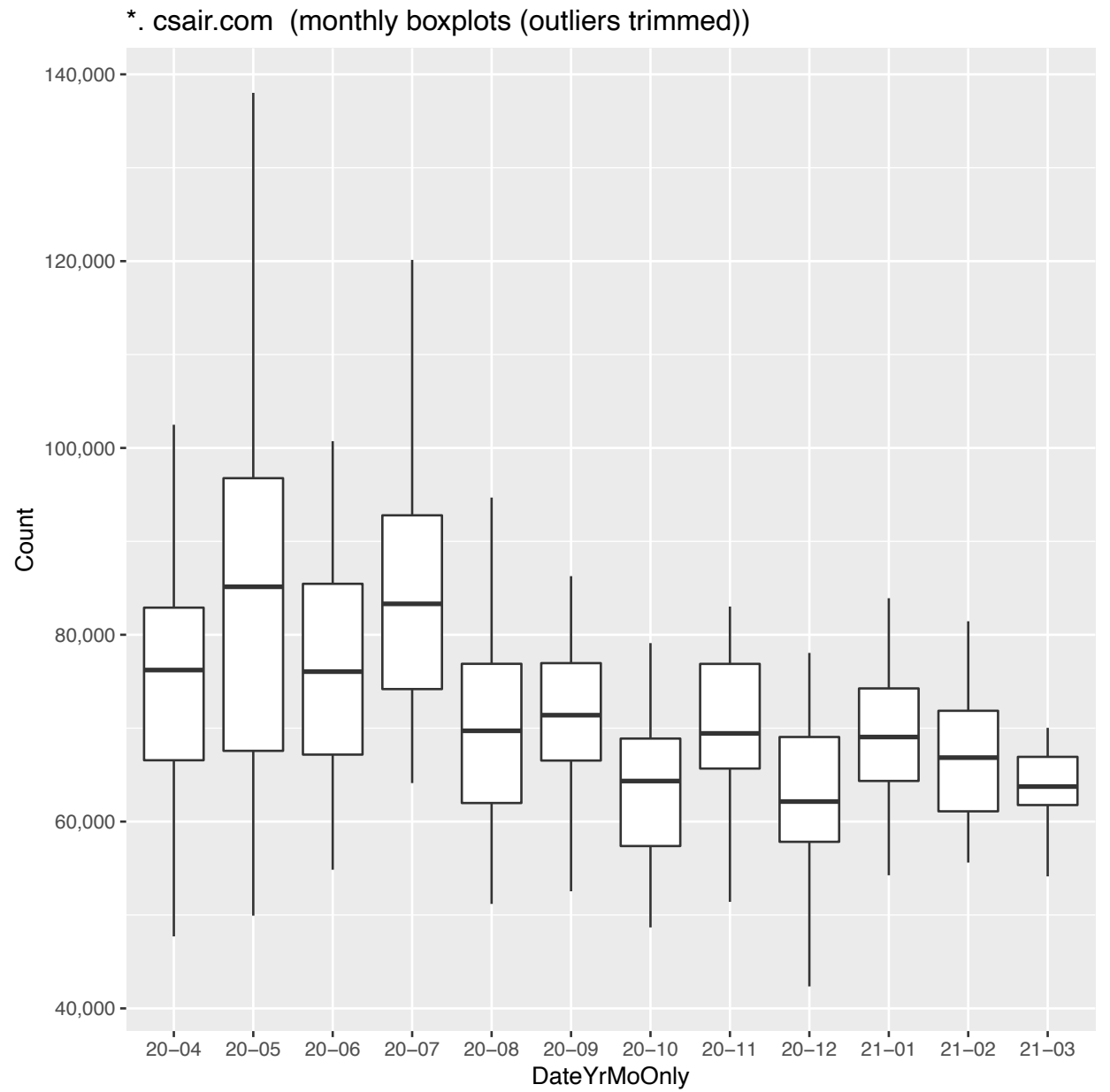
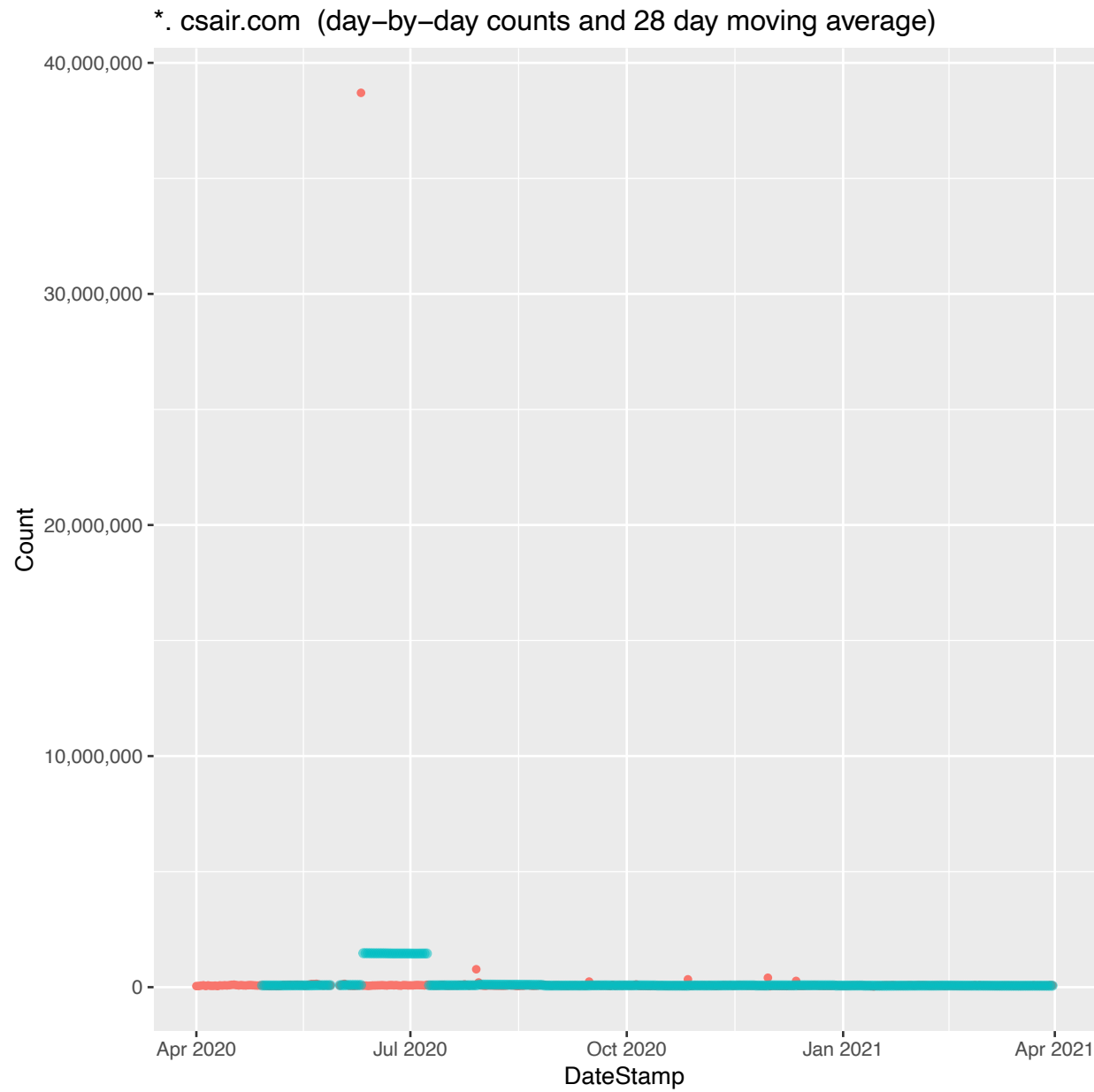
*. britishairways.com (day-by-day counts and 28 day moving average)



*. britishairways.com (monthly boxplots (outliers trimmed))



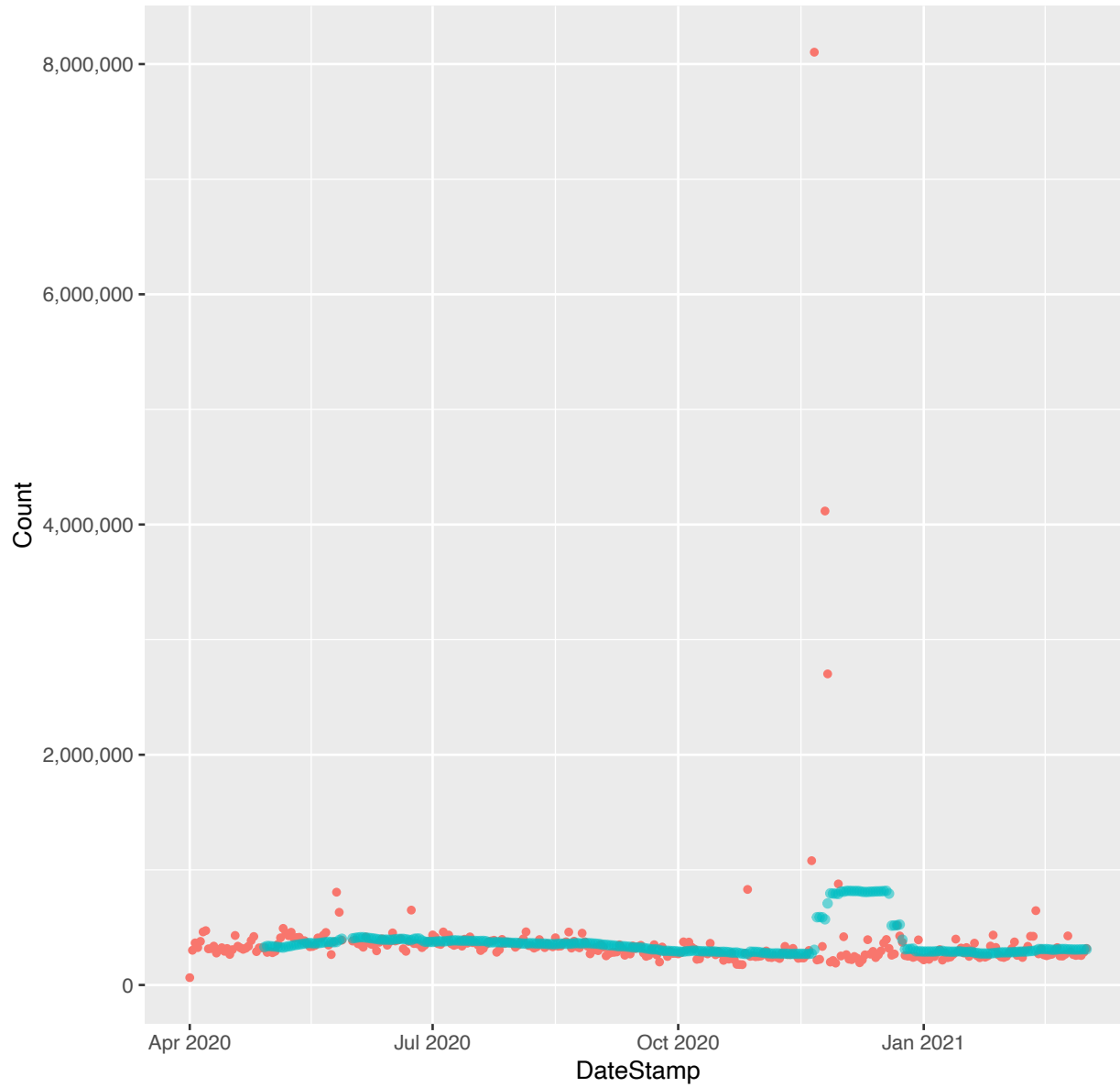
5. csair.com:



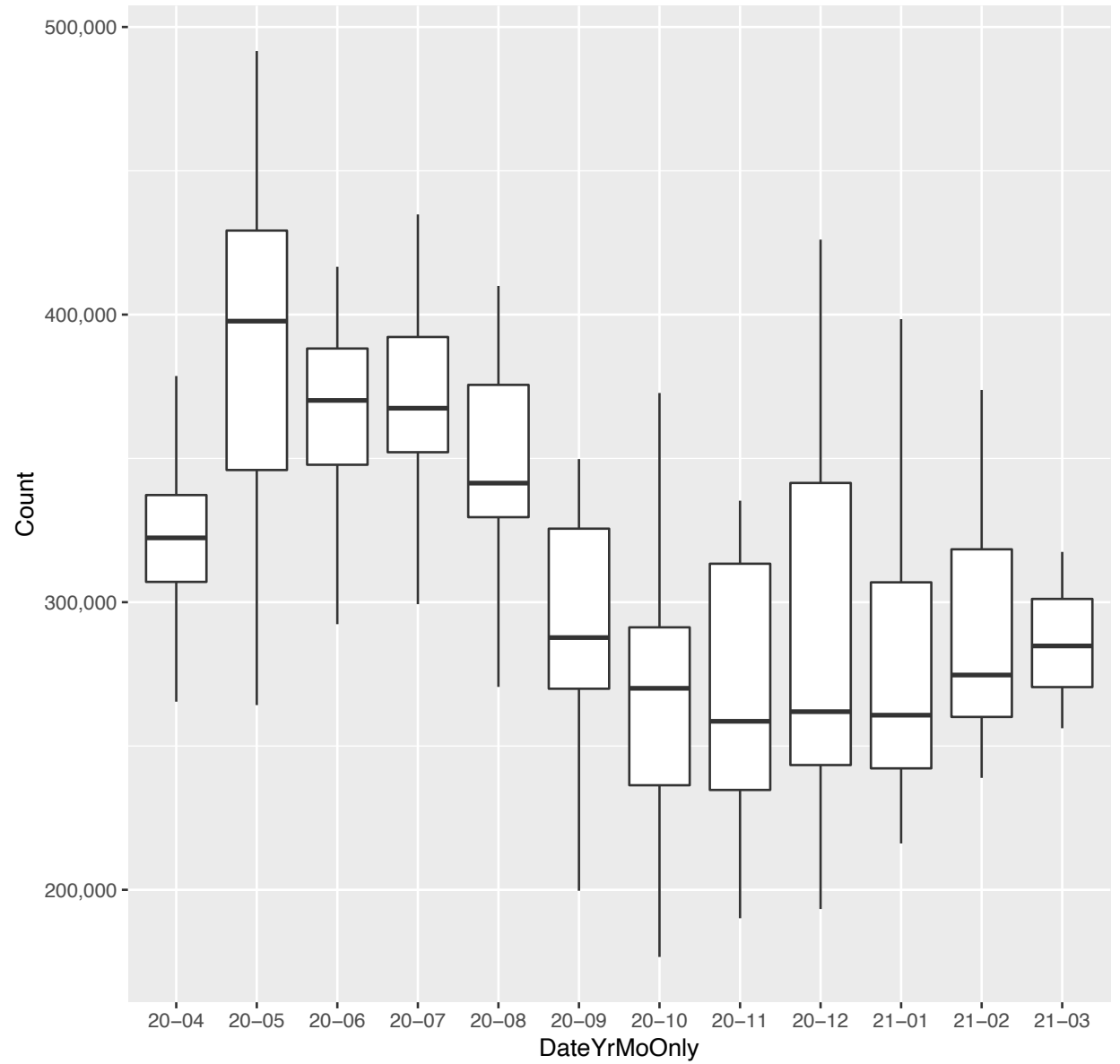
6. delta.com:



*. delta.com (day-by-day counts and 28 day moving average)



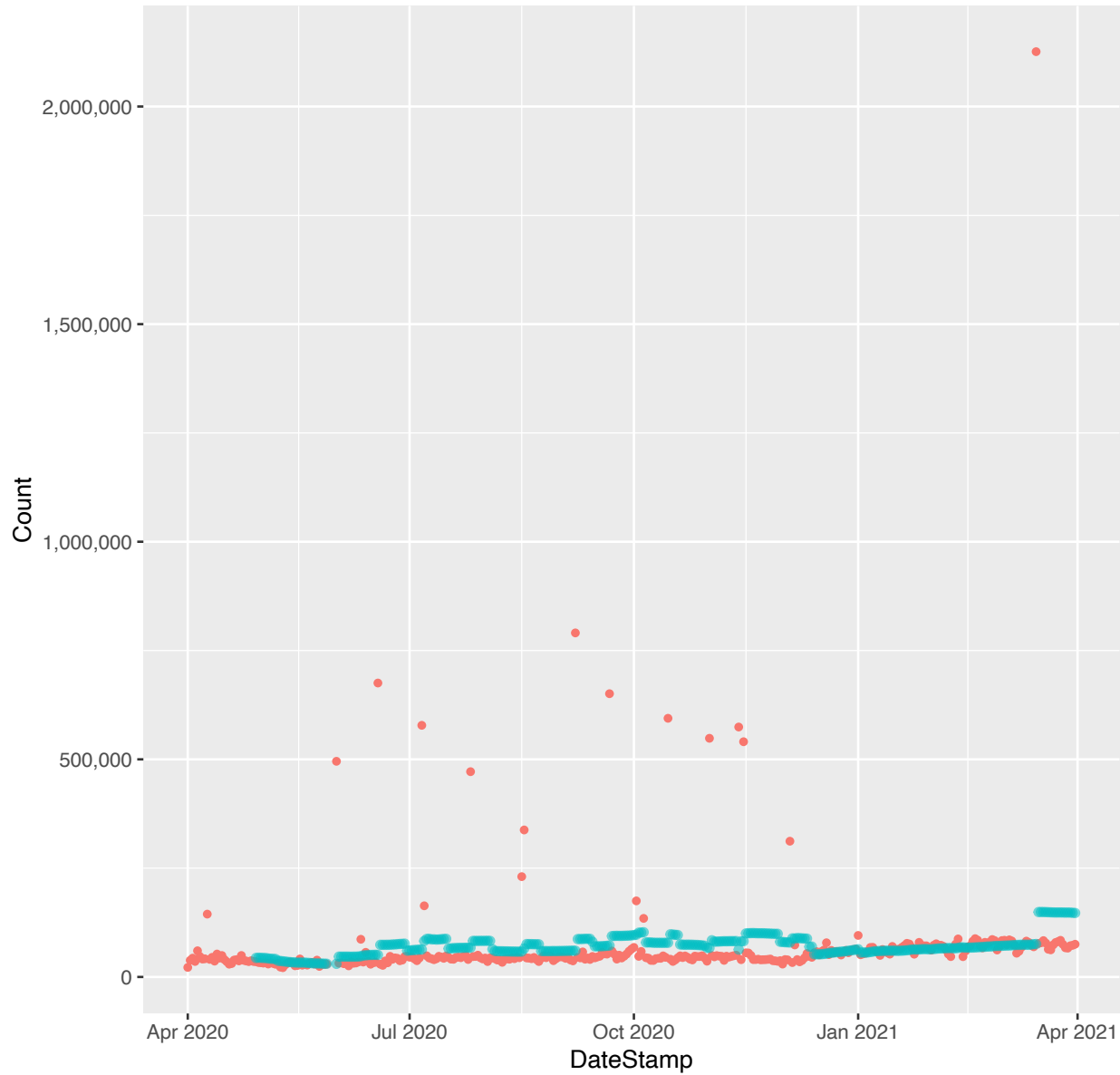
*. delta.com (monthly boxplots (outliers trimmed))



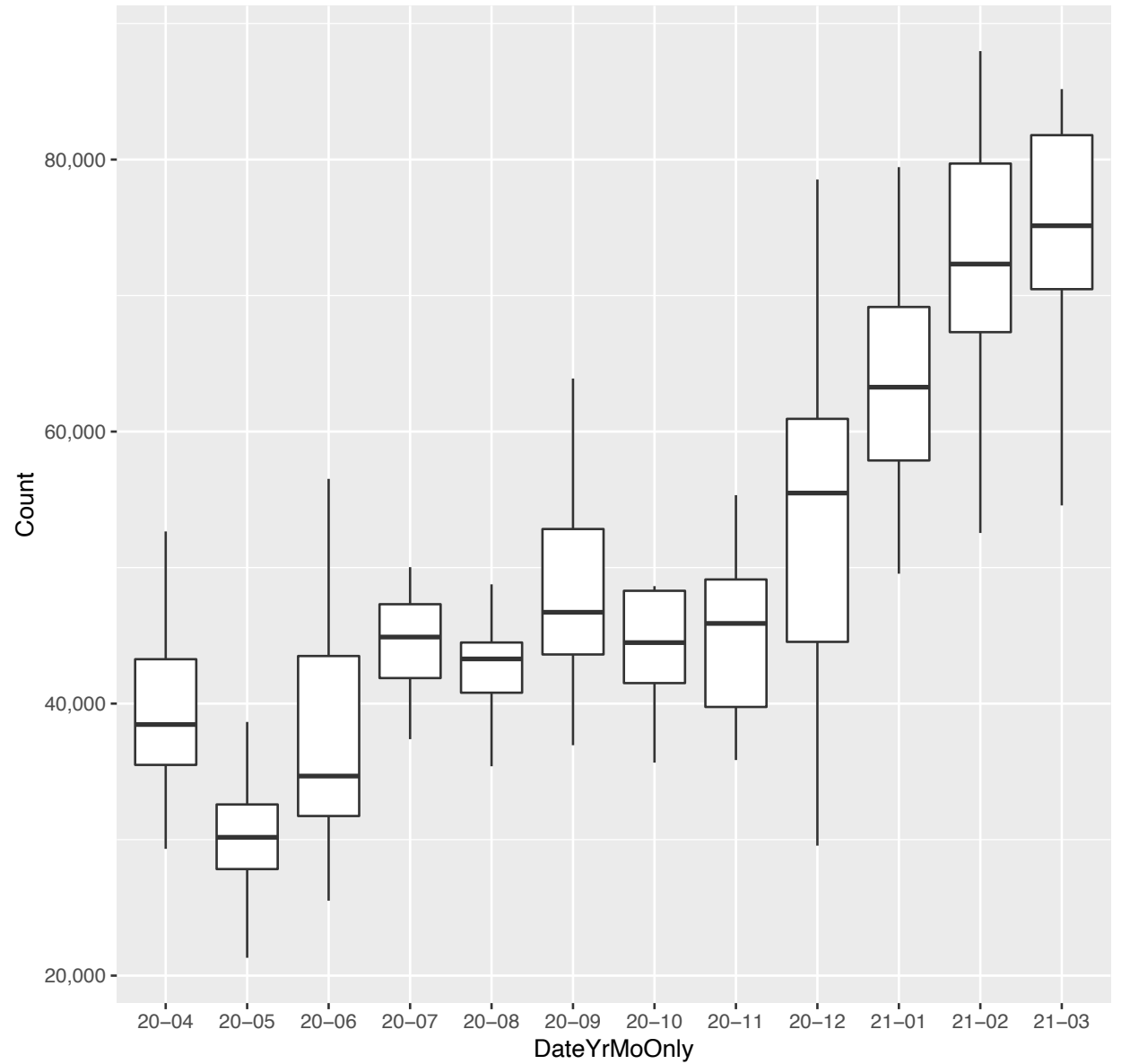
7. emirates.com:



*. emirates.com (day-by-day counts and 28 day moving average)



*. emirates.com (monthly boxplots (outliers trimmed))

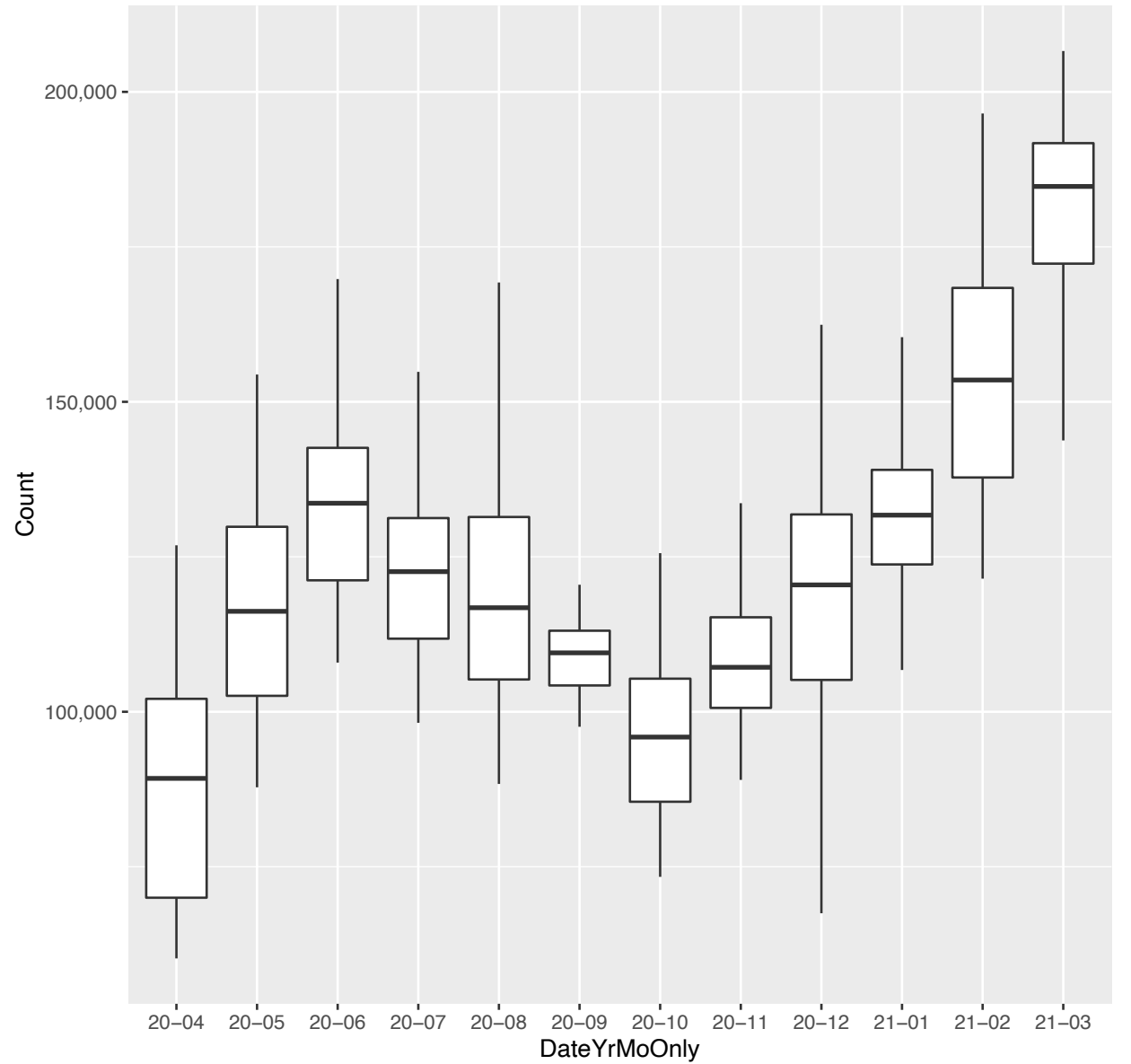


8. flyfrontier.com: ~

*. flyfrontier.com (day-by-day counts and 28 day moving average)



*. flyfrontier.com (monthly boxplots (outliers trimmed))

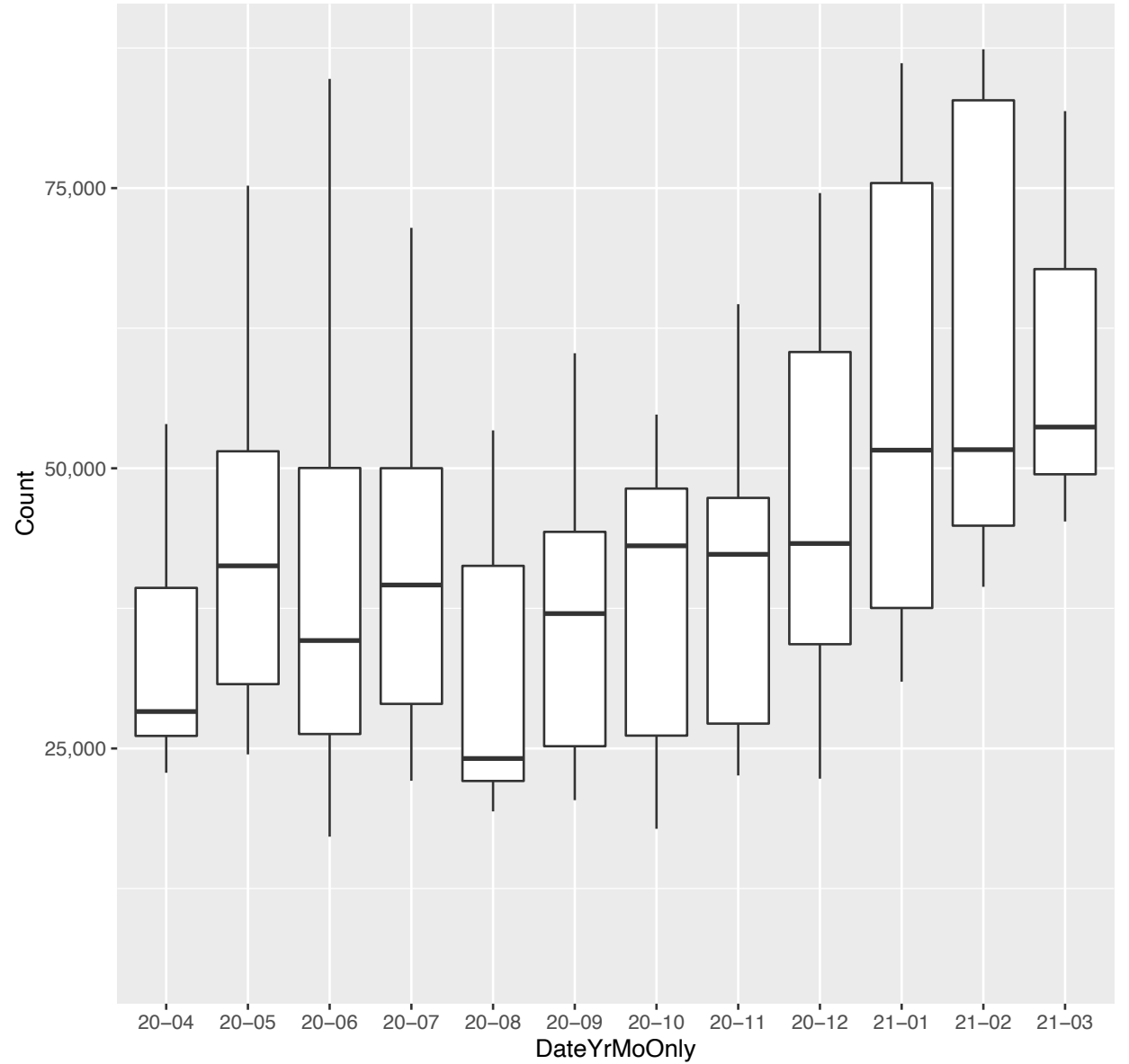


9. hawaiianairlines.com: ~

*. hawaiianairlines.com (day-by-day counts and 28 day moving average)



*. hawaiianairlines.com (monthly boxplots (outliers trimmed))



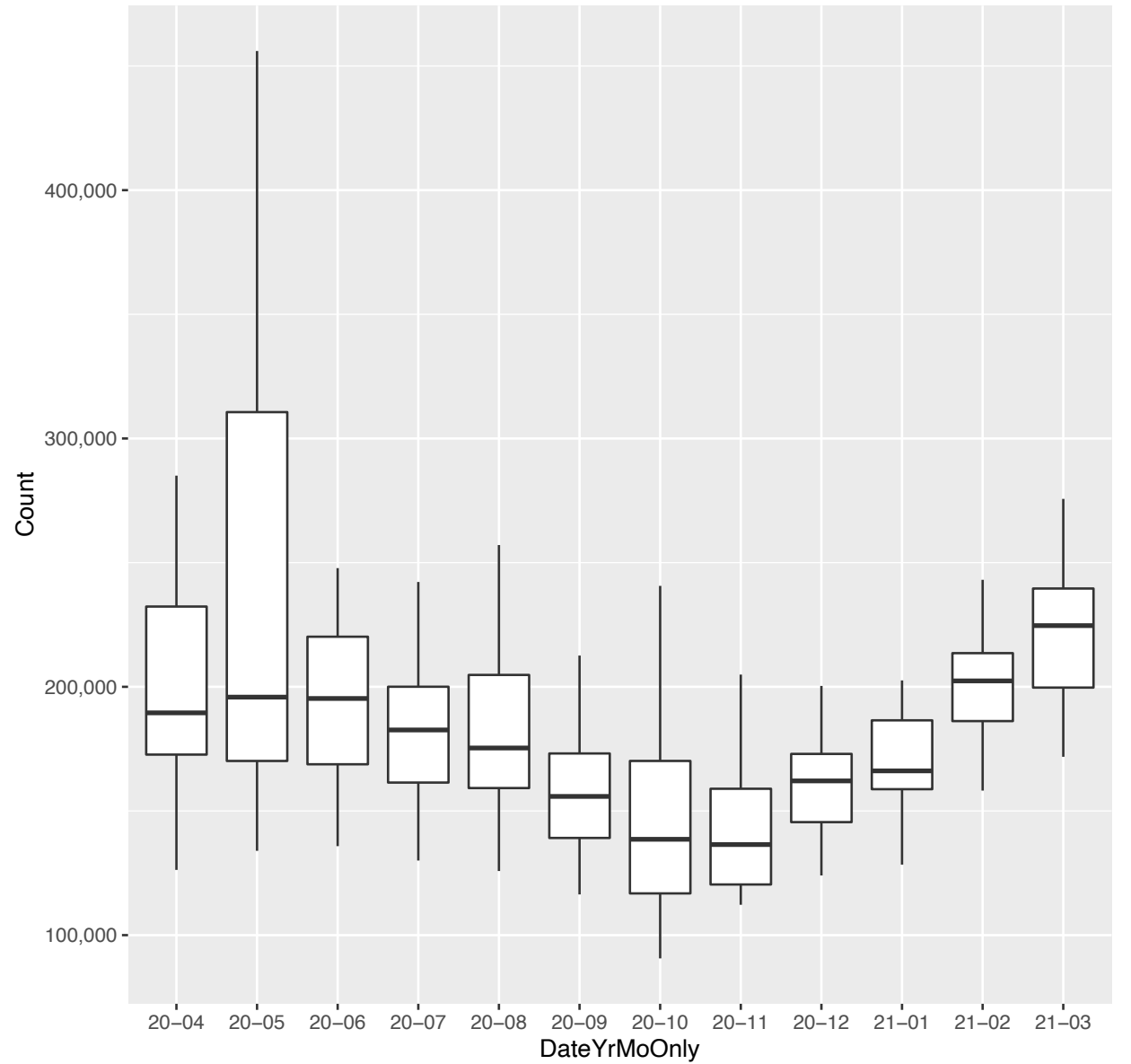
10. jetblue.com:

~

*. jetblue.com (day-by-day counts and 28 day moving average)



*. jetblue.com (monthly boxplots (outliers trimmed))

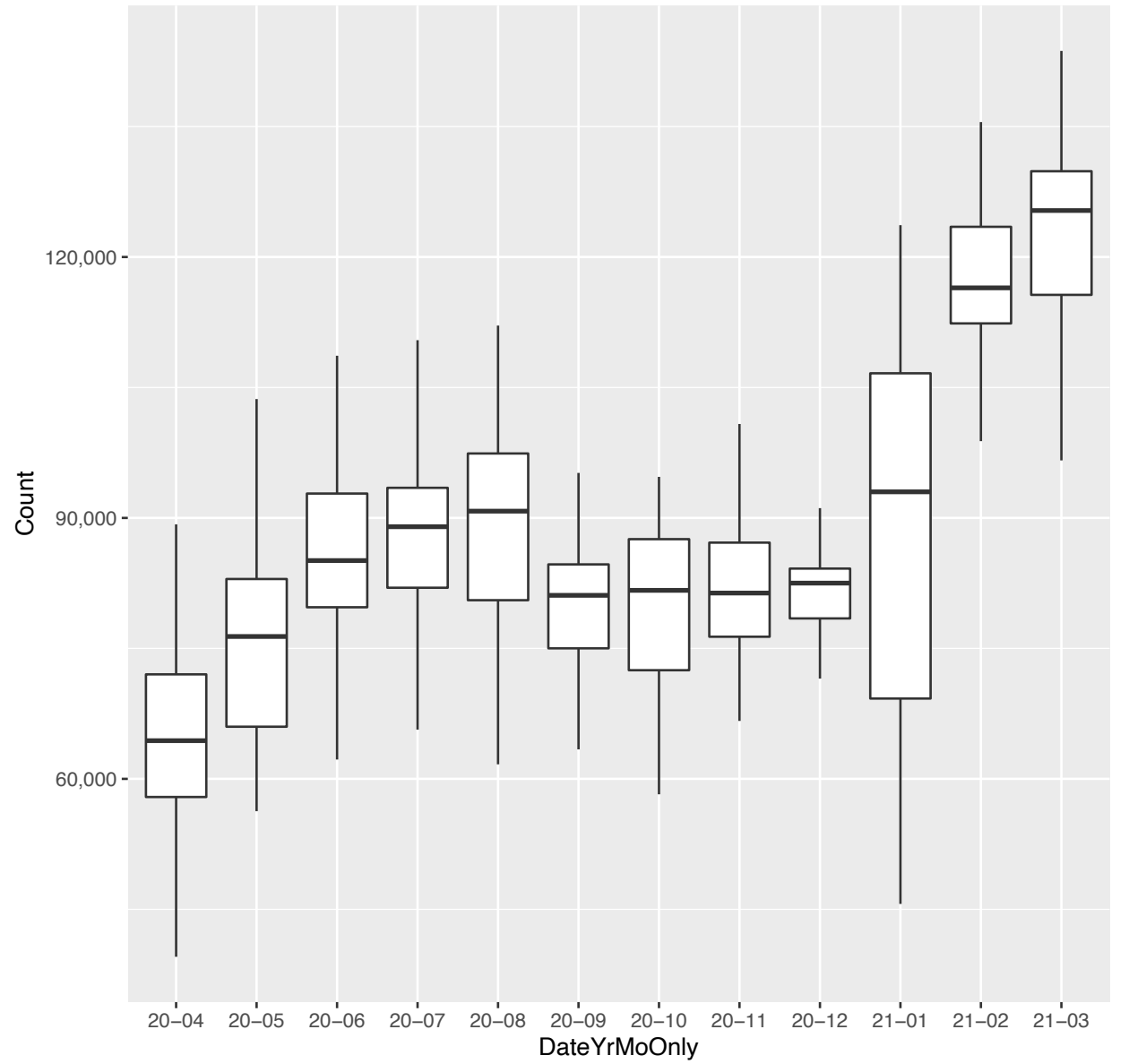


11. pobeda.aero: ~

*. pobeda.aero (day-by-day counts and 28 day moving average)



*. pobeda.aero (monthly boxplots (outliers trimmed))



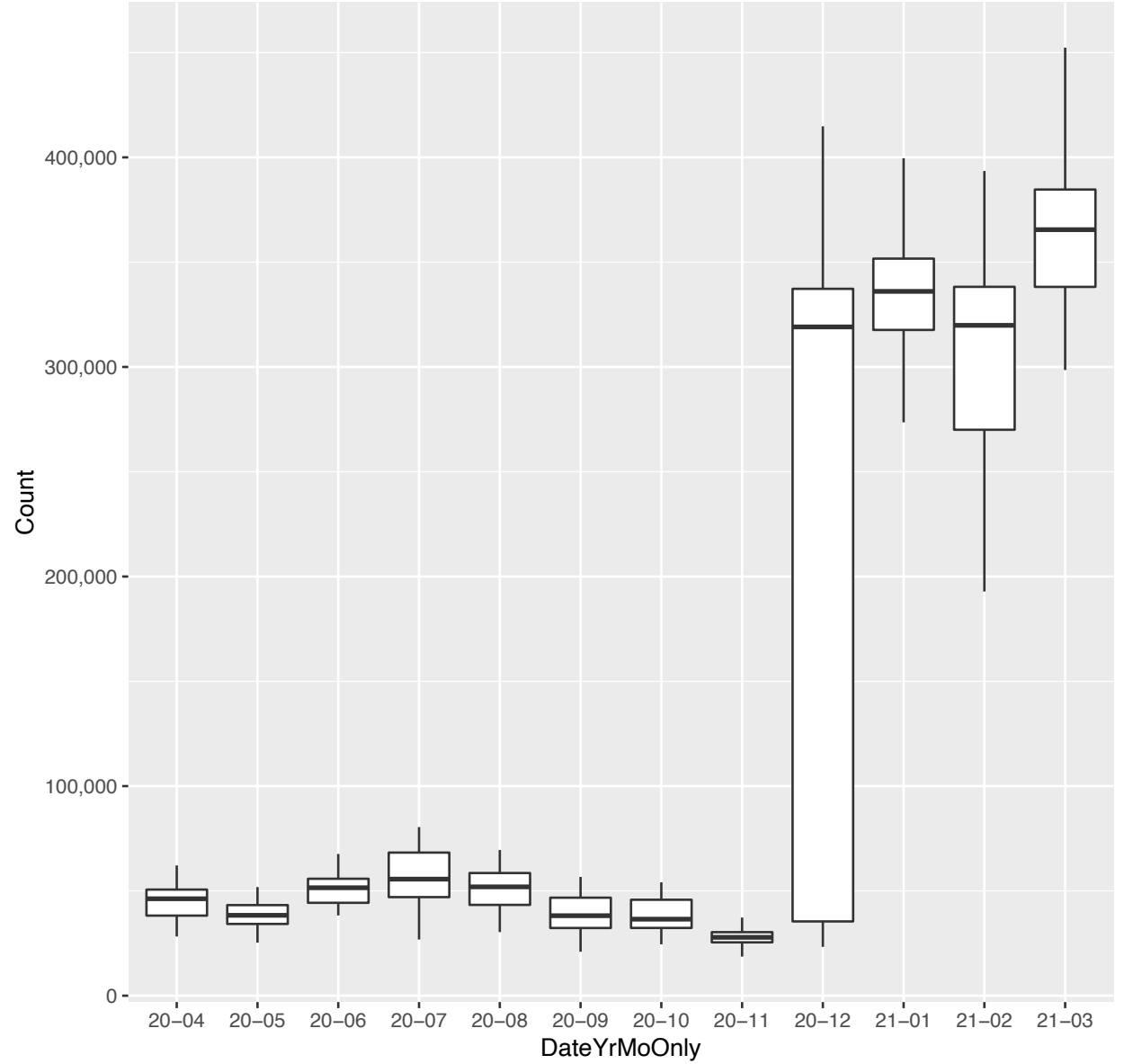
12. ryanair.com:



*. ryanair.com (day-by-day counts and 28 day moving average)



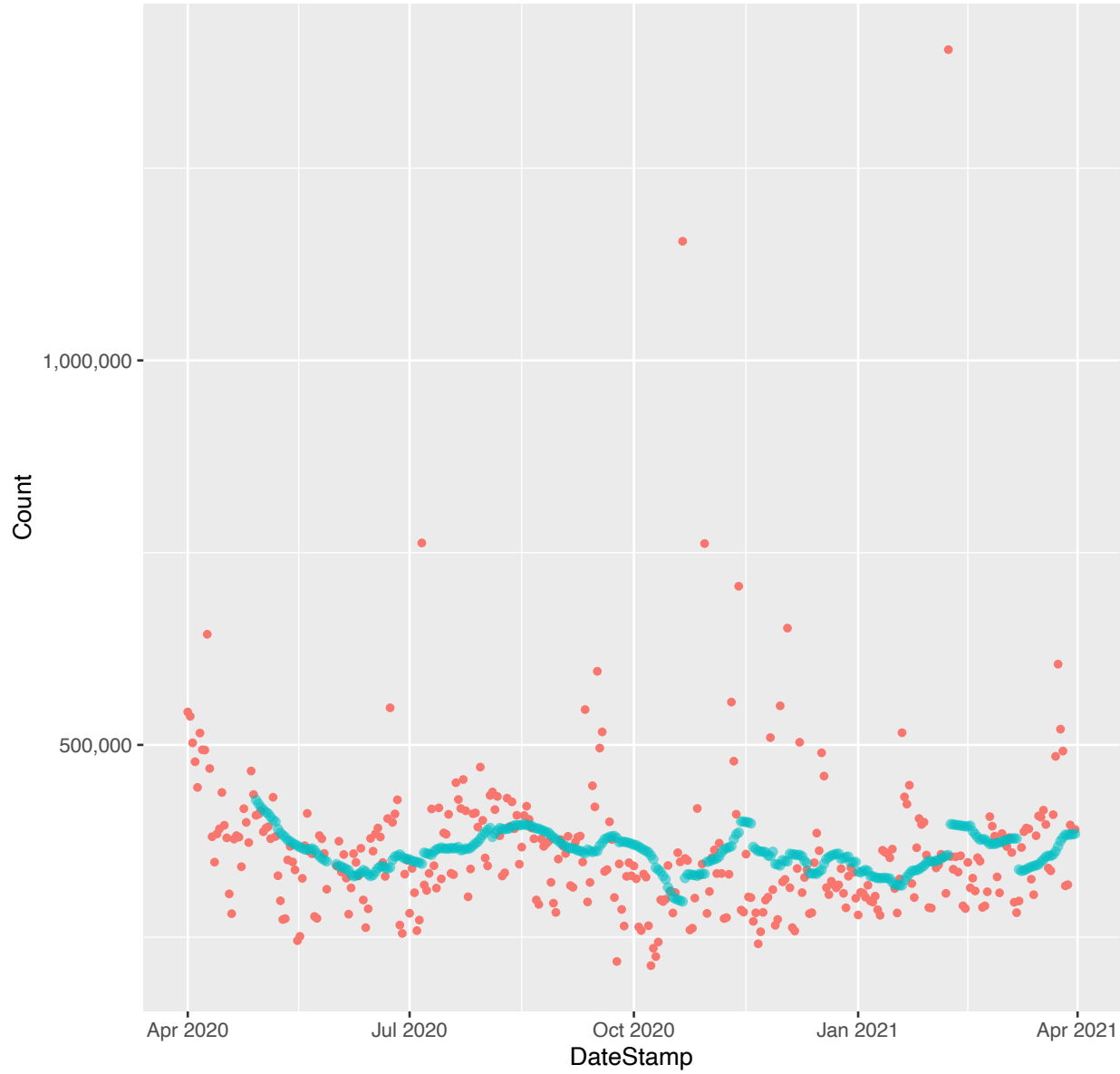
*. ryanair.com (monthly boxplots (outliers trimmed))



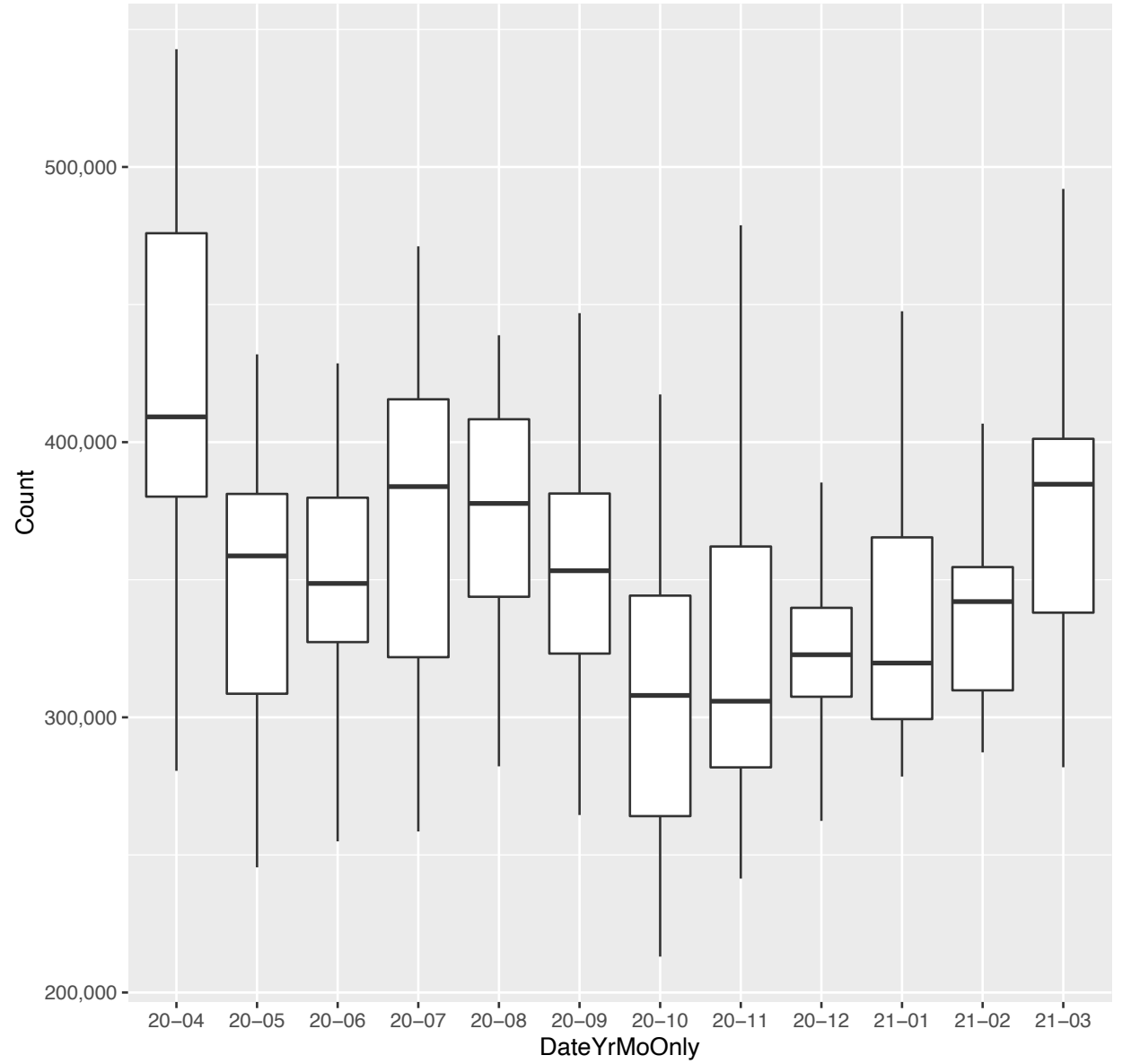
13. s7.ru:



*. s7.ru (day-by-day counts and 28 day moving average)

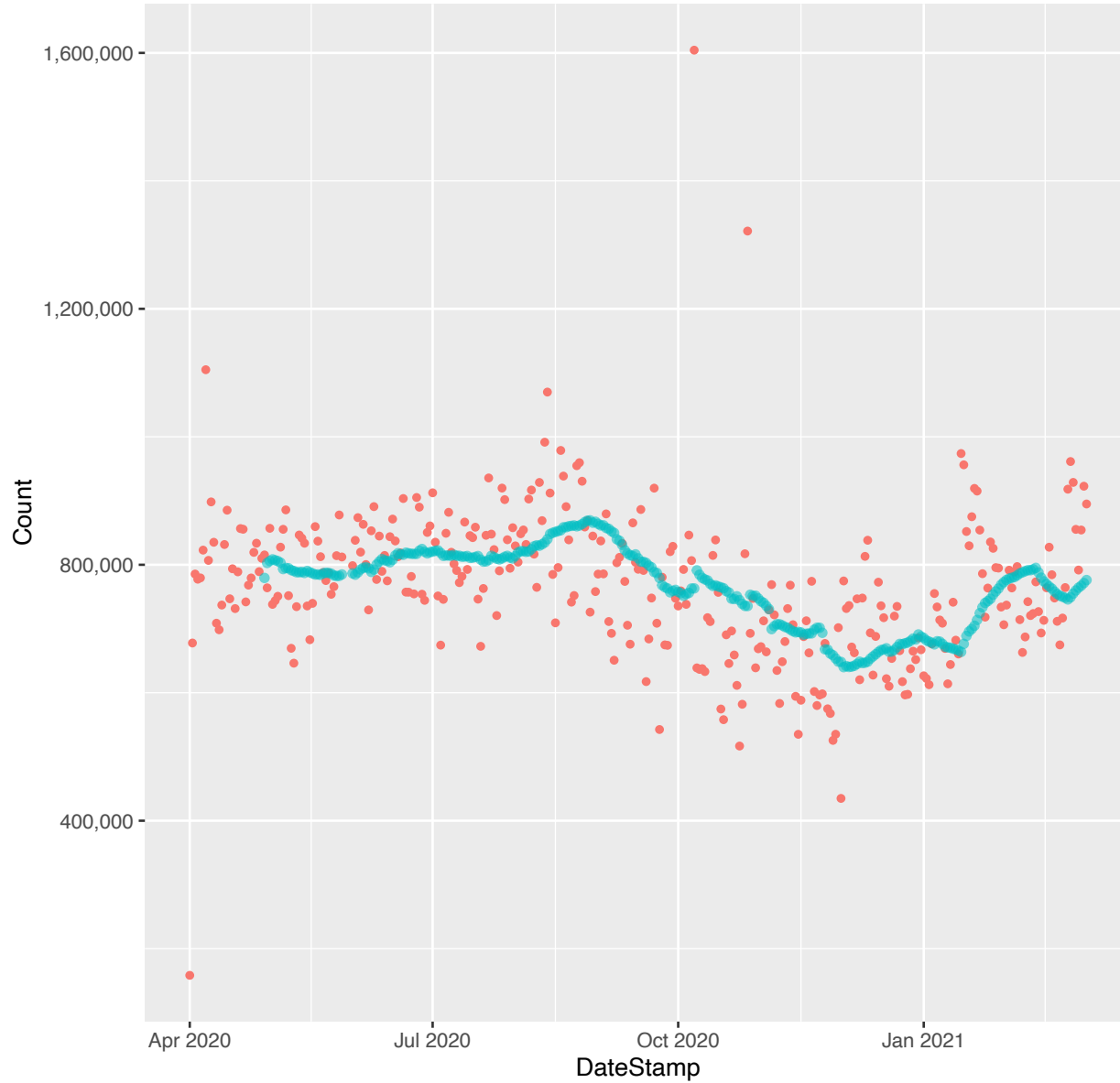


*. s7.ru (monthly boxplots (outliers trimmed))

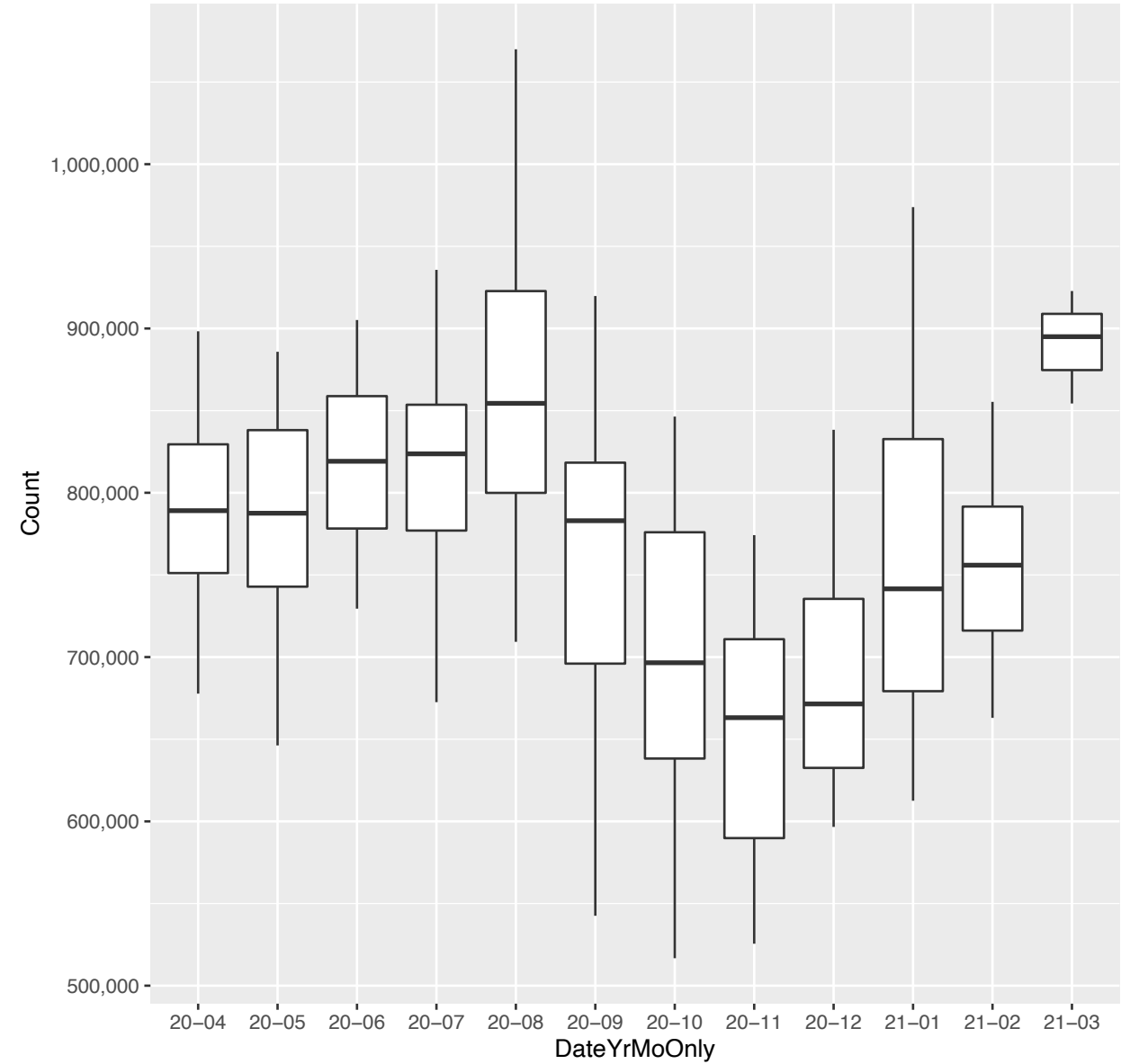


14. southwest.com: * ~

*. southwest.com (day-by-day counts and 28 day moving average)



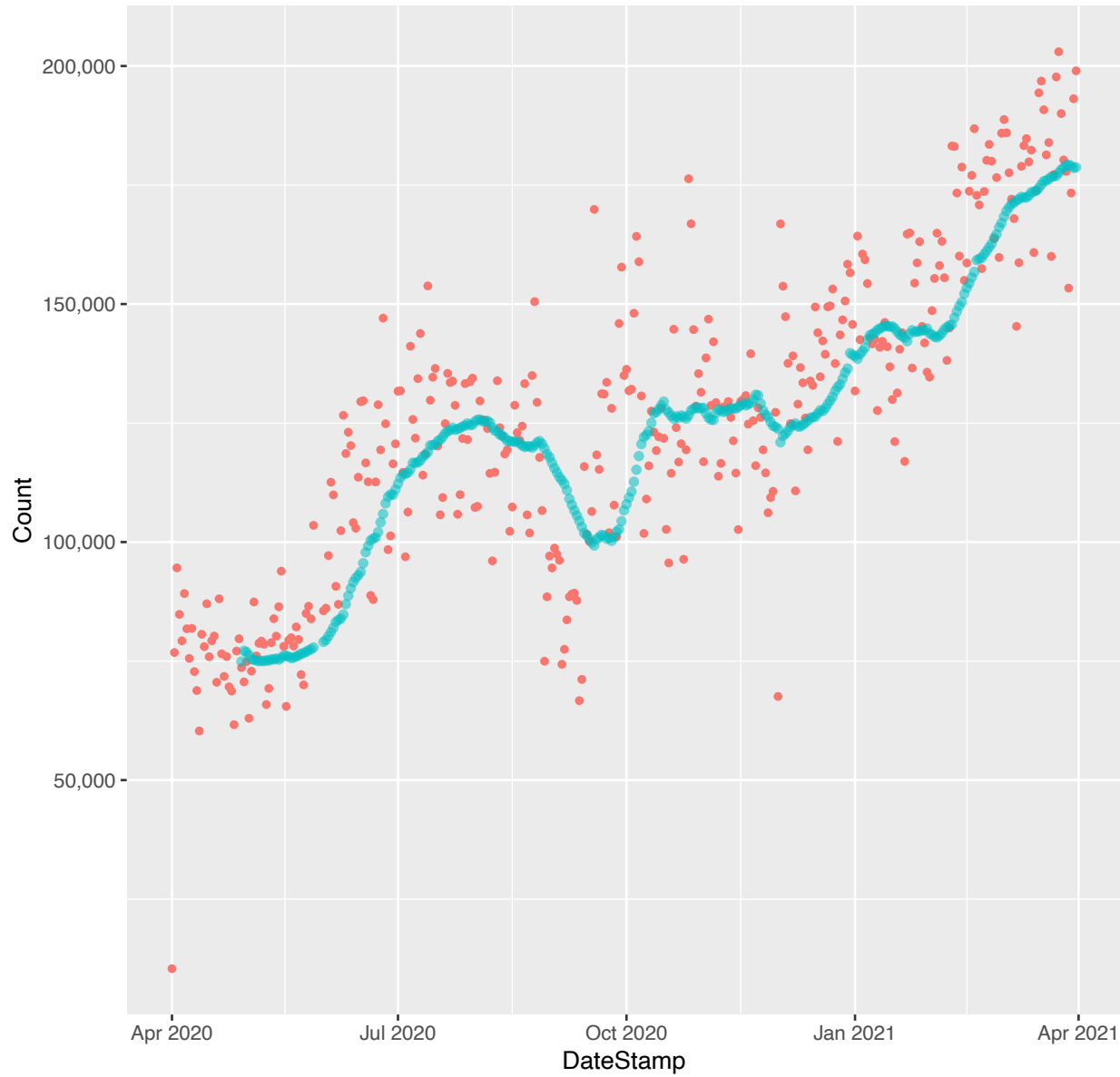
*. southwest.com (monthly boxplots (outliers trimmed))



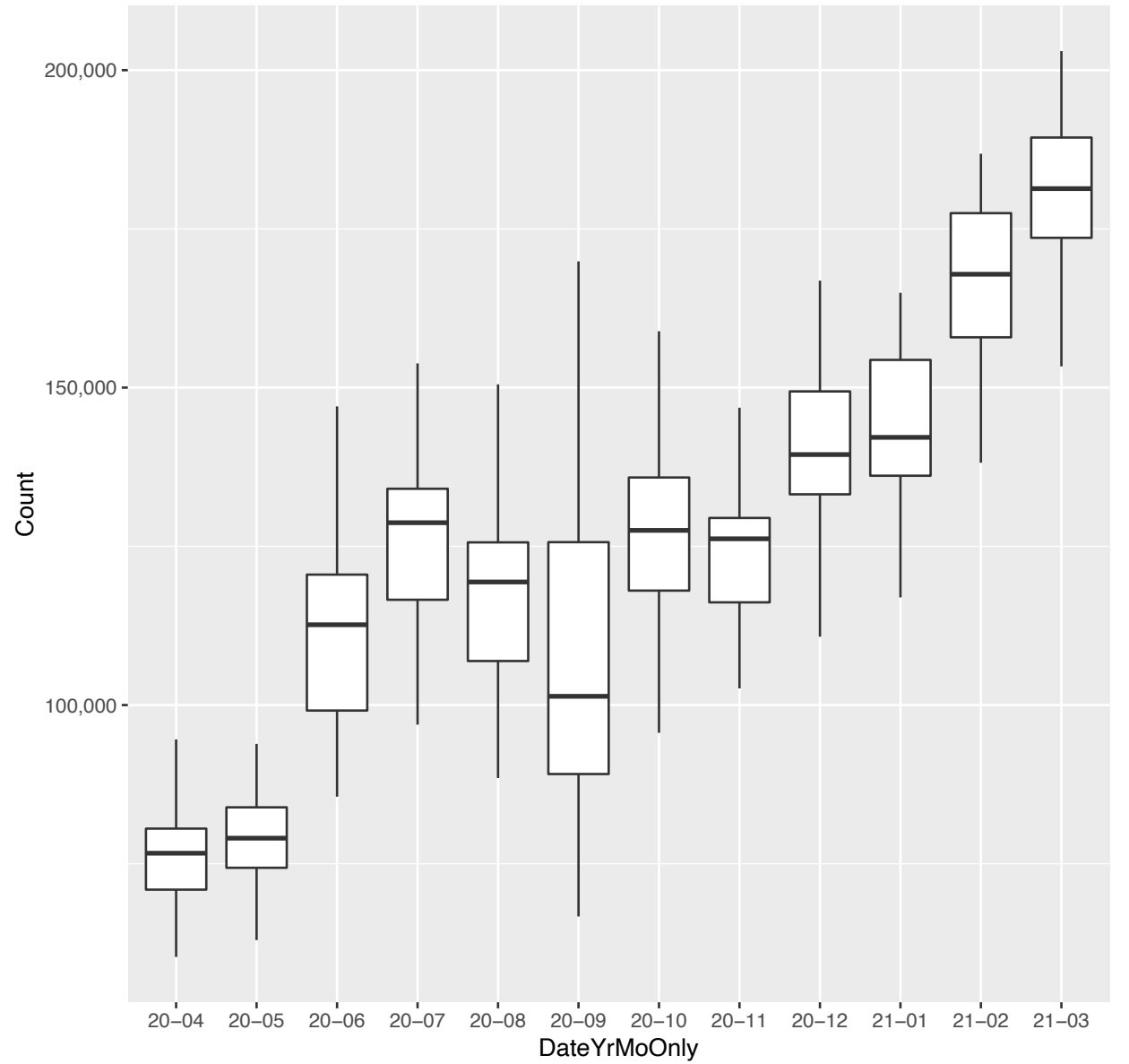
15. spirit.com:



*. spirit.com (day-by-day counts and 28 day moving average)



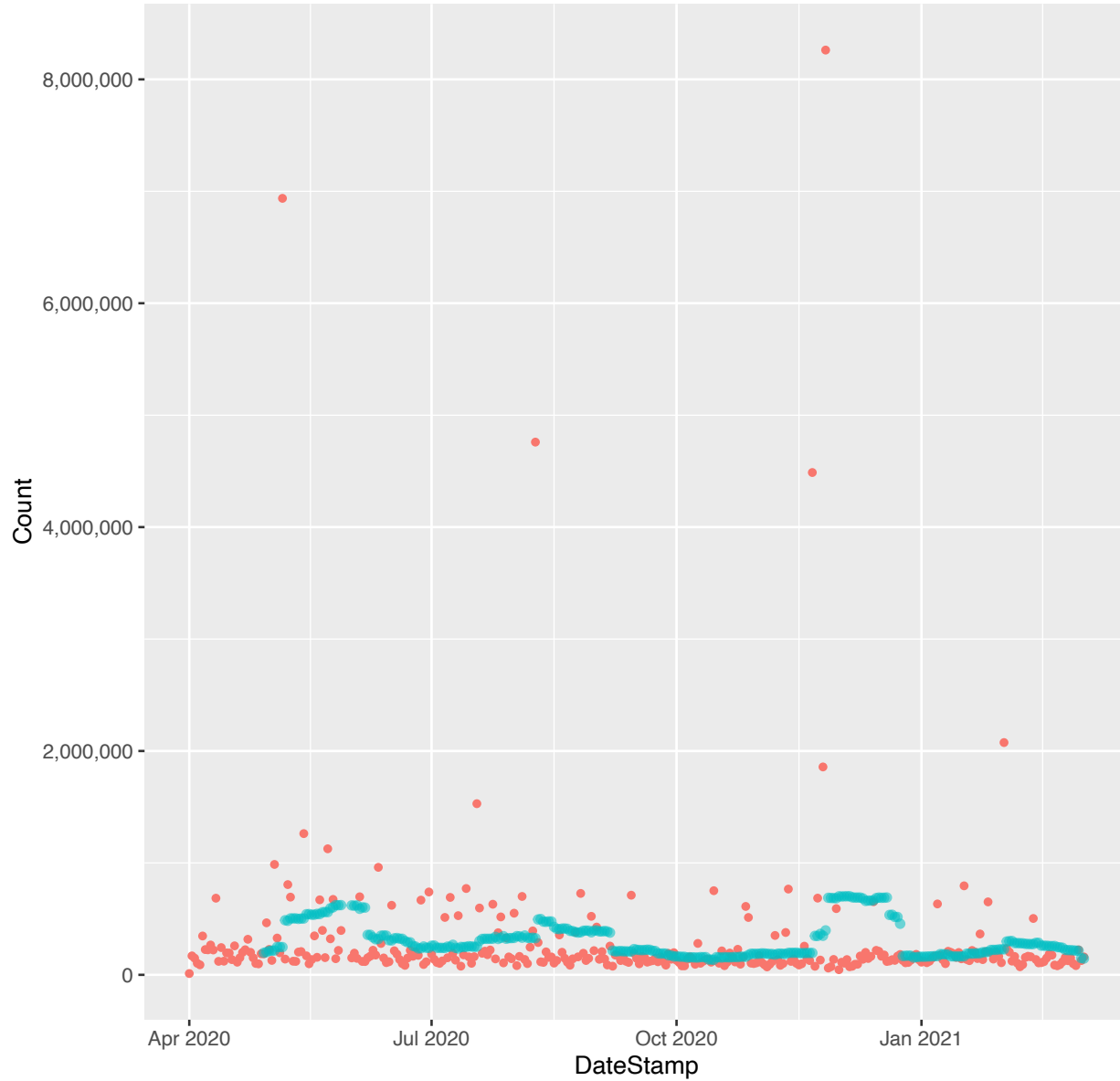
*. spirit.com (monthly boxplots (outliers trimmed))



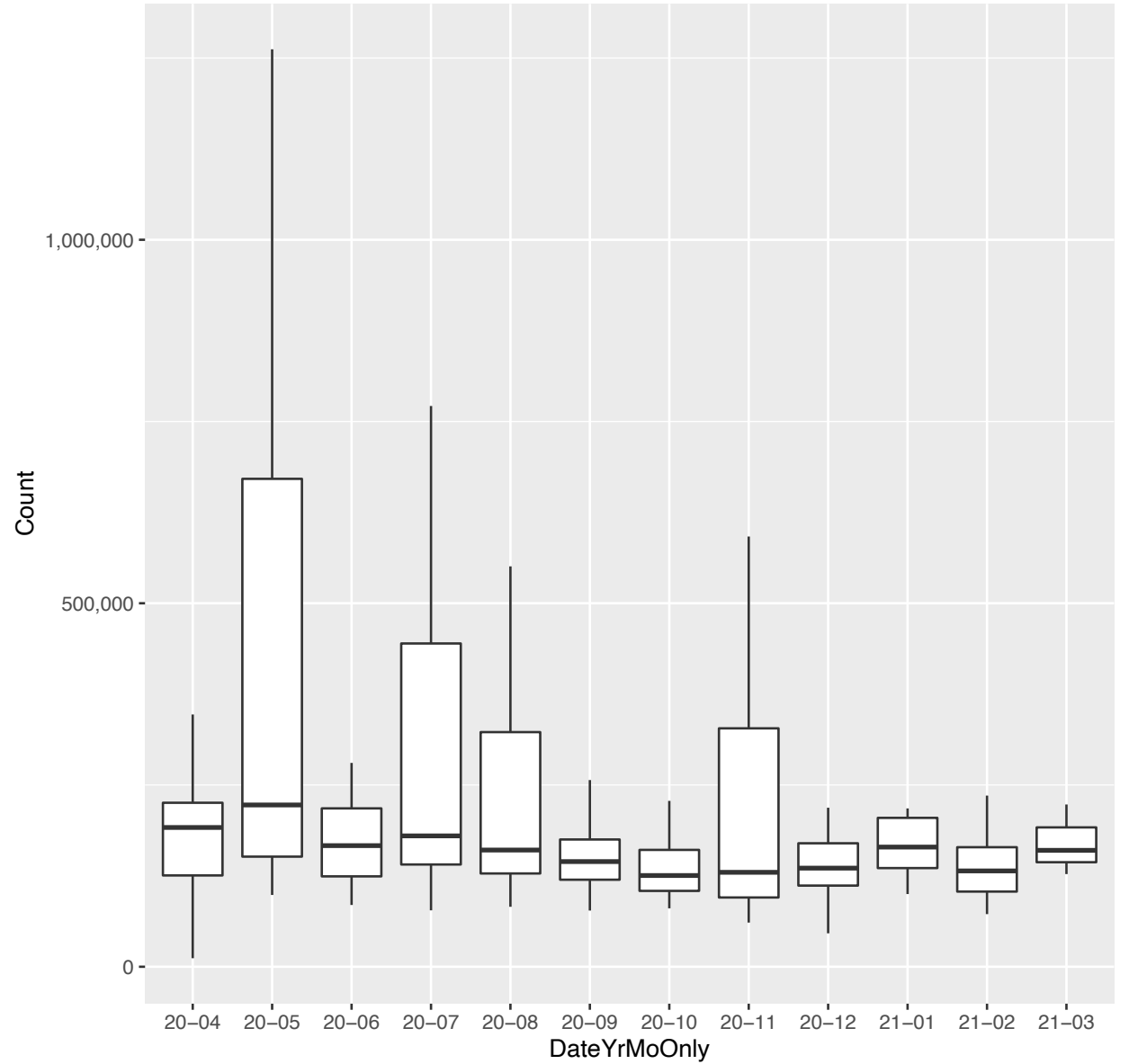
16. united.com:



*. united.com (day-by-day counts and 28 day moving average)



*. united.com (monthly boxplots (outliers trimmed))



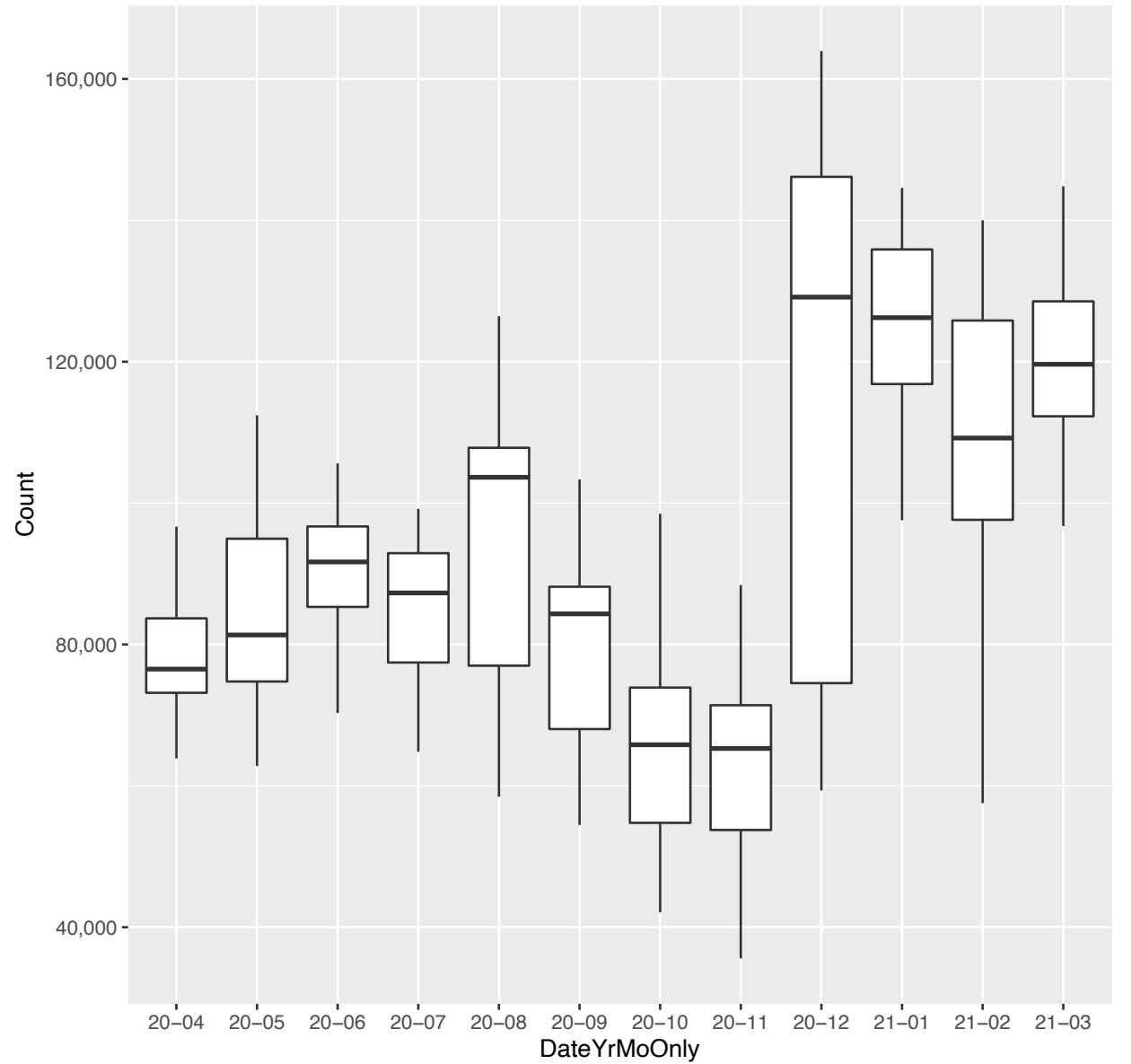
17. wizzair.com:

~

*. wizzair.com (day-by-day counts and 28 day moving average)

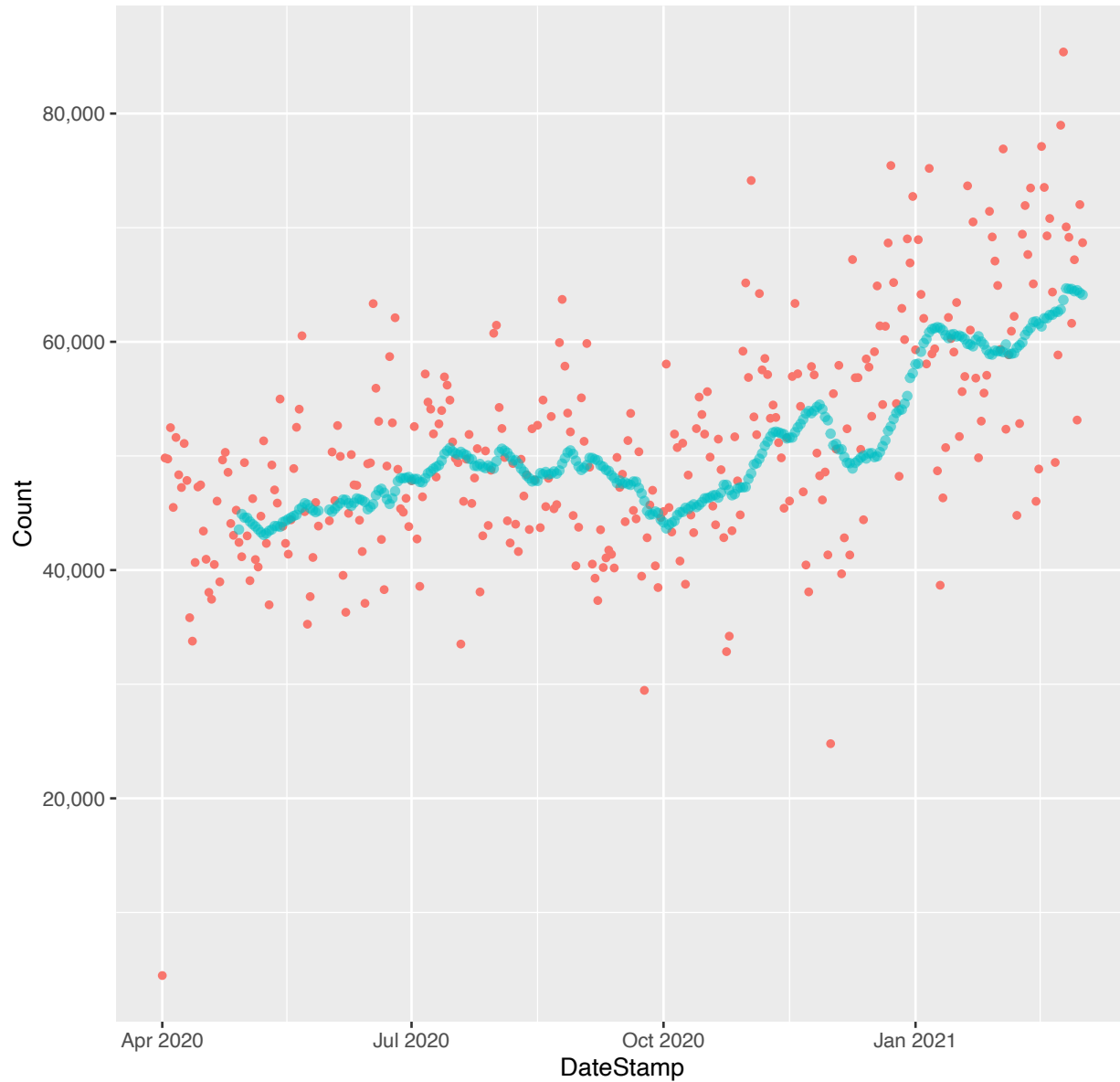


*. wizzair.com (monthly boxplots (outliers trimmed))

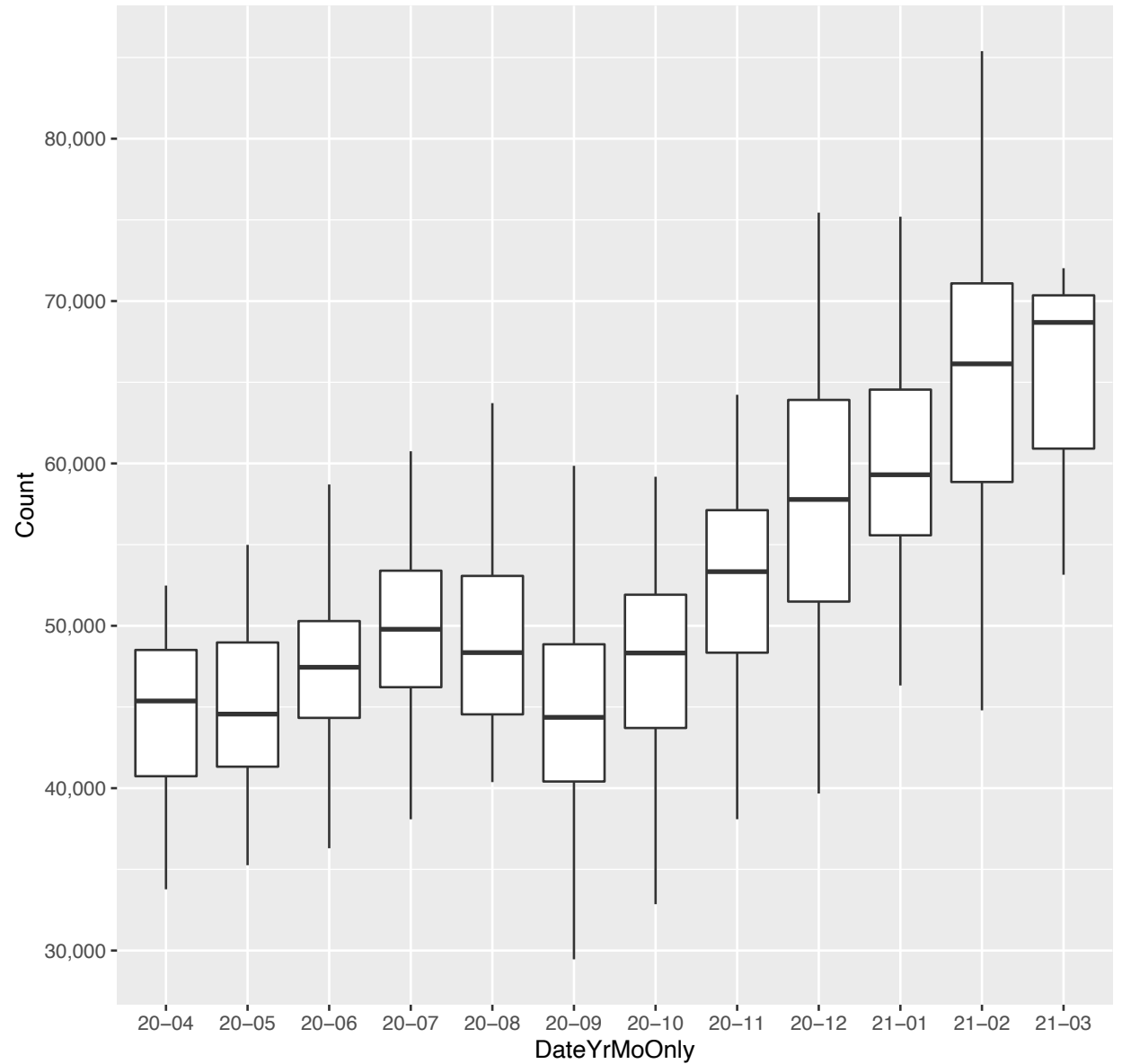




*. greyhound.com (day-by-day counts and 28 day moving average)



*. greyhound.com (monthly boxplots (outliers trimmed))



c) Car Rentals

[\[back to Travel/Tourism/Transportation\]](#)

[\[back to TOC\]](#)

19 *.enterprise.com

∪ shaped (ending lower)

20 *.hertz.com

L shaped

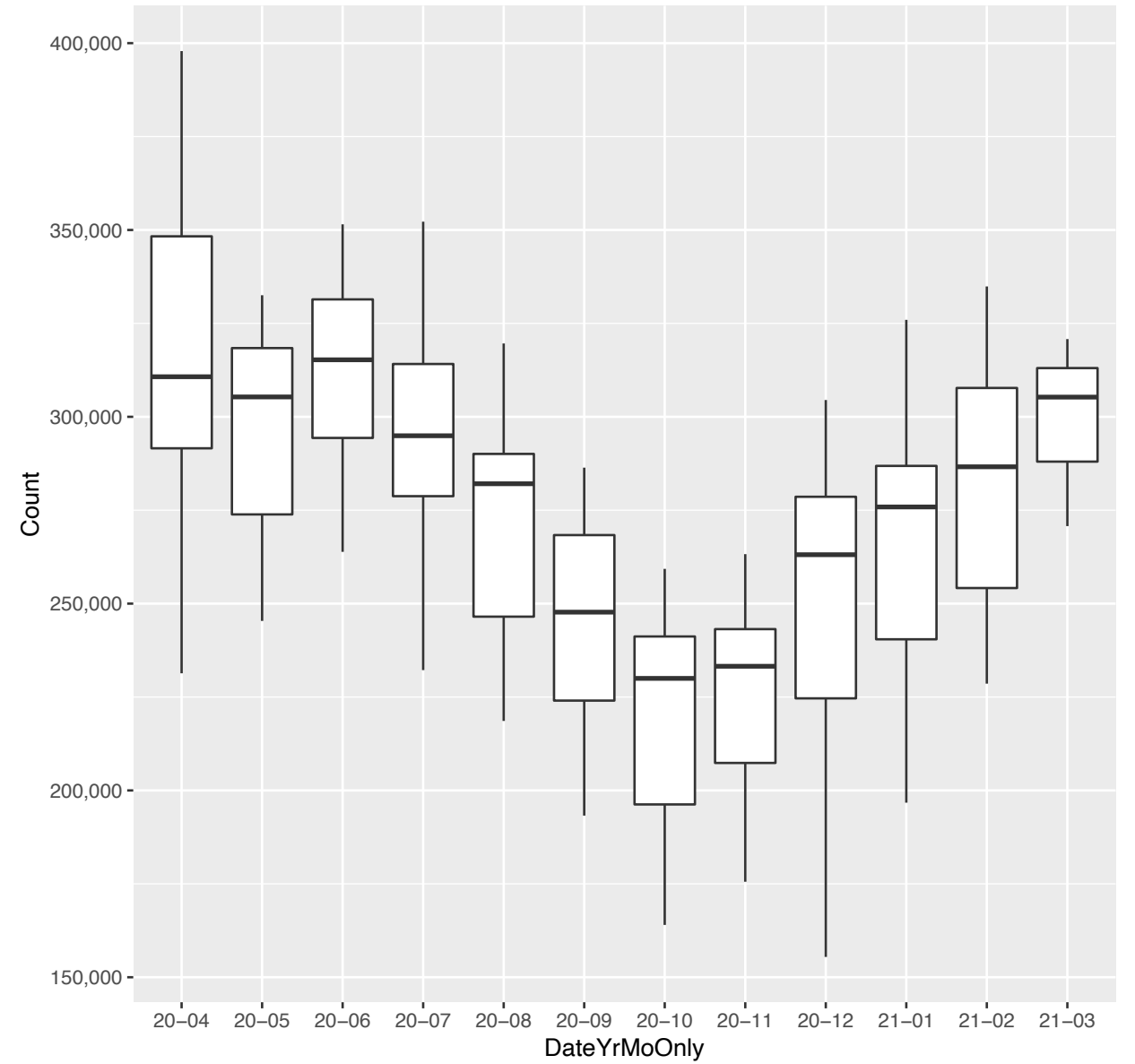
19. enterprise.com

U shaped (ending lower)

*. enterprise.com (day-by-day counts and 28 day moving average)



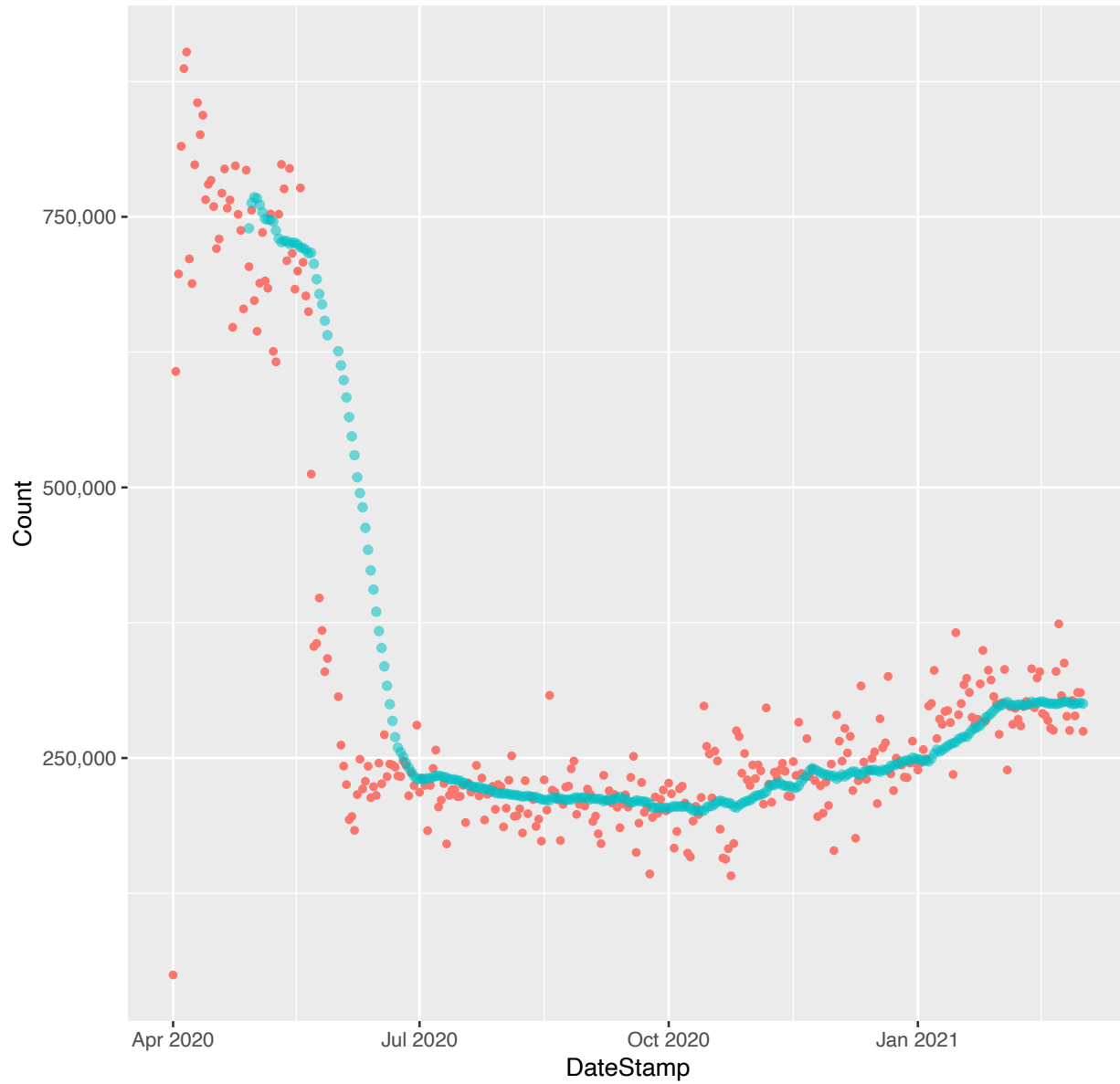
*. enterprise.com (monthly boxplots (outliers trimmed))



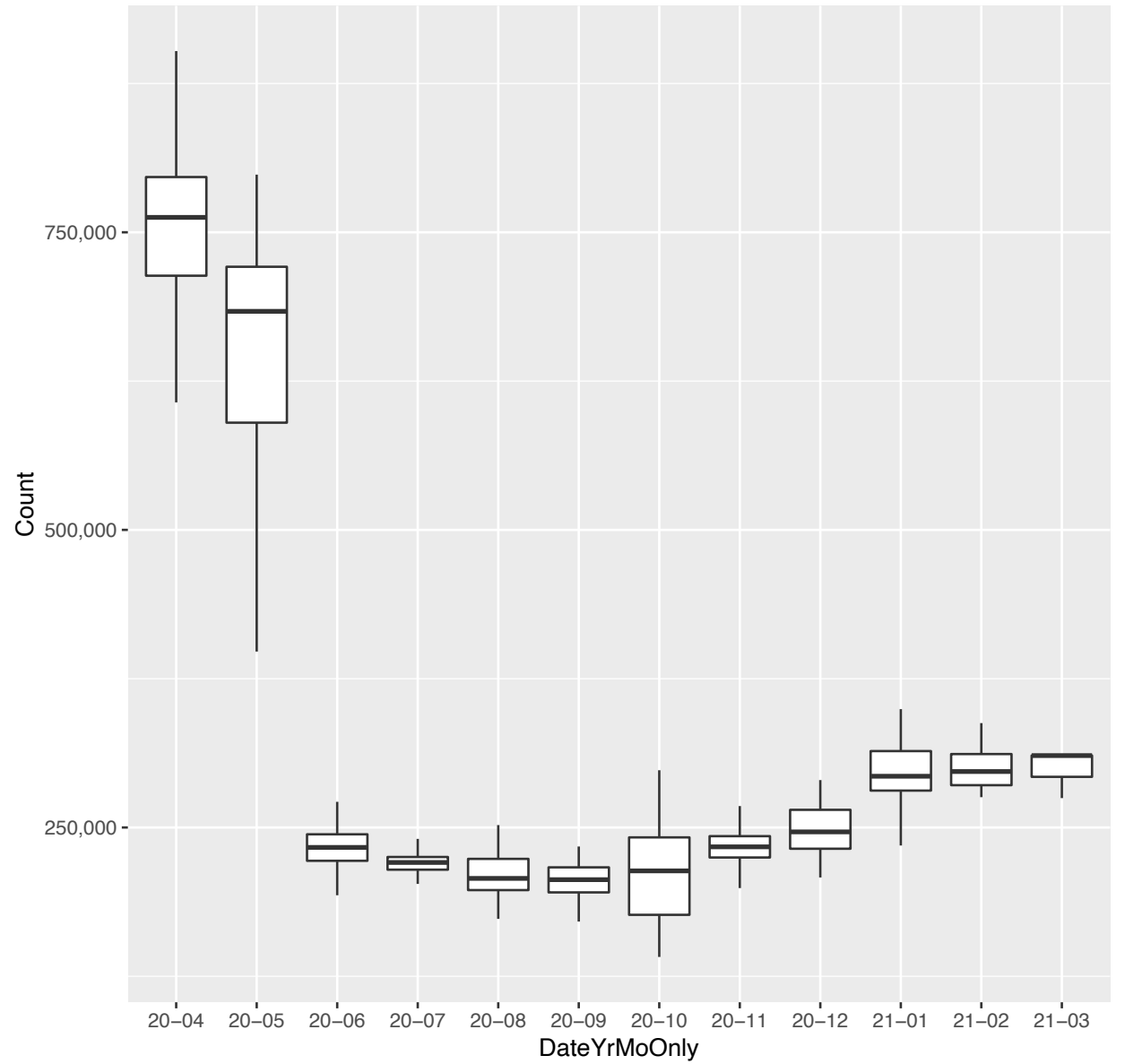
20. hertz.com:

L shaped

*. hertz.com (day-by-day counts and 28 day moving average)



*. hertz.com (monthly boxplots (outliers trimmed))



d) Cruise Lines

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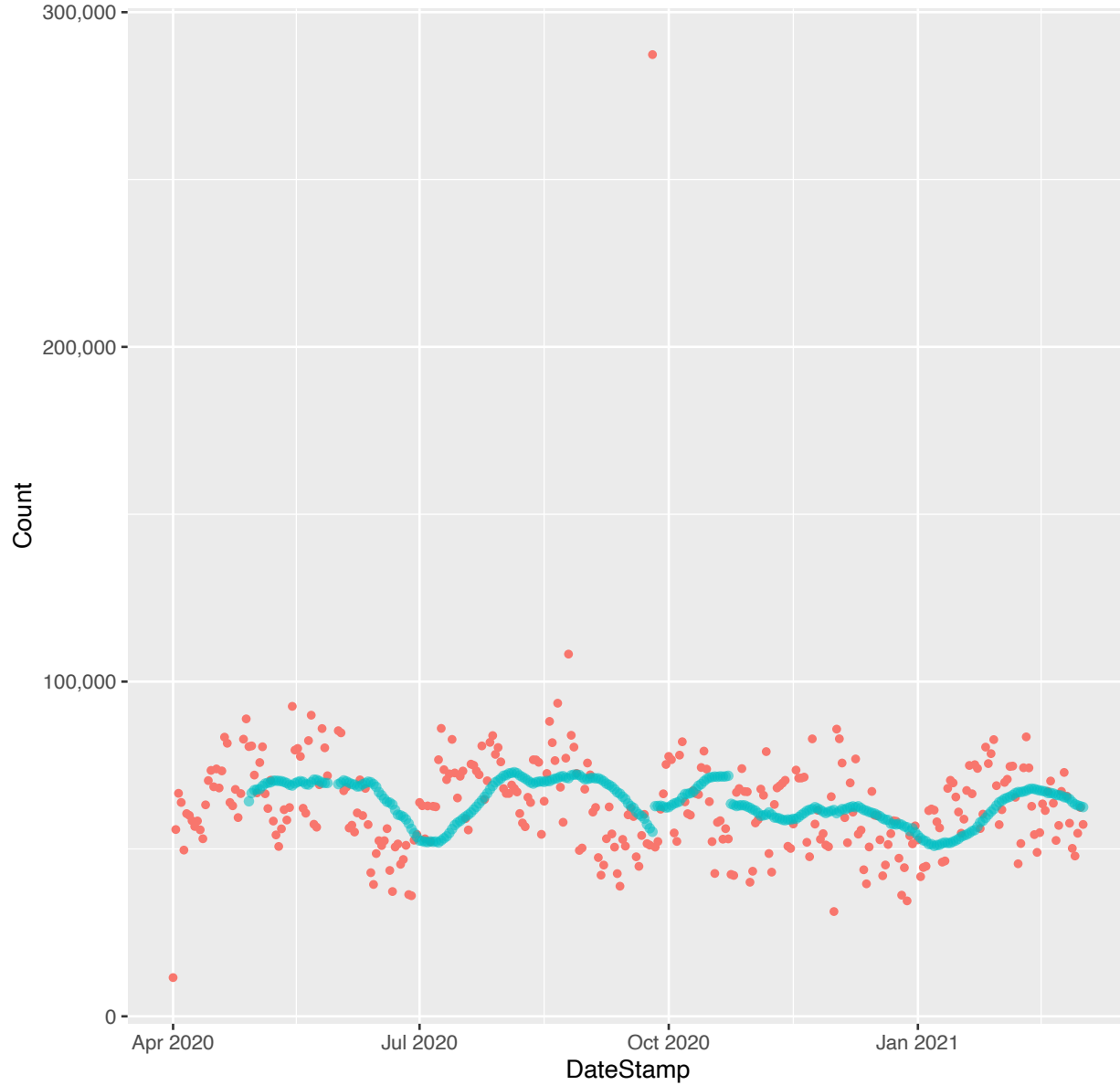
- 21 *.carnival.com
- 22 *.ncl.com
- 23 *.princess.com



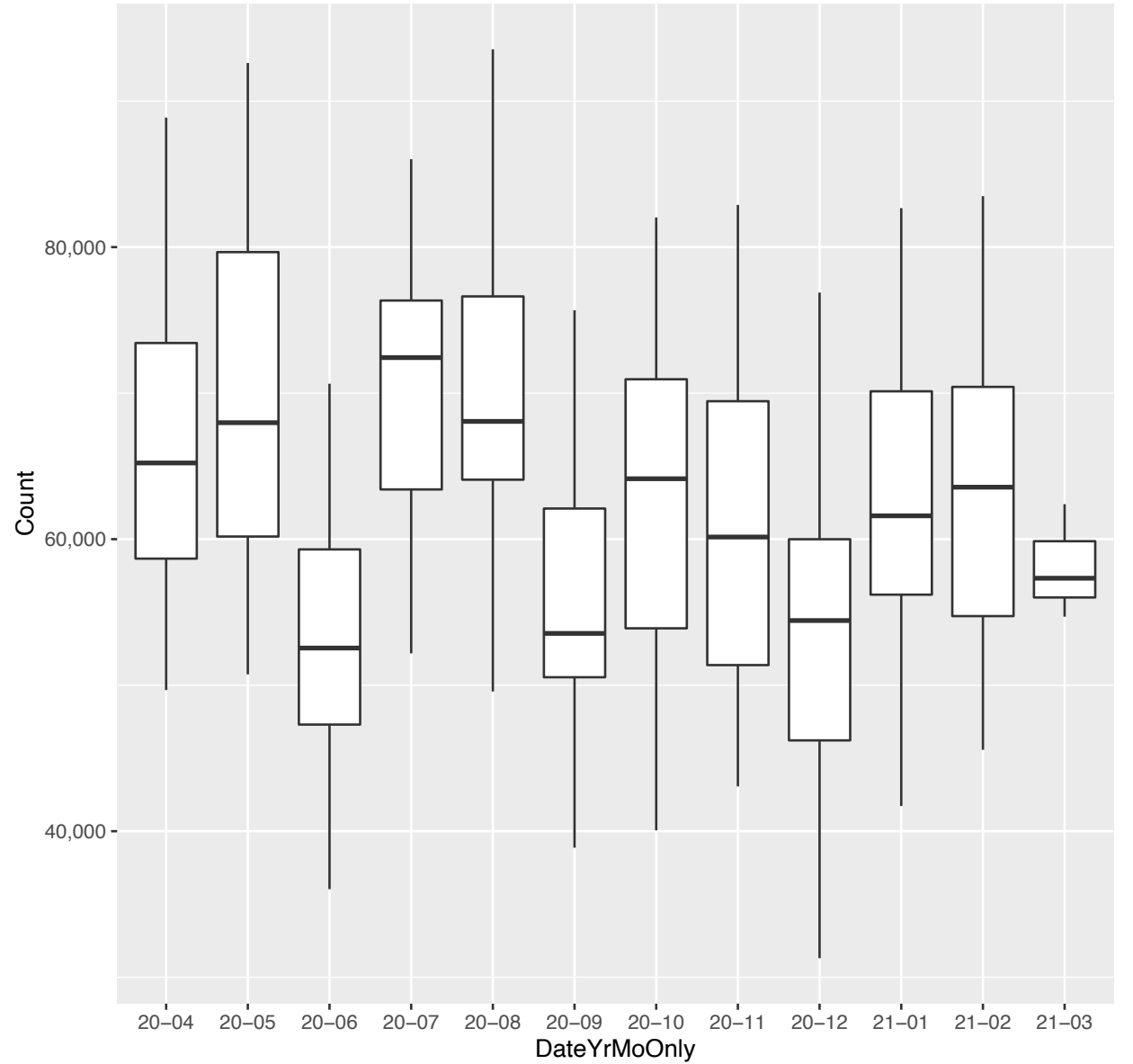
21. carnival.com:

~

*. carnival.com (day-by-day counts and 28 day moving average)



*. carnival.com (monthly boxplots (outliers trimmed))



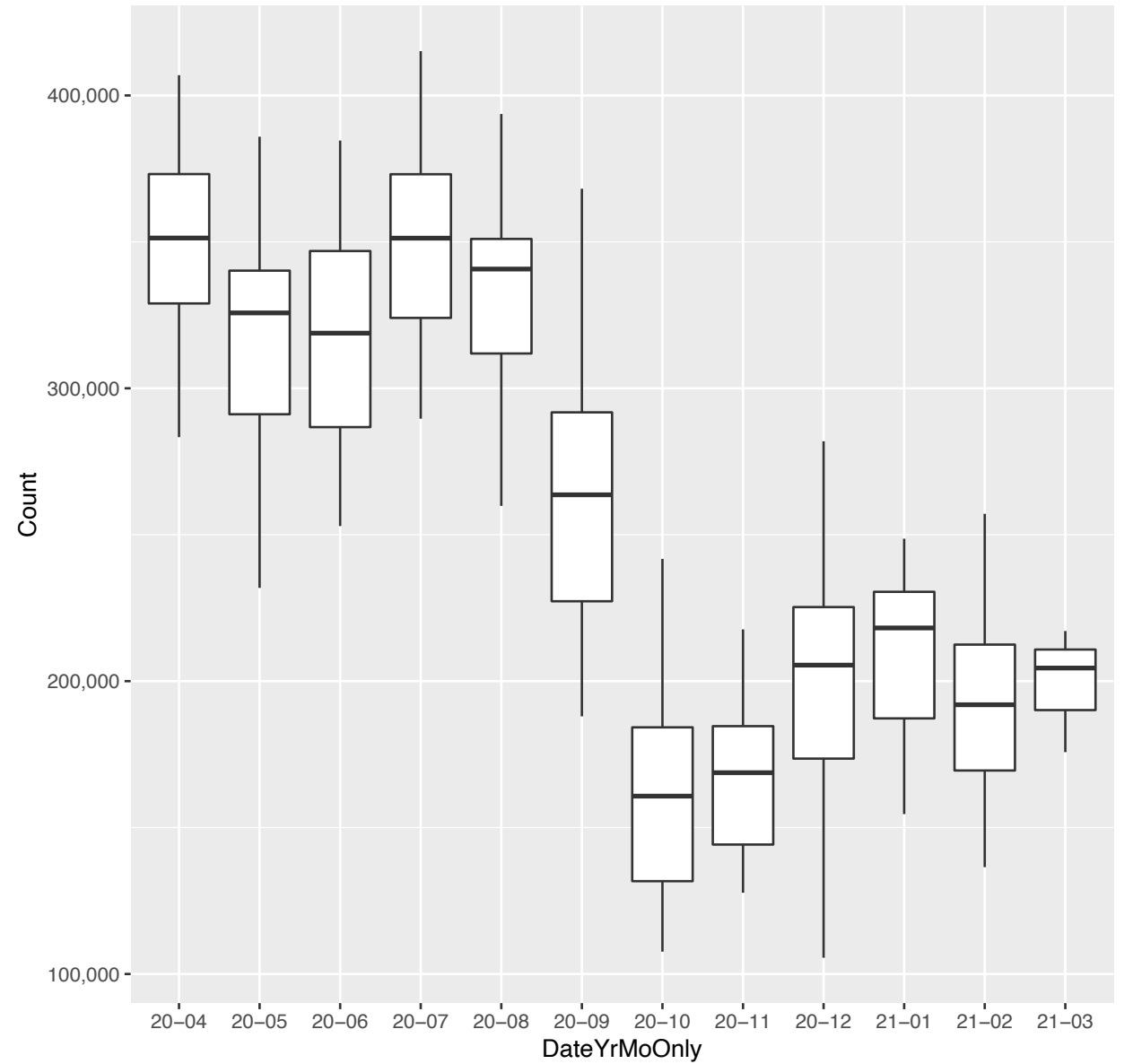
22. ncl.com:



*. ncl.com (day-by-day counts and 28 day moving average)

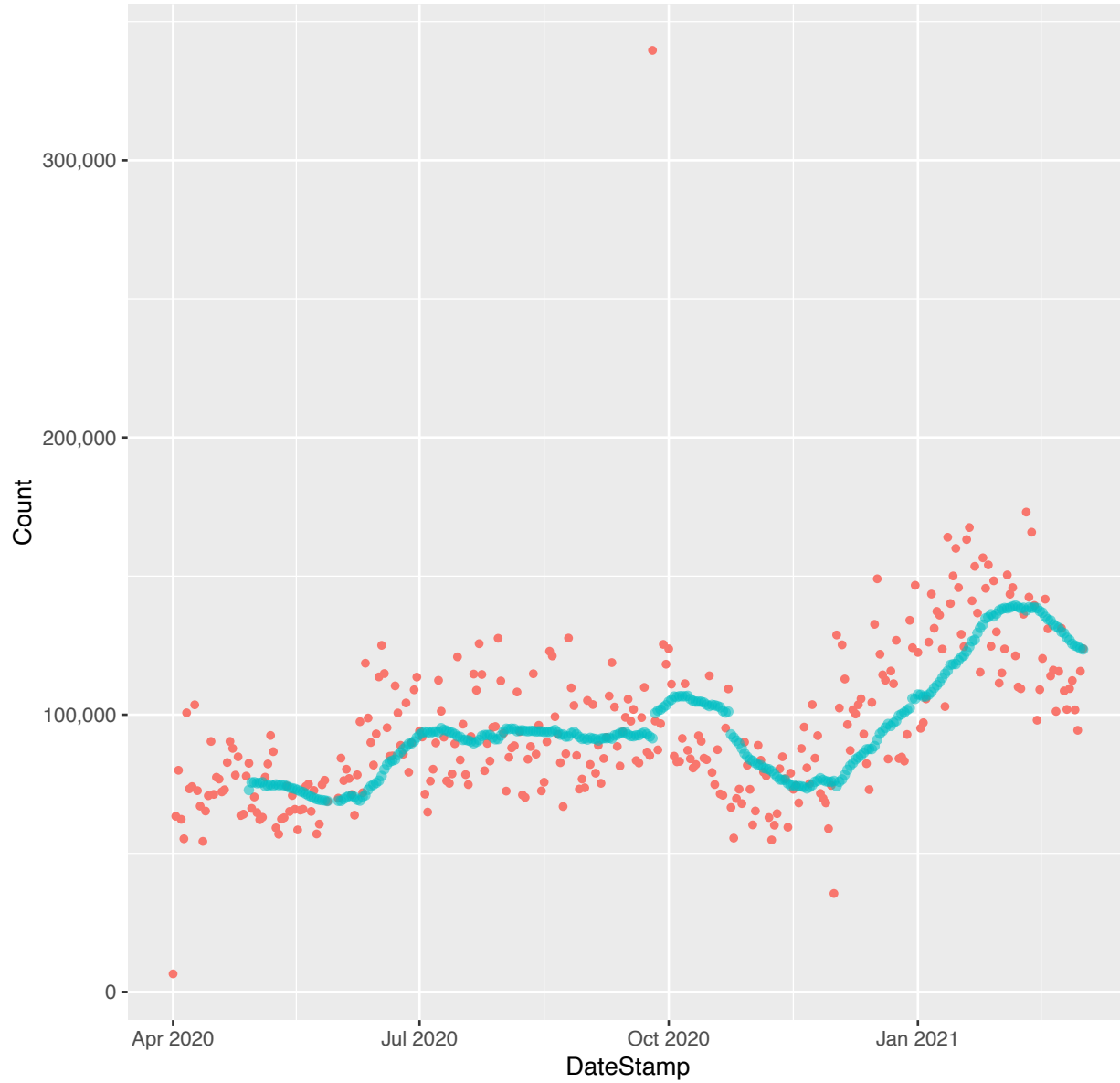


*. ncl.com (monthly boxplots (outliers trimmed))

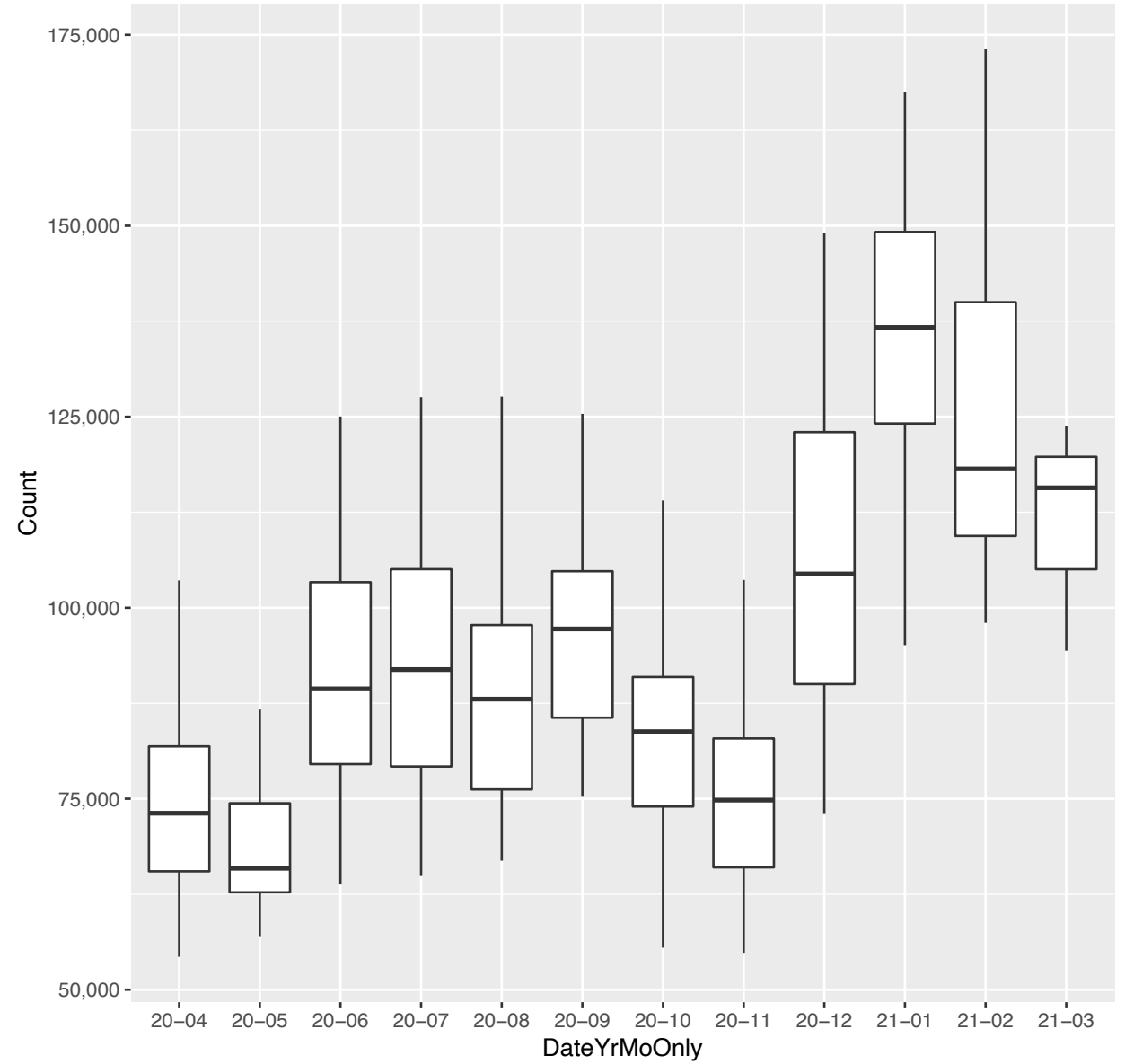


23. princess.com: ↗

*. princess.com (day-by-day counts and 28 day moving average)



*. princess.com (monthly boxplots (outliers trimmed))



e) Lodging

[\[back to Travel/Tourism/Transportation\]](#)

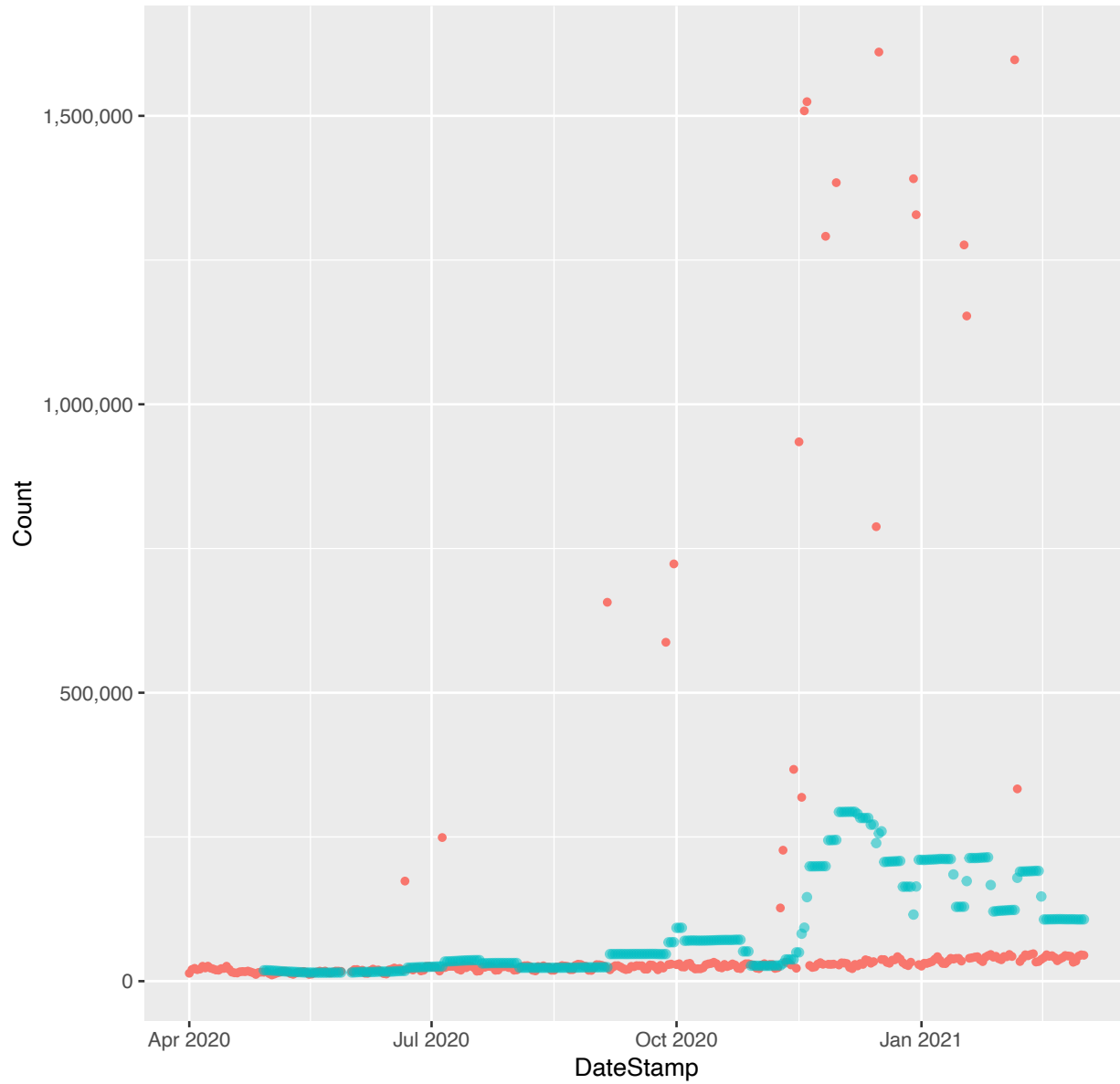
[\[back to TOC\]](#)

24	*.accor.com	✳	↗	
25	*.airbnb.com	✳	~	M
26	*.bestwestern.com		↗	
27	*.choicehotels.com	✳	~	
28	*.hilton.com	✳	~	M
29	*.hyatt.com	✳	↘	M
30	*.ihg.com	✳	↗	
31	*.marriott.com		↘	MM

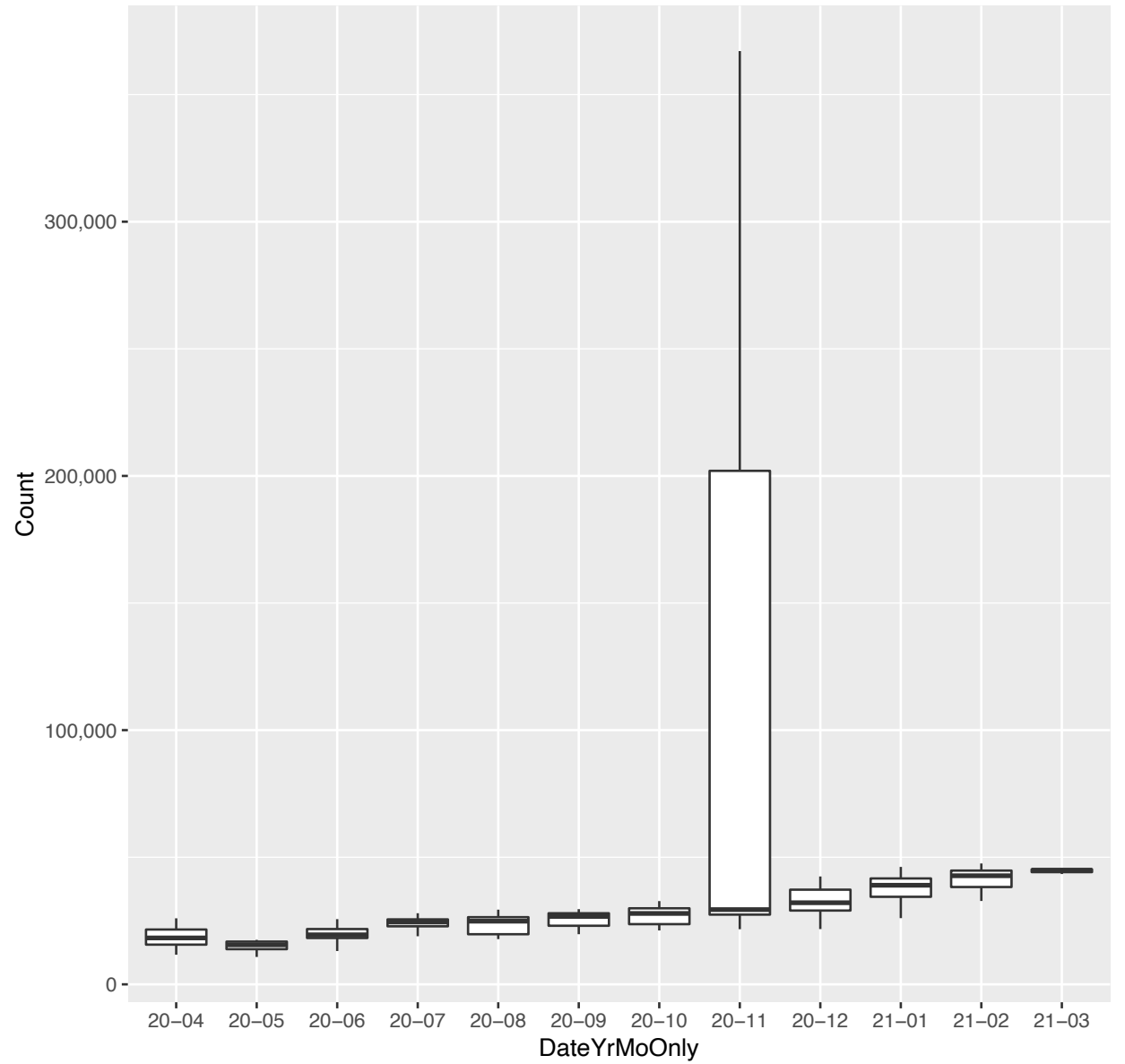
24. accor.com:



*. accor.com (day-by-day counts and 28 day moving average)



*. accor.com (monthly boxplots (outliers trimmed))

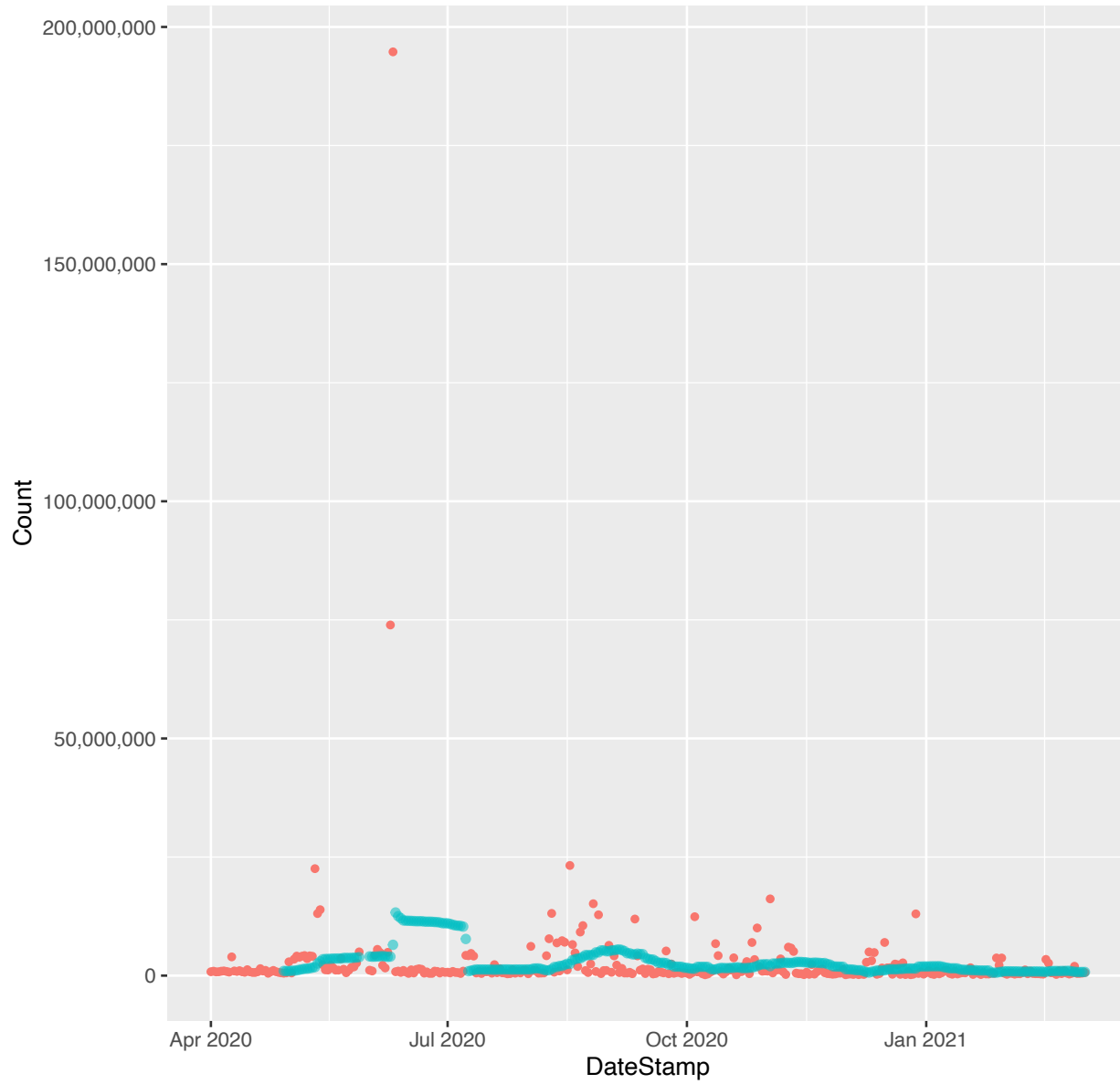


25. airbnb.com:

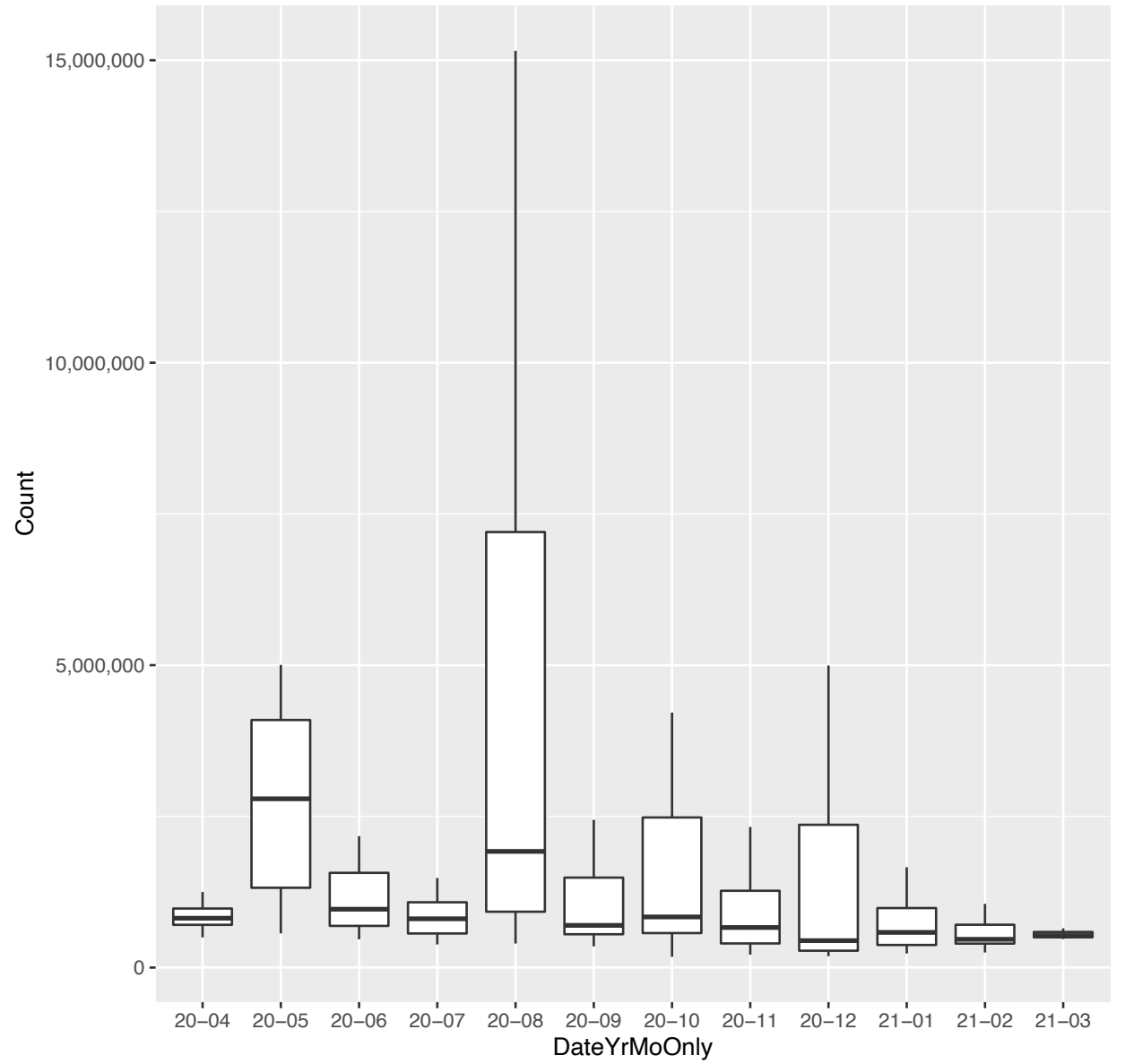


M

*. airbnb.com (day-by-day counts and 28 day moving average)



*. airbnb.com (monthly boxplots (outliers trimmed))



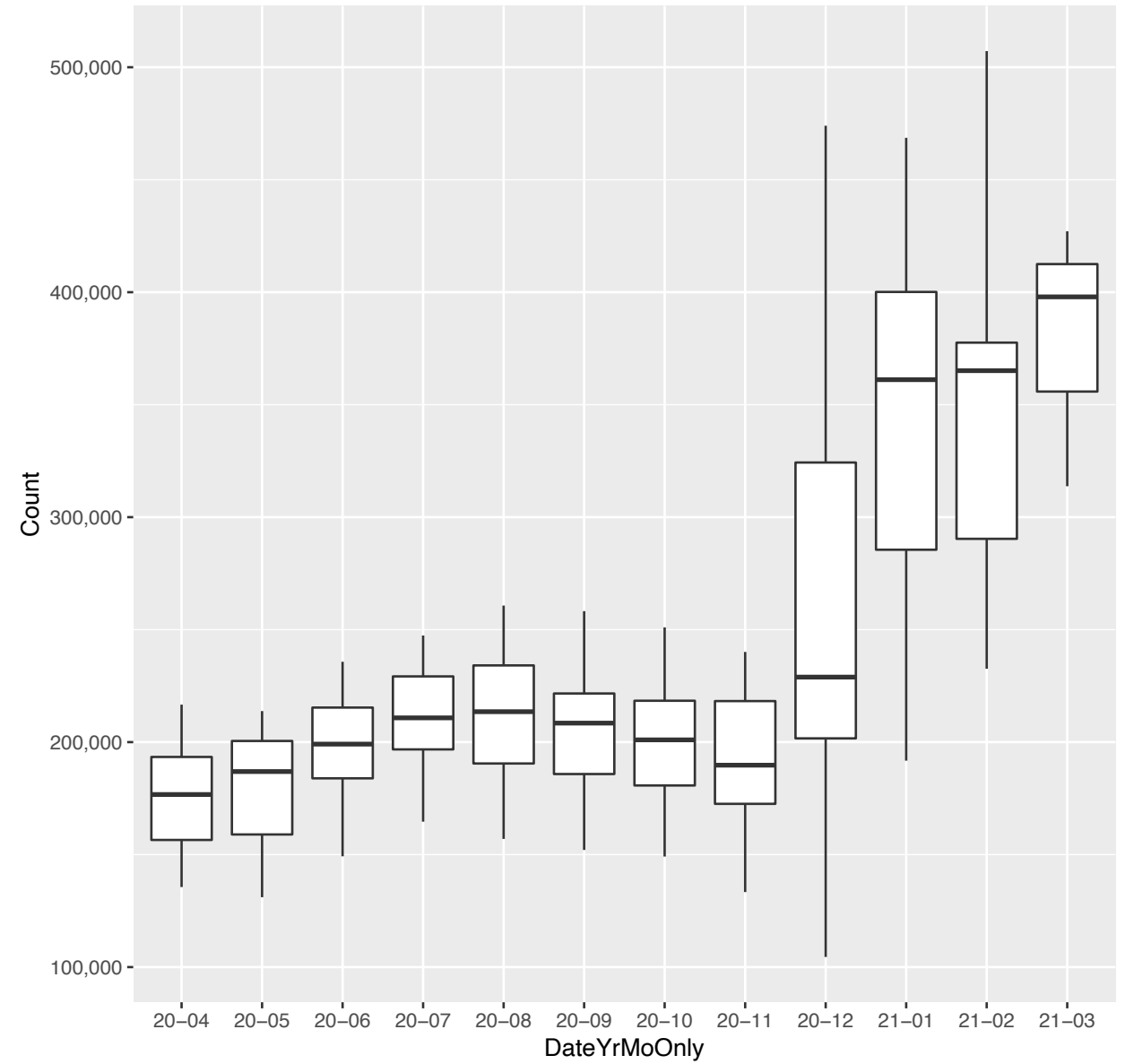
26. bestwestern.com:



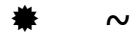
*. bestwestern.com (day-by-day counts and 28 day moving average)



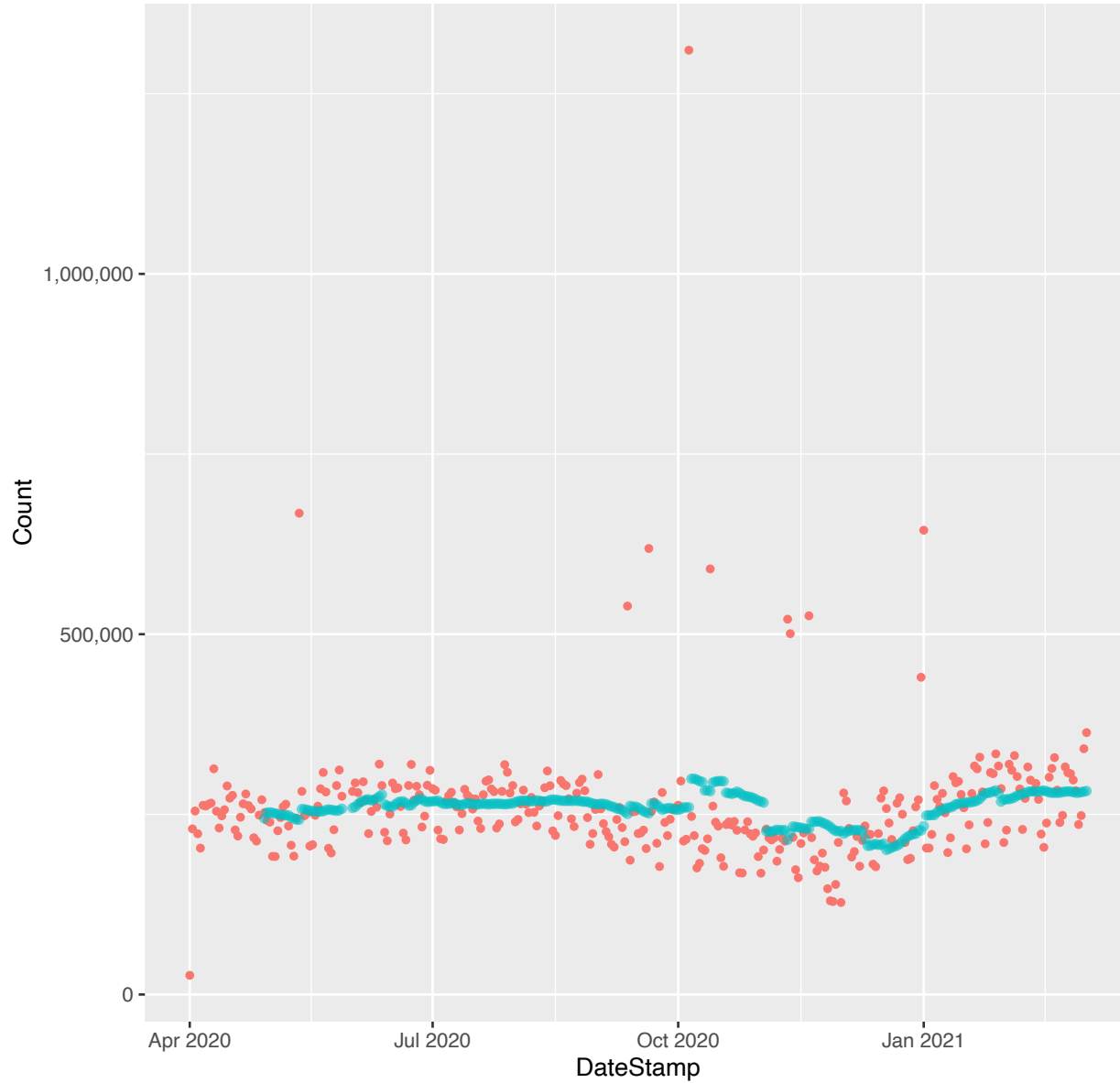
*. bestwestern.com (monthly boxplots (outliers trimmed))



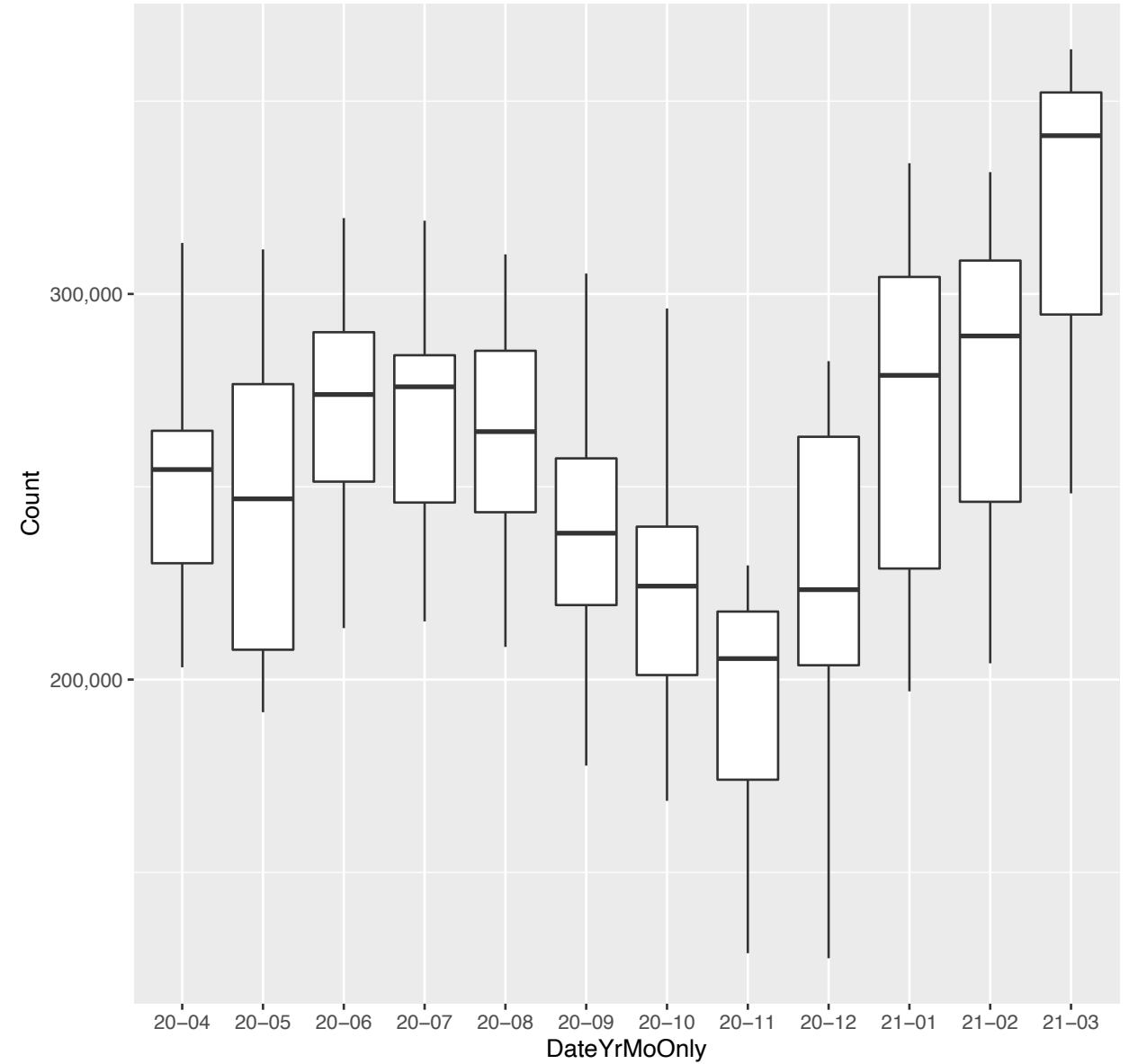
27. choicehotels.com:



*. choicehotels.com (day-by-day counts and 28 day moving average)



*. choicehotels.com (monthly boxplots (outliers trimmed))

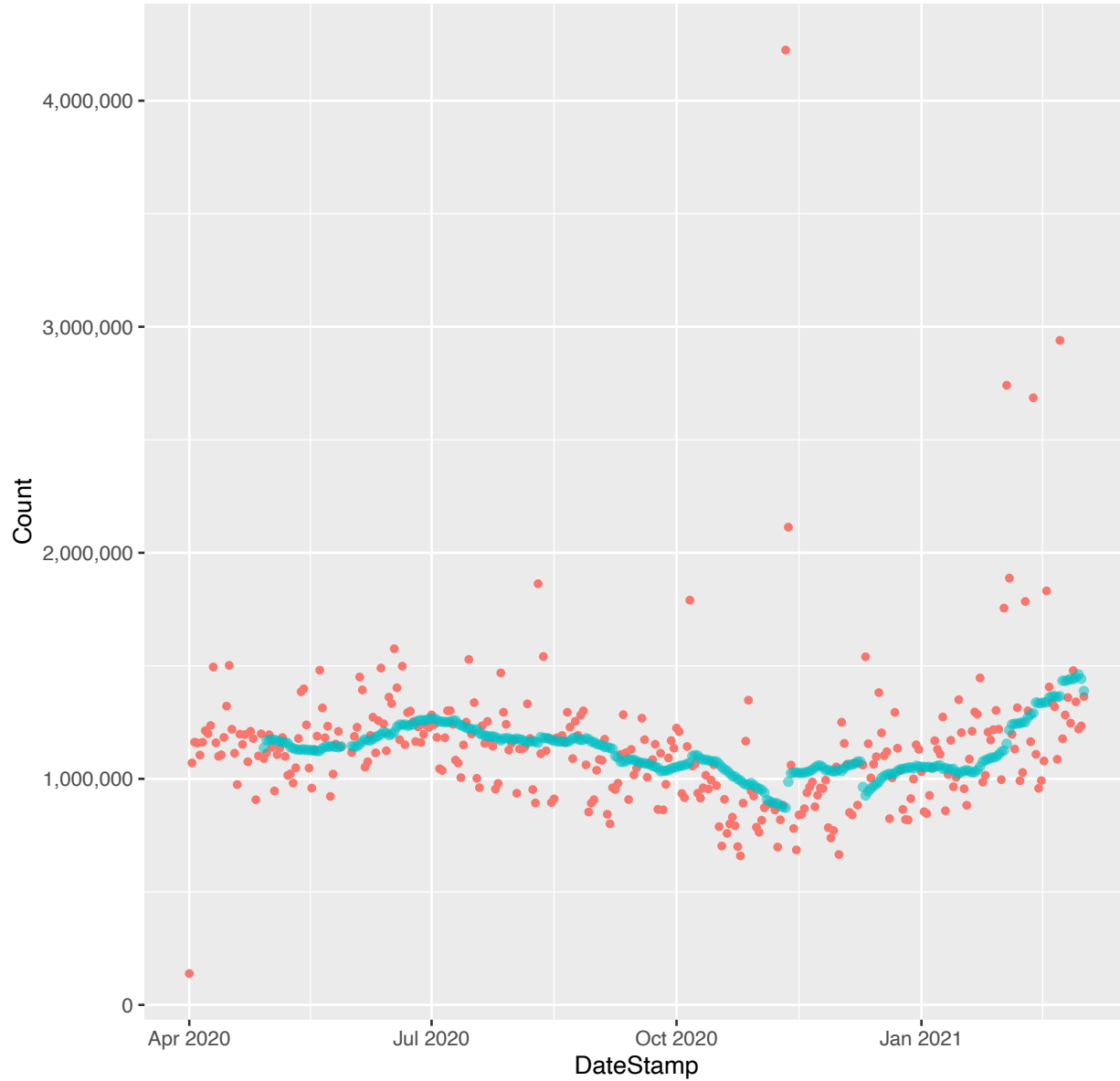


28. hilton.com:

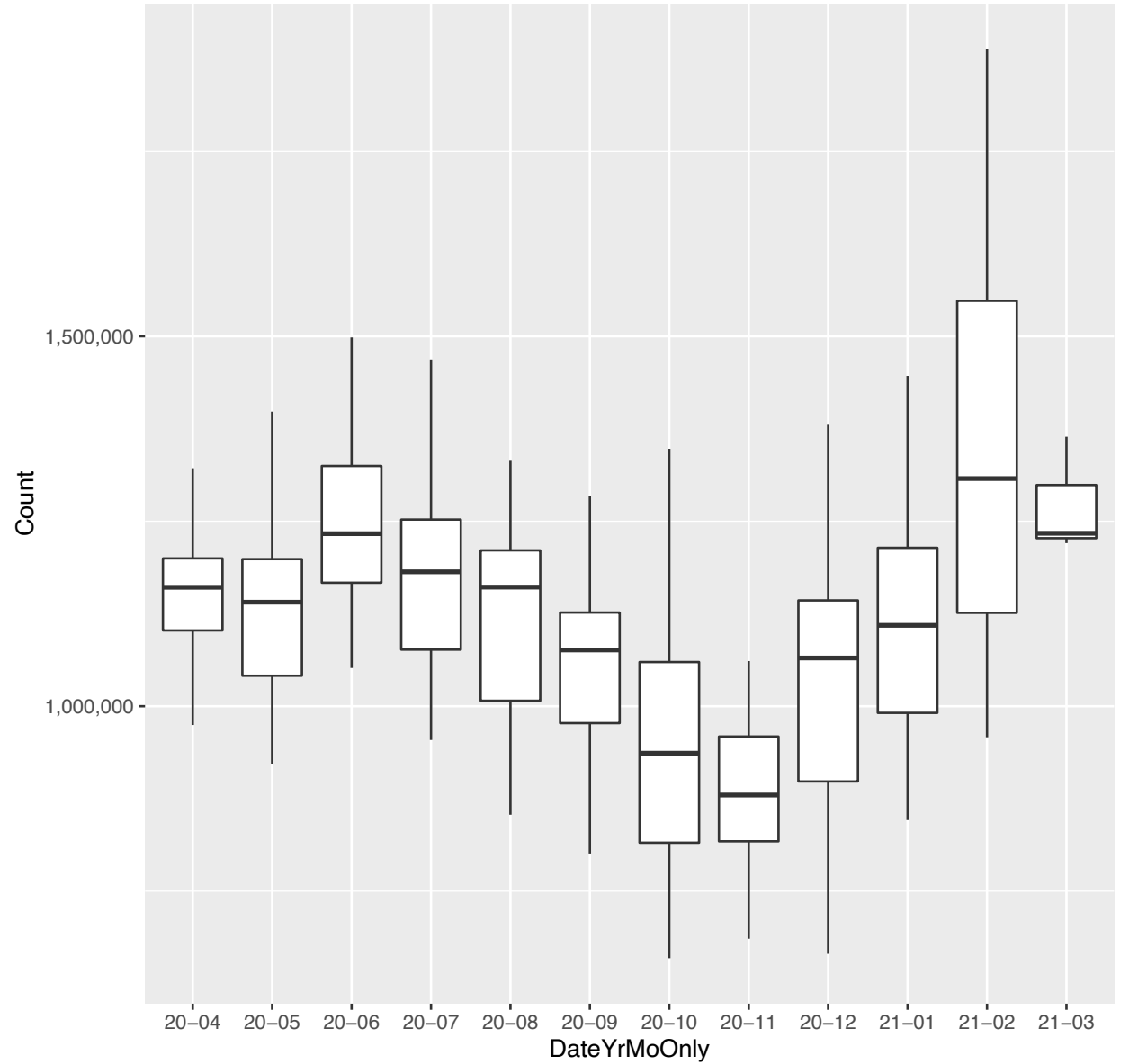


M

*. hilton.com (day-by-day counts and 28 day moving average)

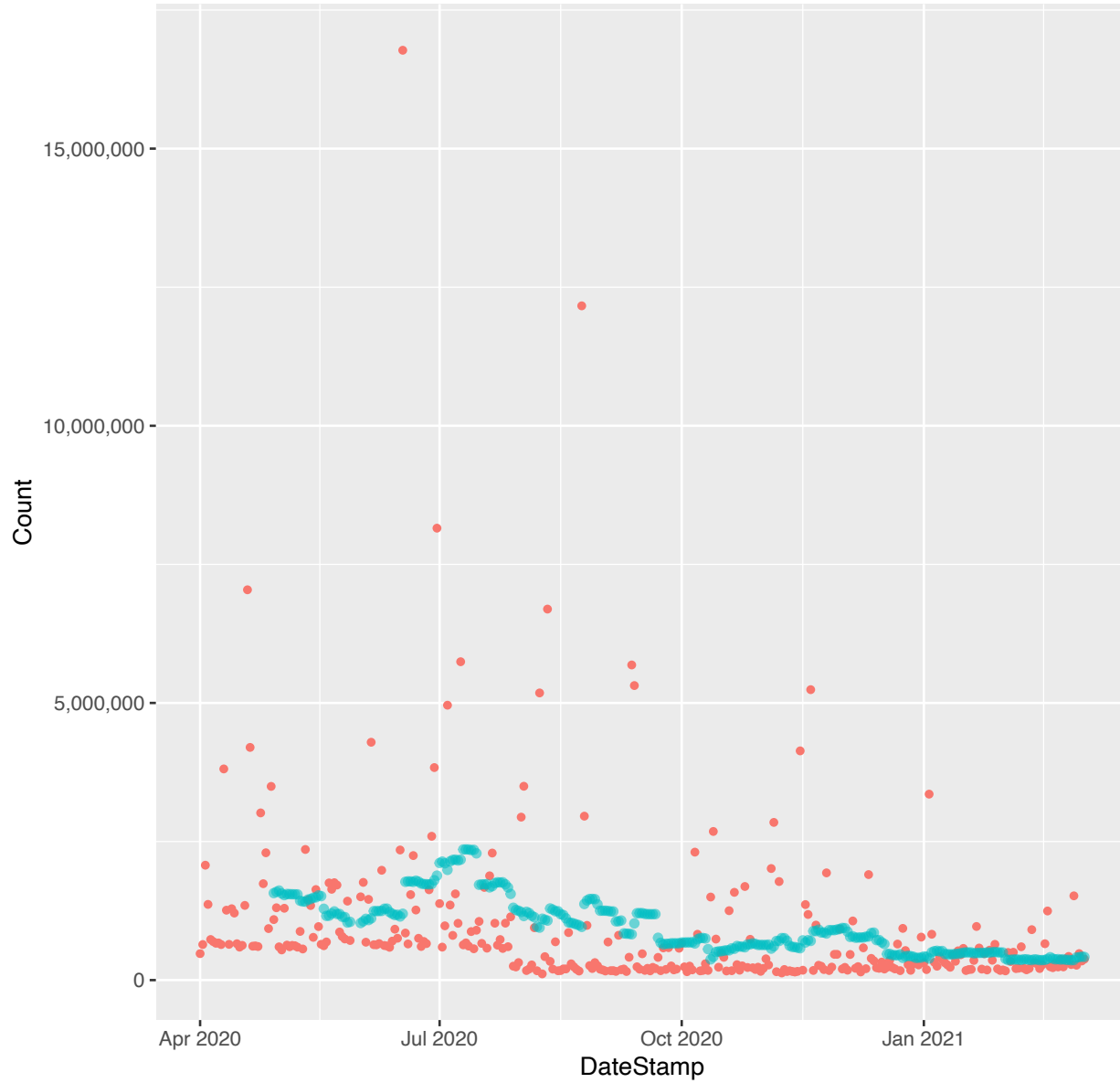


*. hilton.com (monthly boxplots (outliers trimmed))

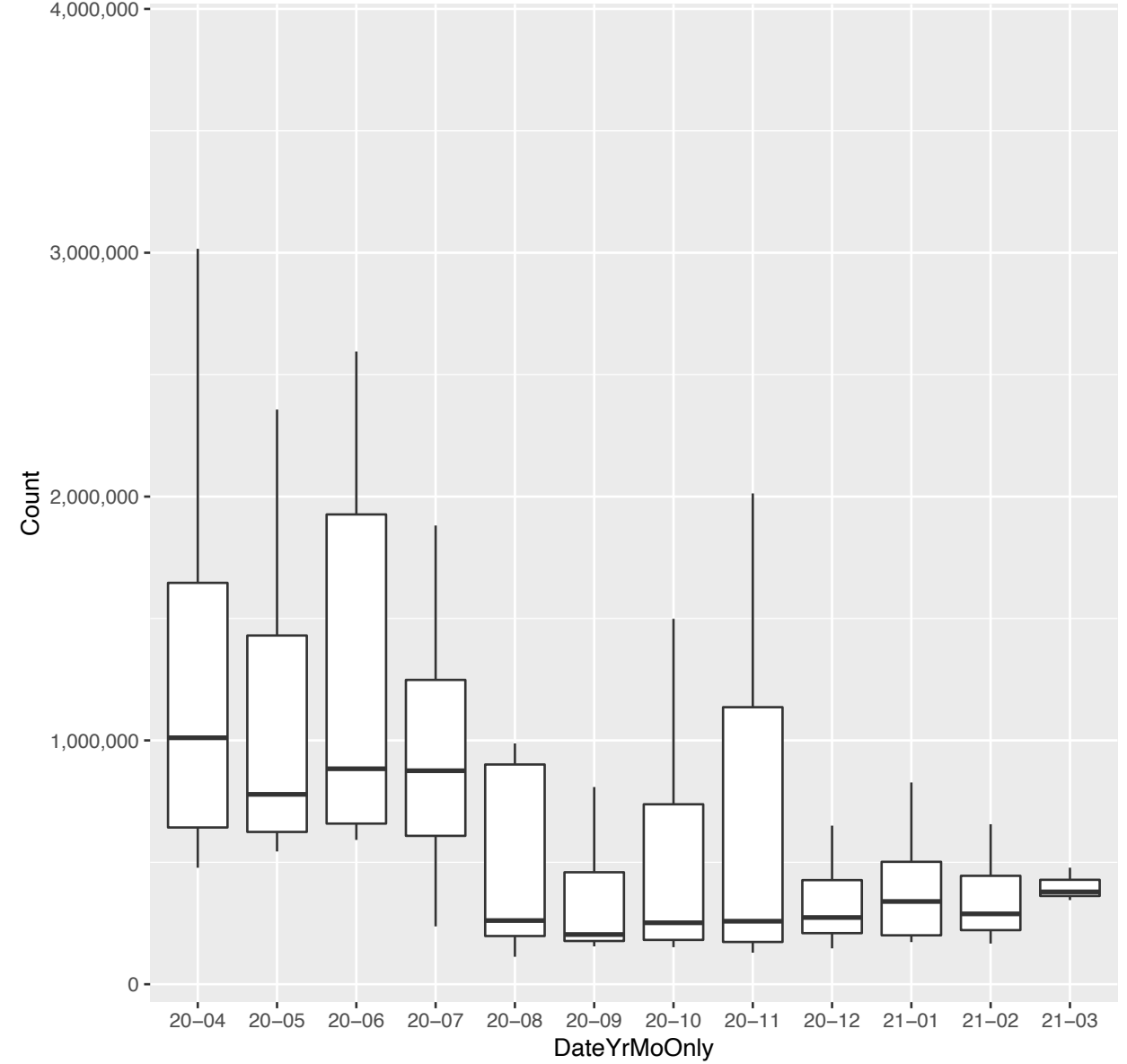




*. hyatt.com (day-by-day counts and 28 day moving average)



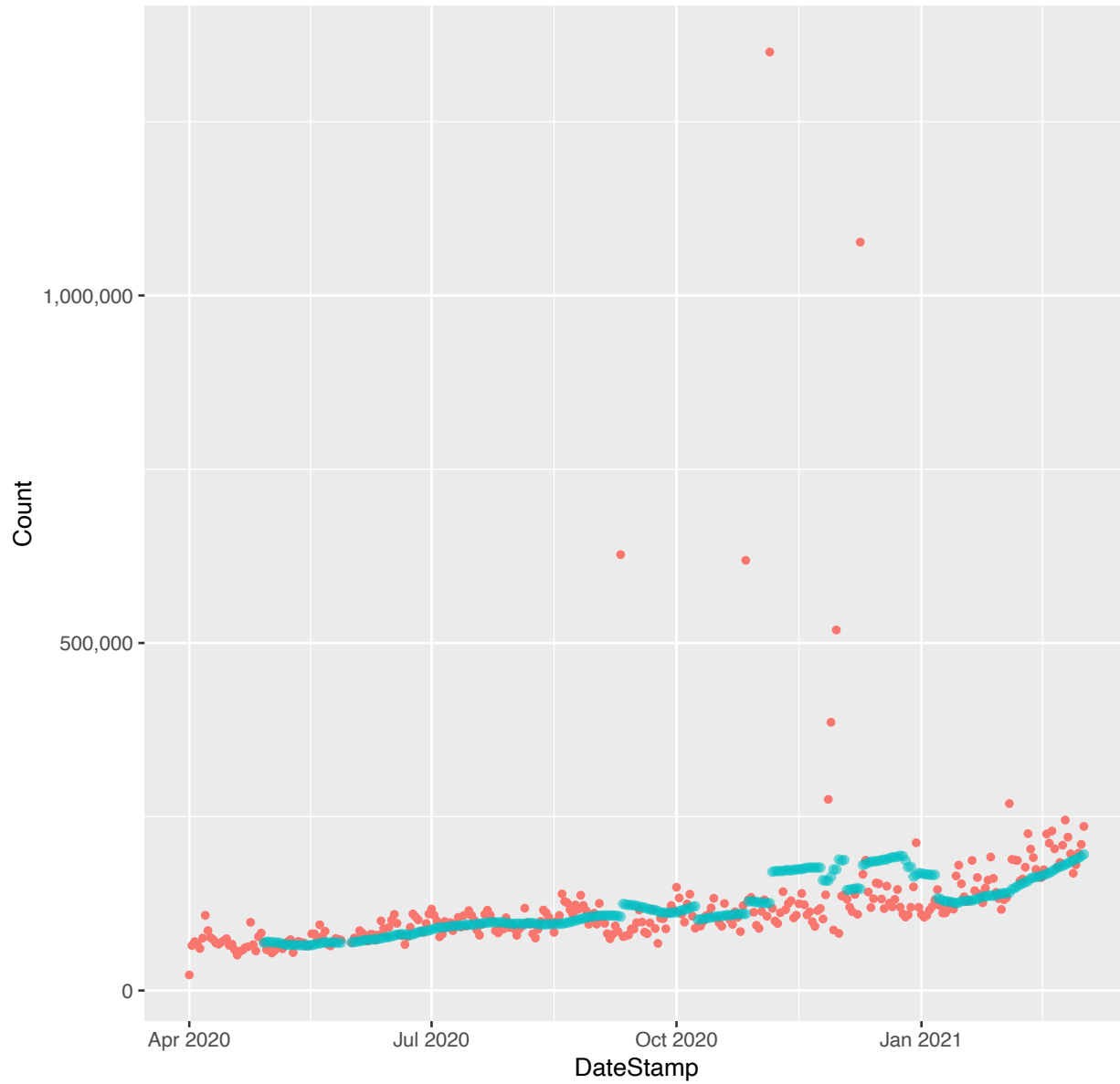
*. hyatt.com (monthly boxplots (outliers trimmed))



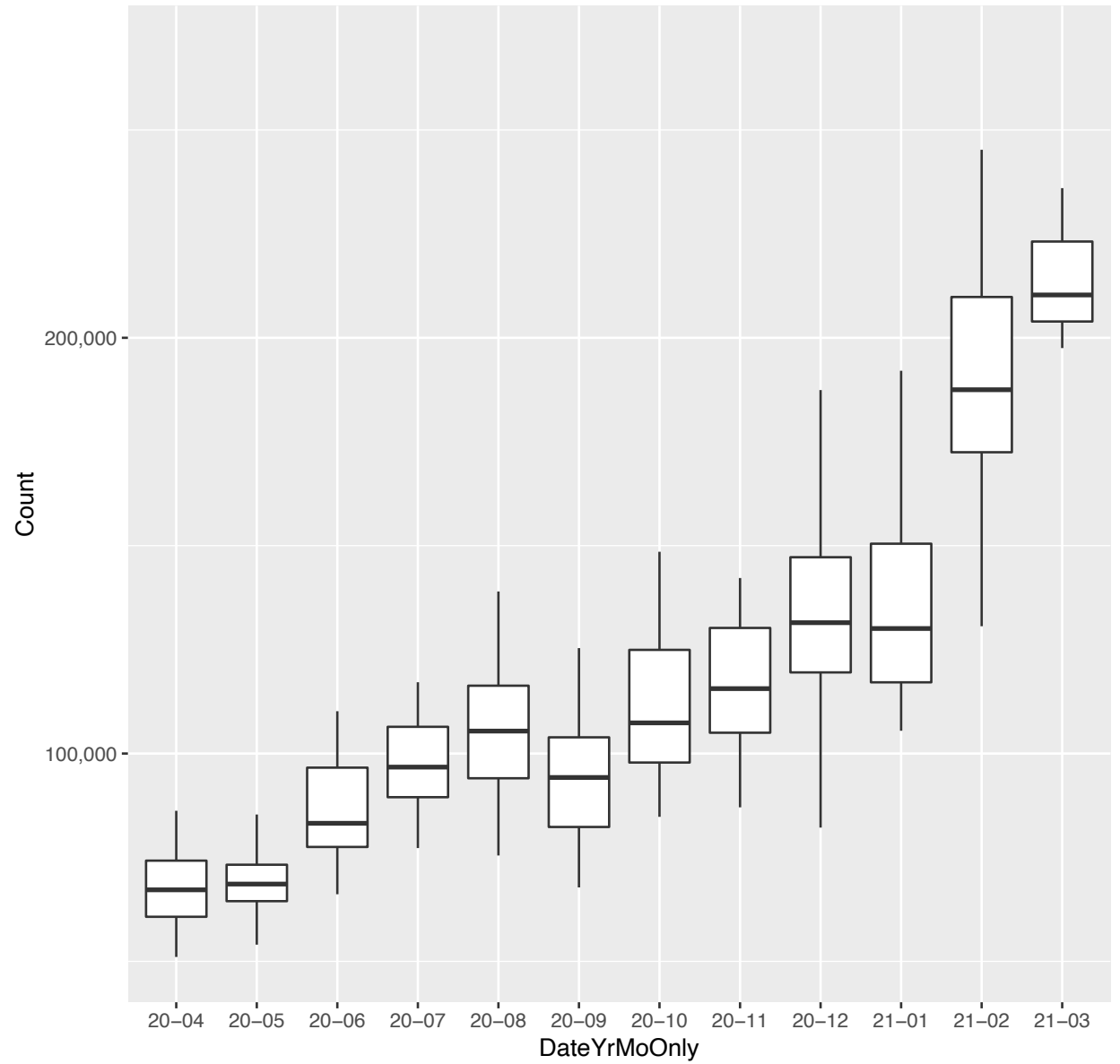
30. ihg.com:



*. ihg.com (day-by-day counts and 28 day moving average)

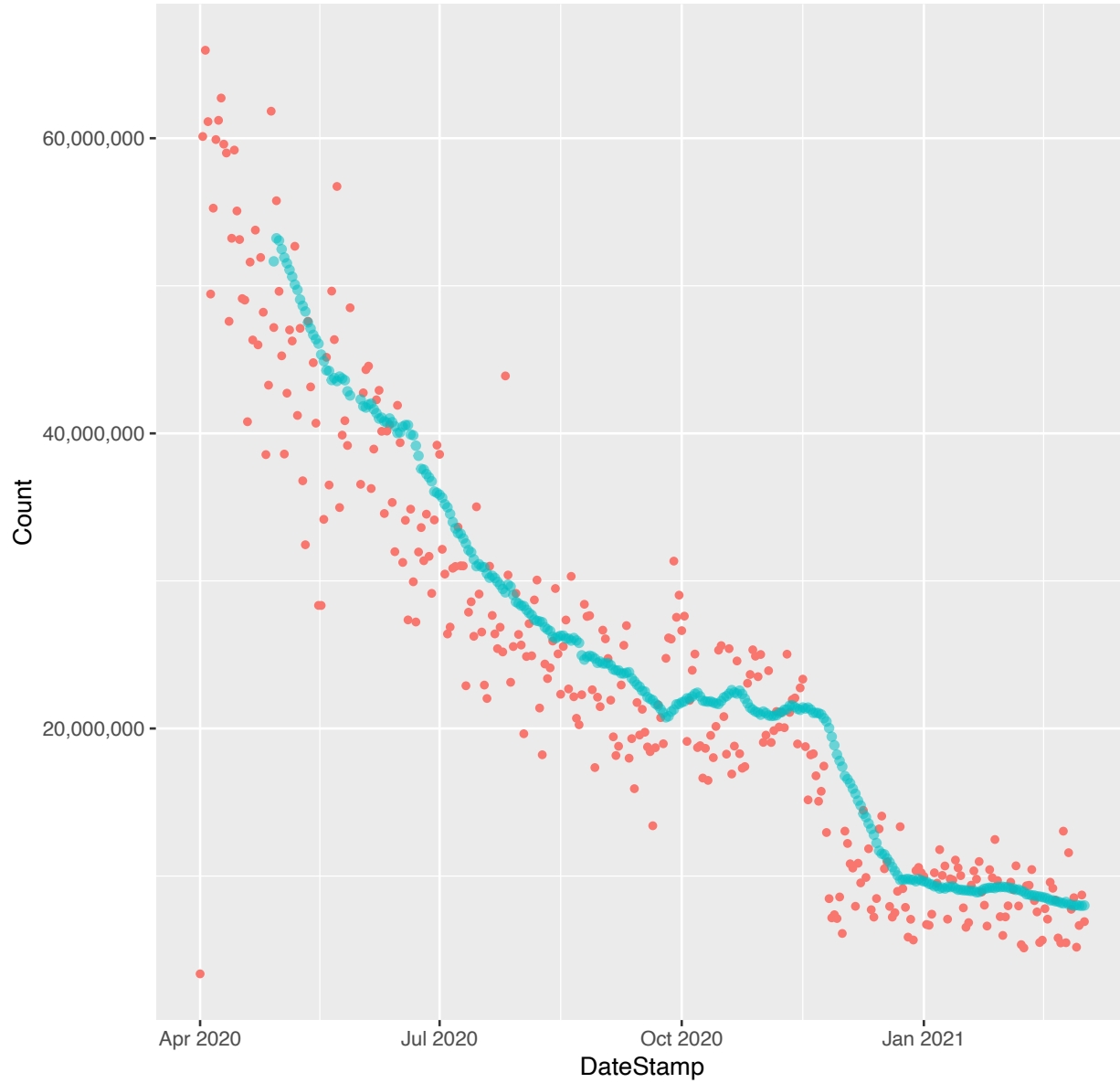


*. ihg.com (monthly boxplots (outliers trimmed))

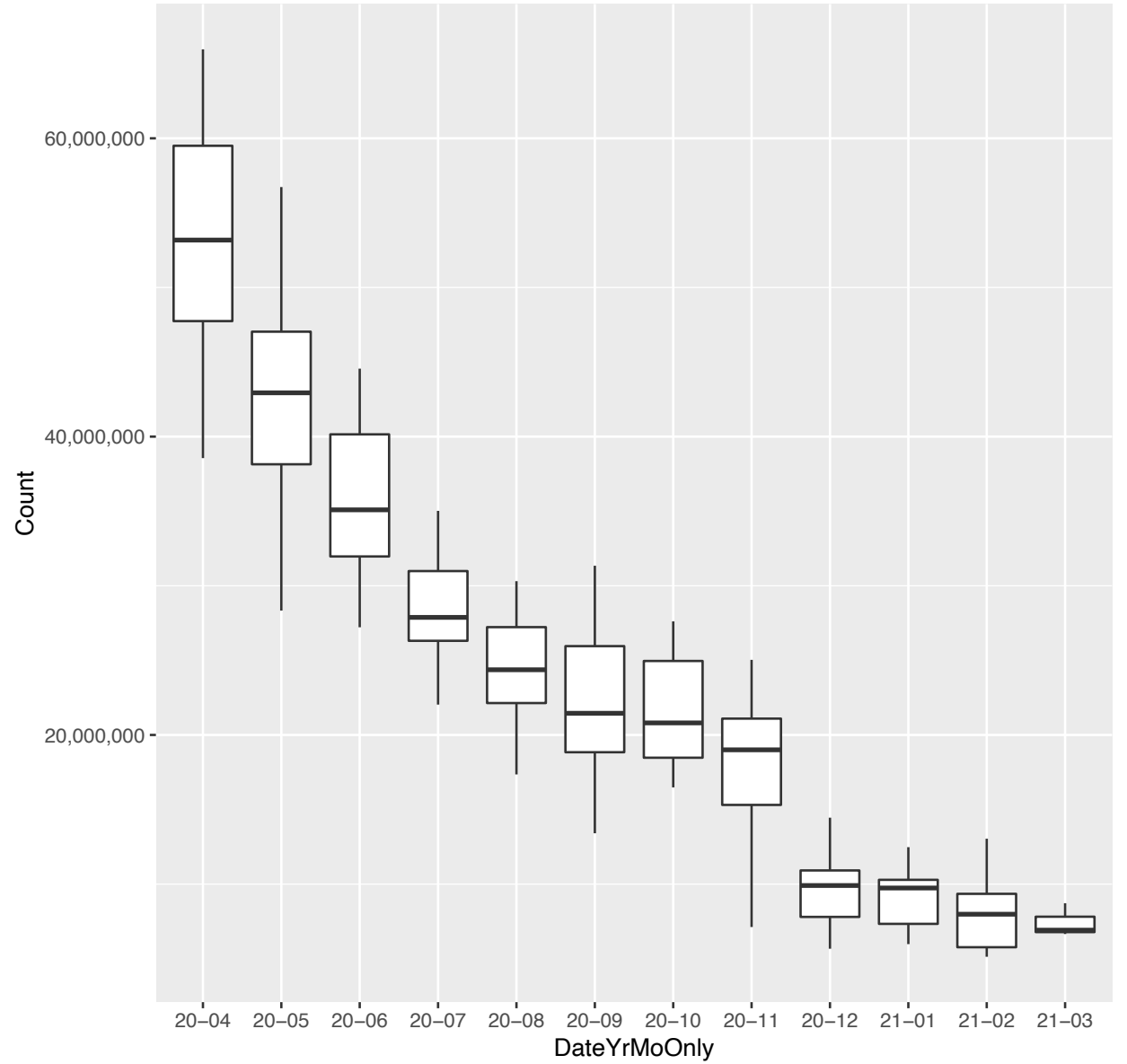




*. marriott.com (day-by-day counts and 28 day moving average)



*. marriott.com (monthly boxplots (outliers trimmed))



f) Package Transport

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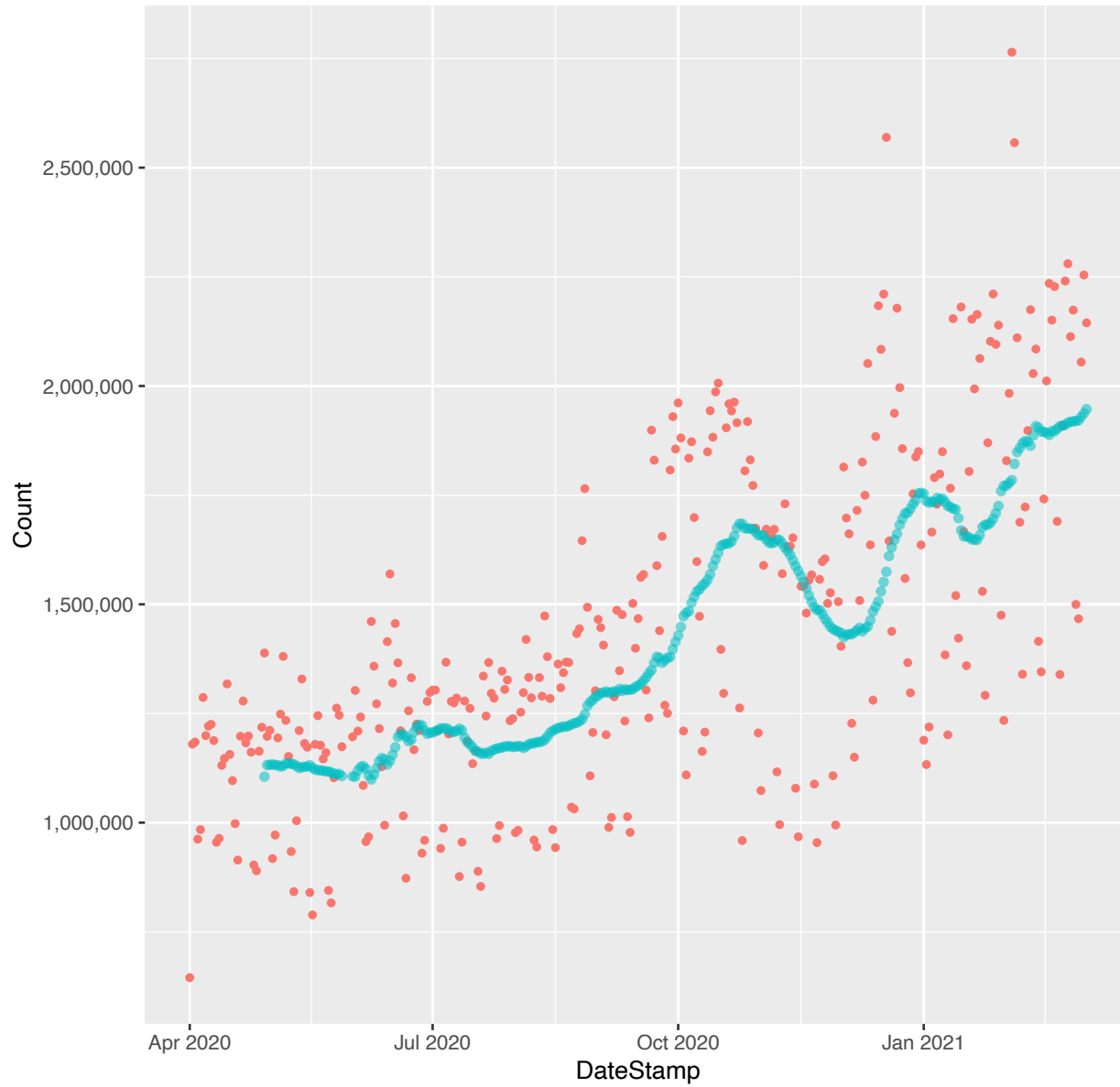
32	*.dhl.com		↗	M
33	*.fedex.com		↘	MM
34	*.ups.com	✱	~	M
35	*.usps.com	✱	↗	

32. dhl.com:

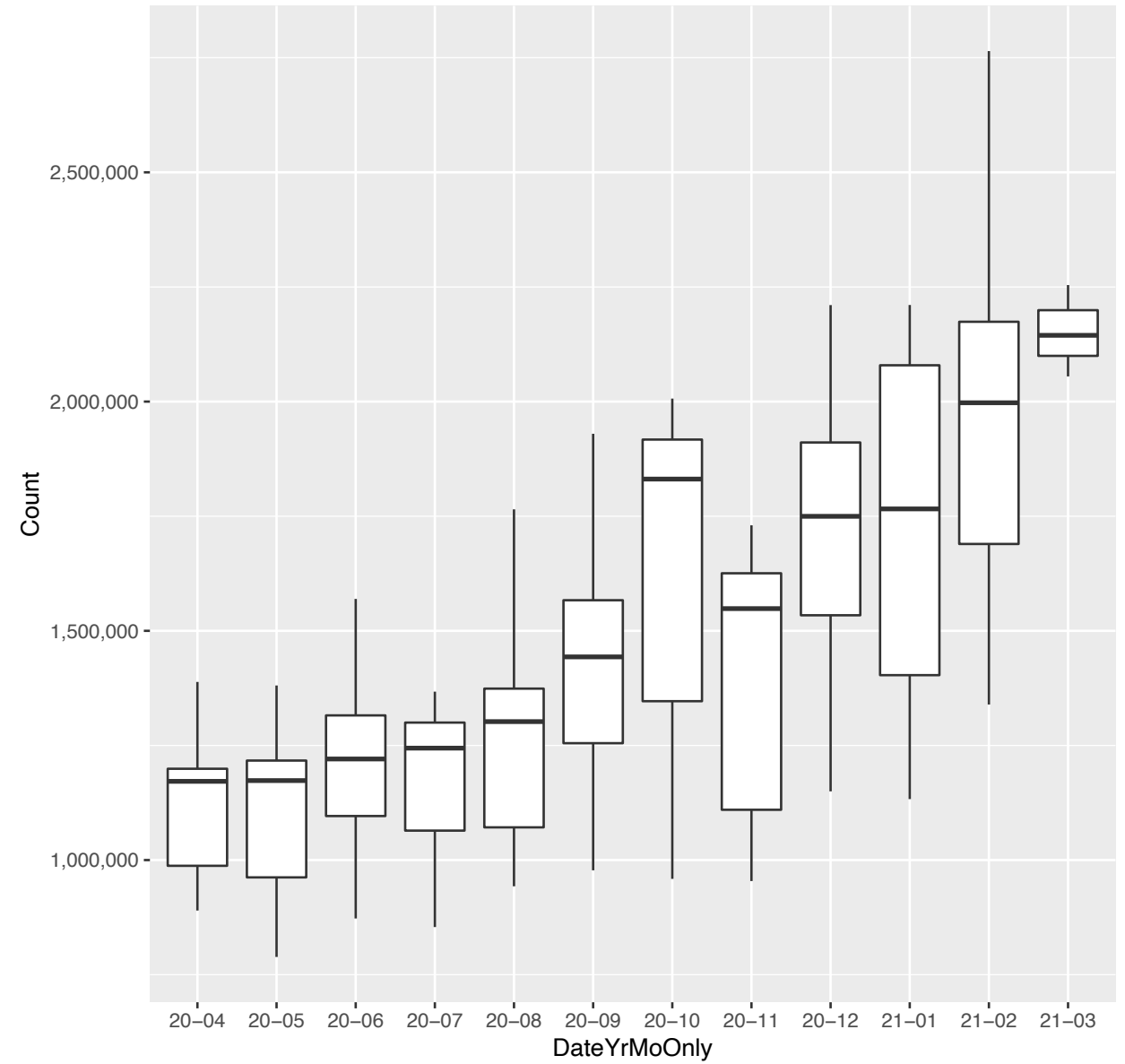


M

*. dhl.com (day-by-day counts and 28 day moving average)



*. dhl.com (monthly boxplots (outliers trimmed))

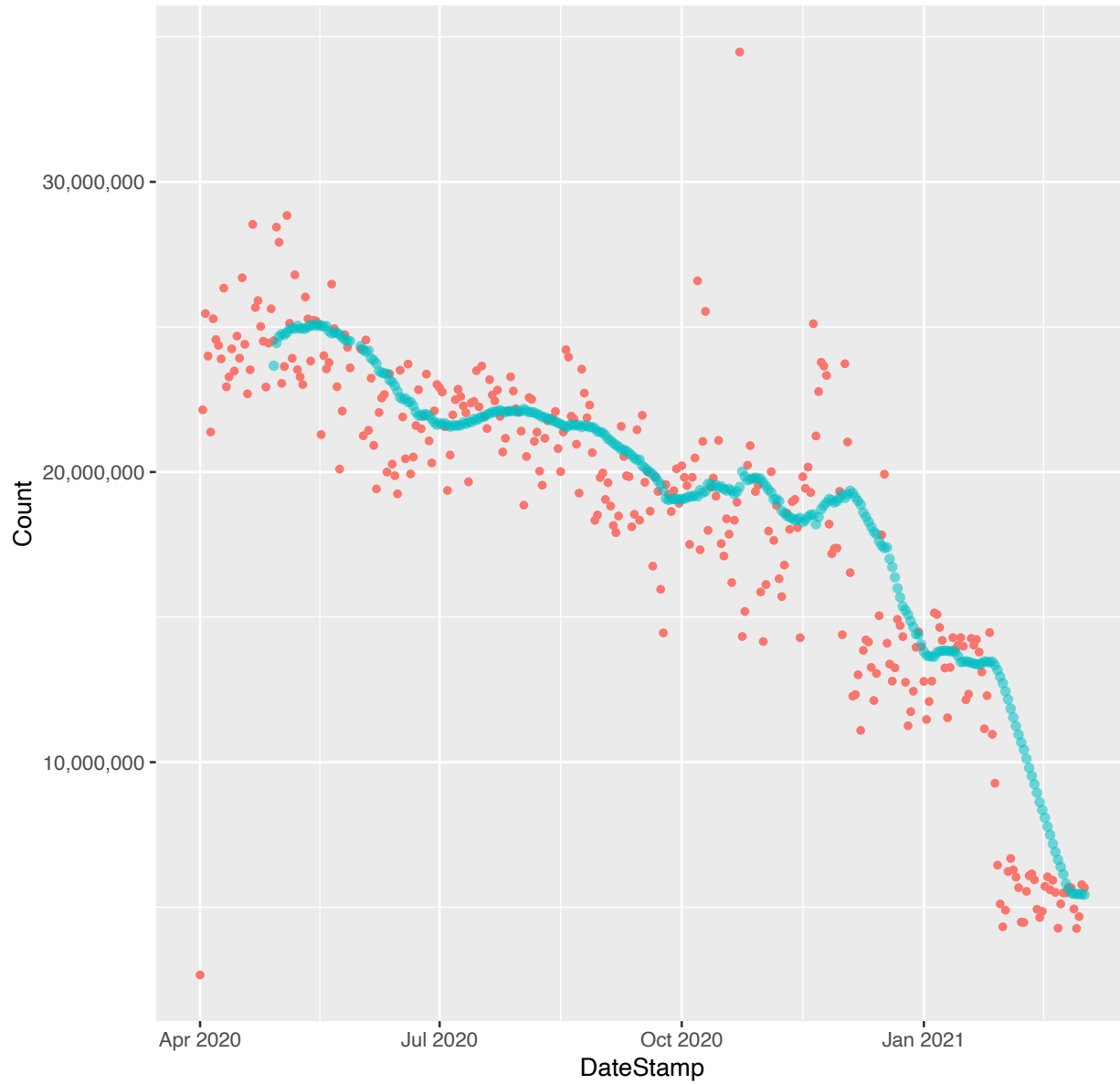


33. fedex.com:

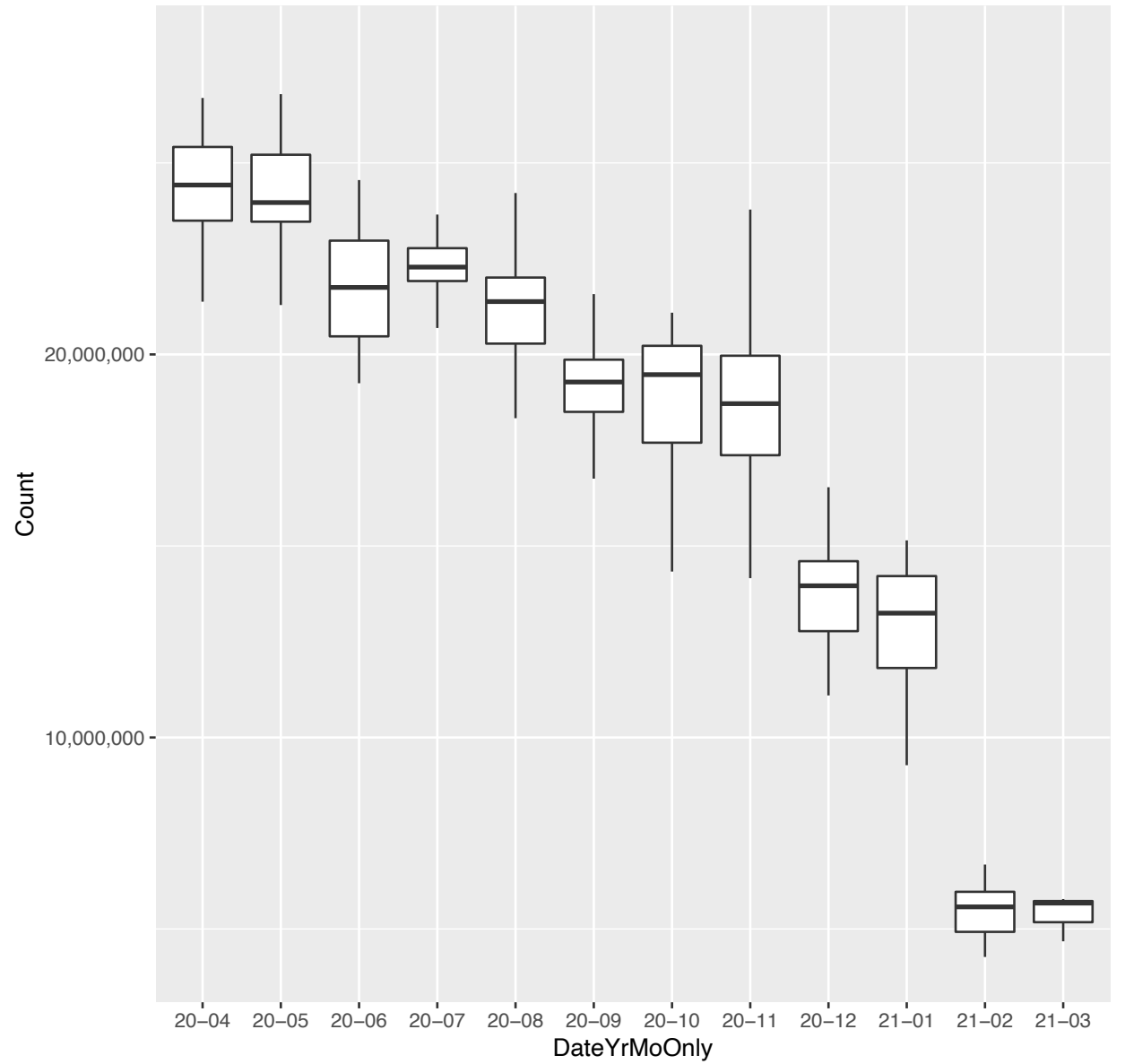


MM

*. fedex.com (day-by-day counts and 28 day moving average)



*. fedex.com (monthly boxplots (outliers trimmed))

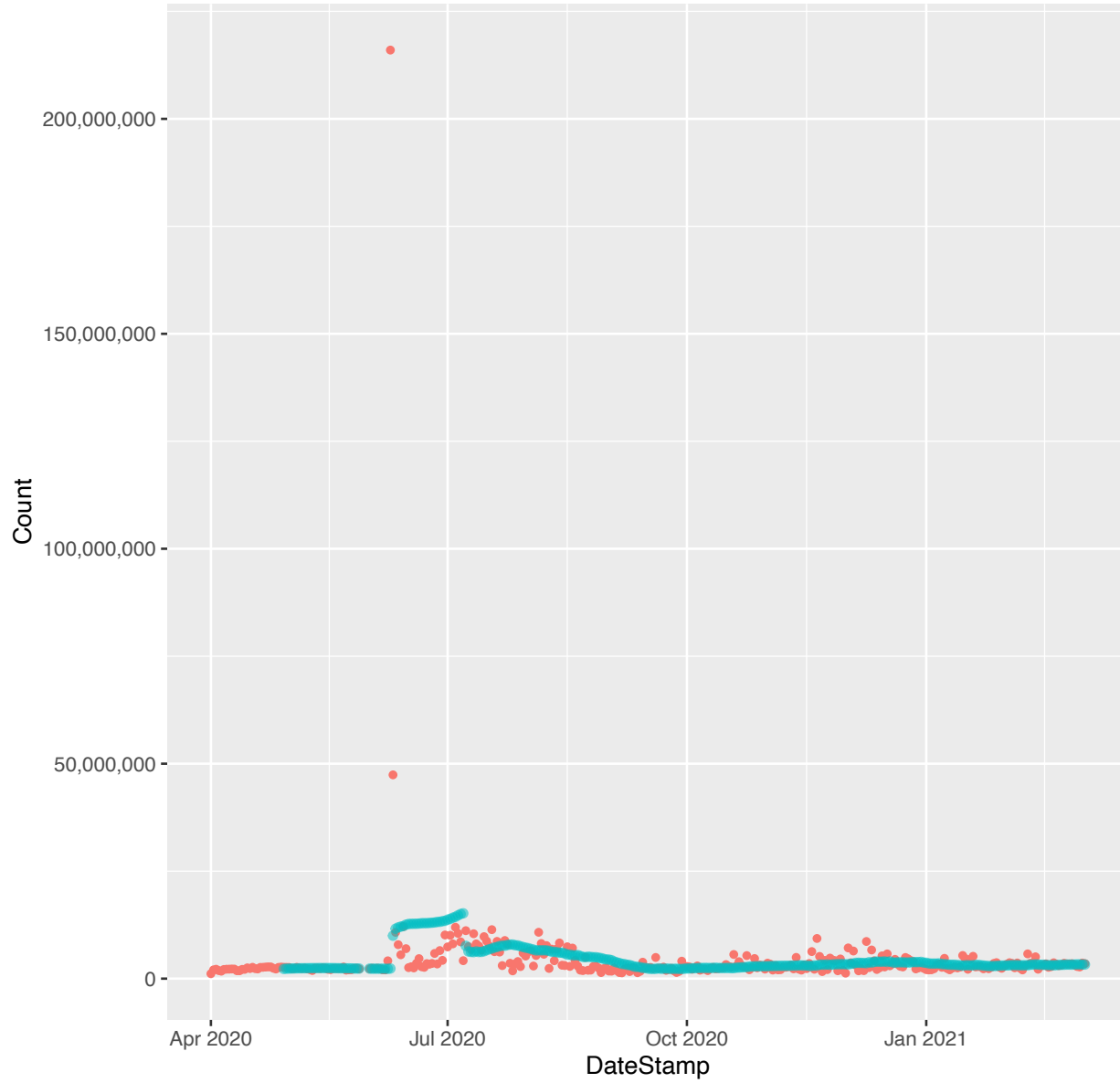


34. ups.com:

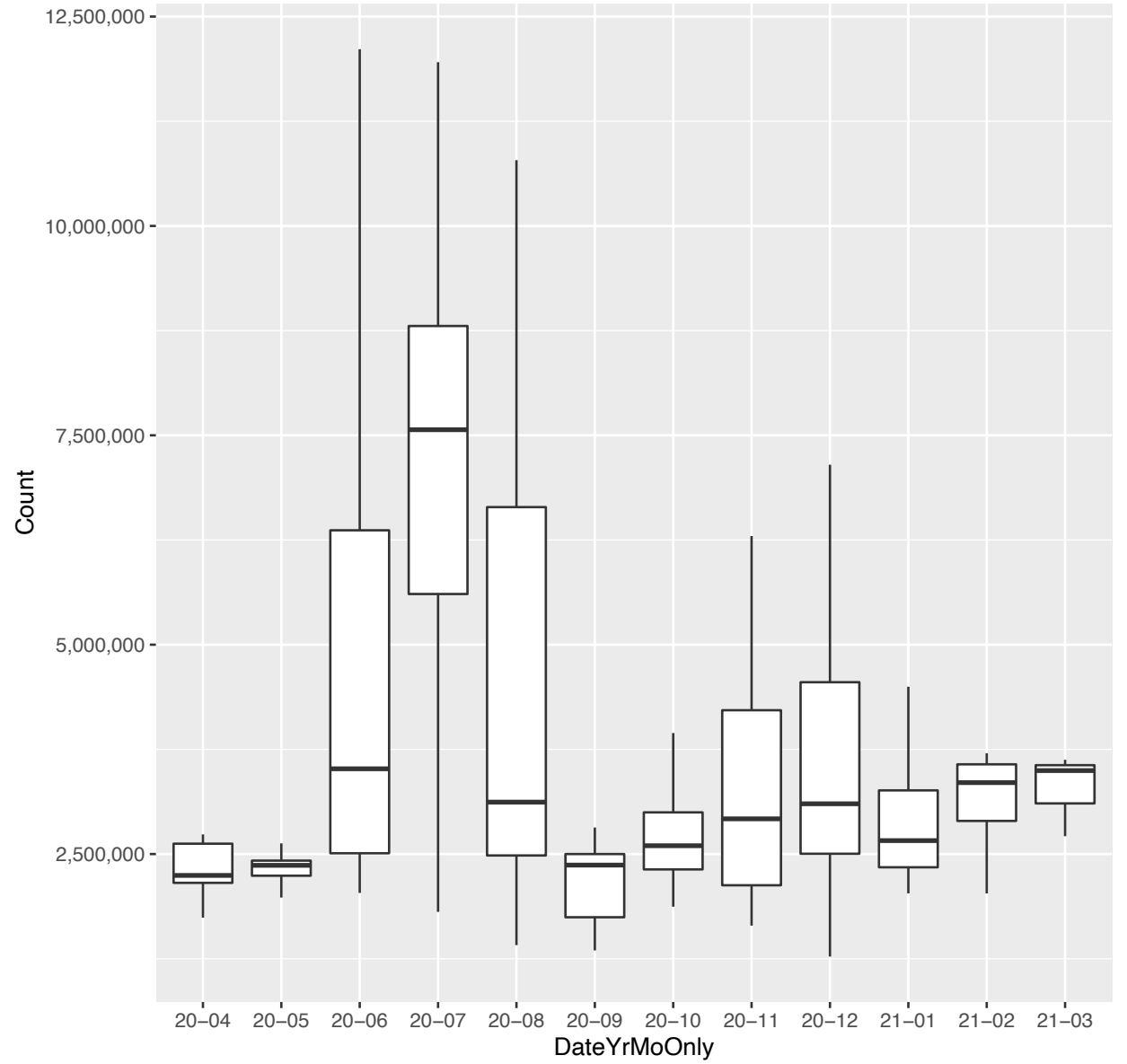


M

*. ups.com (day-by-day counts and 28 day moving average)



*. ups.com (monthly boxplots (outliers trimmed))

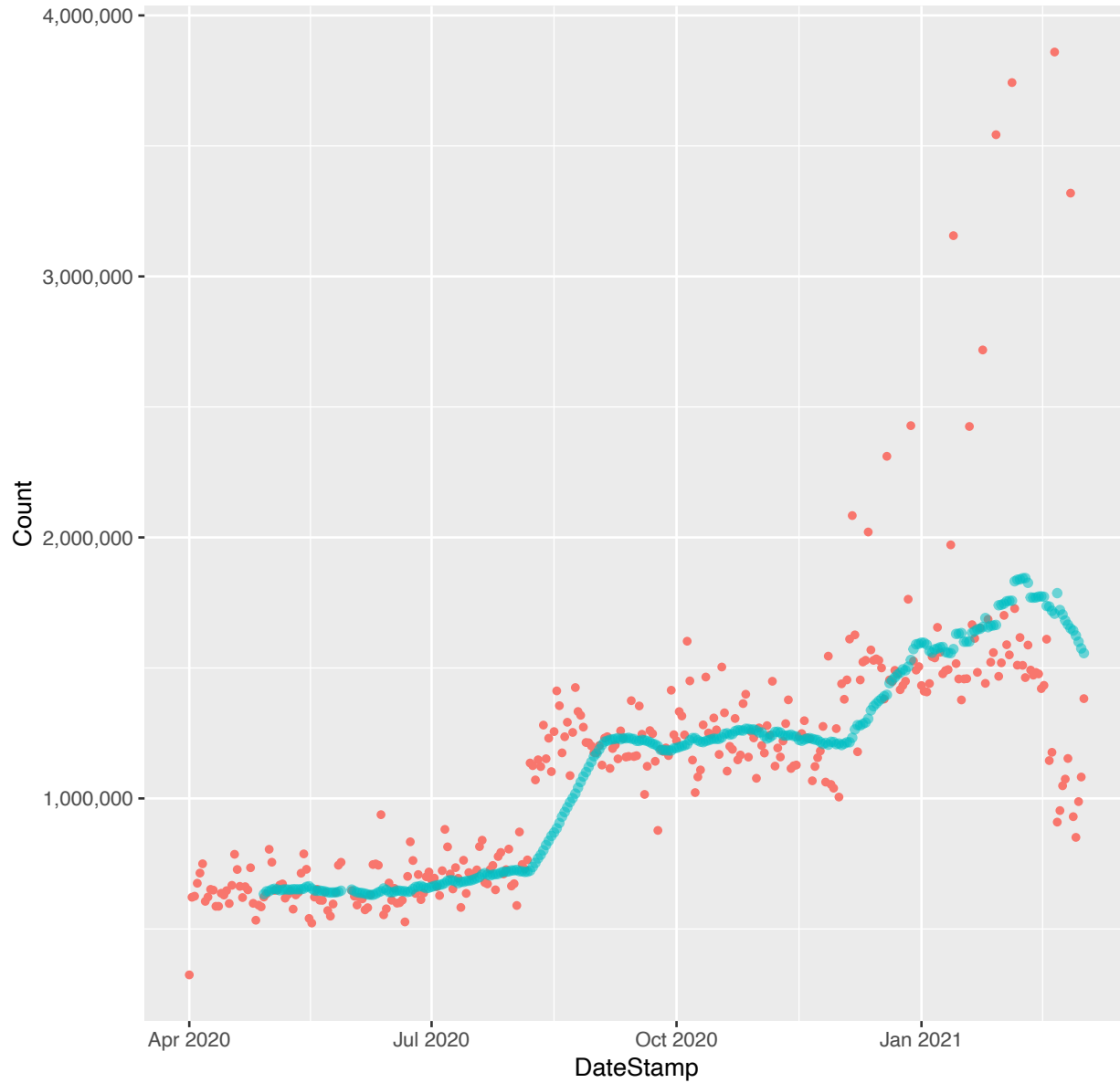


35. usps.com:

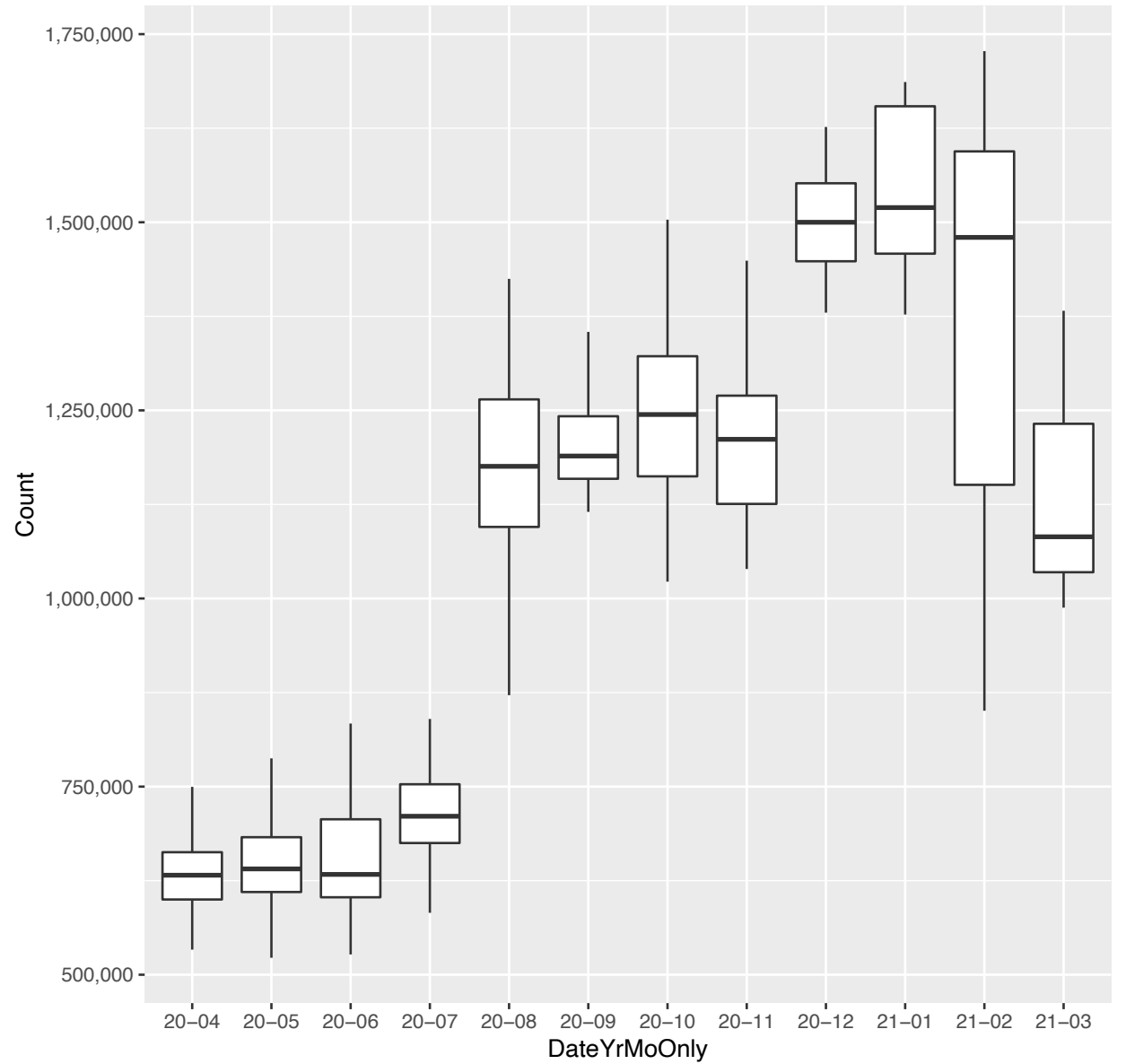


M

*. usps.com (day-by-day counts and 28 day moving average)



*. usps.com (monthly boxplots (outliers trimmed))



g) Railroads

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36 *.bnsf.com

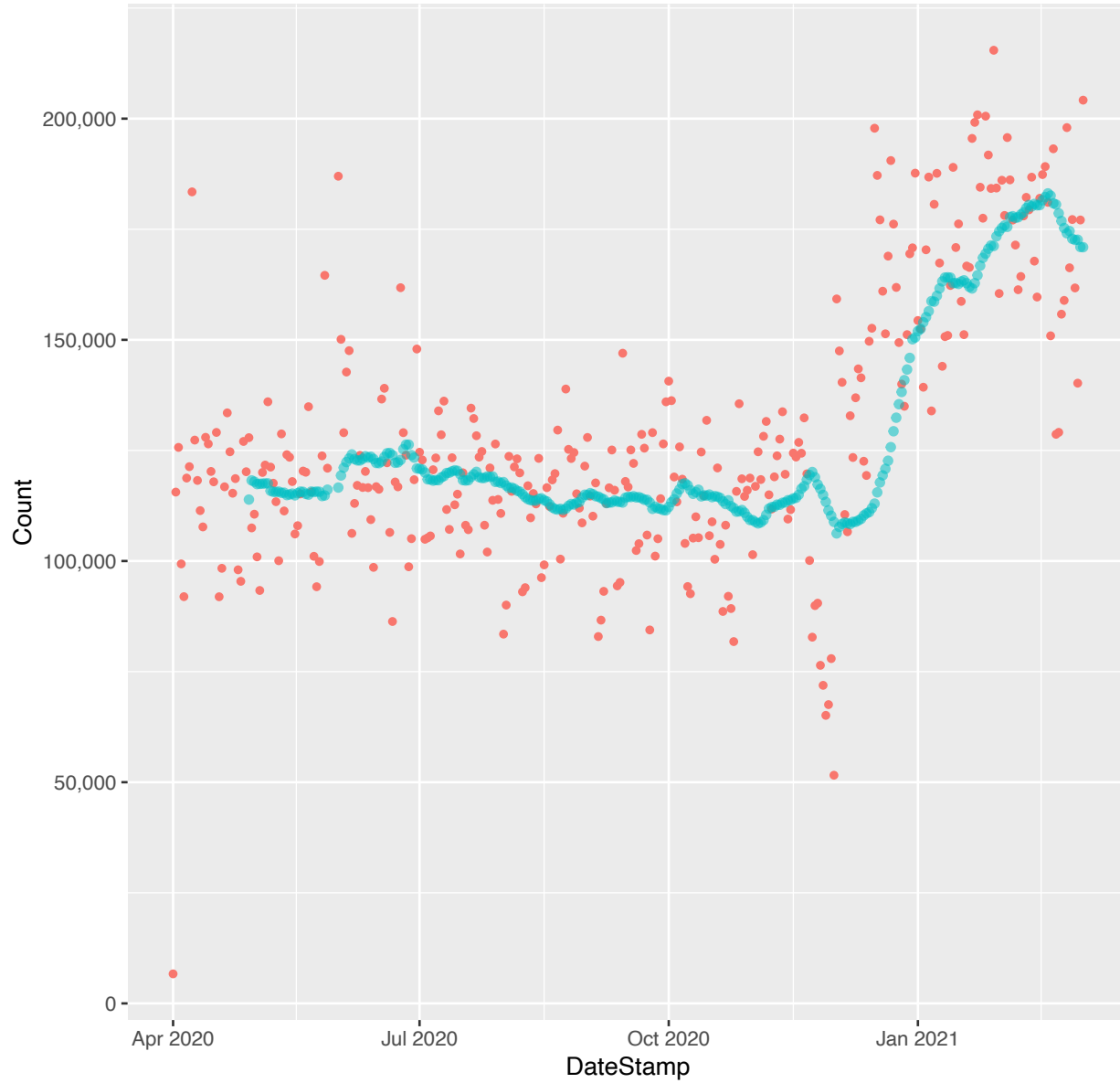


37 *.nscorp.com

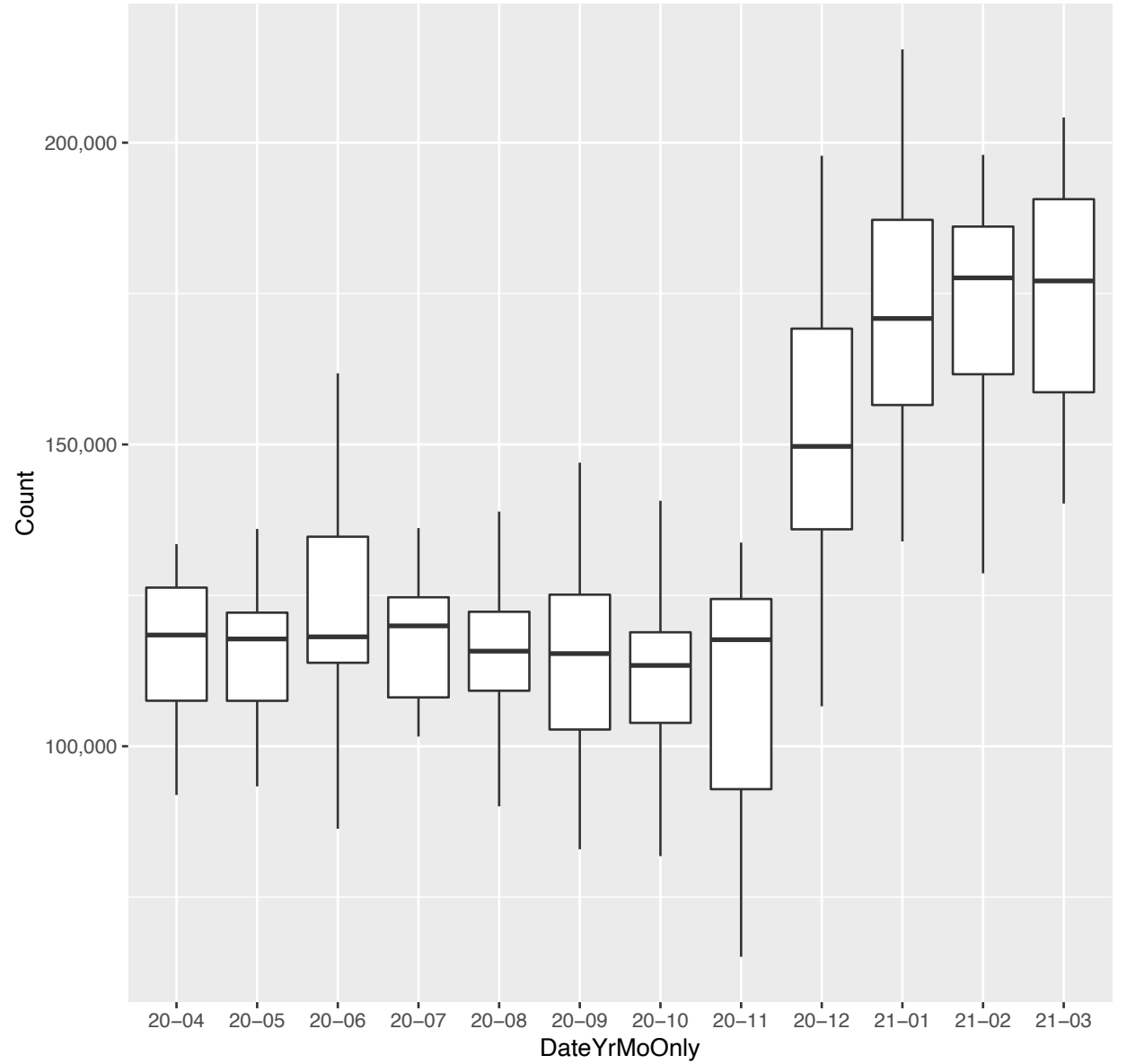
∪ shaped (ending lower)

36. bnsf.com: ↗

*. bnsf.com (day-by-day counts and 28 day moving average)



*. bnsf.com (monthly boxplots (outliers trimmed))

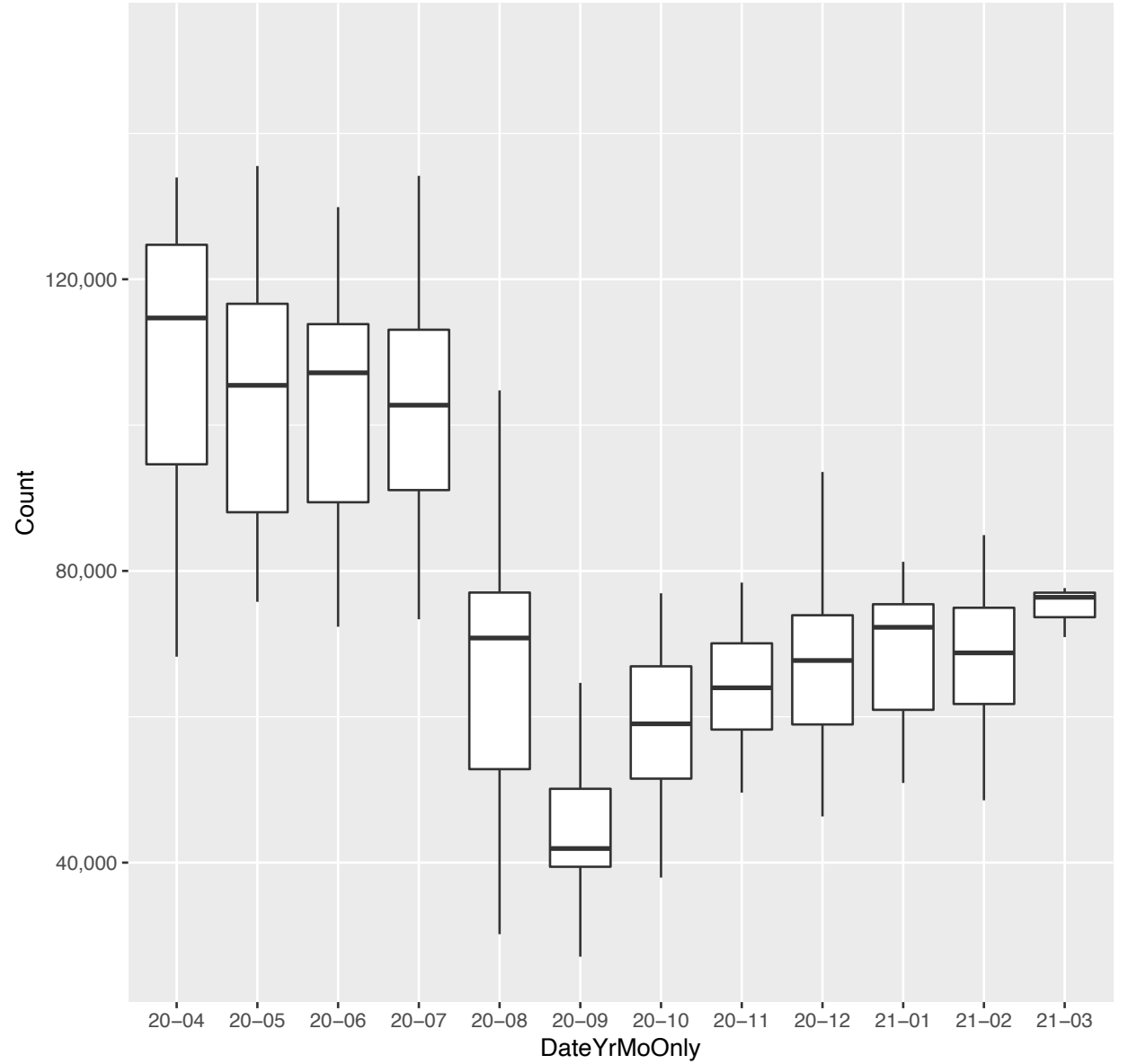


37. nscorp.com: ○ shaped (ending lower)

*. nscorp.com (day-by-day counts and 28 day moving average)



*. nscorp.com (monthly boxplots (outliers trimmed))



h) Ride Sharing

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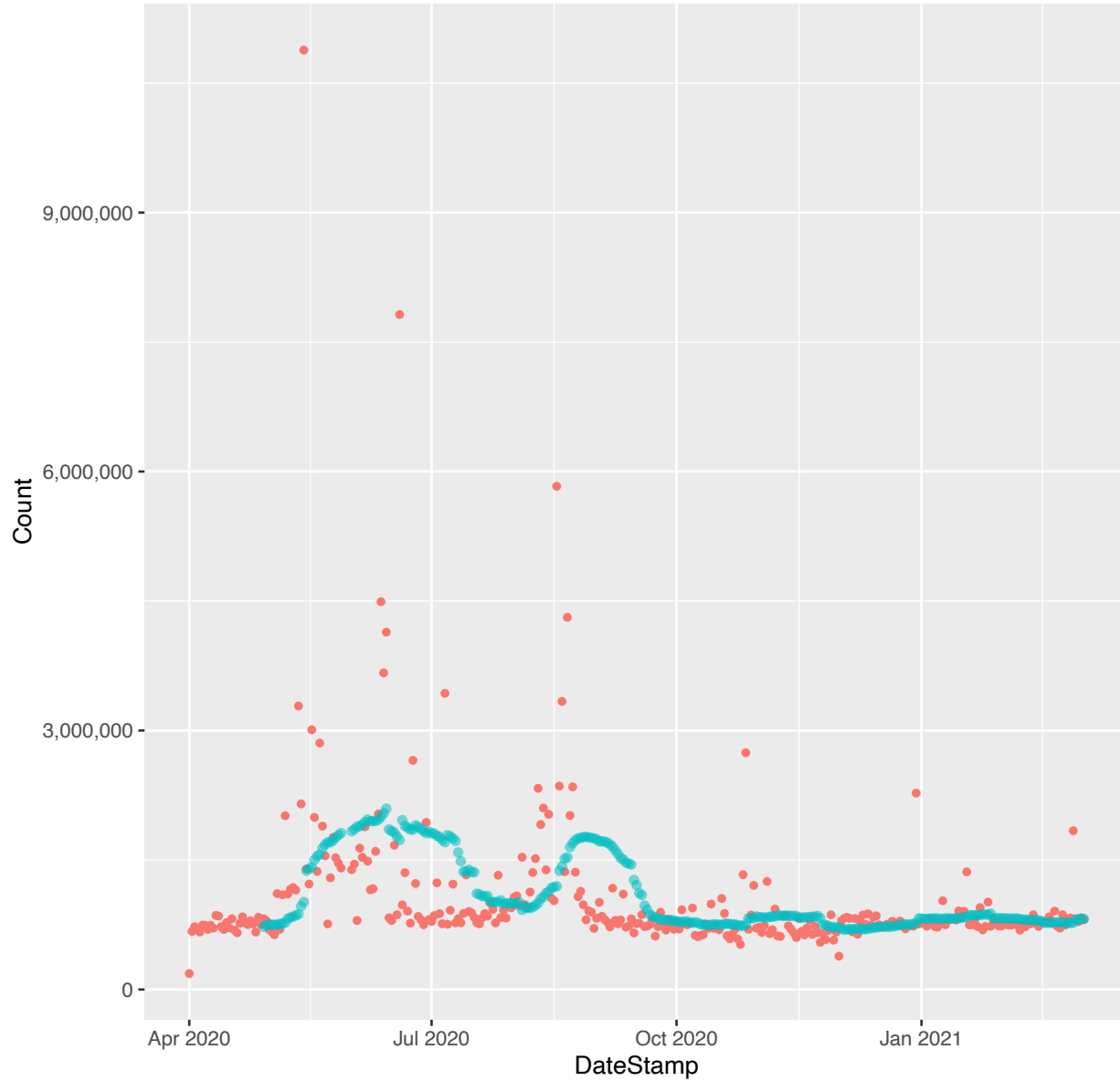
- 38 *.lyft.com * ~ M
- 39 *.uber.com * ~ M

25. lyft.com:

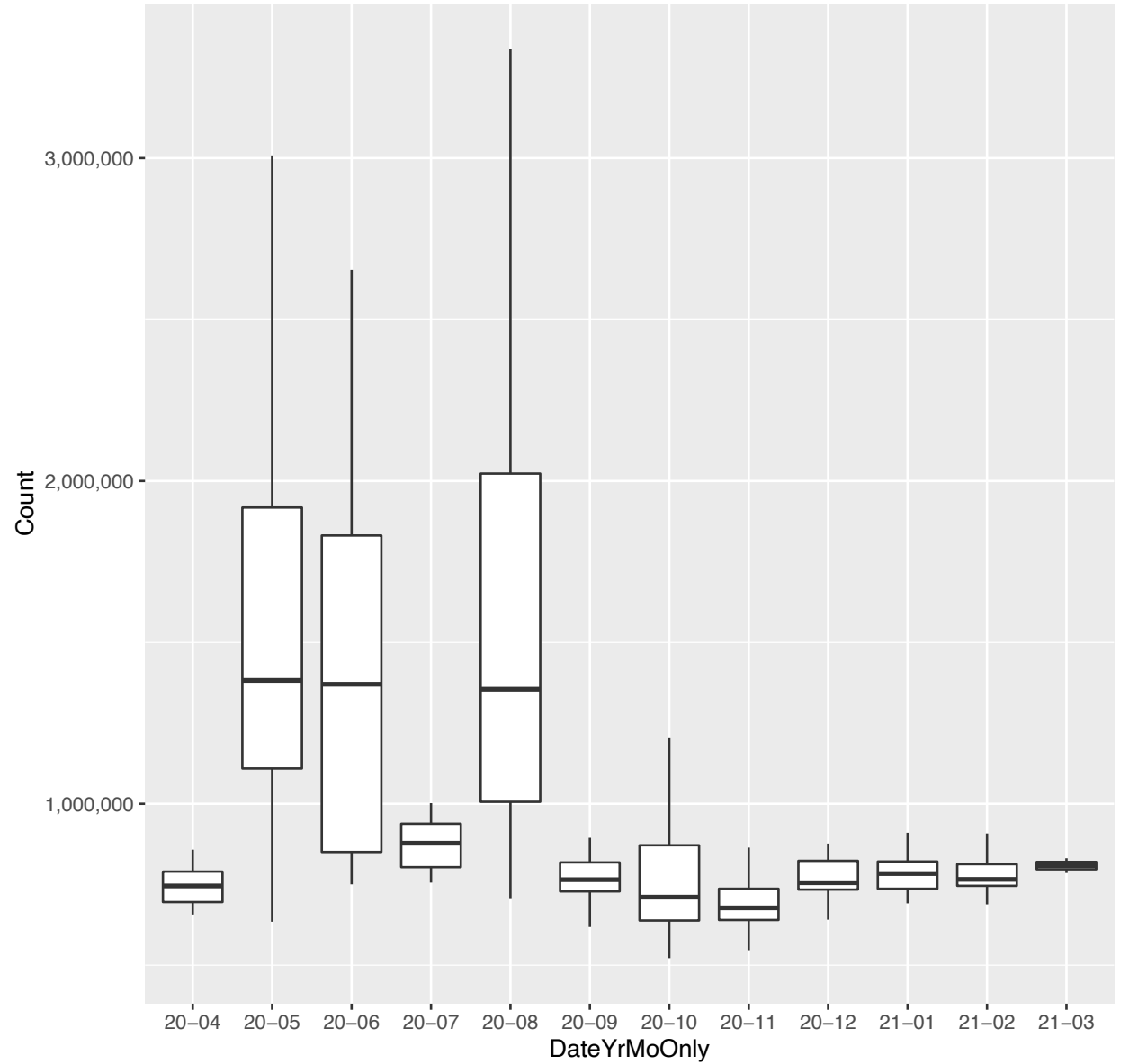


M

*. lyft.com (day-by-day counts and 28 day moving average)



*. lyft.com (monthly boxplots (outliers trimmed))

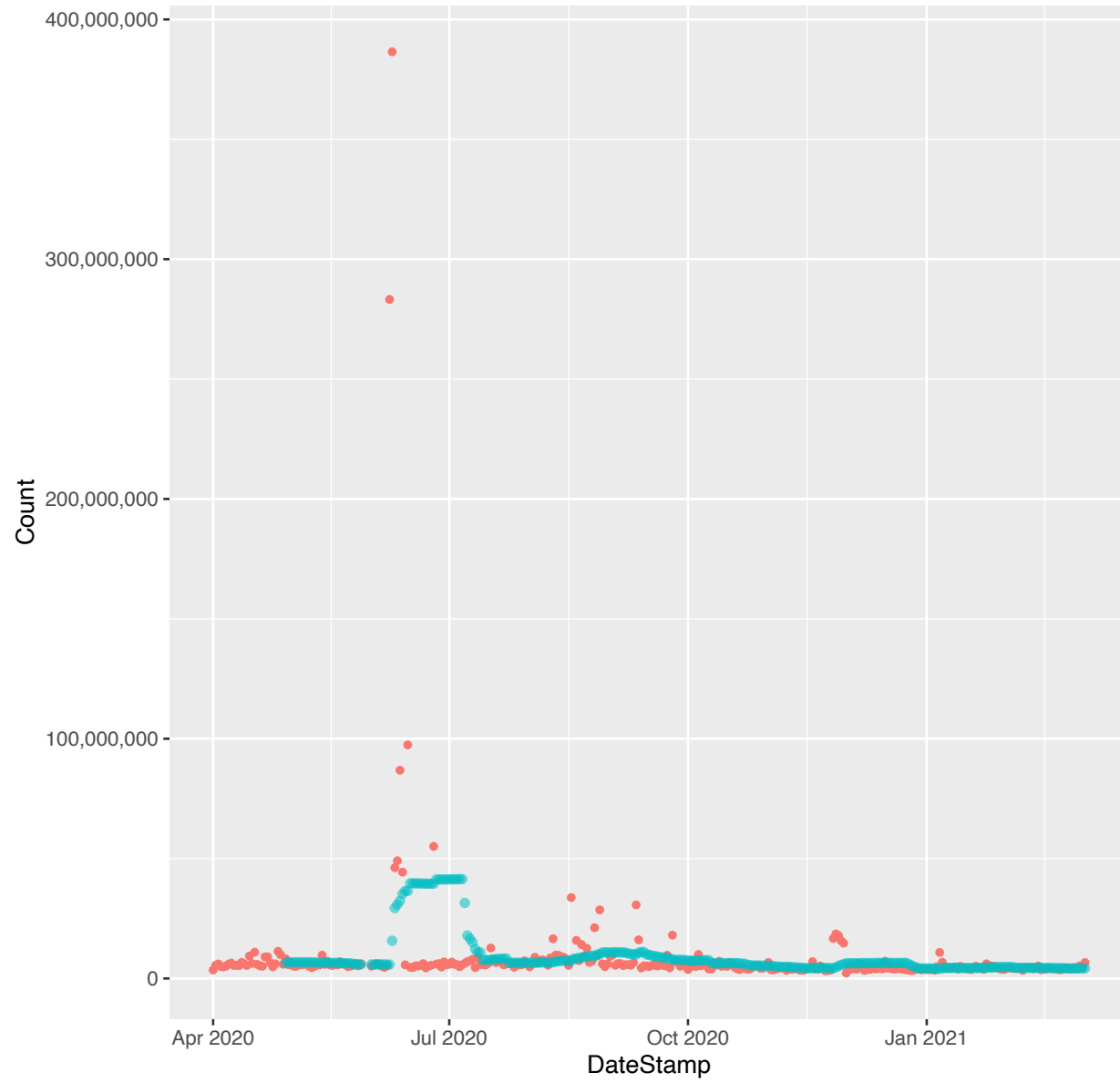


35. uber.com:

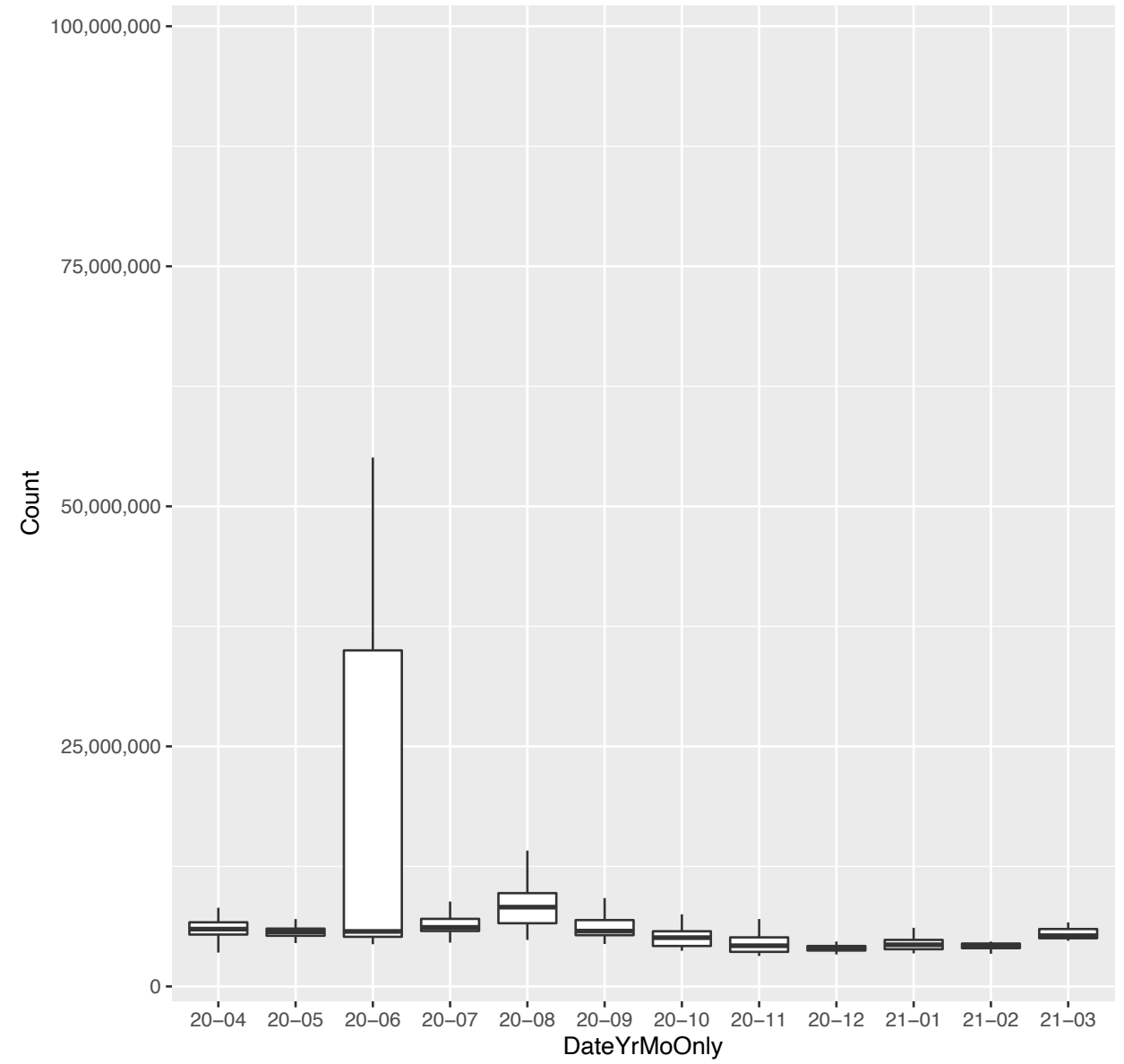


M

*. uber.com (day-by-day counts and 28 day moving average)



*. uber.com (monthly boxplots (outliers trimmed))



XIV. University Sites

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- a) [American](#)
- b) [Australian](#)
- c) [British](#)
- d) [Canada](#)
- e) [China](#)
- f) [Germany](#)
- g) [Hong Kong](#)
- h) [Japan](#)
- i) [Singapore](#)
- j) [Switzerland](#)

a) American Universities

[\[back to University Sites\]](#)

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1	*.arizona.edu	~	M	26	*.mit.edu	☀	~	M	52	*.uiowa.edu	☀	~	
2	*.asu.edu	∪ shaped (ending high)	M	27	*.msu.edu	☀	L shaped		53	*.uiuc.edu		↘	
3	*.berkeley.edu	☀	↘	28	*.ncsu.edu		L shaped		54	*.umd.edu	☀	L shaped	
4	*.brown.edu	~		29	*.nd.edu	☀	∪ shaped		55	*.umich.edu		L shaped	M
5	*.bu.edu	☀	~	30	*.northwestern.edu		∪ shaped		56	*.umn.edu	☀	~	
6	*.byu.edu		L shaped	31	*.nyu.edu	☀	~		57	*.unc.edu		L shaped	
7	*.caltech.edu		∪ shaped	32	*.olemiss.edu	☀	L shaped		58	*.uoregon.edu		↗	
8	*.carleton.edu		∪ shaped	33	*.oregonstate.edu	☀	∪ shaped		59	*.upenn.edu	☀	~	
9	*.clermson.edu		↘	M	34	*.osu.edu		L shaped	60	*.usc.edu	☀	∪ shaped (ending higher)	
10	*.cmu.edu	~		35	*.pitt.edu		L shaped		61	*.utexas.edu	☀	L shaped	
11	*.colorado.edu		L shaped	36	*.princeton.edu		~		62	*.vanderbilt.edu	☀	~	
12	*.columbia.edu		∪ shaped	37	*.psu.edu		~		63	*.virginia.edu		L shaped	
13	*.cornell.edu		∪ shaped (ending higher)	38	*.reed.edu		~		64	*.vt.edu	☀	∪ shaped	
14	*.dartmouth.edu		~	39	*.rice.edu	☀	~		65	*.washington.edu		∪ shaped (ending lower)	M
15	*.duke.edu	☀	~	M	40	*.rpi.edu		L shaped					
16	*.emory.edu	☀	~	41	*.stanford.edu	☀	∪ shaped	M	66	*.wesleyan.edu		L shaped	
17	*.fsu.edu	☀	~	42	*.tamu.edu	☀	L shaped		67	*.wfu.edu	☀	L shaped	
18	*.gatech.edu	☀	∪ shaped	43	*.tufts.edu		∪ shaped		68	*.whitman.edu		L shaped	
19	*.georgetown.edu	☀	~	44	*.ua.edu	☀	L shaped		69	*.williams.edu	☀	L shaped	
20	*.gwu.edu	☀	∪ shaped	45	*.uaf.edu		L shaped		70	*.wm.edu		∪ shaped	
21	*.harvard.edu	☀	∪ shaped (ending higher)	M	46	*.uchicago.edu		~	71	*.wustl.edu		∪ shaped	
22	*.hmc.edu		~	47	*.ucla.edu	☀	∩	M	72	*.wisc.edu		L shaped	
23	*.indiana.edu	☀	~	48	*.ucsb.edu		∪ shaped		73	*.yale.edu	☀	∪ shaped (ending higher)	
24	*.jhu.edu		∪ shaped	49	*.ucsd.edu	☀	∪ shaped	M					
25	*.liberty.edu		↗	50	*.ufl.edu	☀	~	M					
				51	*.uga.edu		L shaped						

1. arizona.edu:

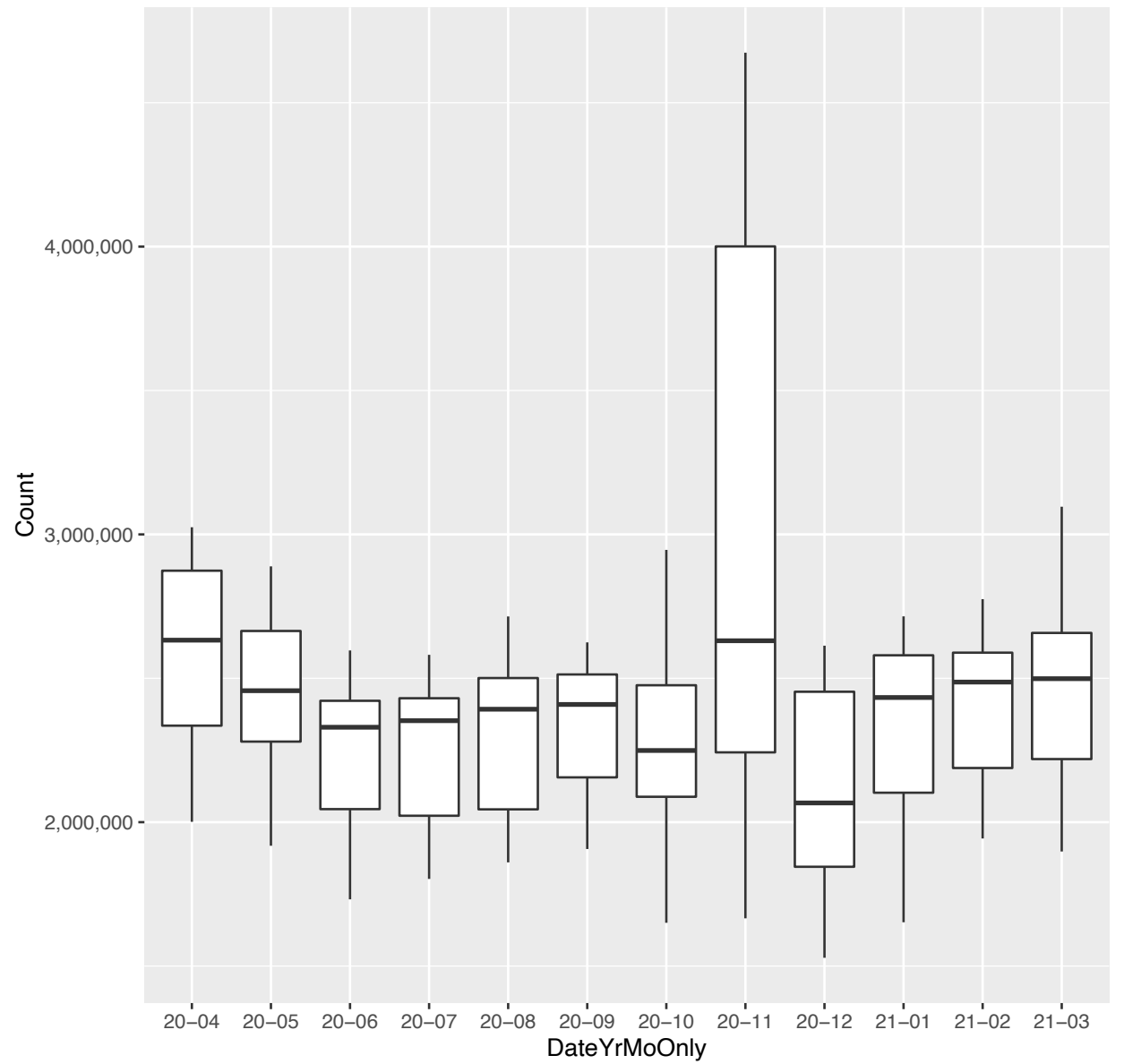
~

M

*. arizona.edu (day-by-day counts and 28 day moving average)



*. arizona.edu (monthly boxplots (outliers trimmed))



2. asu.edu:

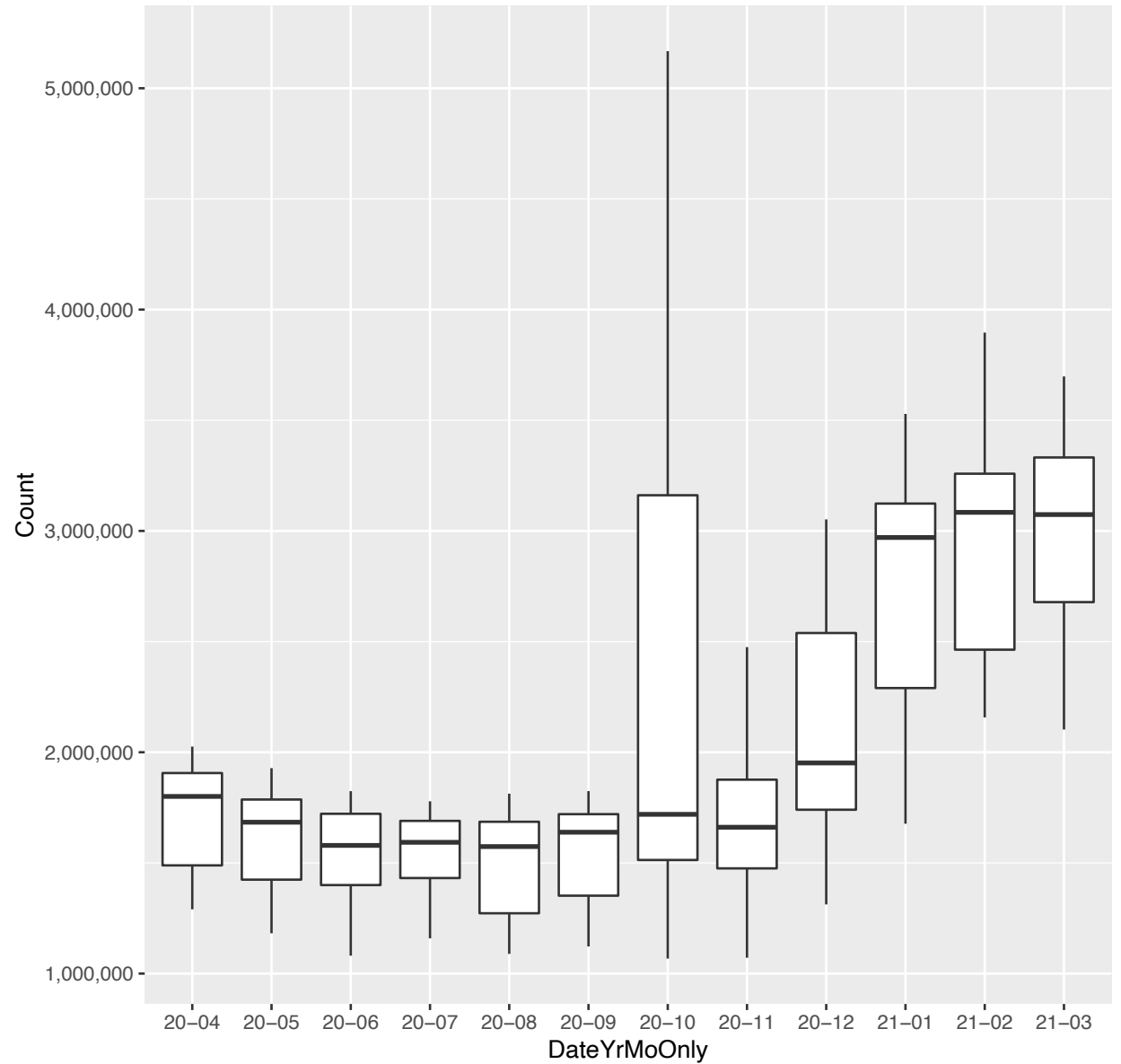
U shaped (ending higher)

M

*. asu.edu (day-by-day counts and 28 day moving average)



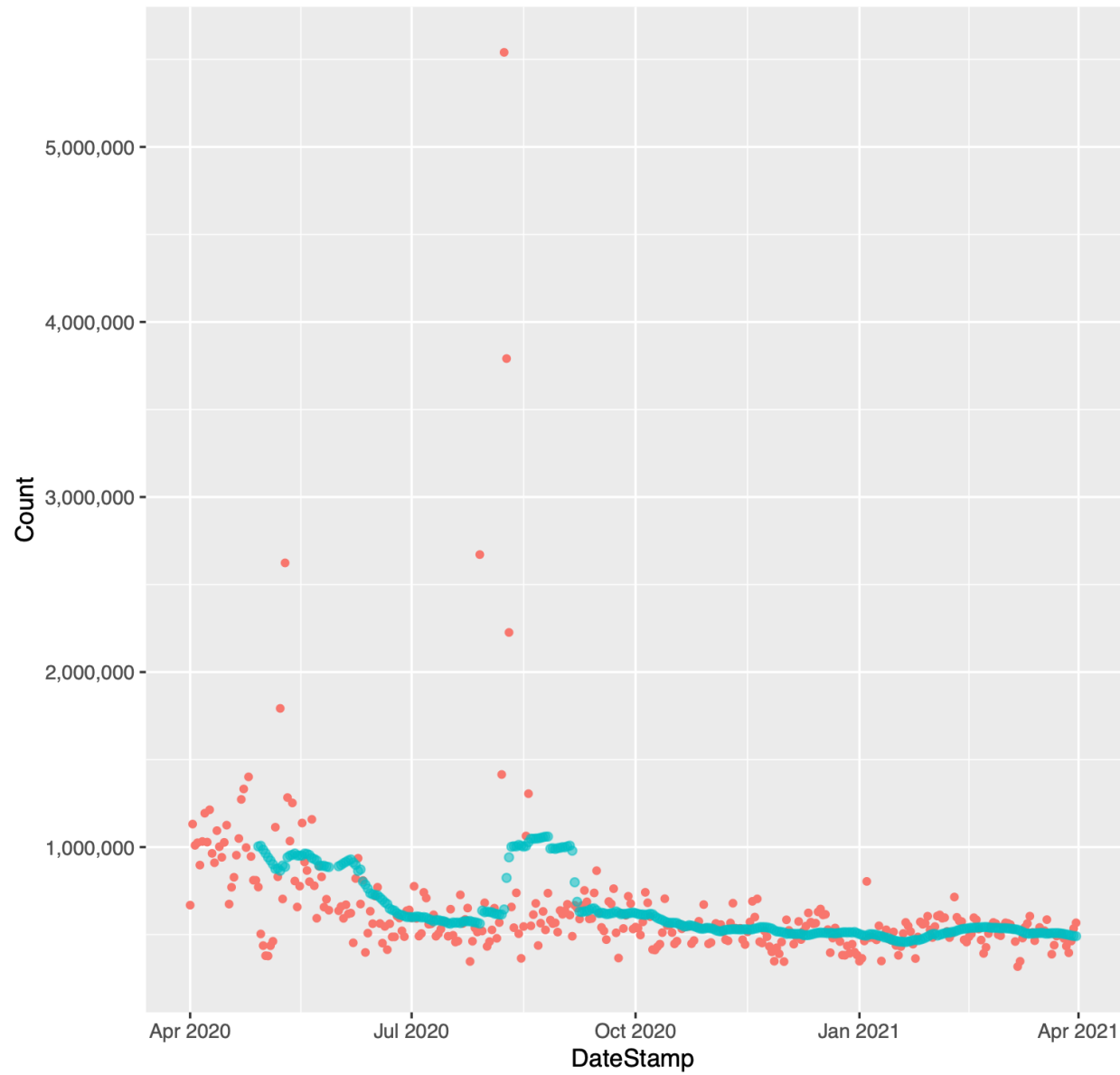
*. asu.edu (monthly boxplots (outliers trimmed))



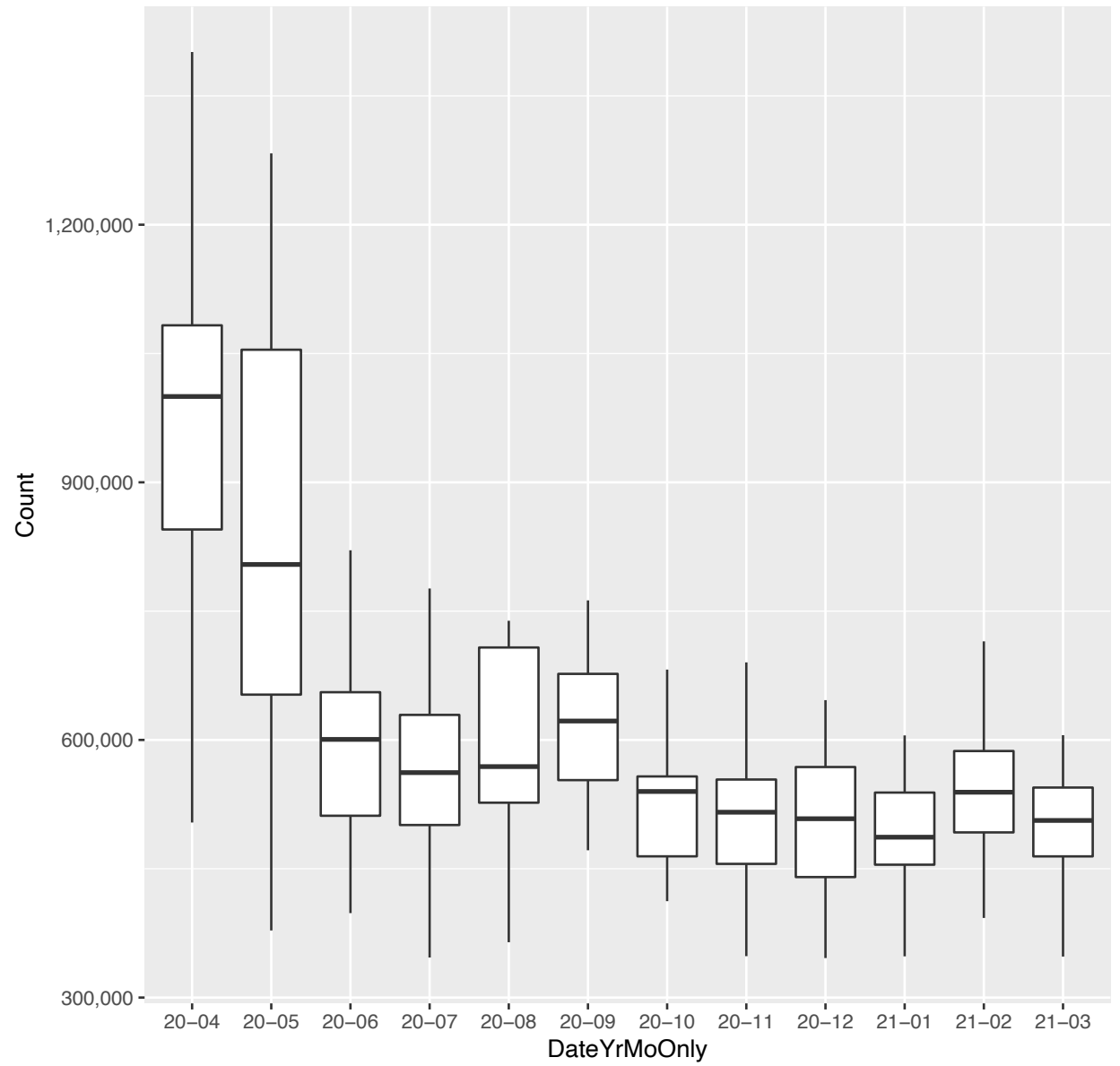
3. berkeley.edu:



*. berkeley.edu (day-by-day counts and 28 day moving average)



*. berkeley.edu (monthly boxplots (outliers trimmed))



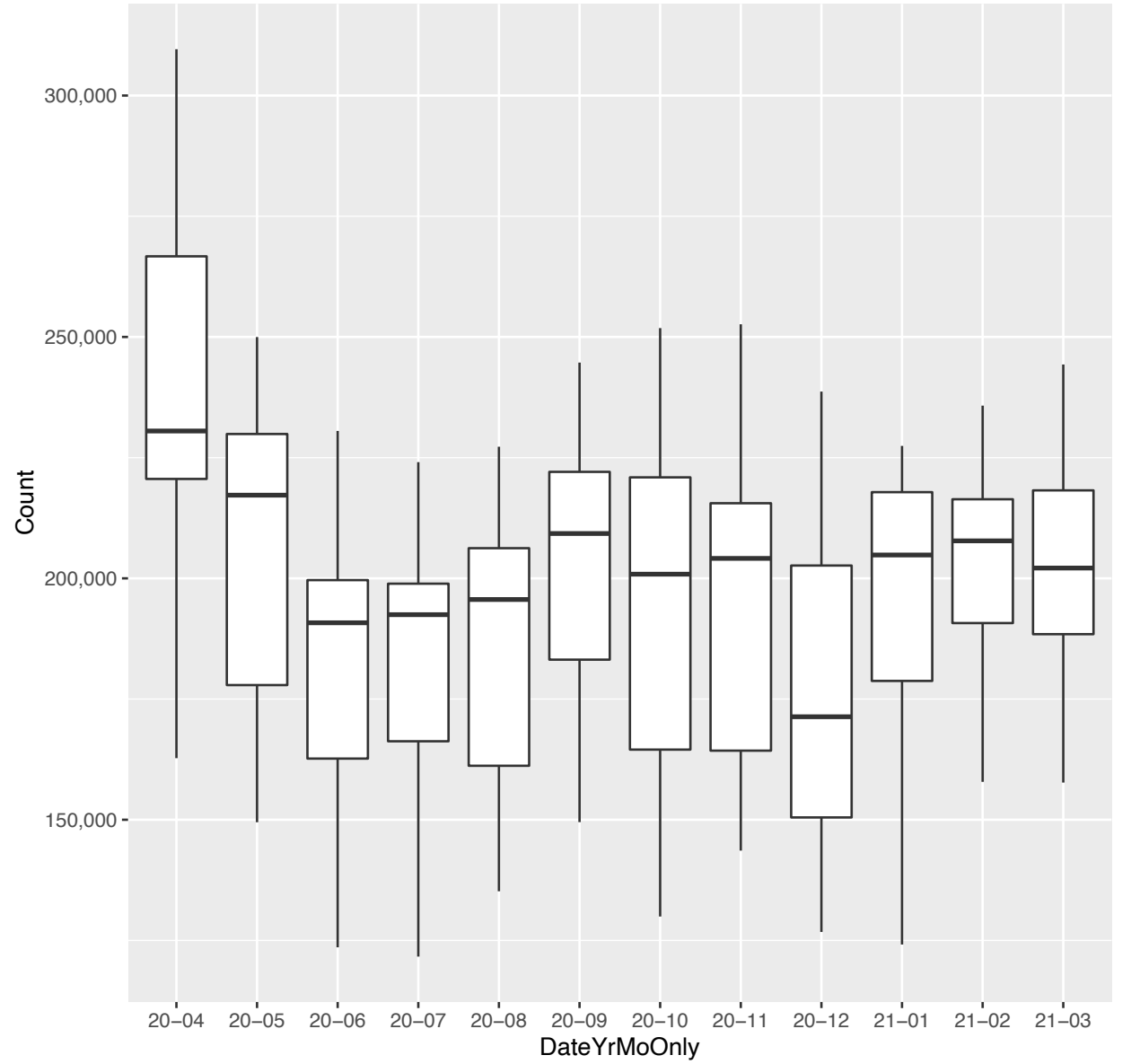
4. brown.edu:

~

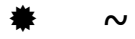
*. brown.edu (day-by-day counts and 28 day moving average)



*. brown.edu (monthly boxplots (outliers trimmed))



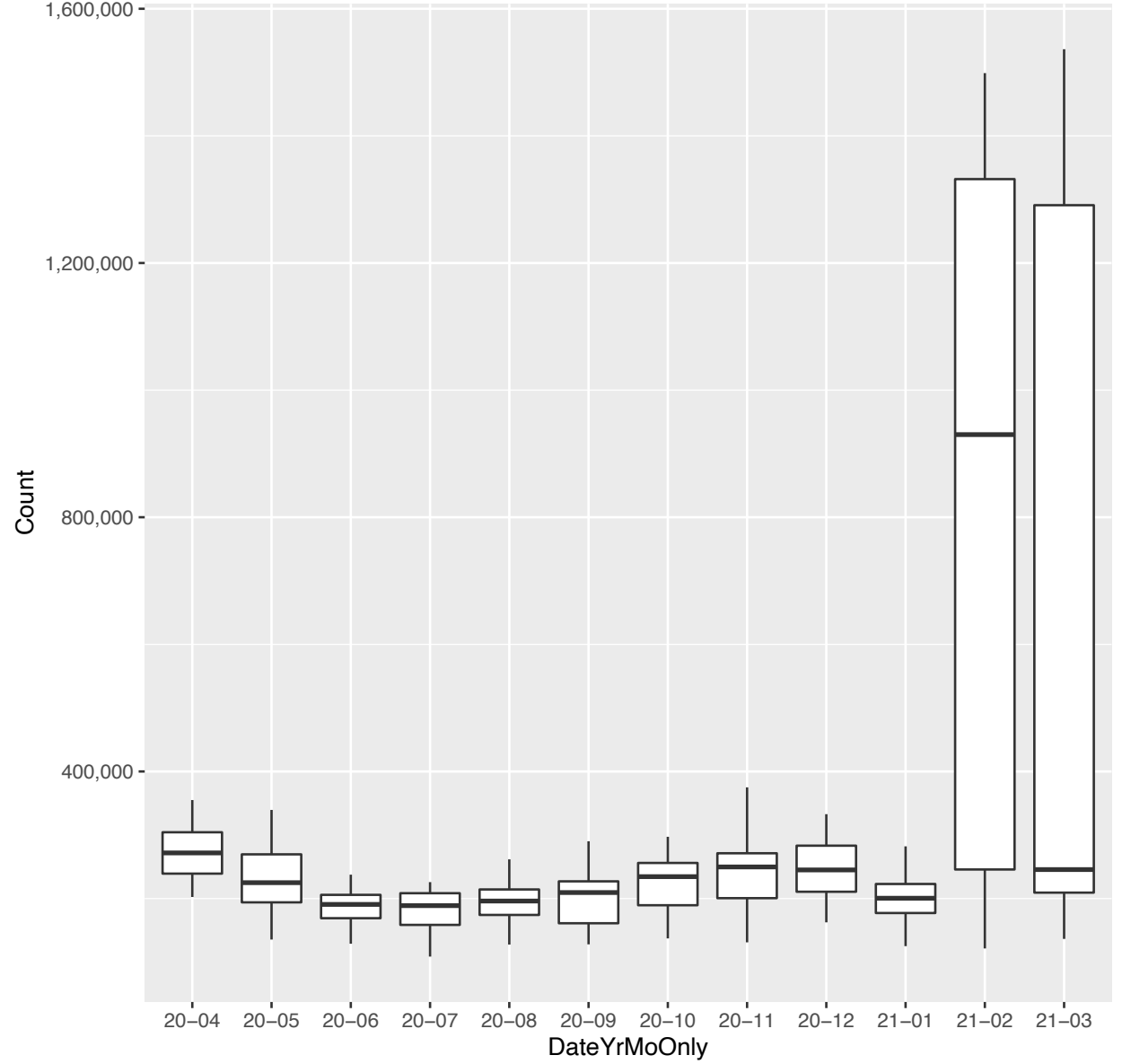
5. bu.edu:



*. bu.edu (day-by-day counts and 28 day moving average)



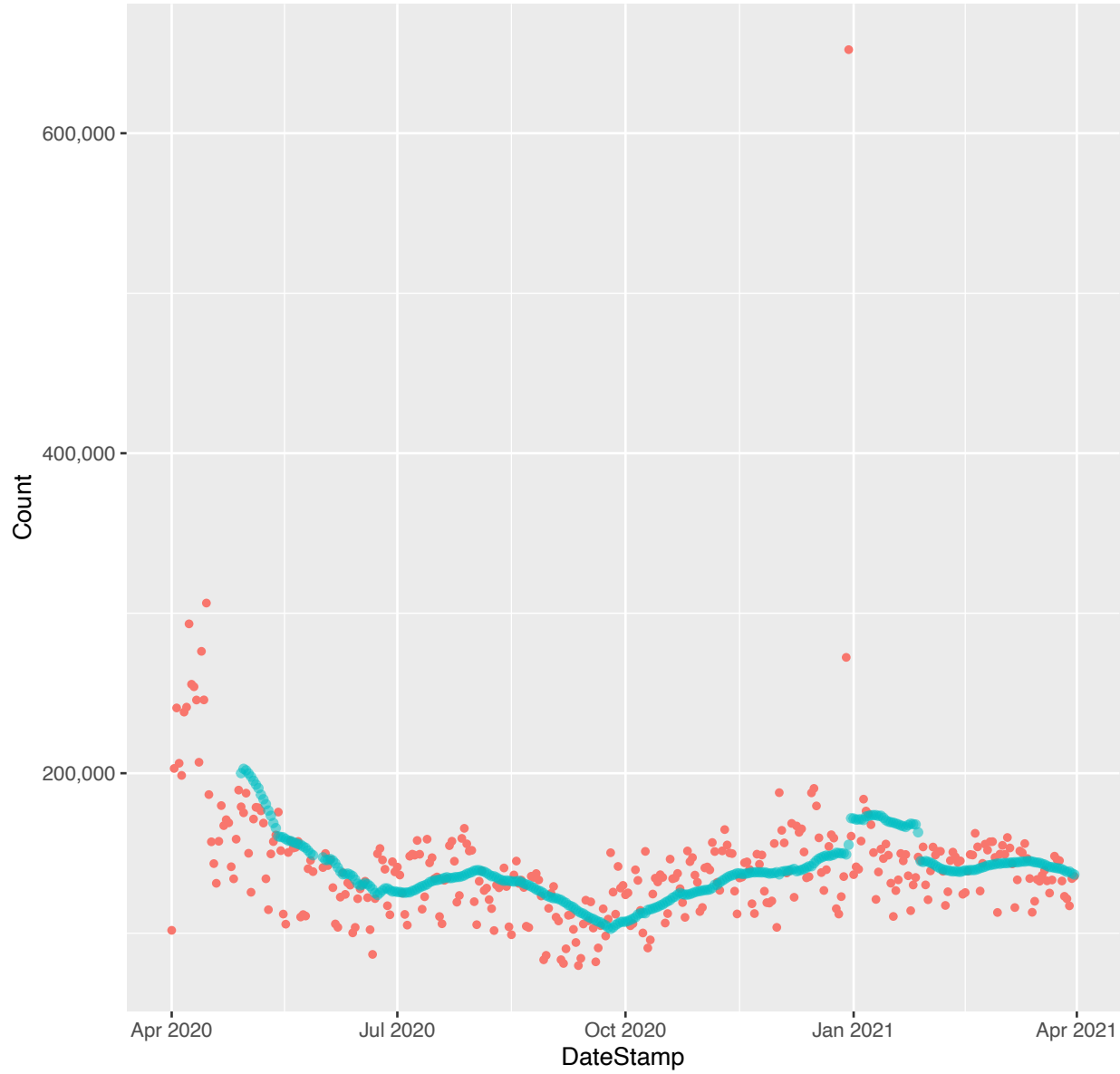
*. bu.edu (monthly boxplots (outliers trimmed))



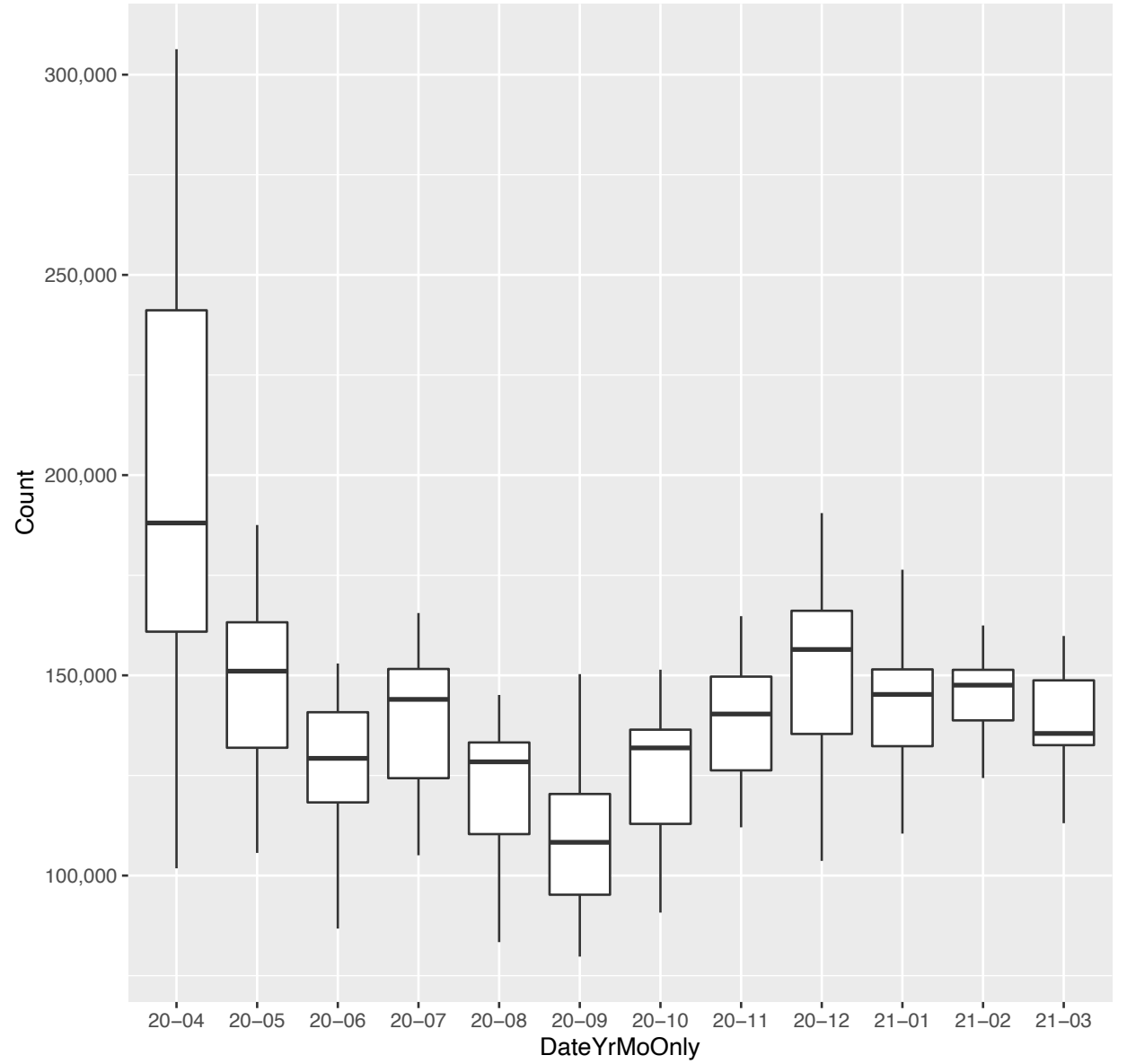
6. byu.edu:

L shaped

*. byu.edu (day-by-day counts and 28 day moving average)



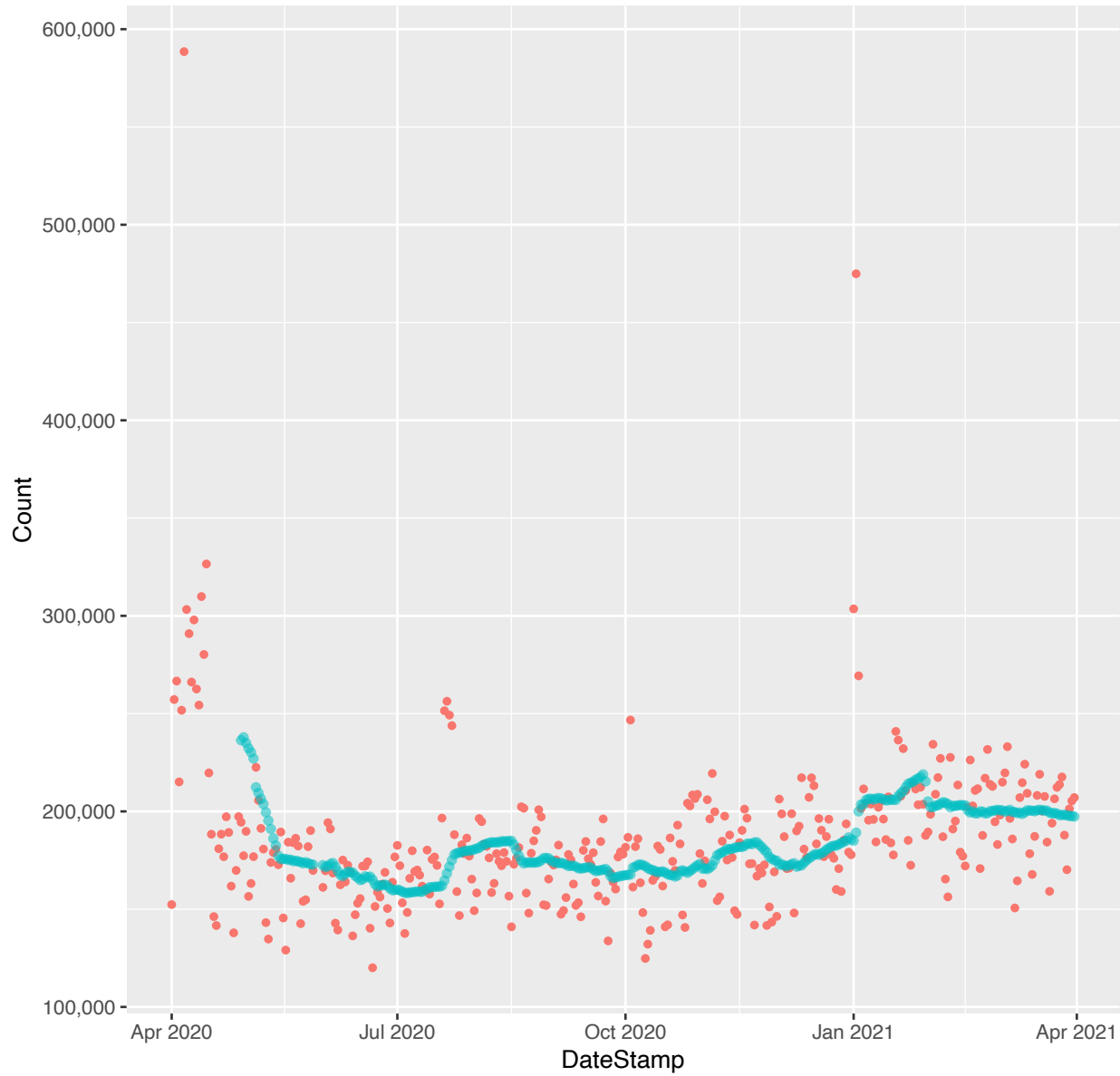
*. byu.edu (monthly boxplots (outliers trimmed))



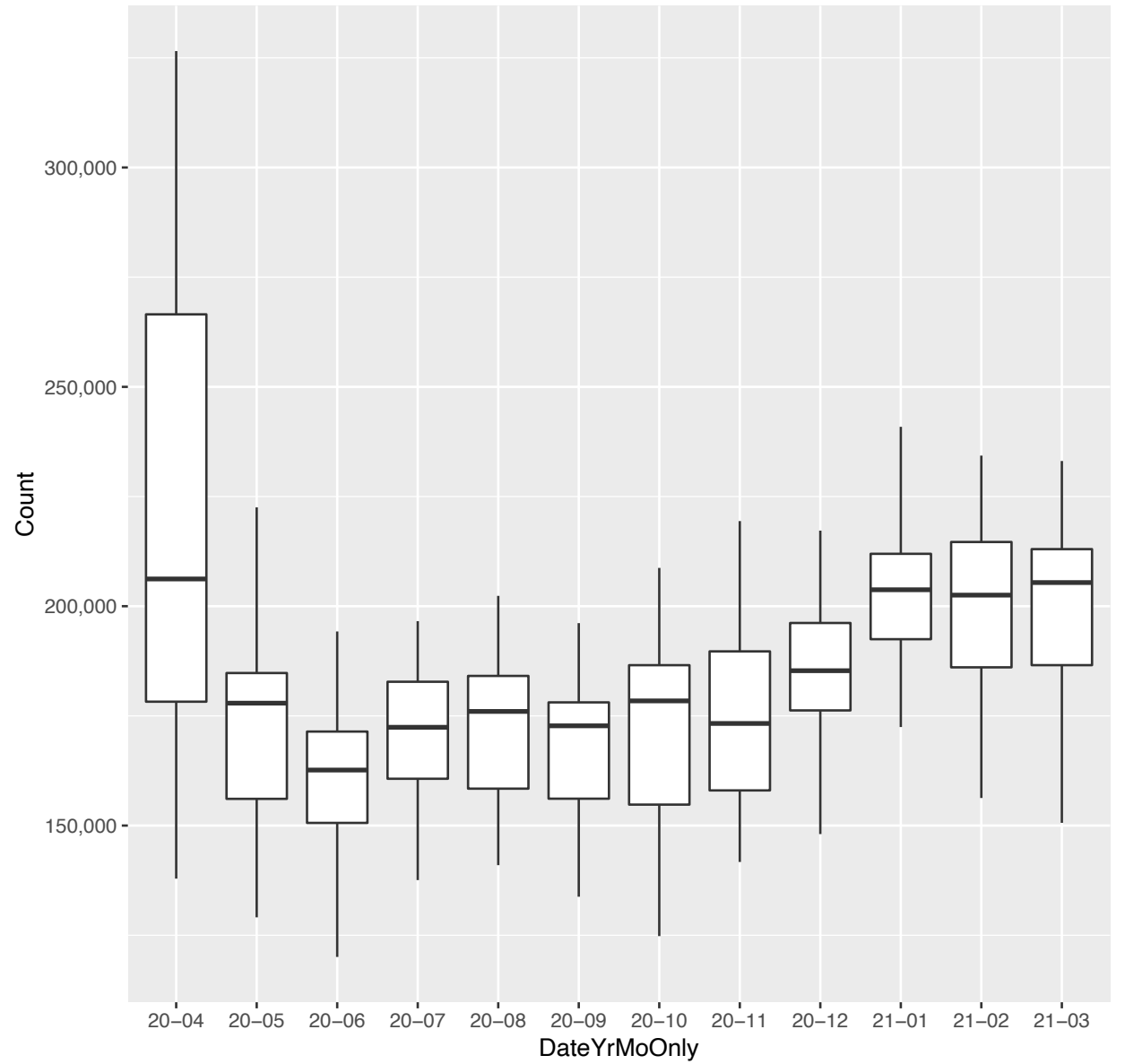
7. caltech.com:

U shaped

*. caltech.edu (day-by-day counts and 28 day moving average)

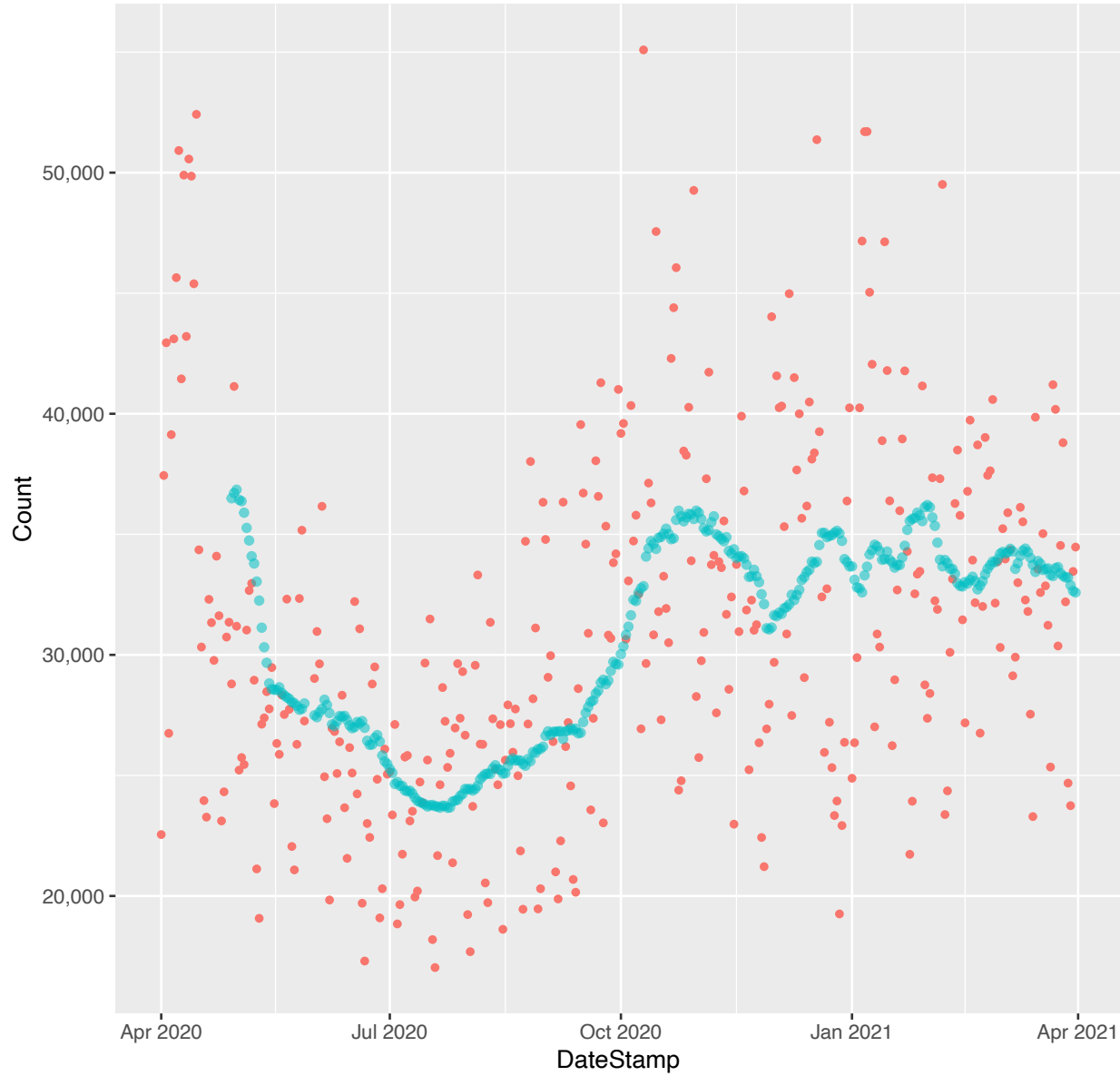


*. caltech.edu (monthly boxplots (outliers trimmed))

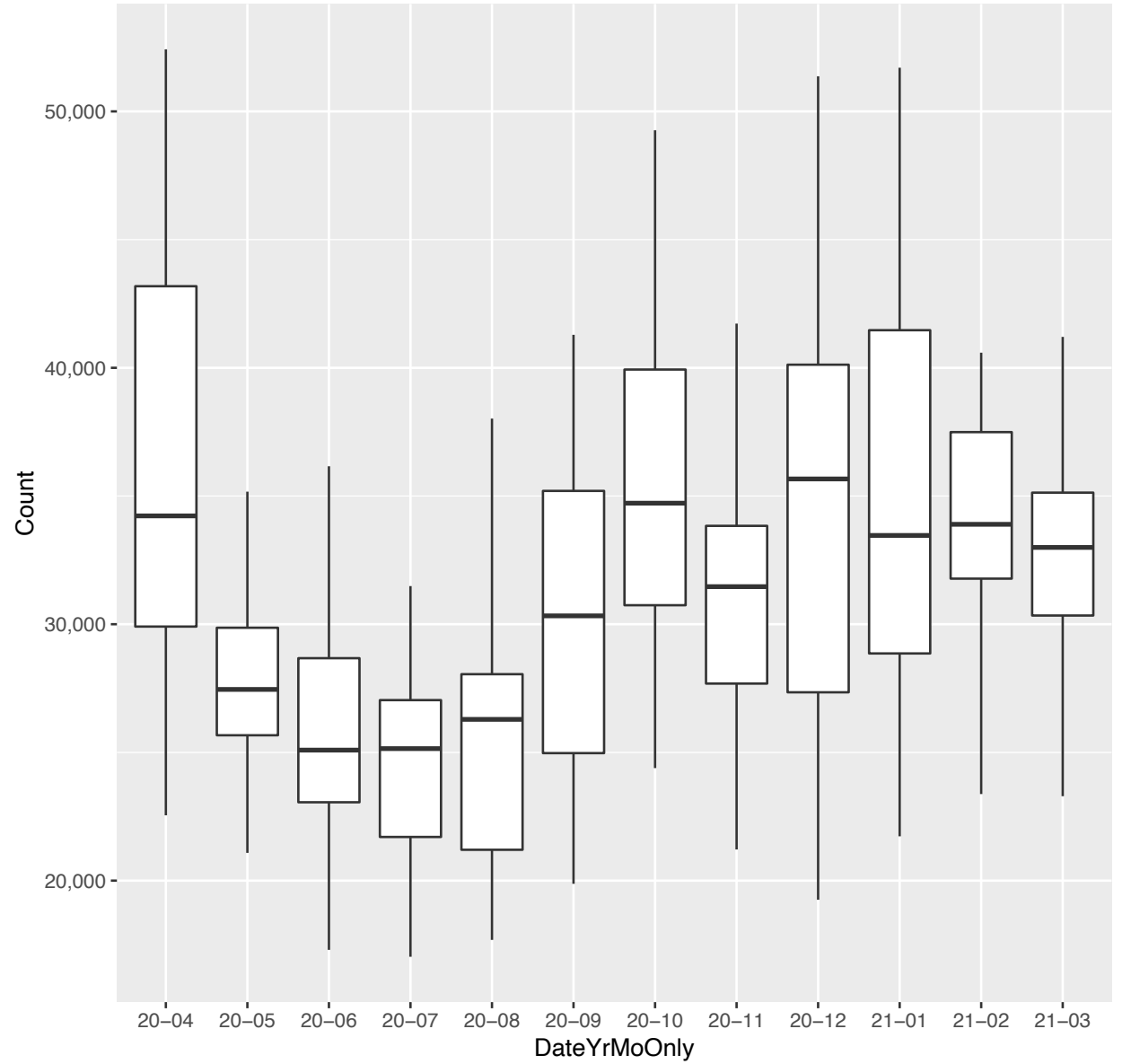


8. carleton.edu: U shaped

*. carleton.edu (day-by-day counts and 28 day moving average)



*. carleton.edu (monthly boxplots (outliers trimmed))

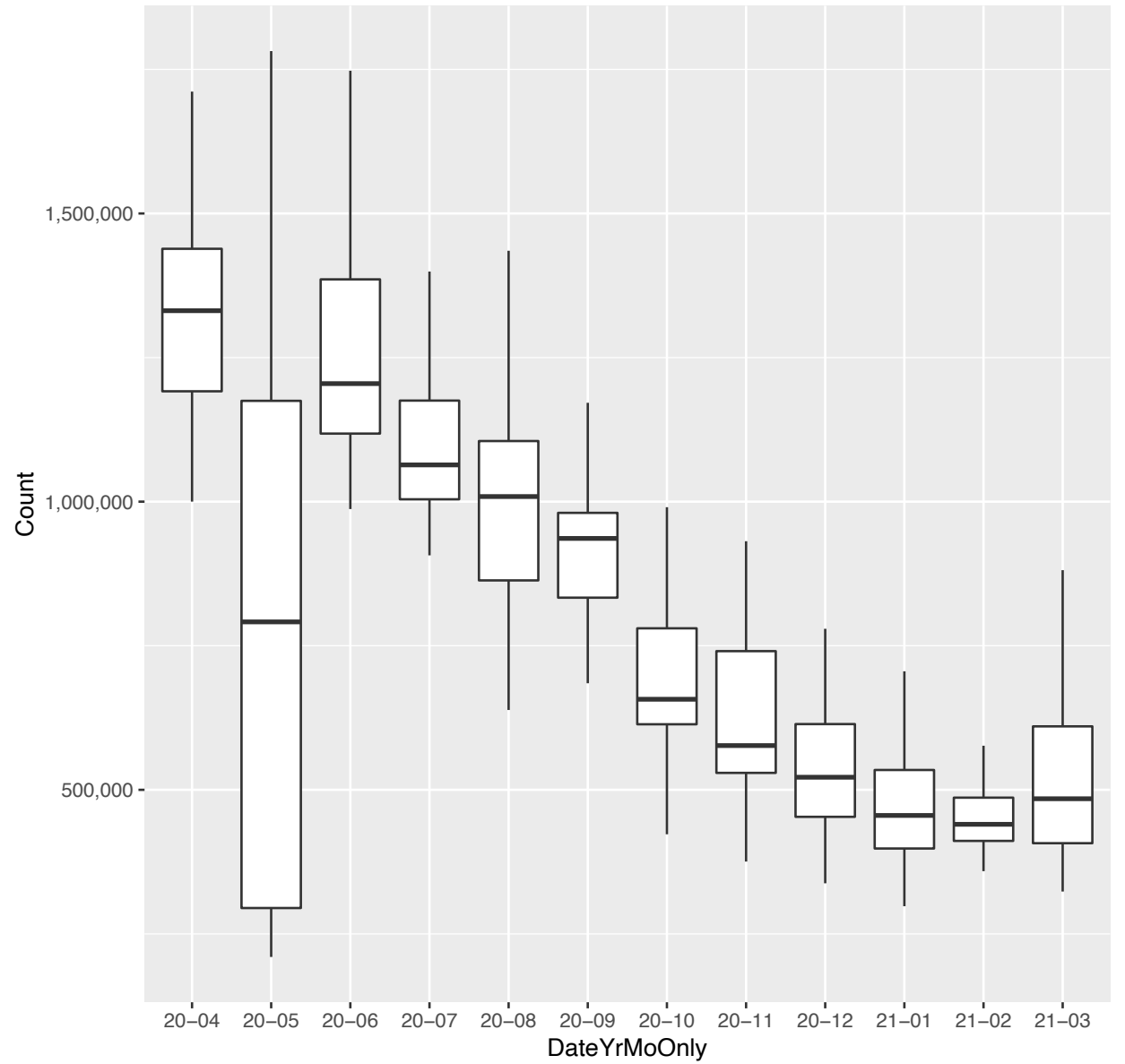




*. clemson.edu (day-by-day counts and 28 day moving average)



*. clemson.edu (monthly boxplots (outliers trimmed))

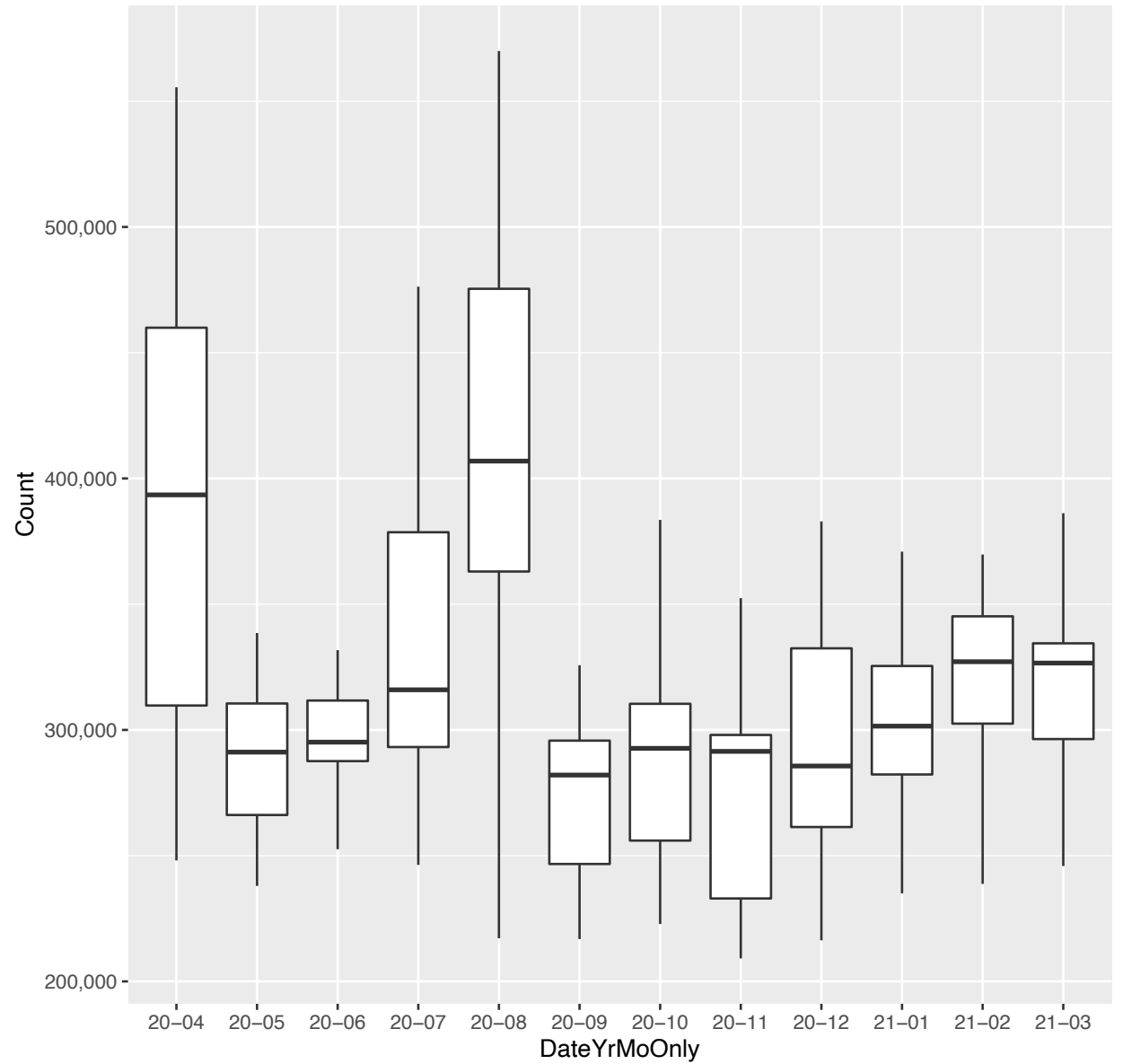


10. cmu.edu: ~

*. cmu.edu (day-by-day counts and 28 day moving average)



*. cmu.edu (monthly boxplots (outliers trimmed))

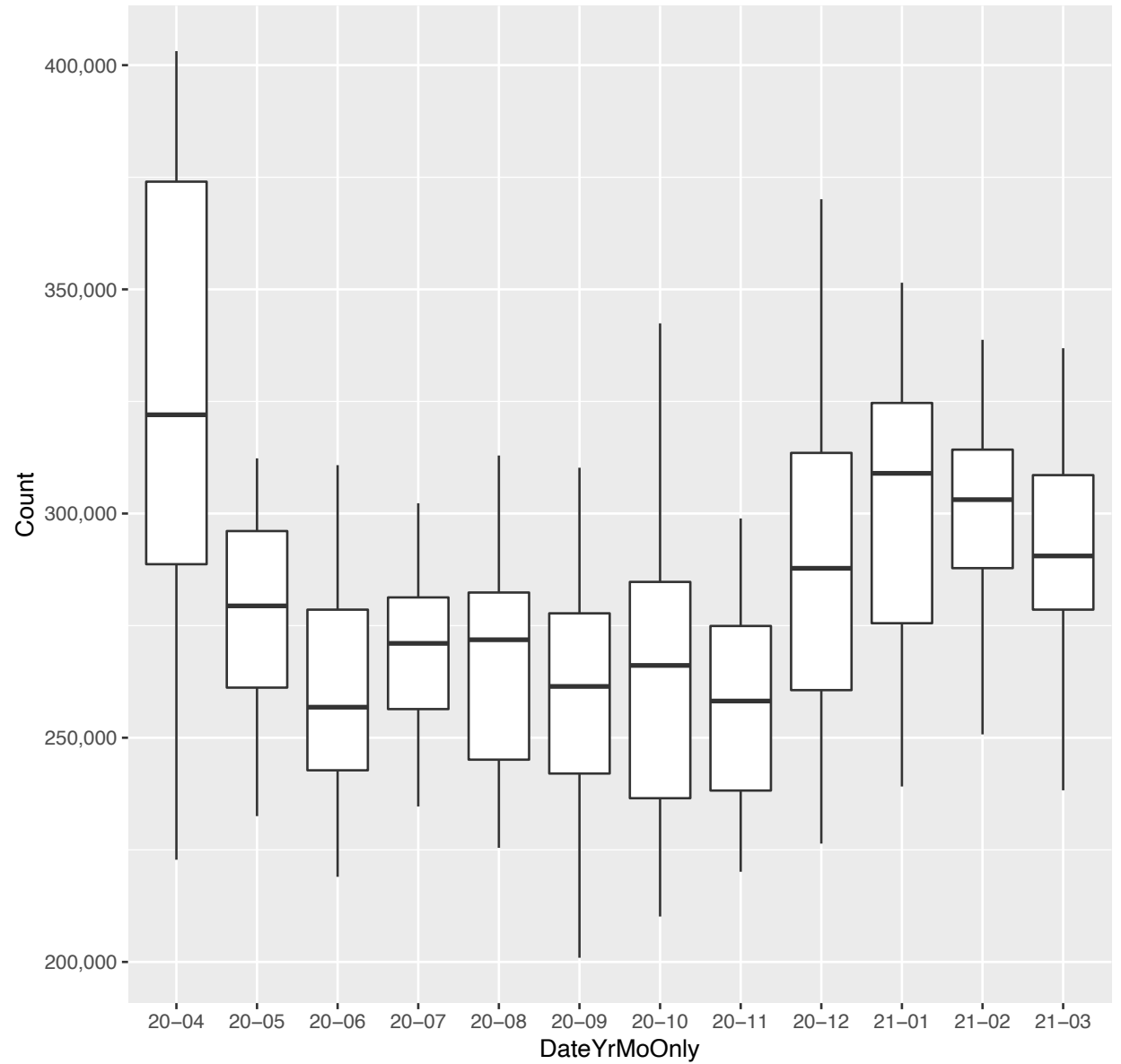


11. colorado.edu: L shaped

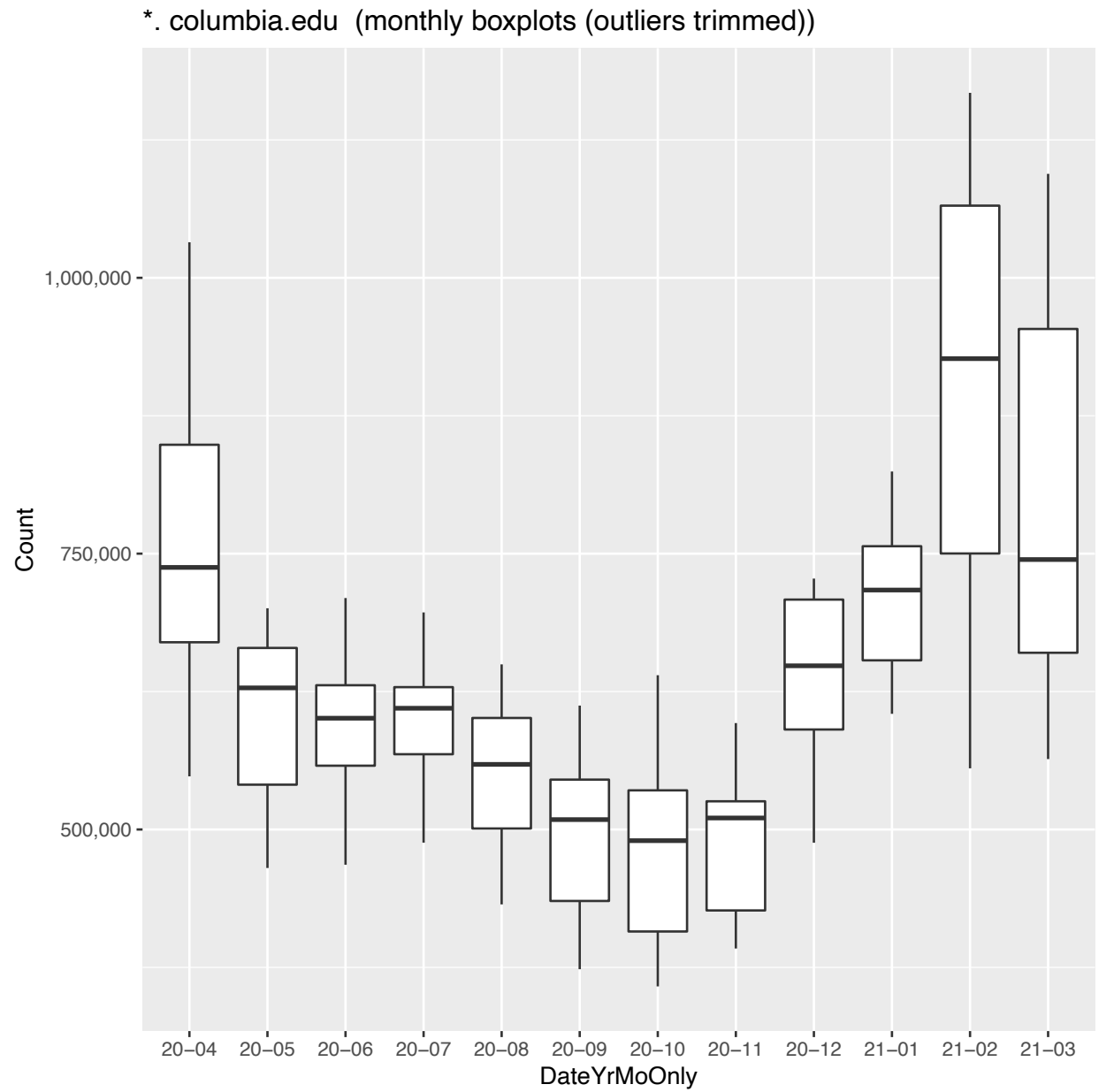
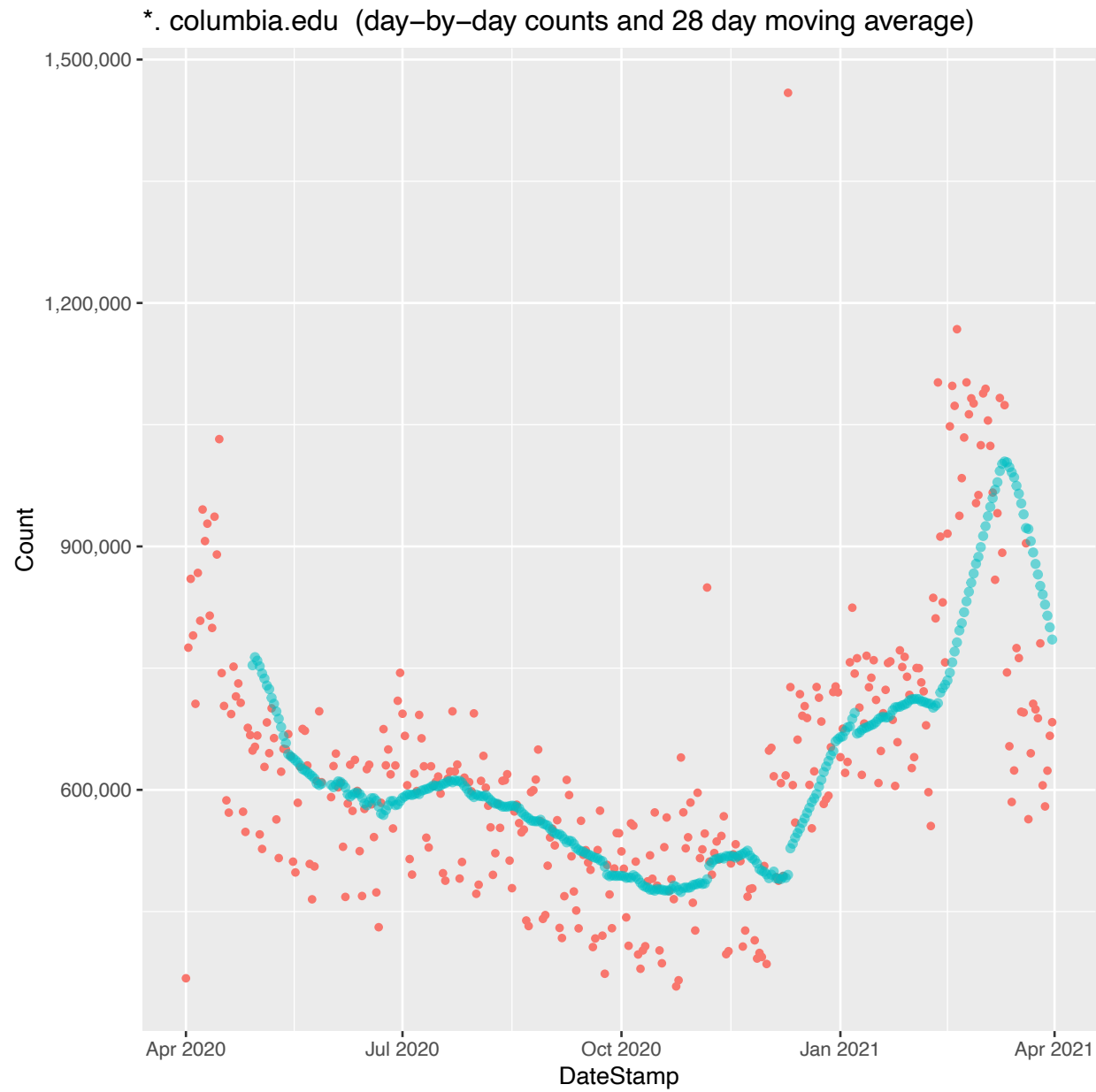
*. colorado.edu (day-by-day counts and 28 day moving average)



*. colorado.edu (monthly boxplots (outliers trimmed))



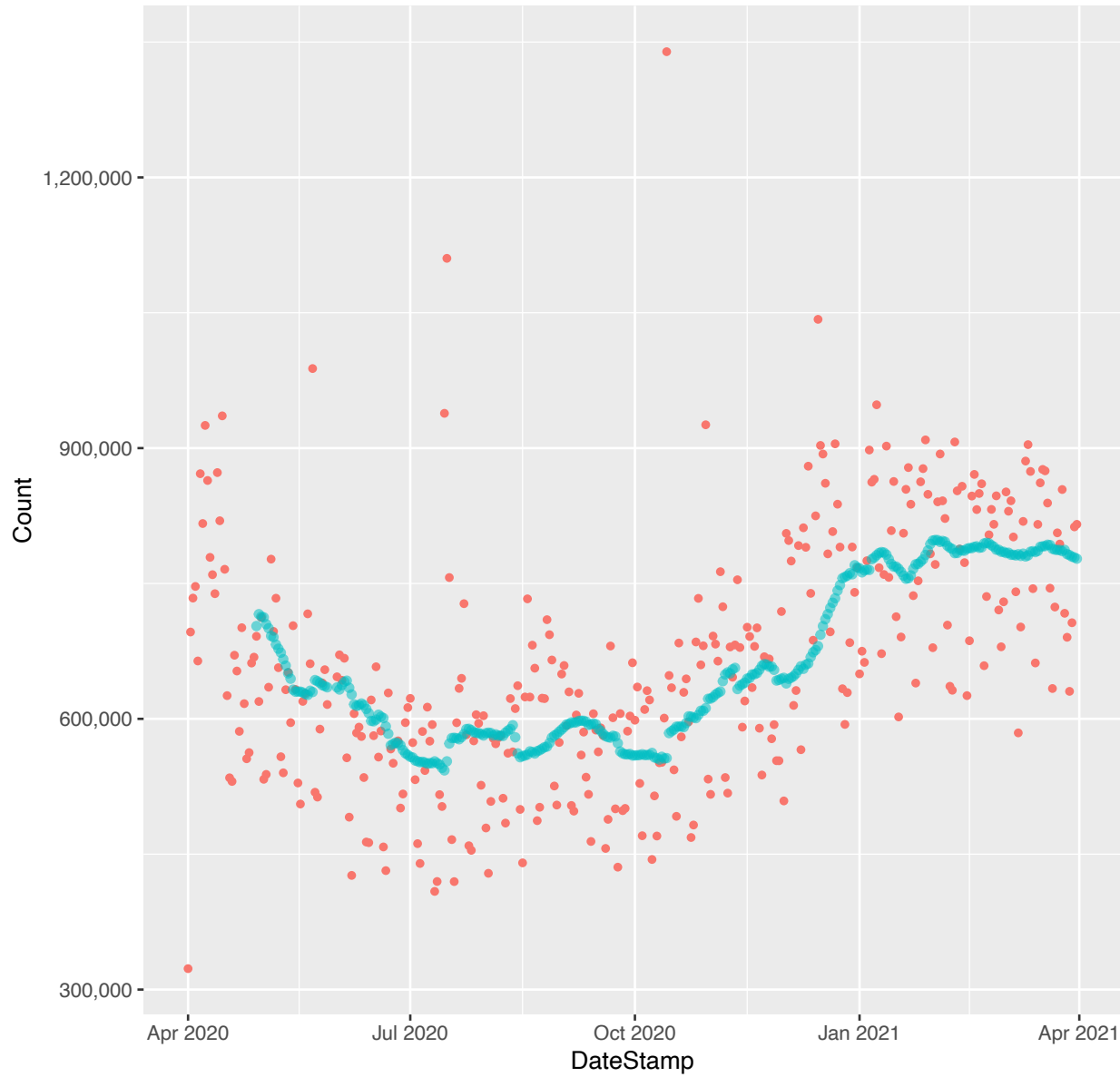
12. columbia.edu: U shaped



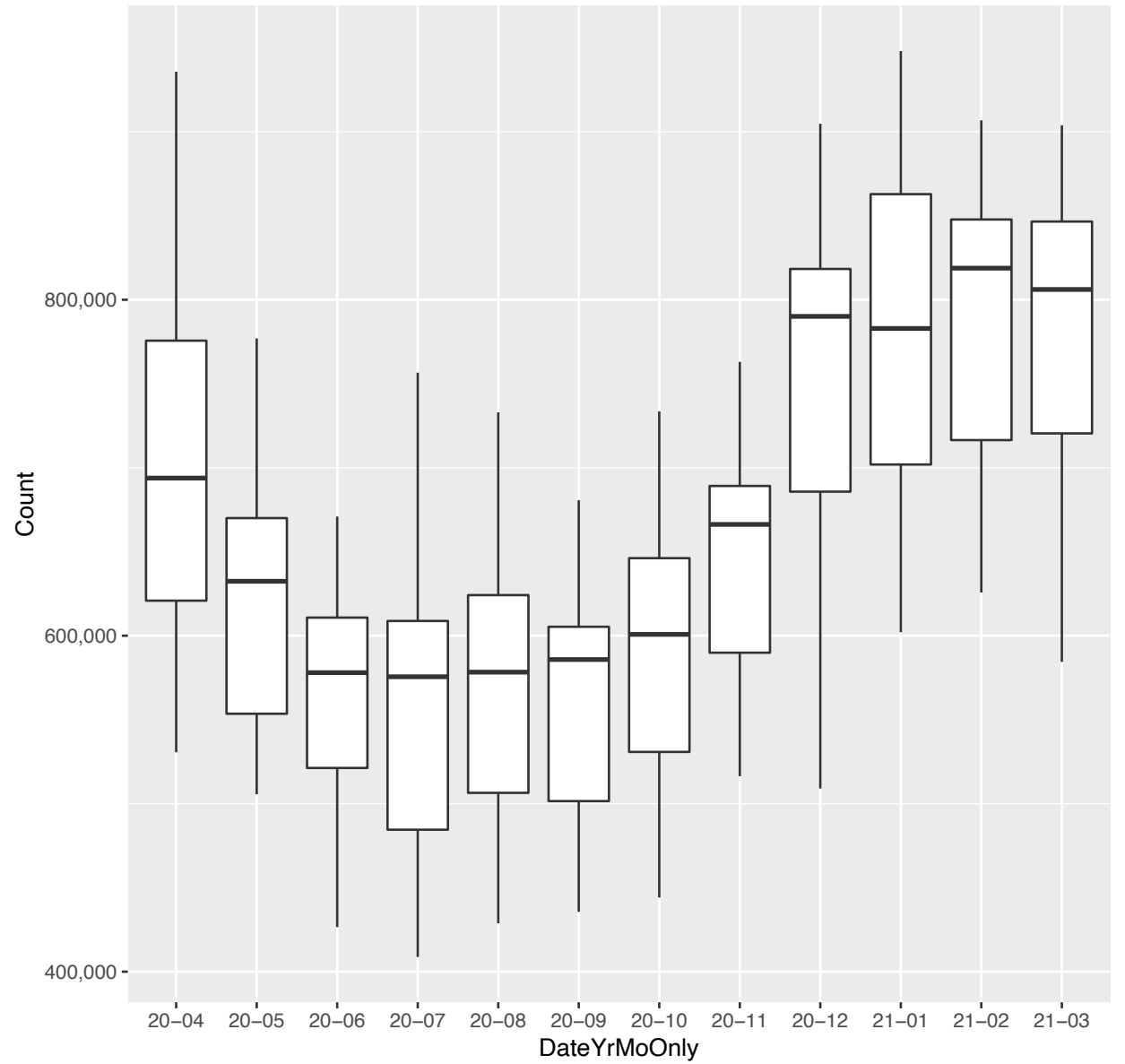
13. cornell.edu:

U shaped (ending higher)

*. cornell.edu (day-by-day counts and 28 day moving average)



*. cornell.edu (monthly boxplots (outliers trimmed))

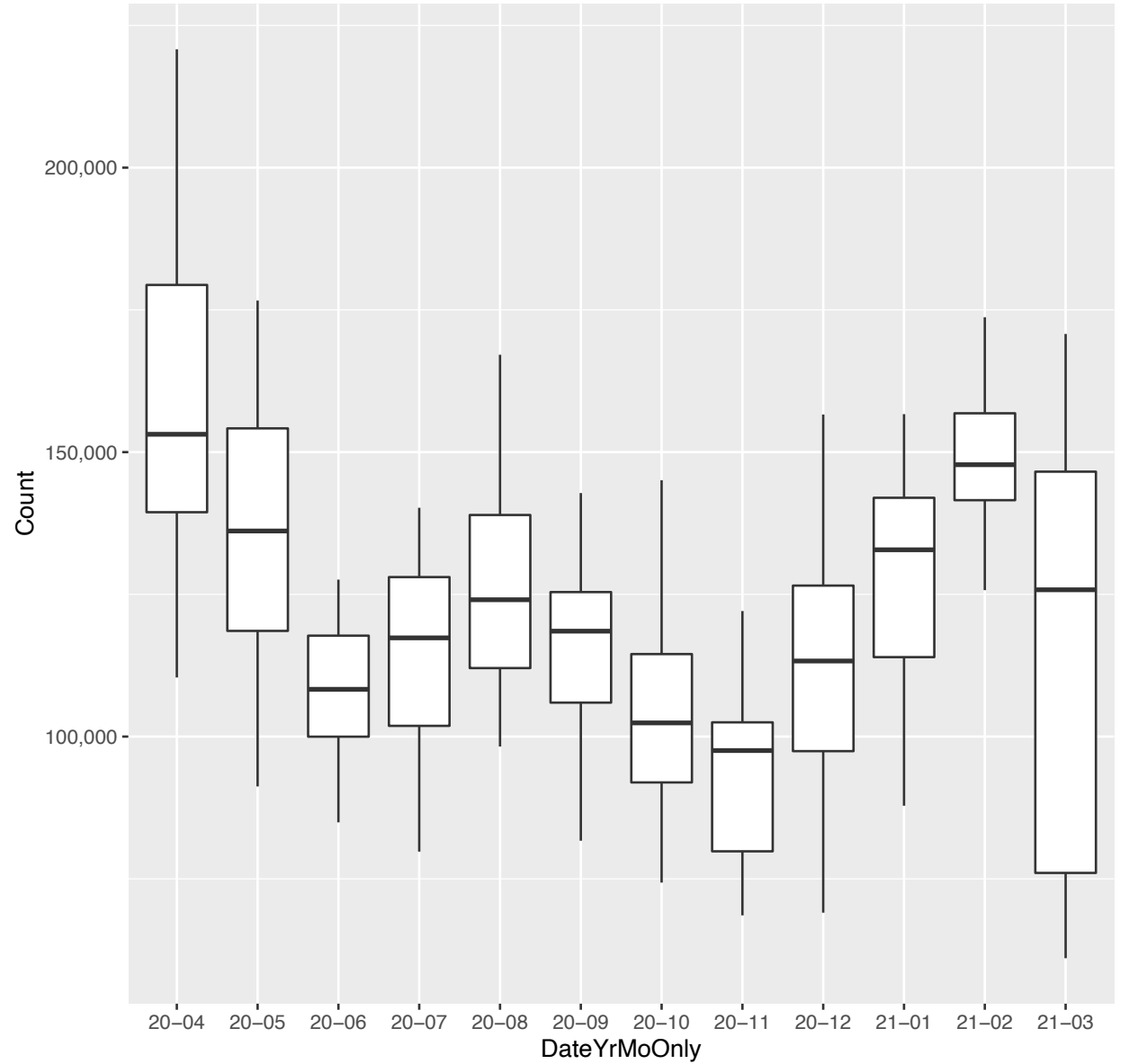


14. dartmouth.edu: ~

*. dartmouth.edu (day-by-day counts and 28 day moving average)



*. dartmouth.edu (monthly boxplots (outliers trimmed))

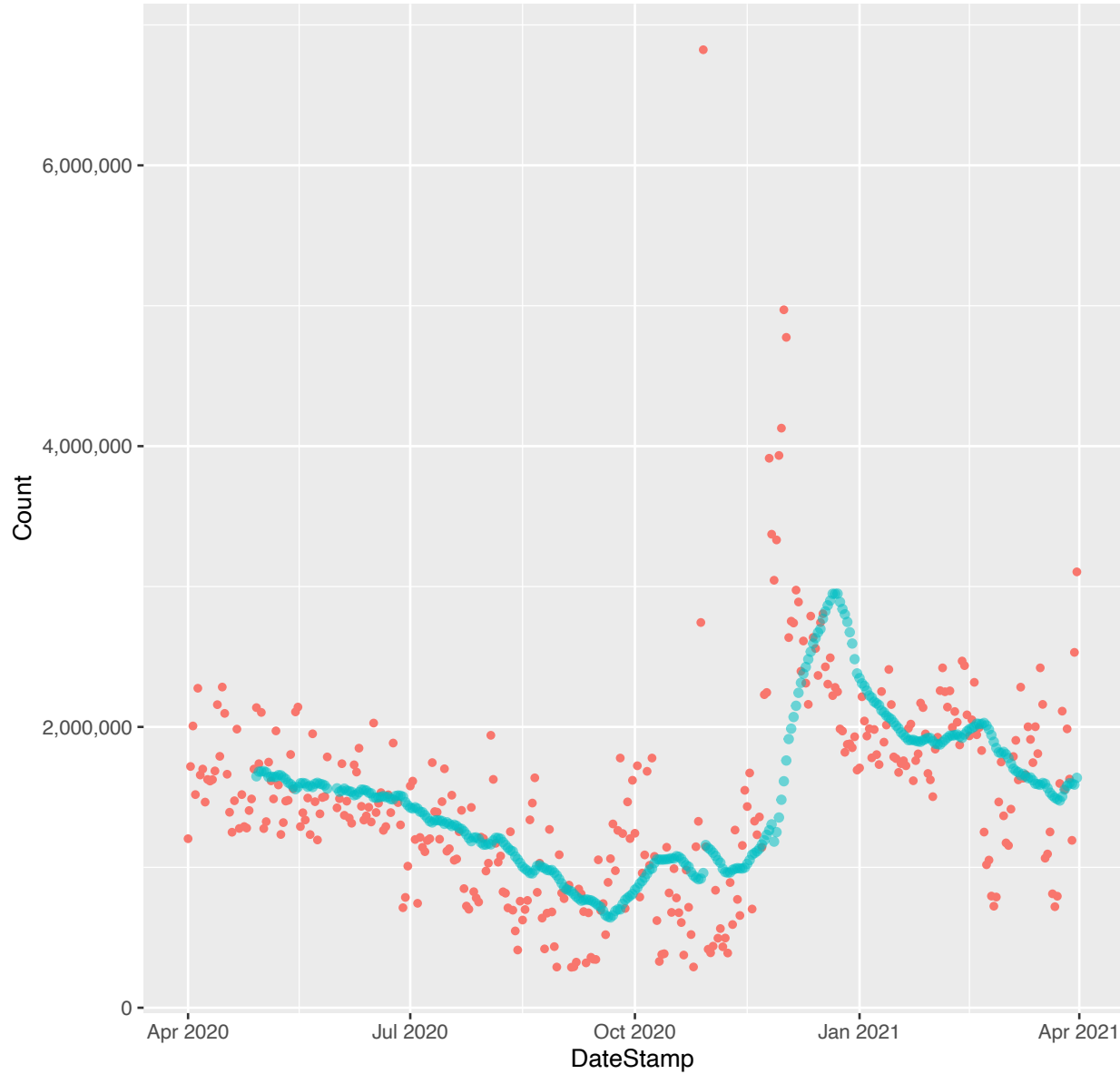


15. duke.edu:

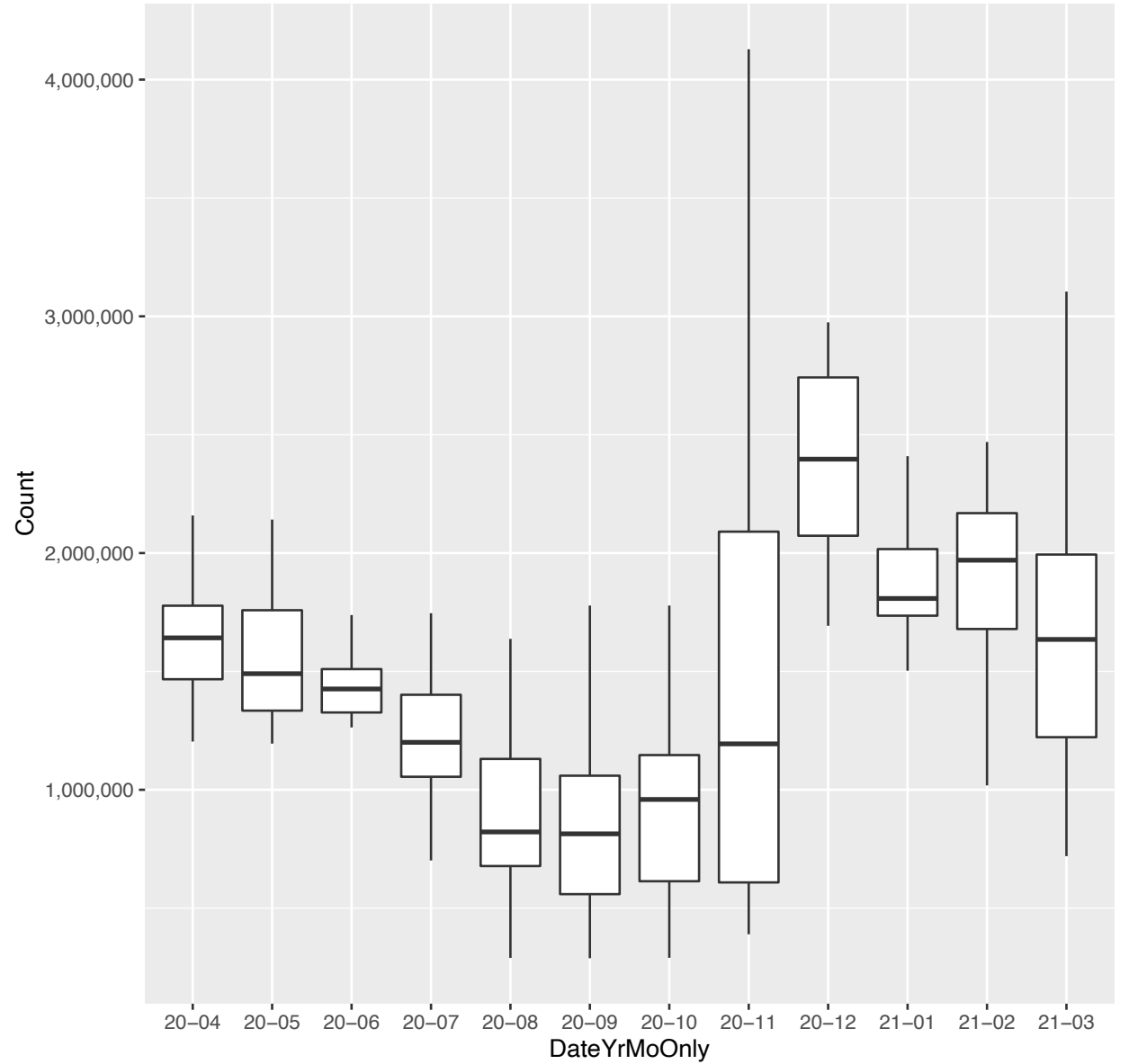


M

*. duke.edu (day-by-day counts and 28 day moving average)



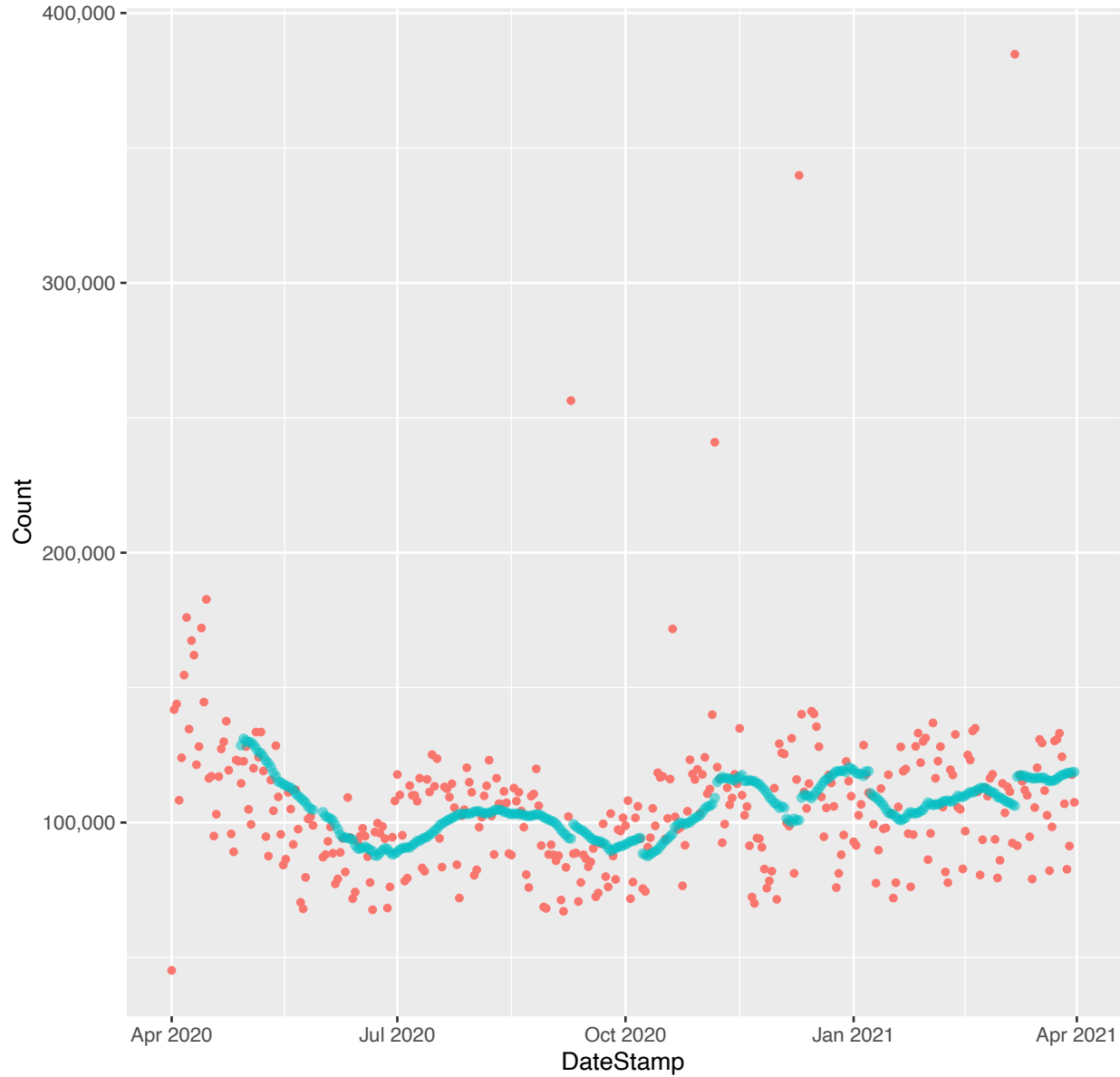
*. duke.edu (monthly boxplots (outliers trimmed))



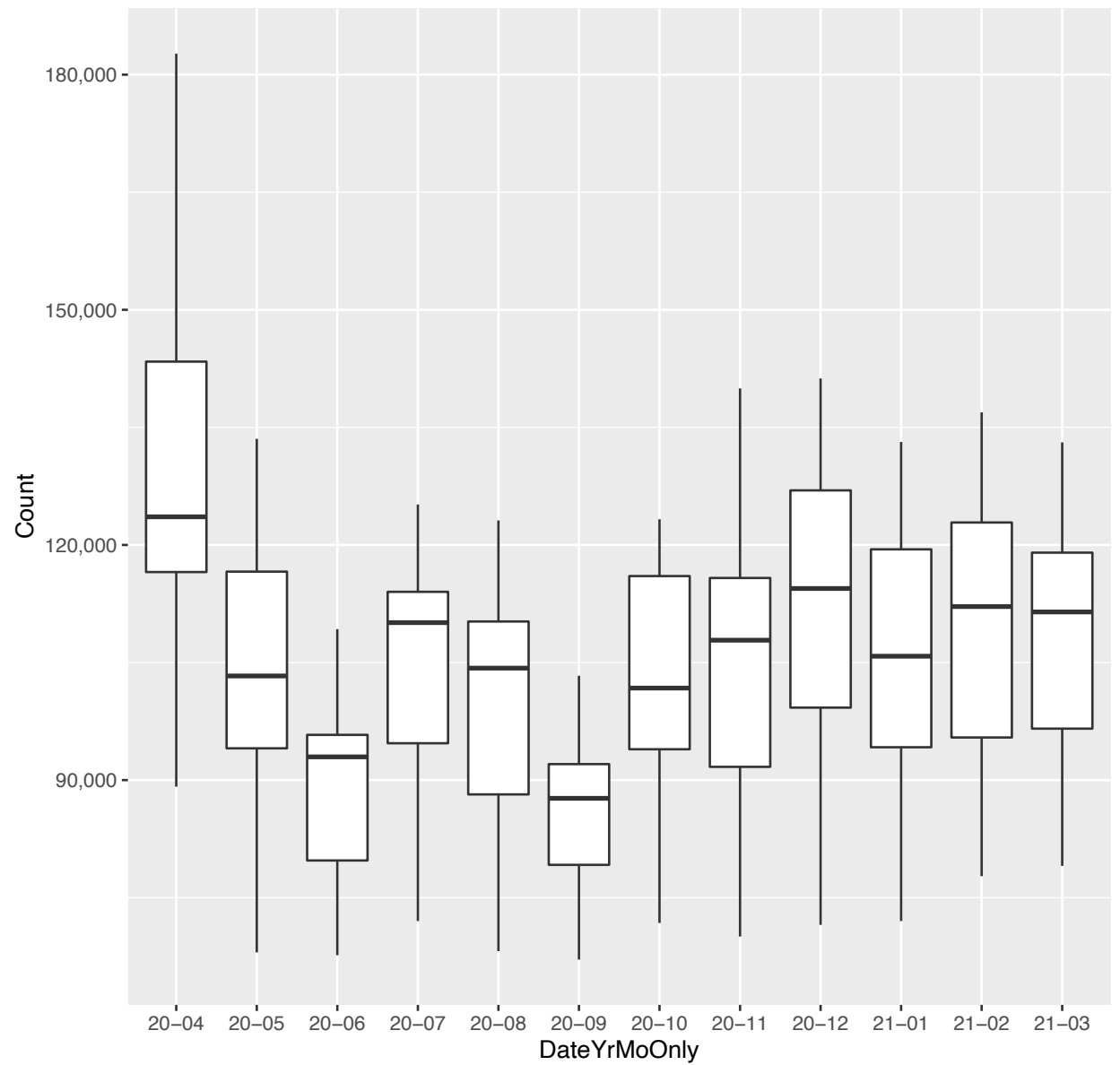
16. emory.edu:



*. emory.edu (day-by-day counts and 28 day moving average)



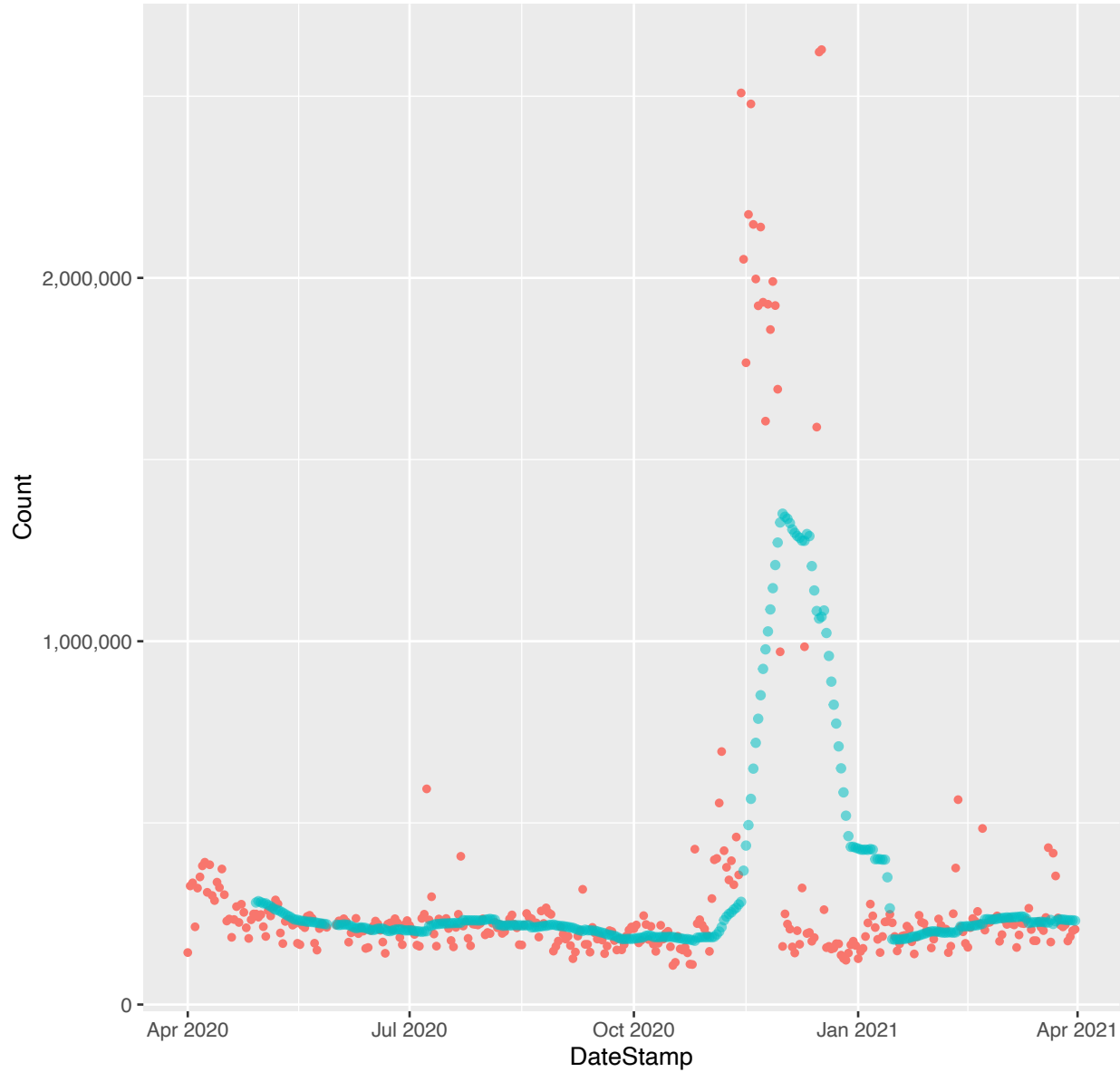
*. emory.edu (monthly boxplots (outliers trimmed))



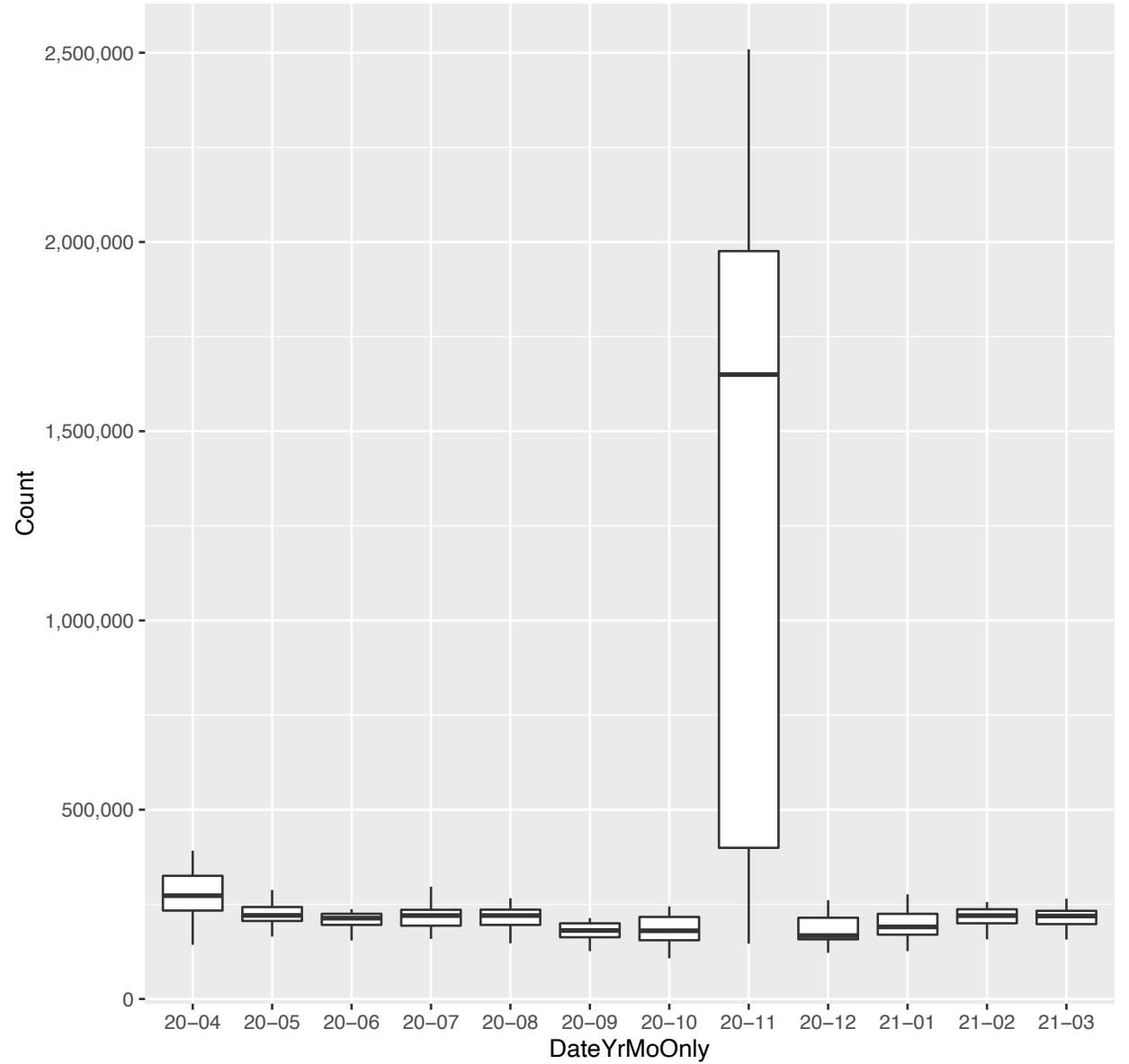
17. fsu.edu:



*. fsu.edu (day-by-day counts and 28 day moving average)

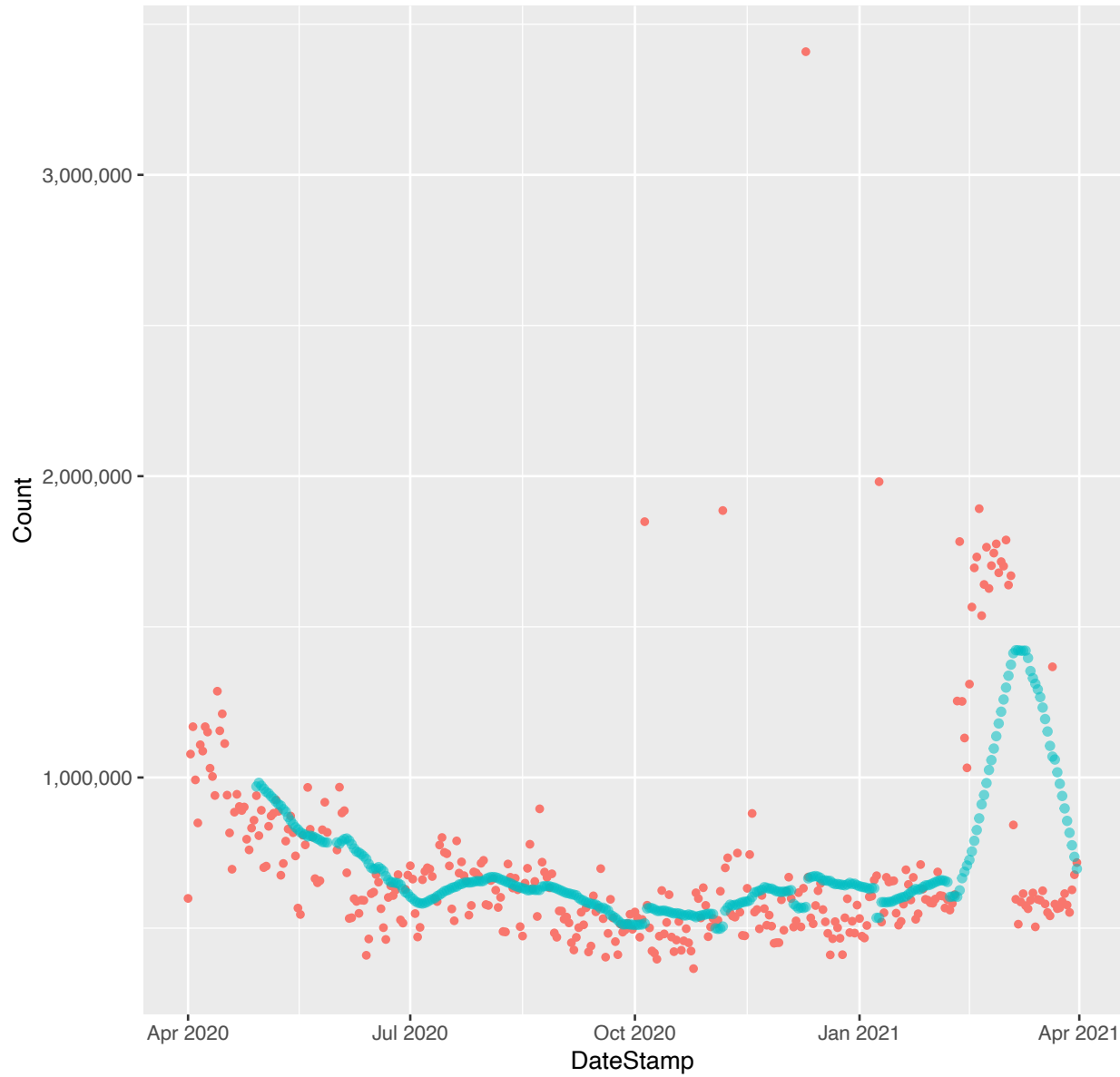


*. fsu.edu (monthly boxplots (outliers trimmed))

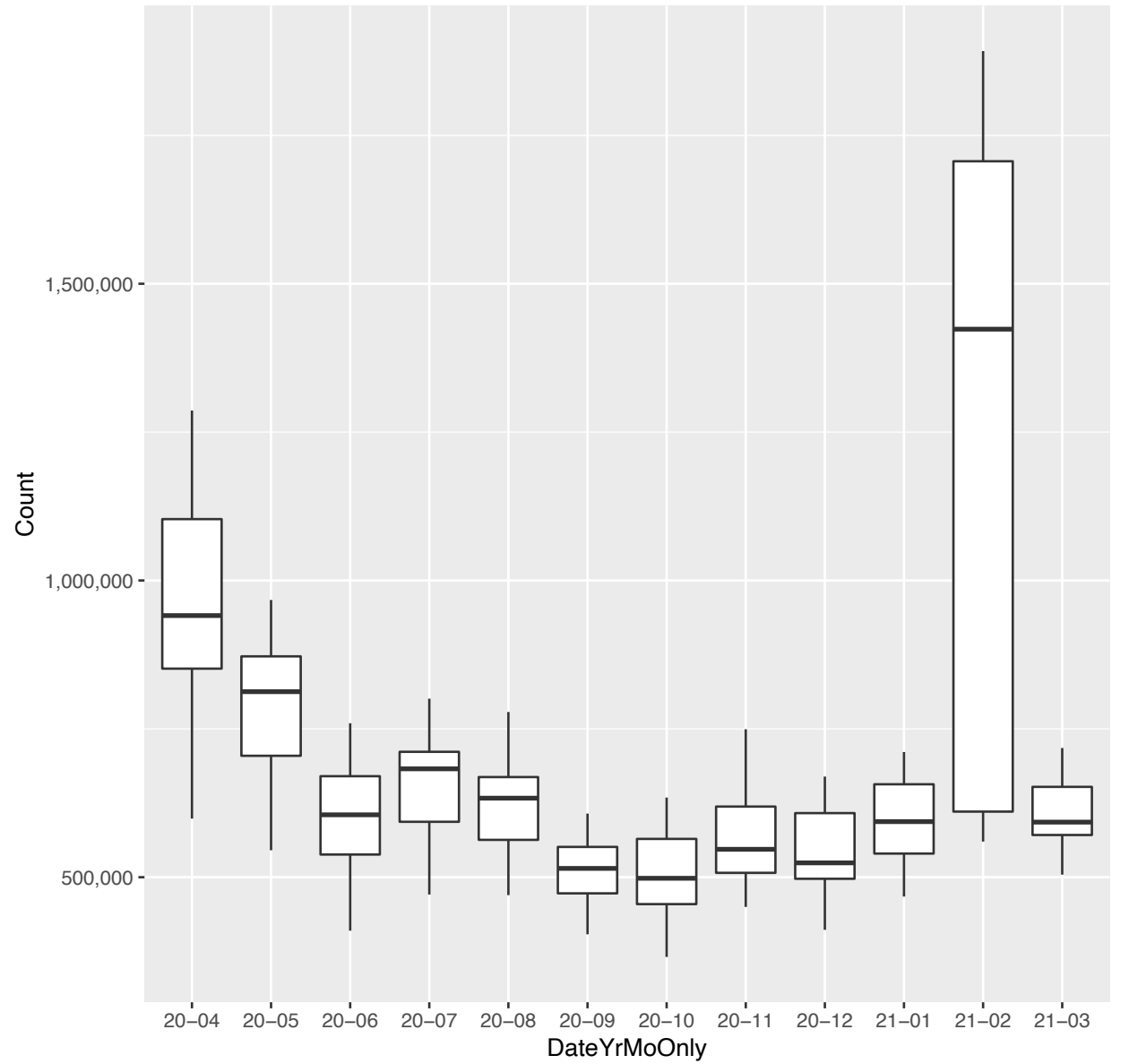


18. gatech.edu: * * U shaped

*. gatech.edu (day-by-day counts and 28 day moving average)

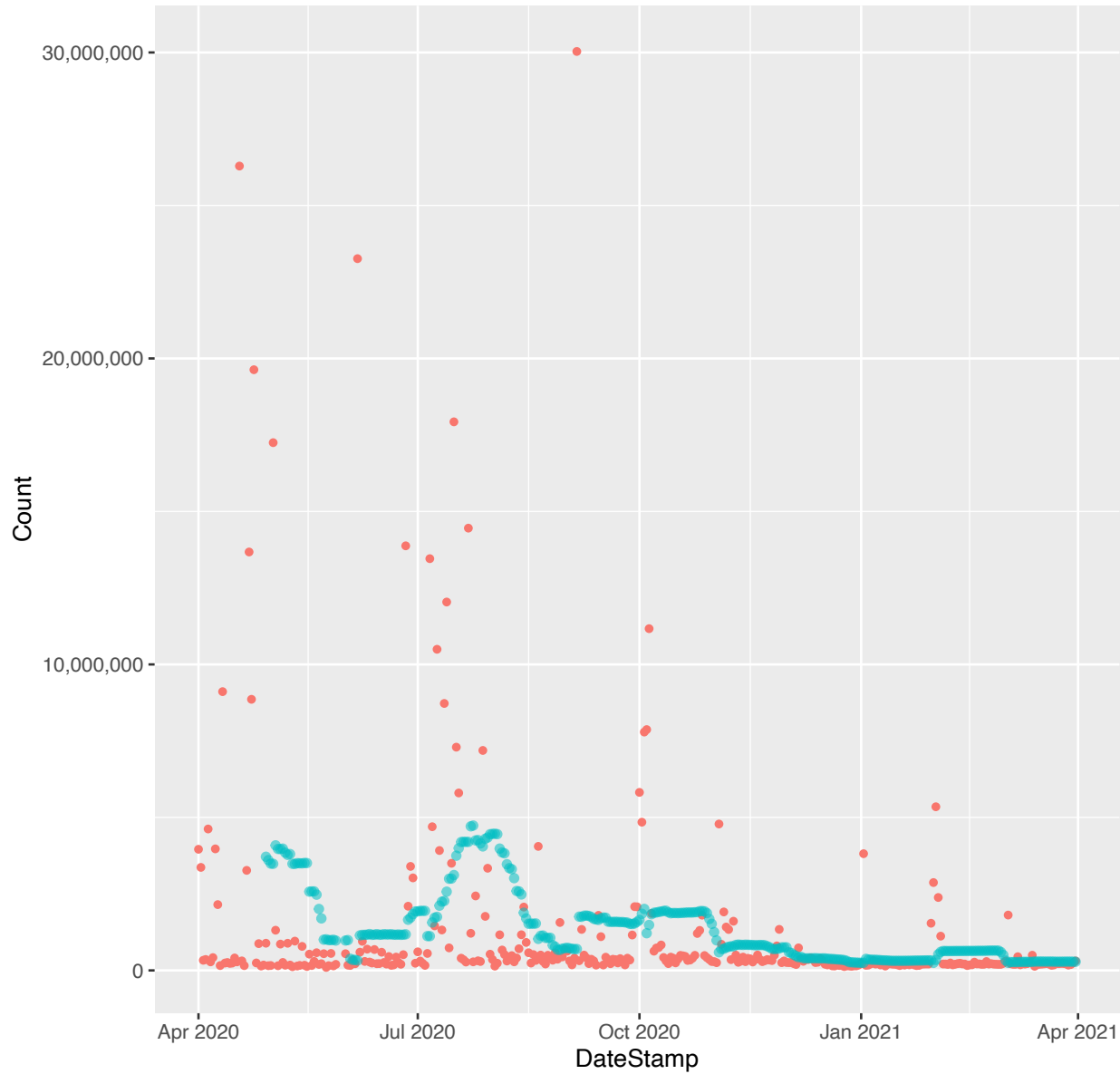


*. gatech.edu (monthly boxplots (outliers trimmed))

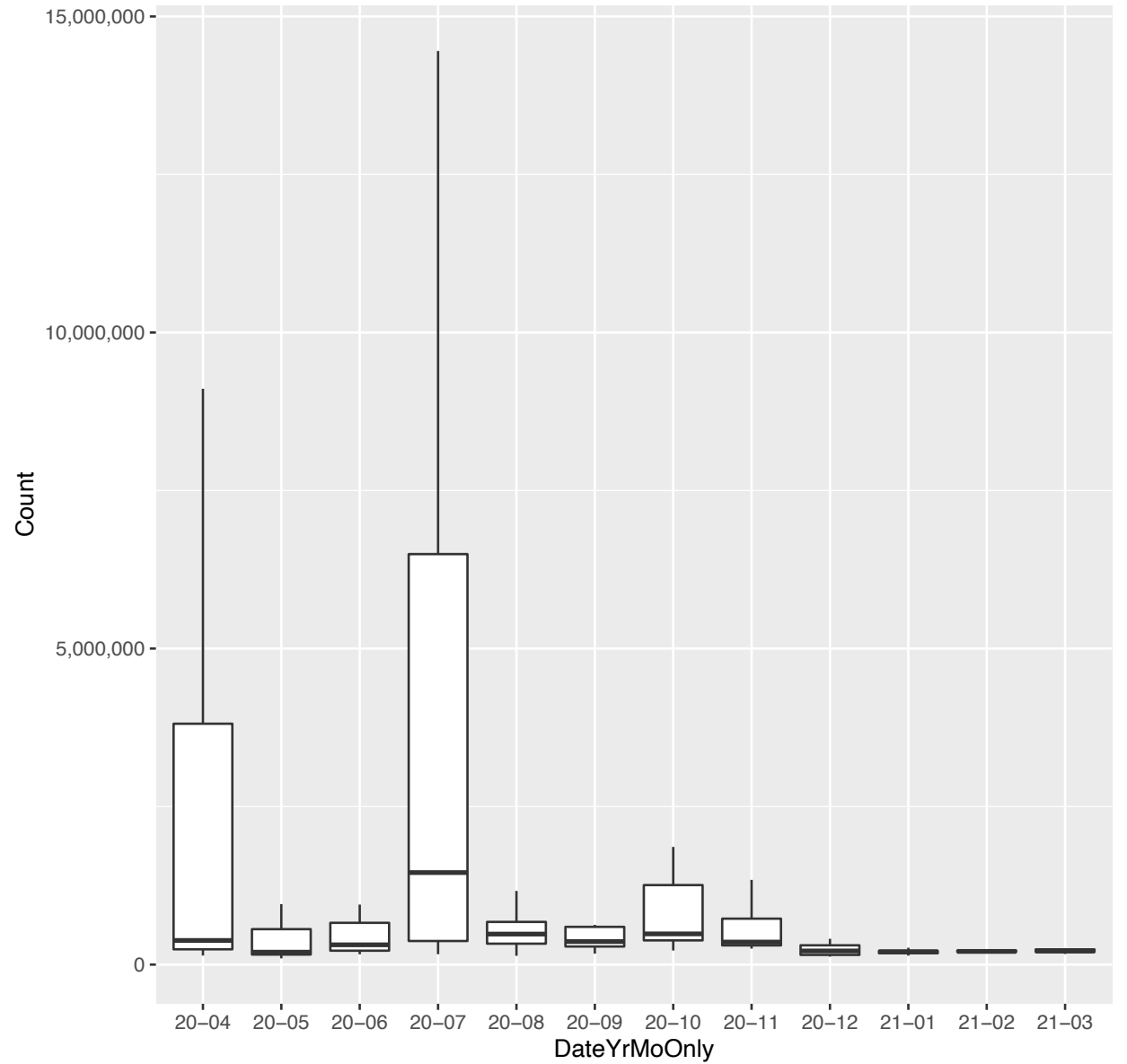


19. georgetown.edu: * ~

*. georgetown.edu (day-by-day counts and 28 day moving average)



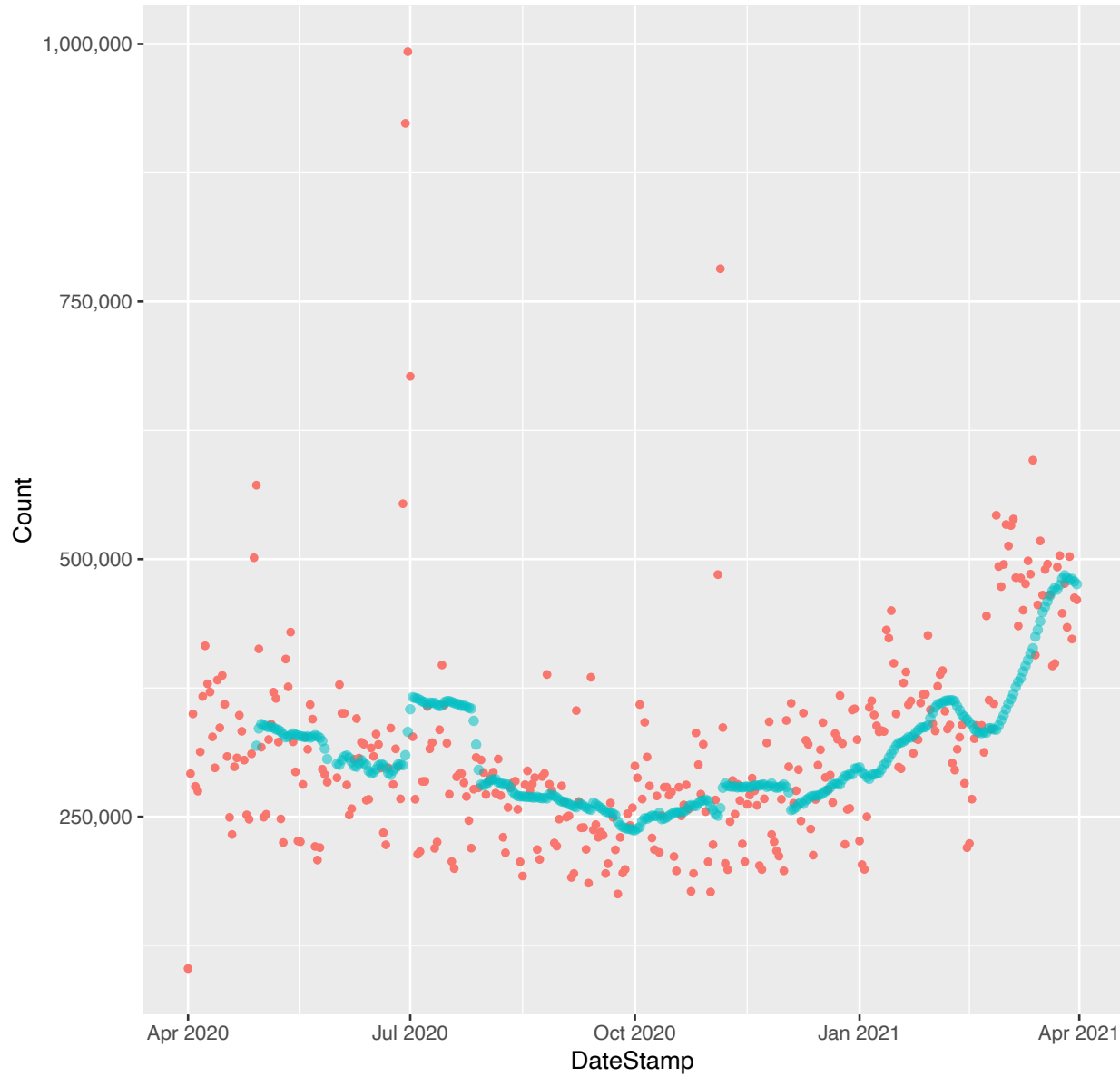
*. georgetown.edu (monthly boxplots (outliers trimmed))



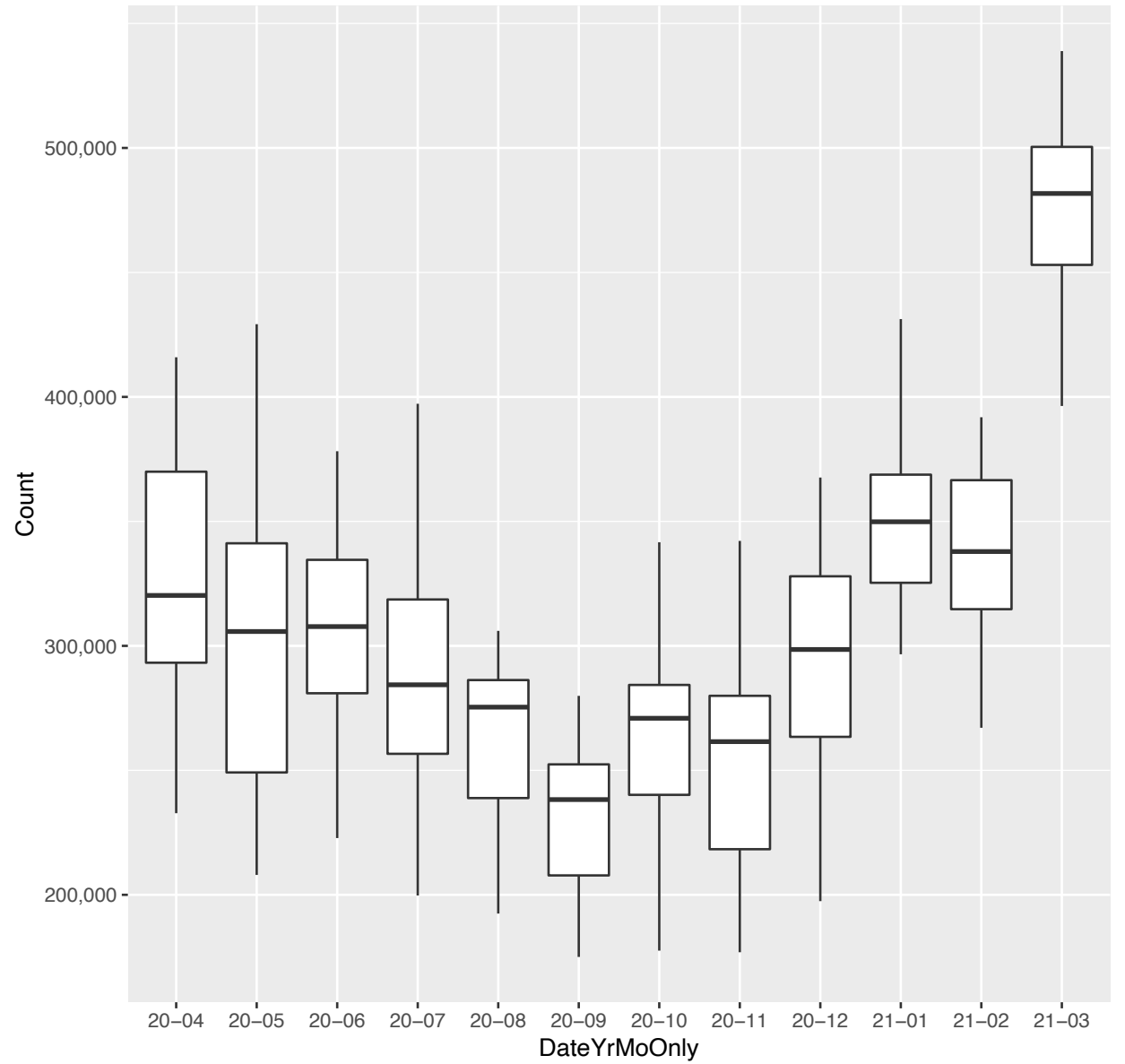
20. gwu.edu:

● U shaped

*. gwu.edu (day-by-day counts and 28 day moving average)



*. gwu.edu (monthly boxplots (outliers trimmed))

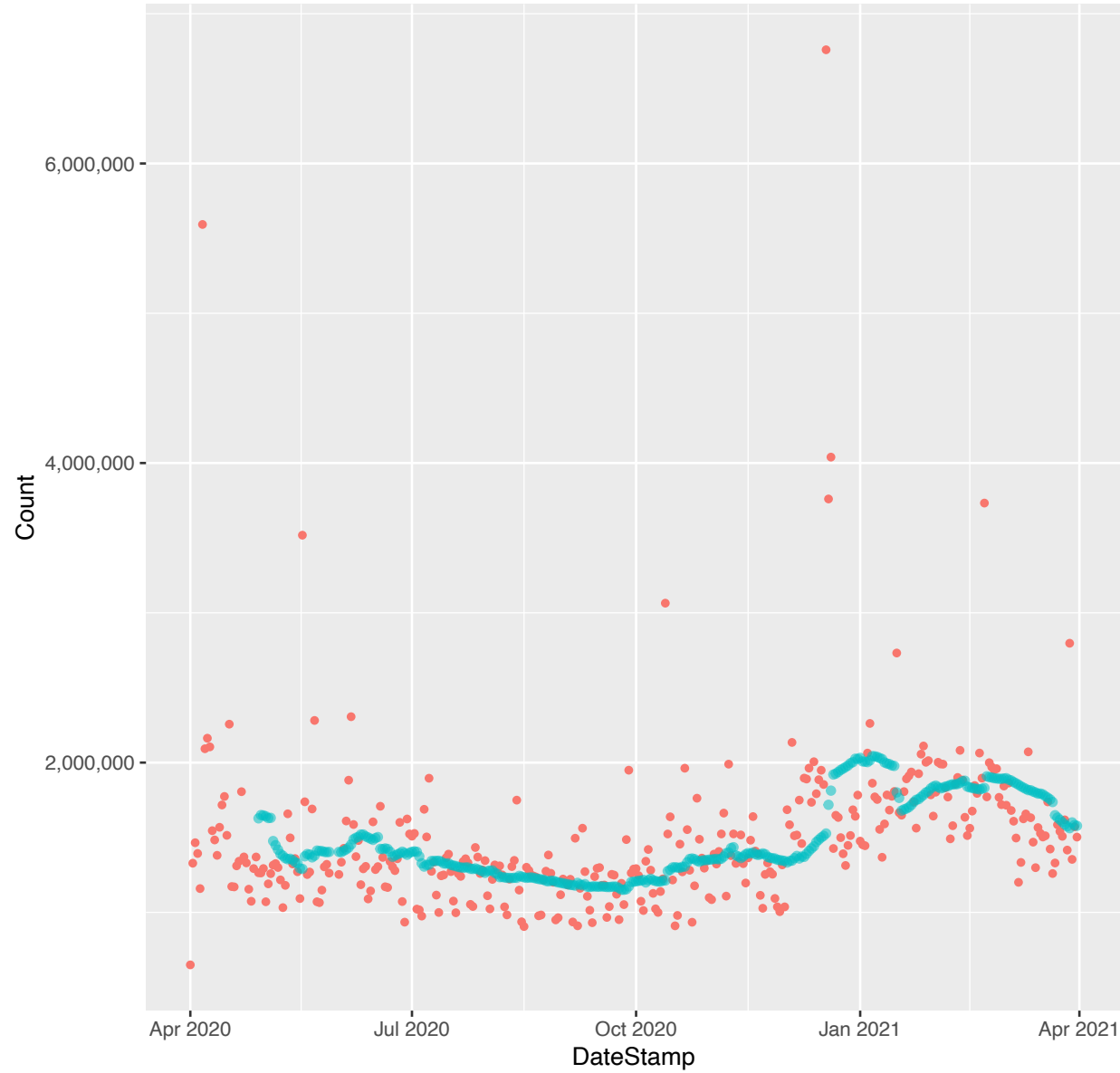


21. harvard.edu:

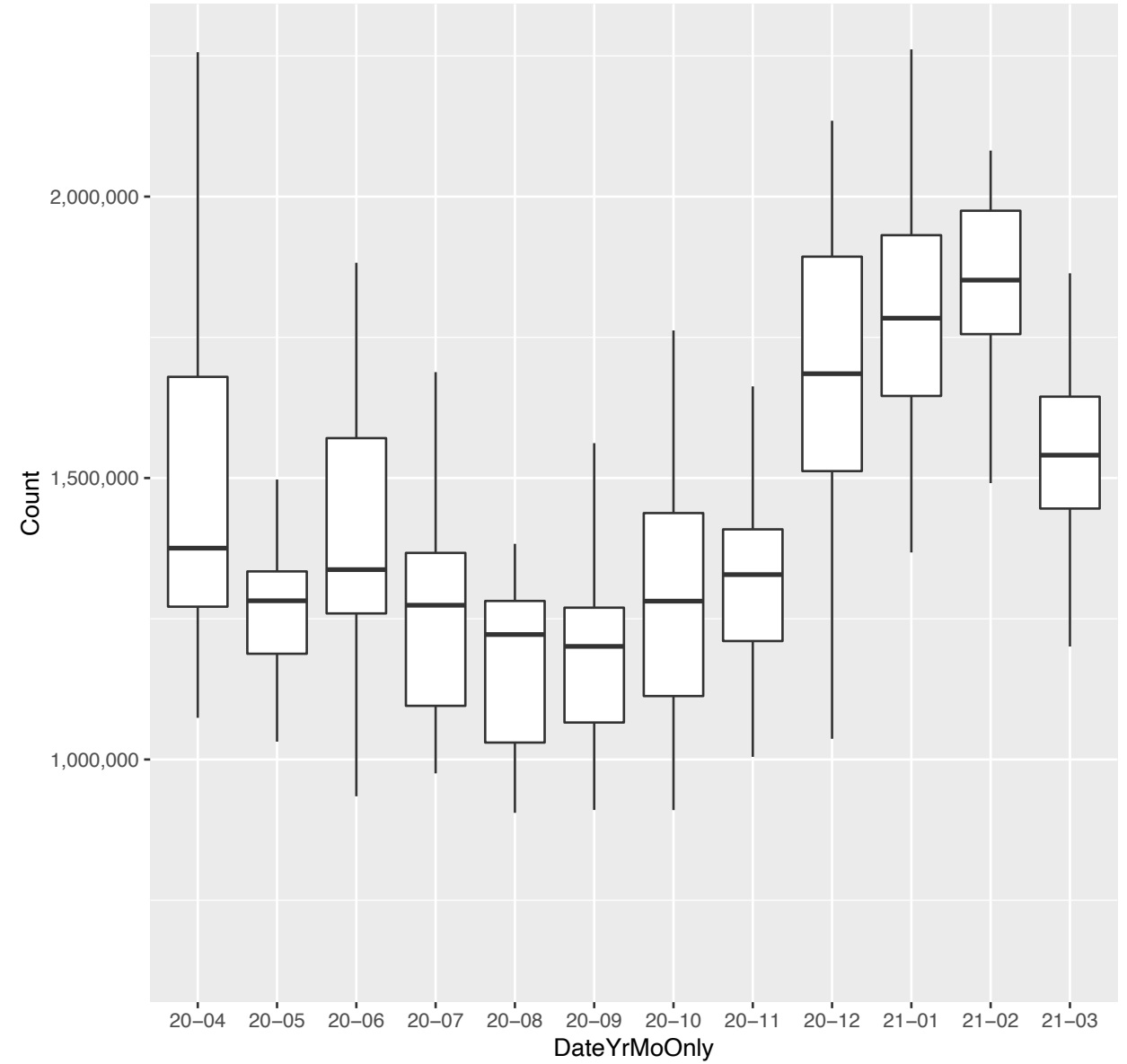
✱ ◡ shaped (ending higher)

M

*. harvard.edu (day-by-day counts and 28 day moving average)

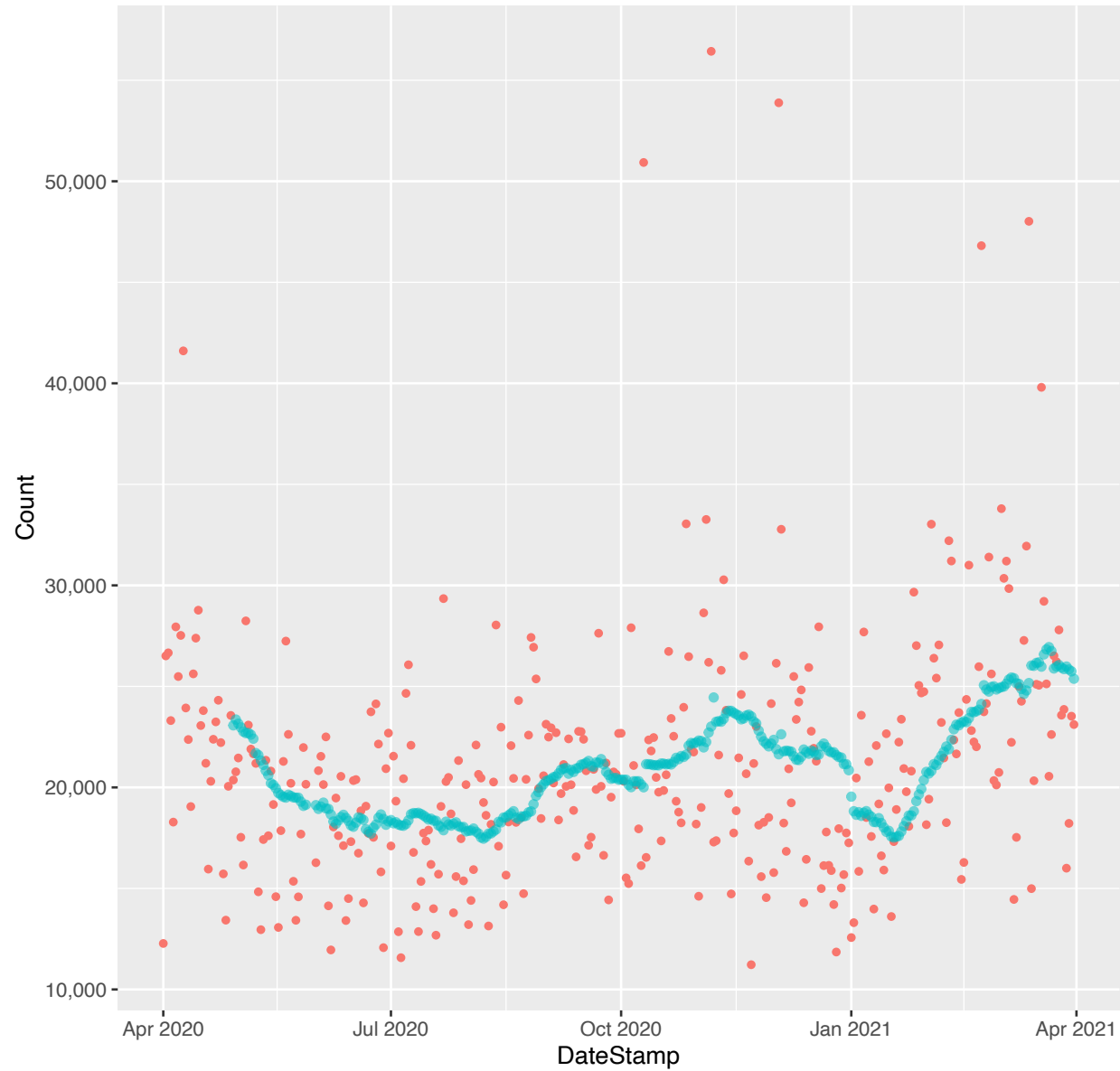


*. harvard.edu (monthly boxplots (outliers trimmed))

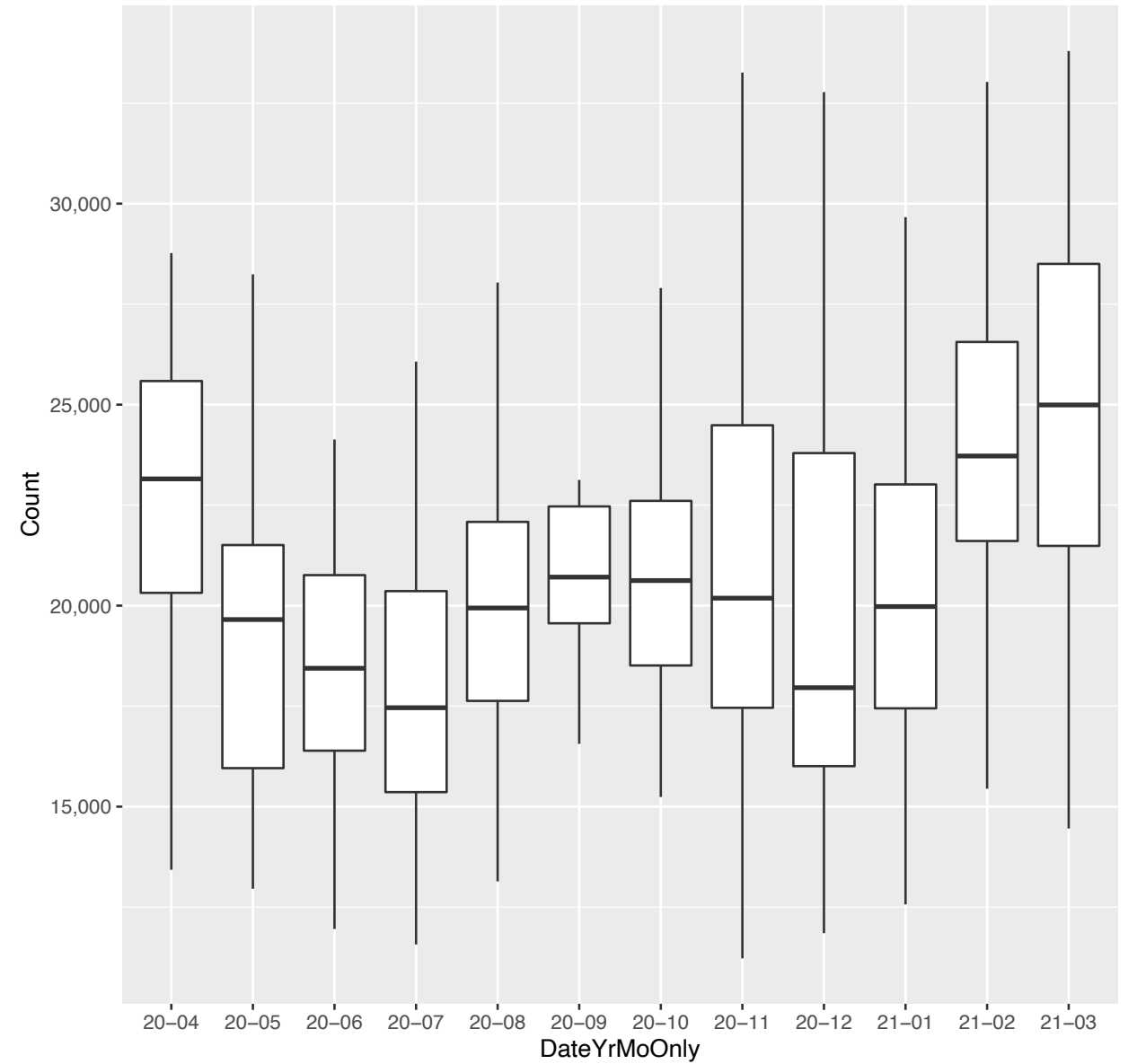


22. hmc.edu: ~

*. hmc.edu (day-by-day counts and 28 day moving average)



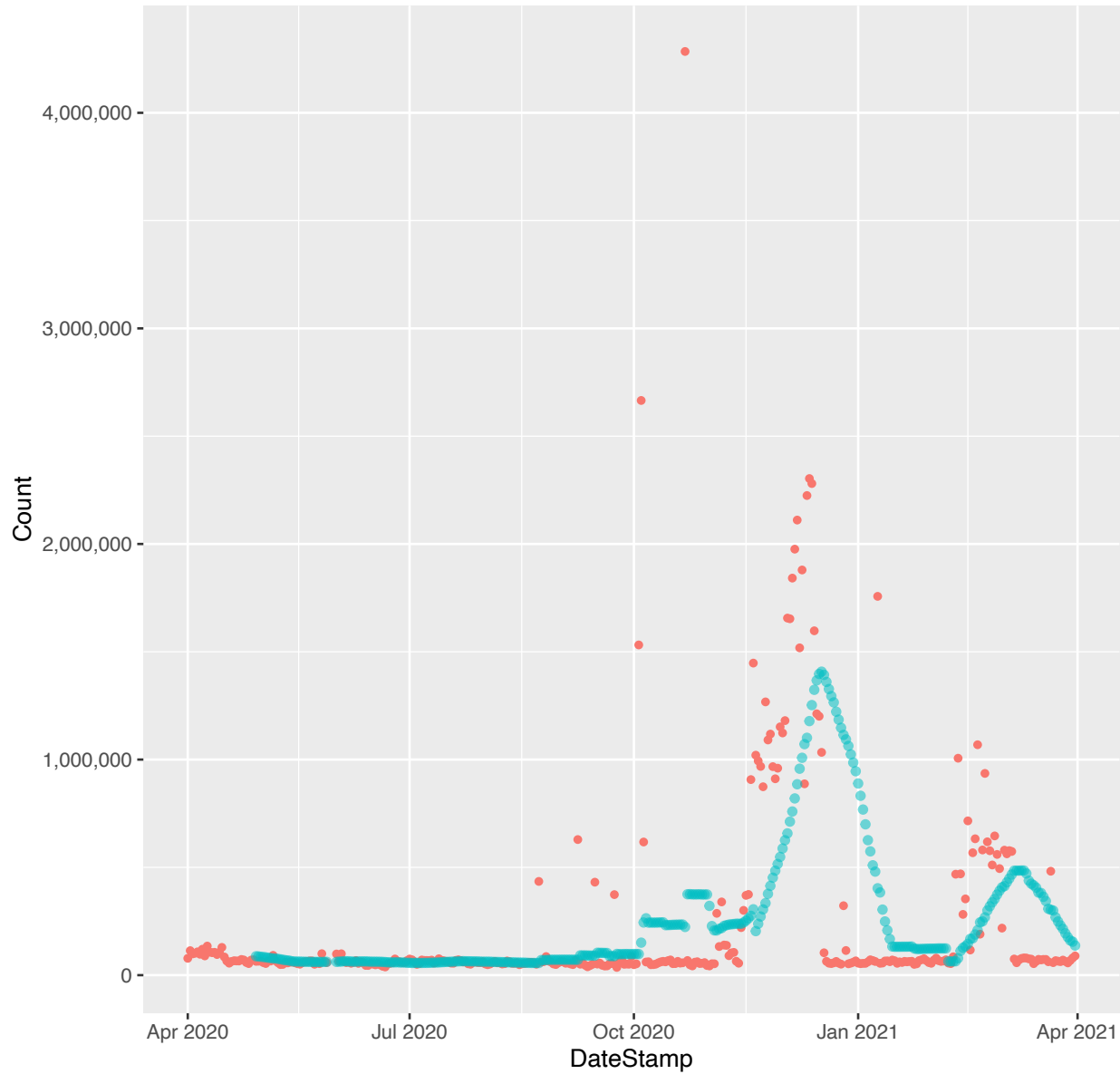
*. hmc.edu (monthly boxplots (outliers trimmed))



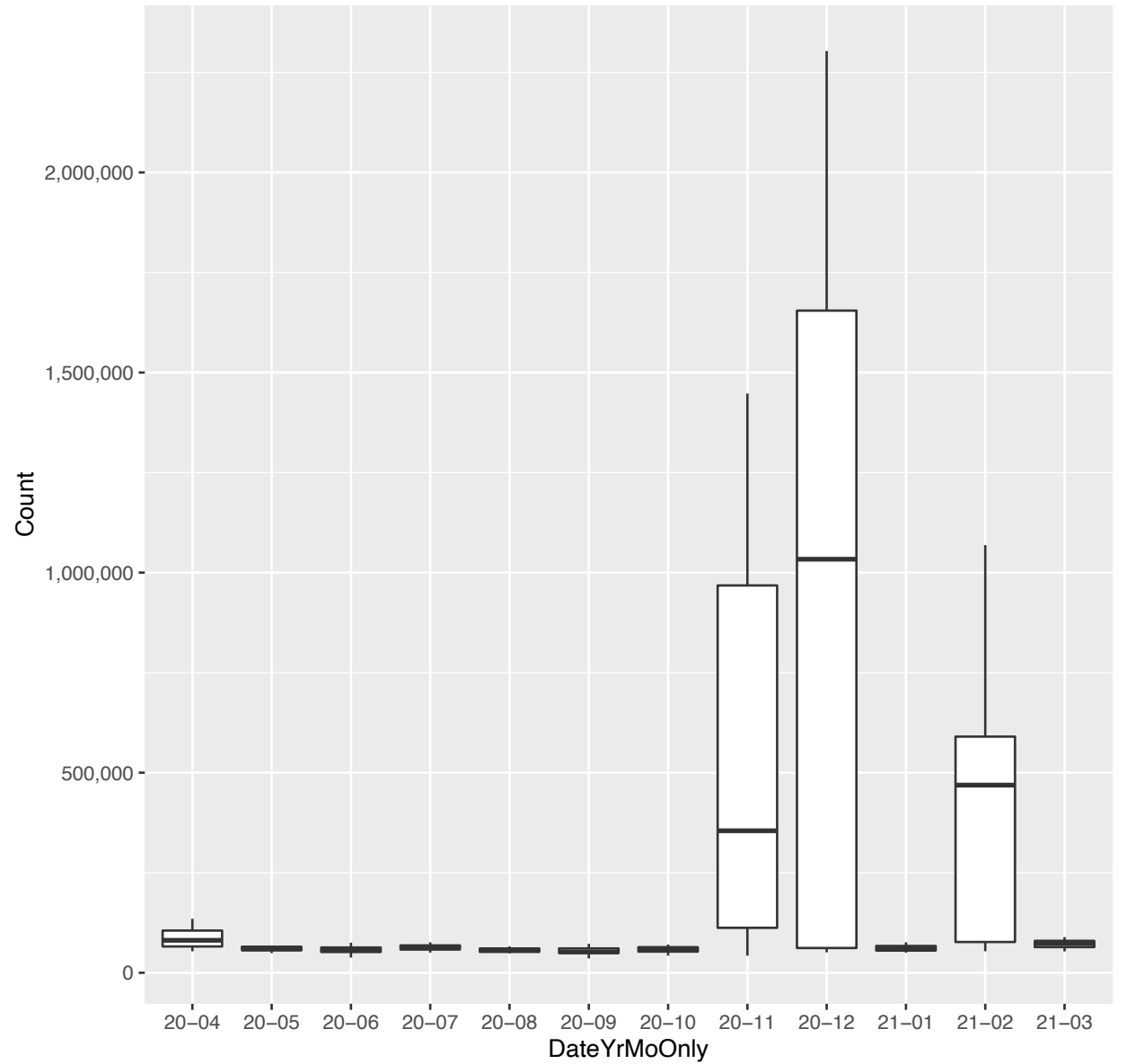
23. indiana.edu:



*. indiana.edu (day-by-day counts and 28 day moving average)

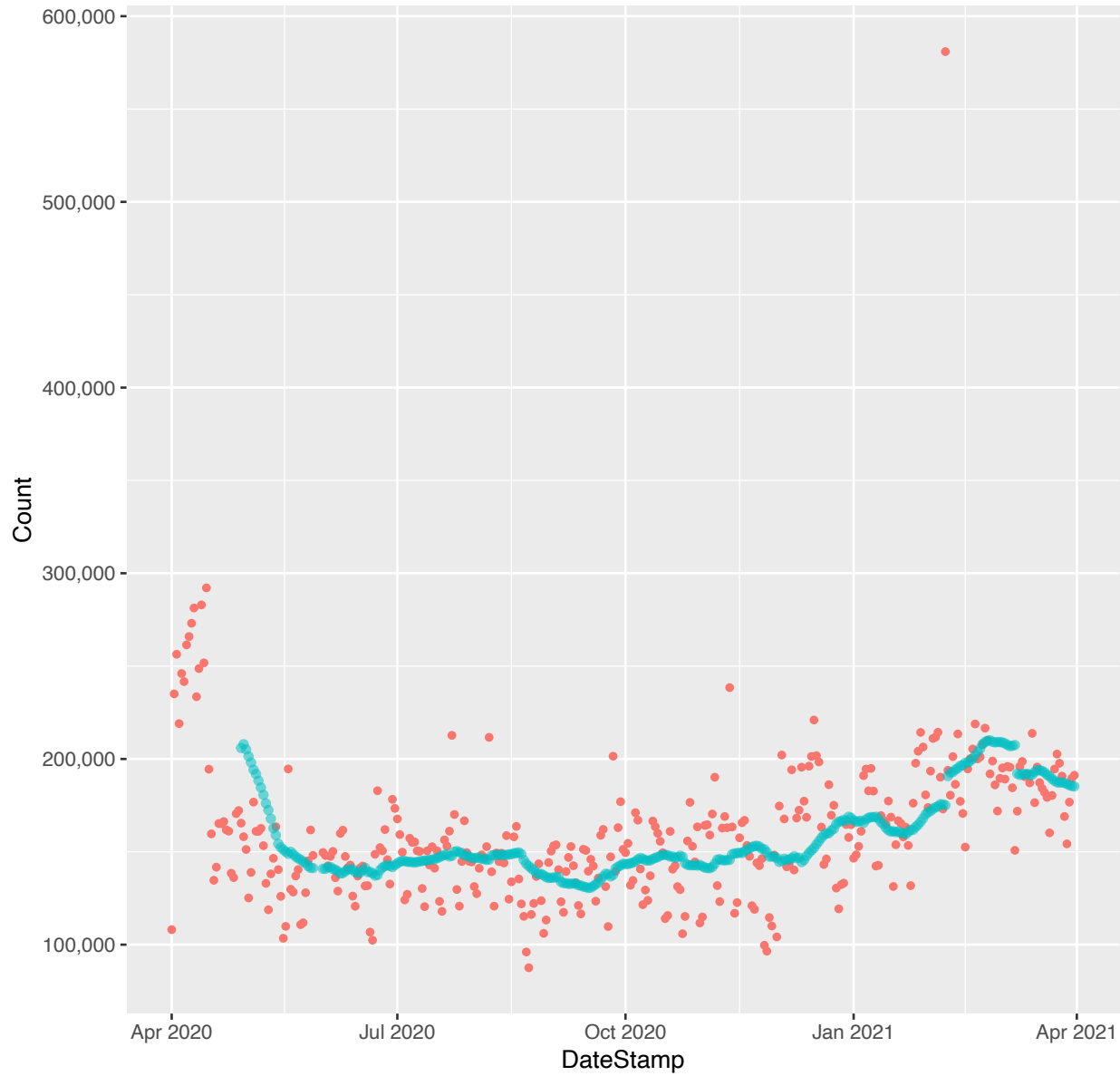


*. indiana.edu (monthly boxplots (outliers trimmed))

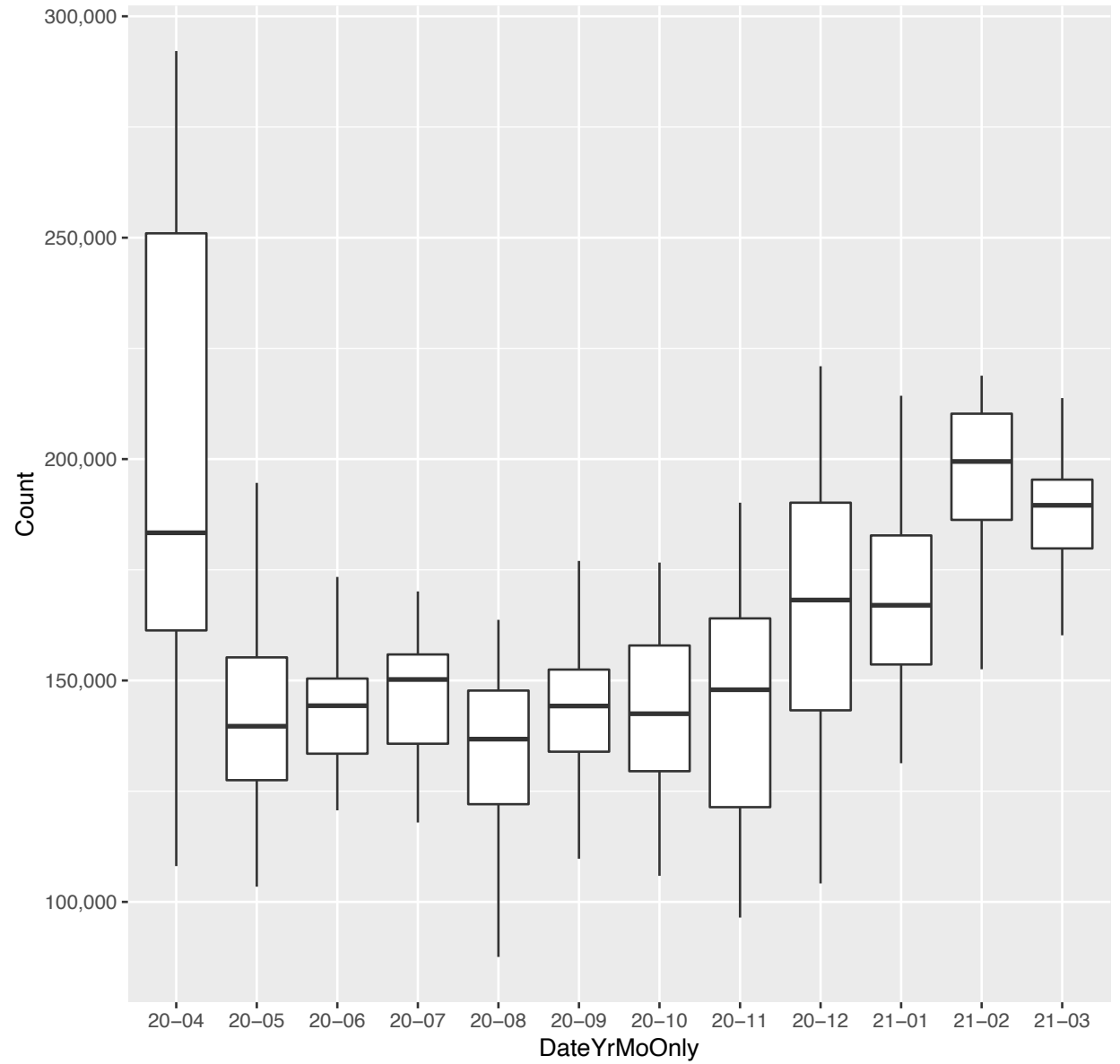


24. jhu.edu: U shaped

*. jhu.edu (day-by-day counts and 28 day moving average)



*. jhu.edu (monthly boxplots (outliers trimmed))



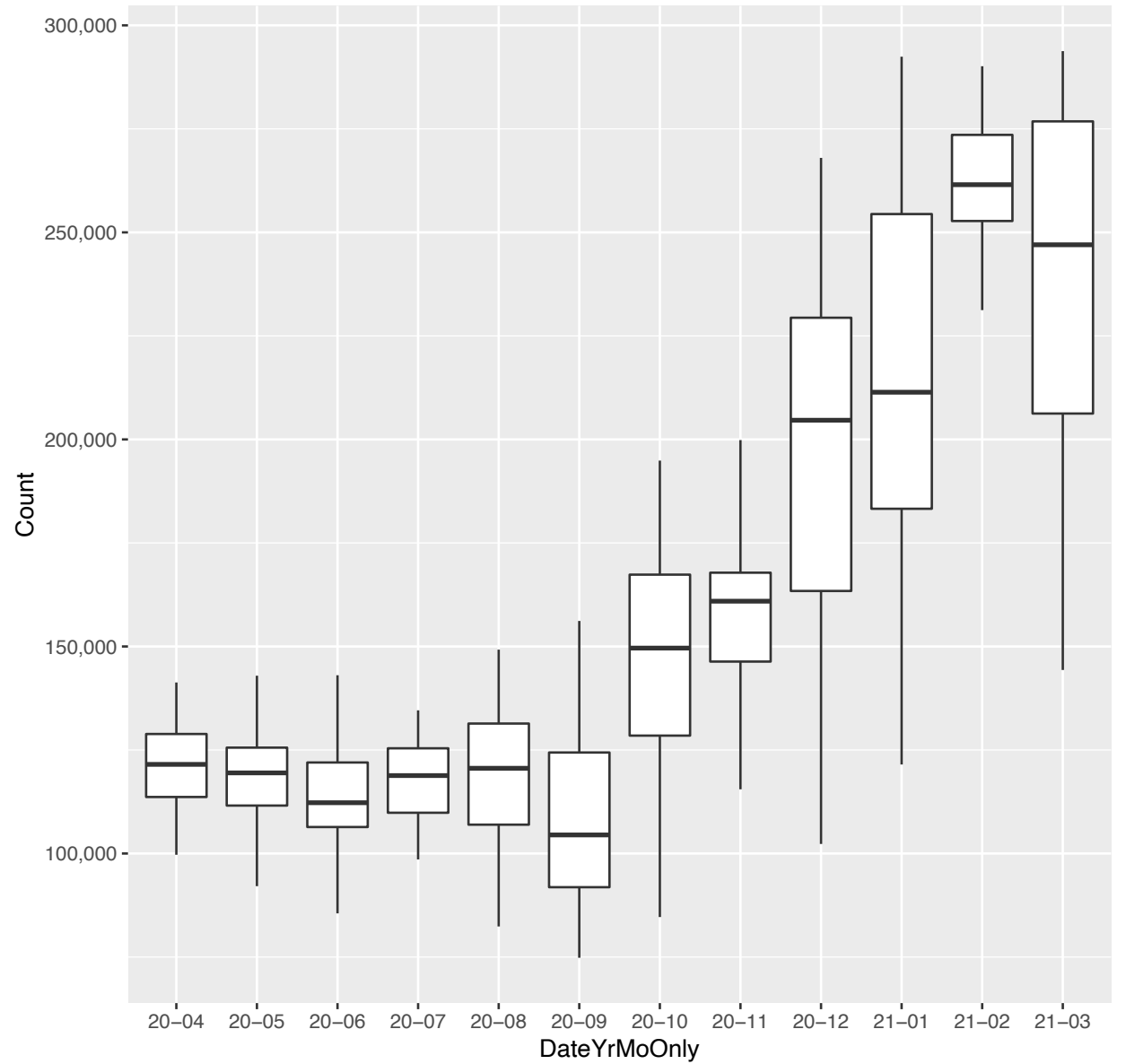
25. liberty.edu:



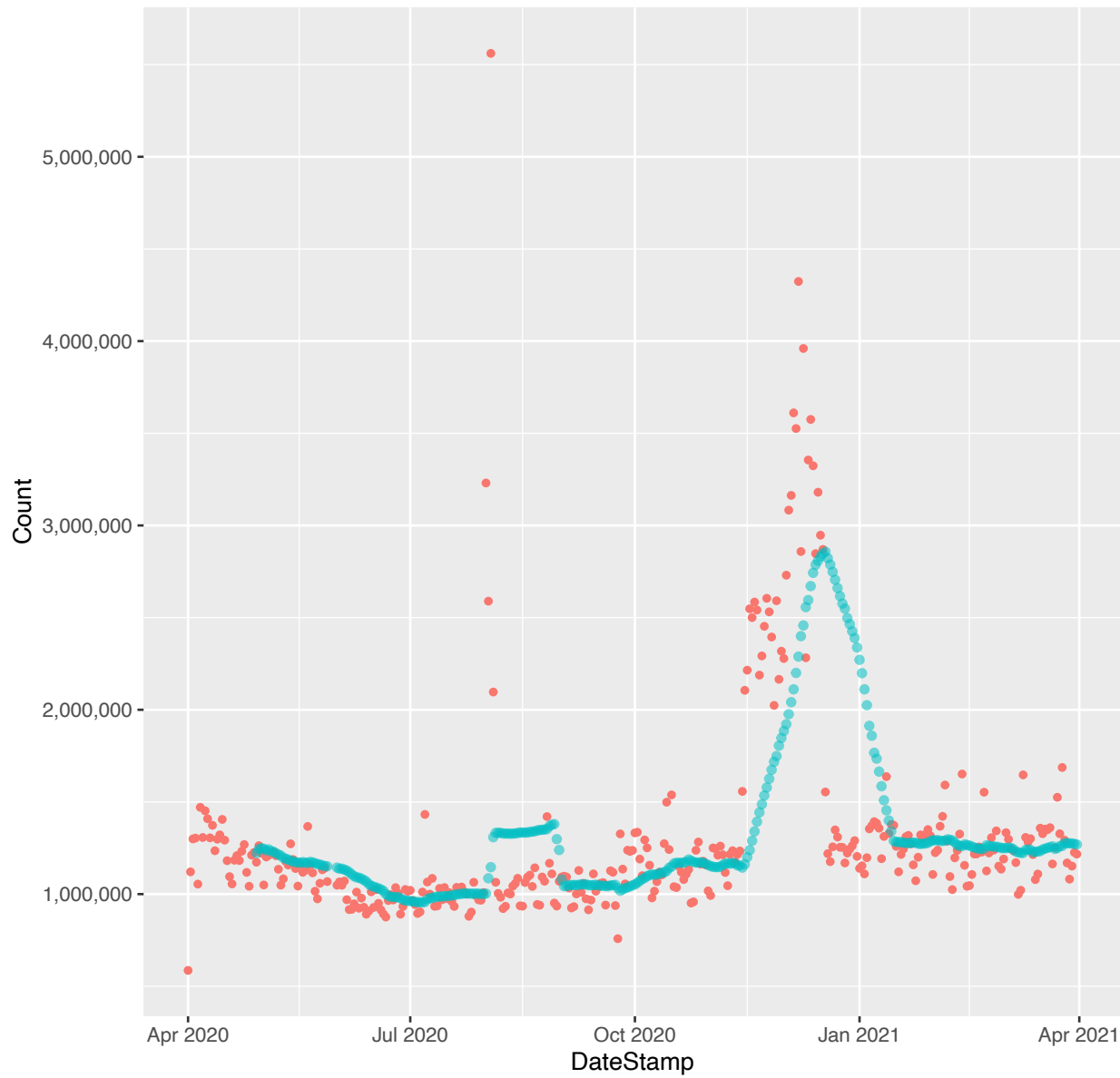
*. liberty.edu (day-by-day counts and 28 day moving average)



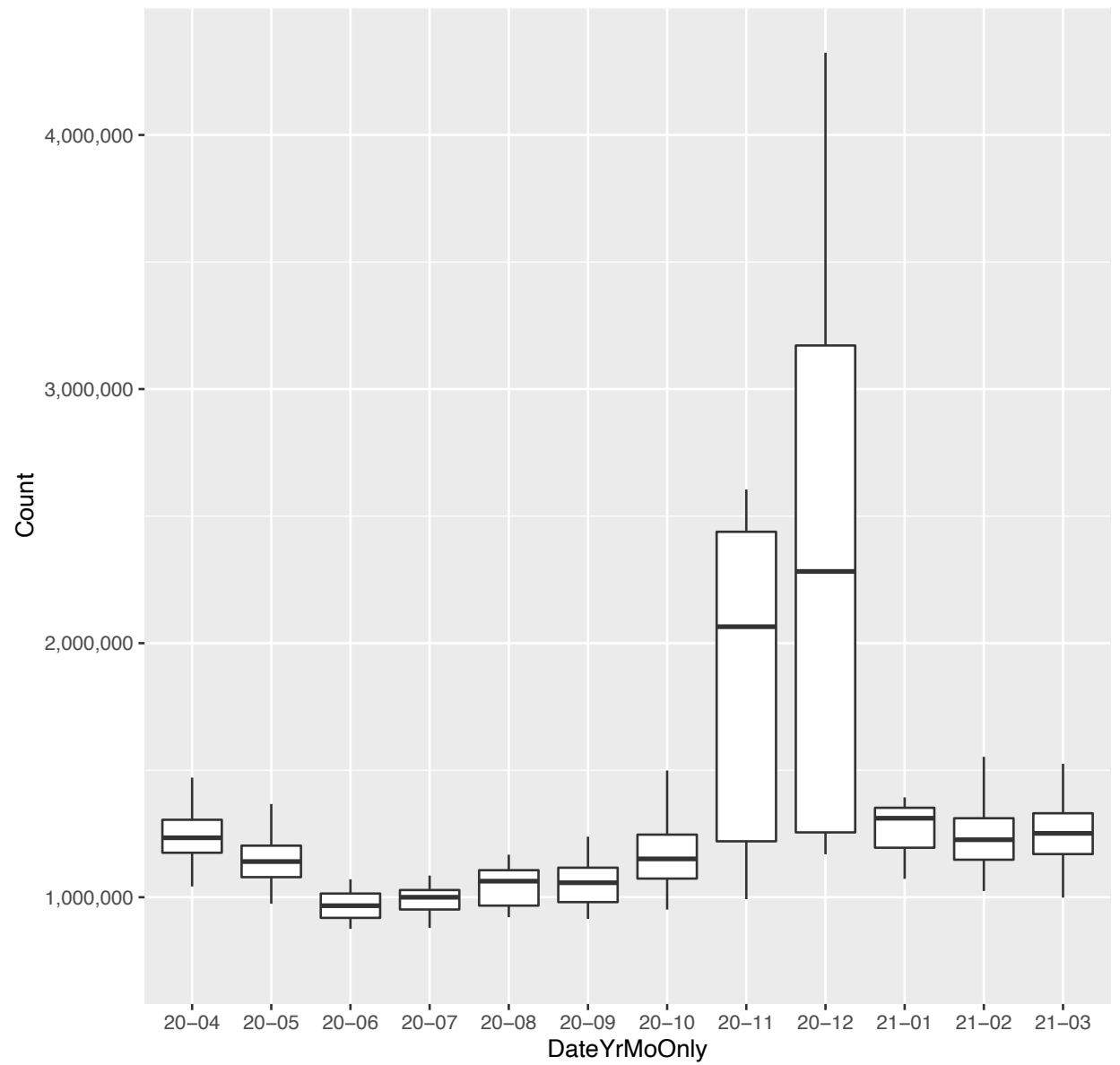
*. liberty.edu (monthly boxplots (outliers trimmed))



*. mit.edu (day-by-day counts and 28 day moving average)

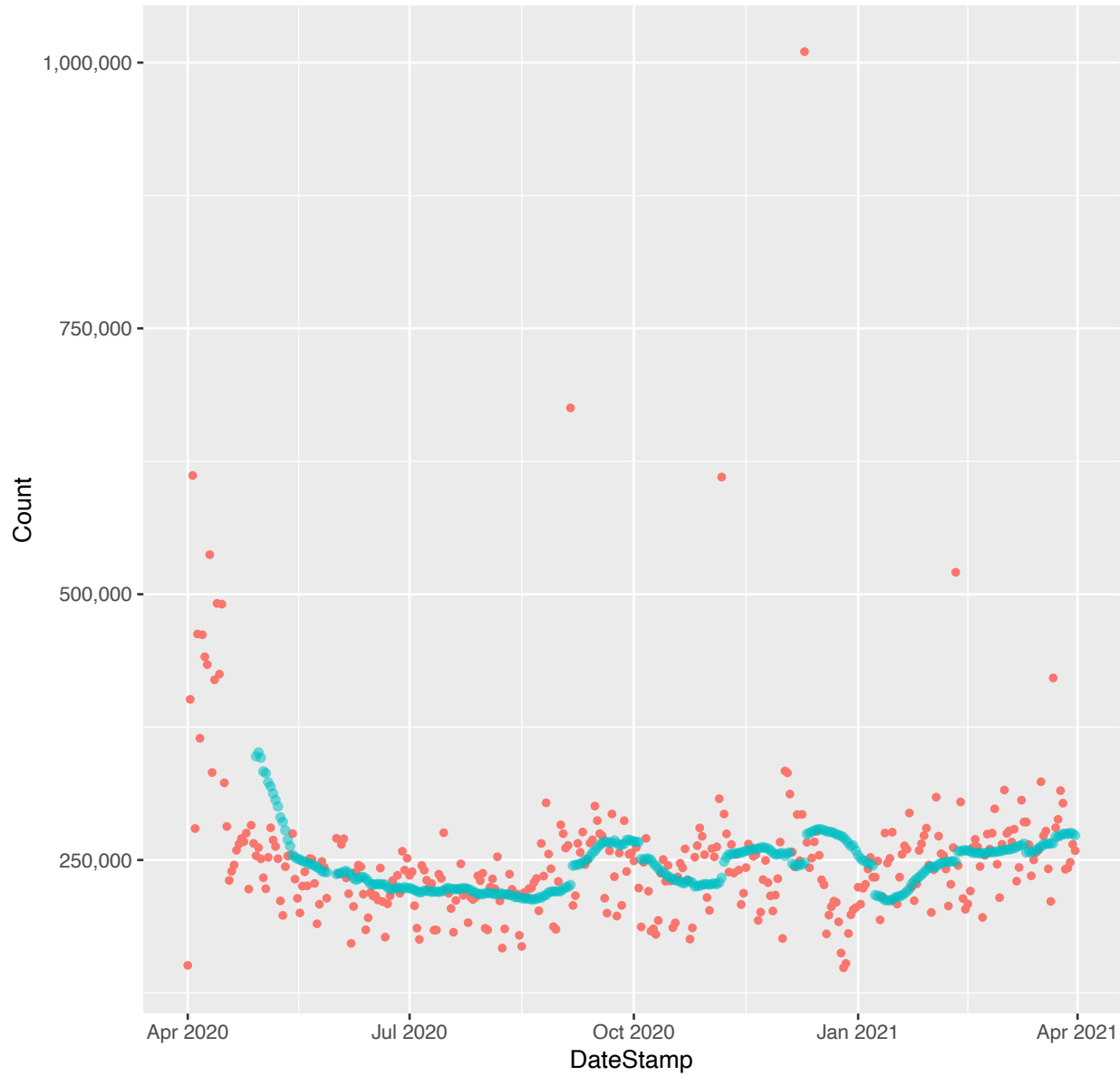


*. mit.edu (monthly boxplots (outliers trimmed))

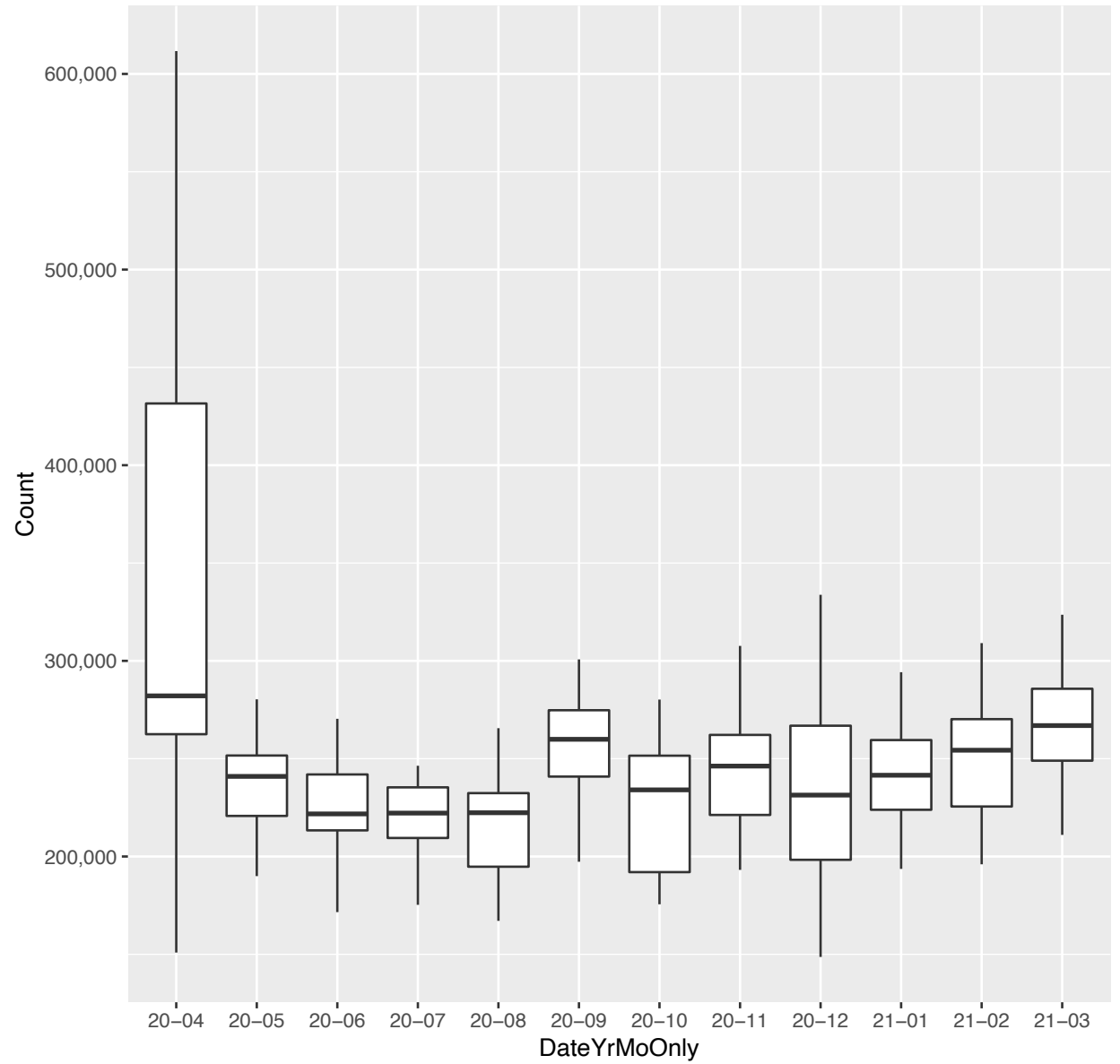


27. msu.edu: * L shaped

*. msu.edu (day-by-day counts and 28 day moving average)

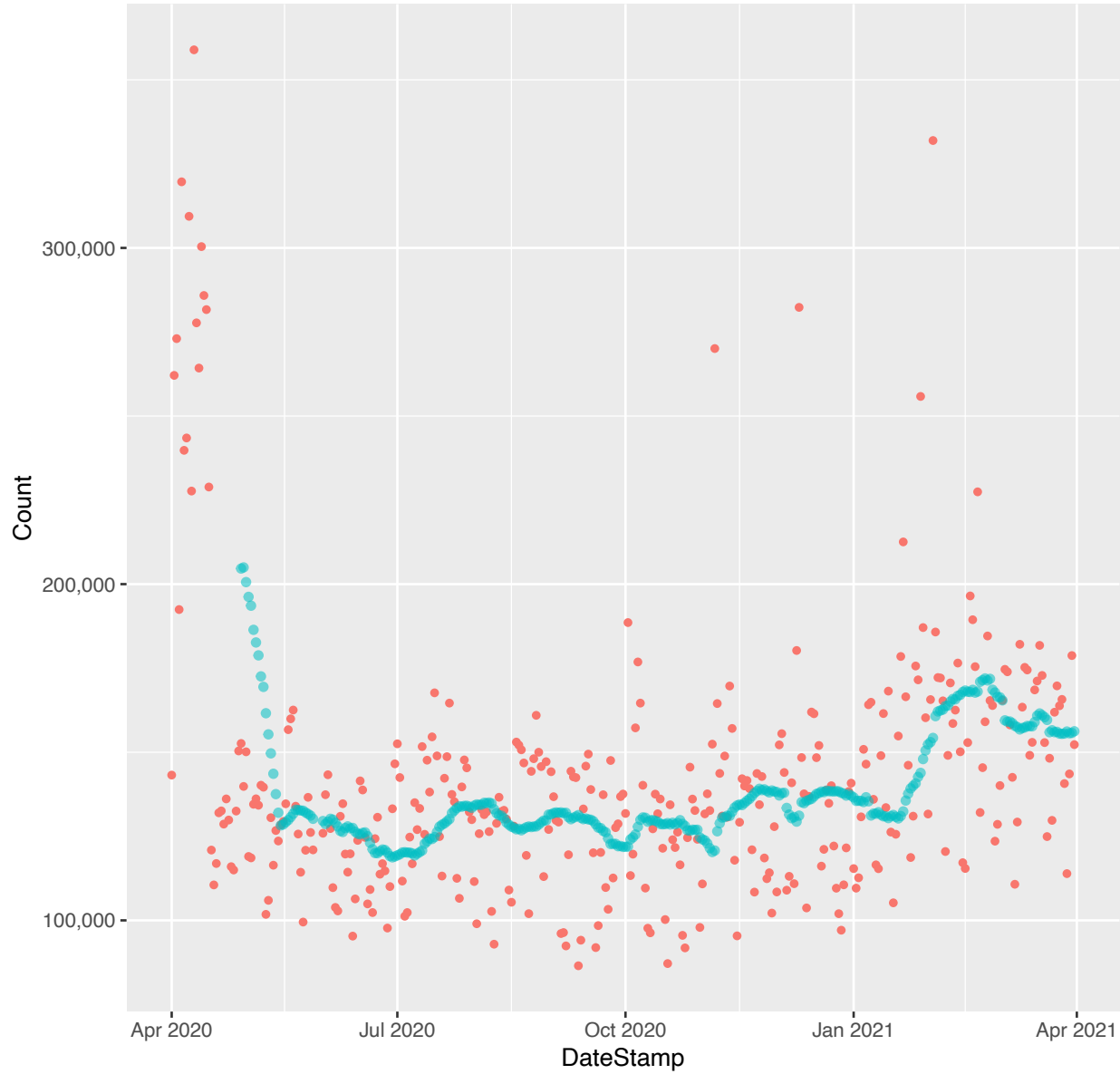


*. msu.edu (monthly boxplots (outliers trimmed))

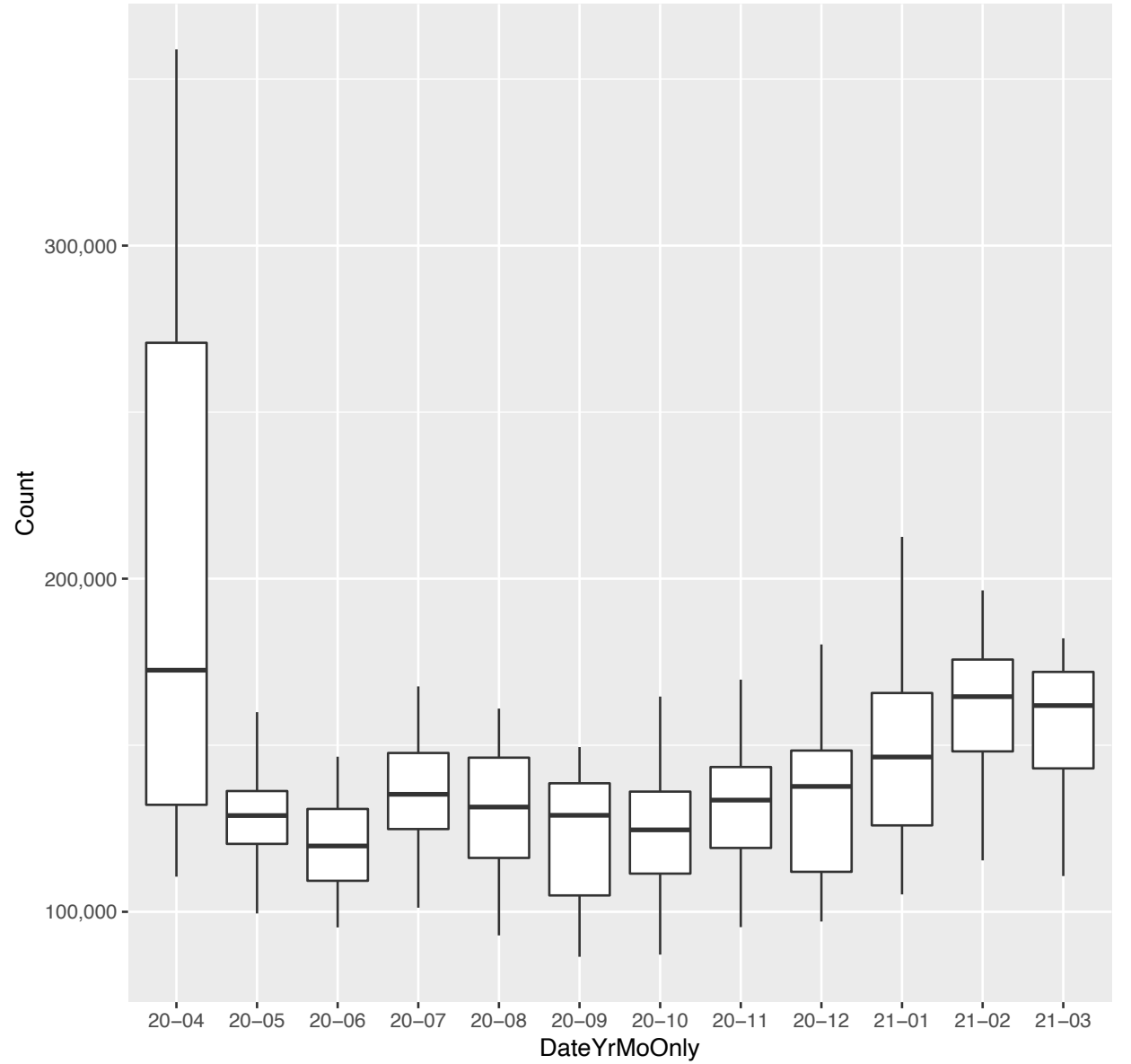


28. ncsu.edu: L shaped

*. ncsu.edu (day-by-day counts and 28 day moving average)

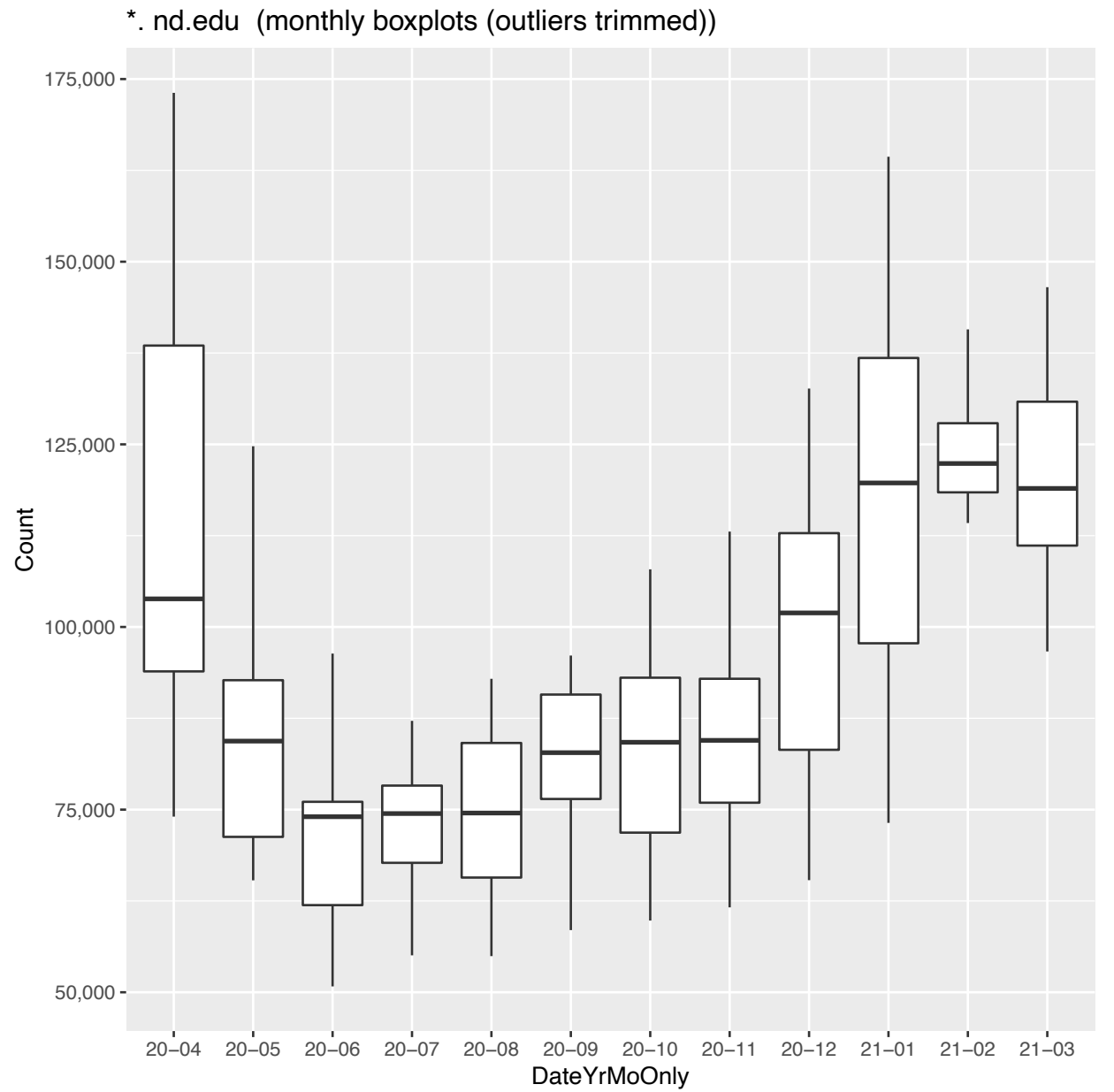
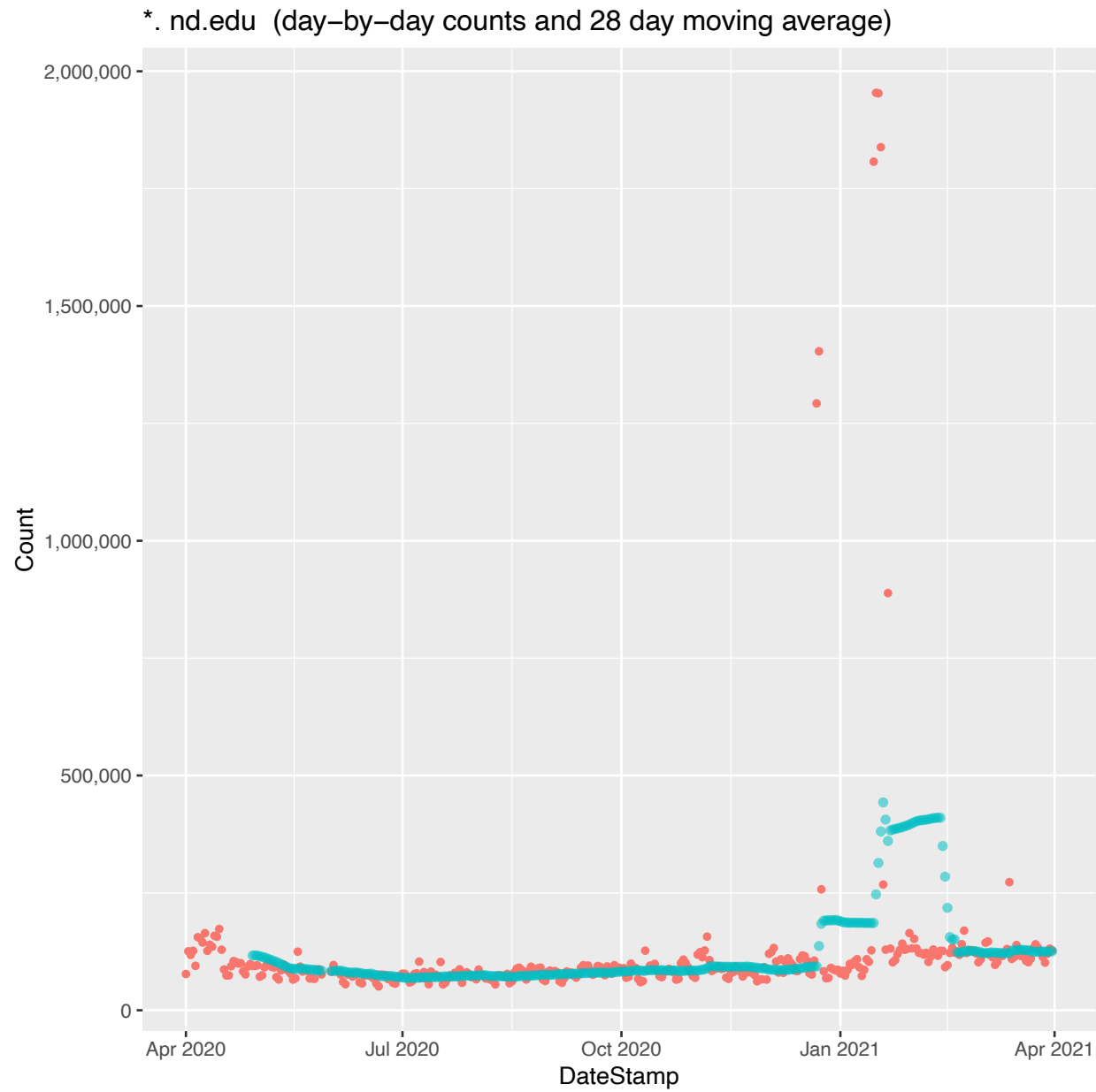


*. ncsu.edu (monthly boxplots (outliers trimmed))



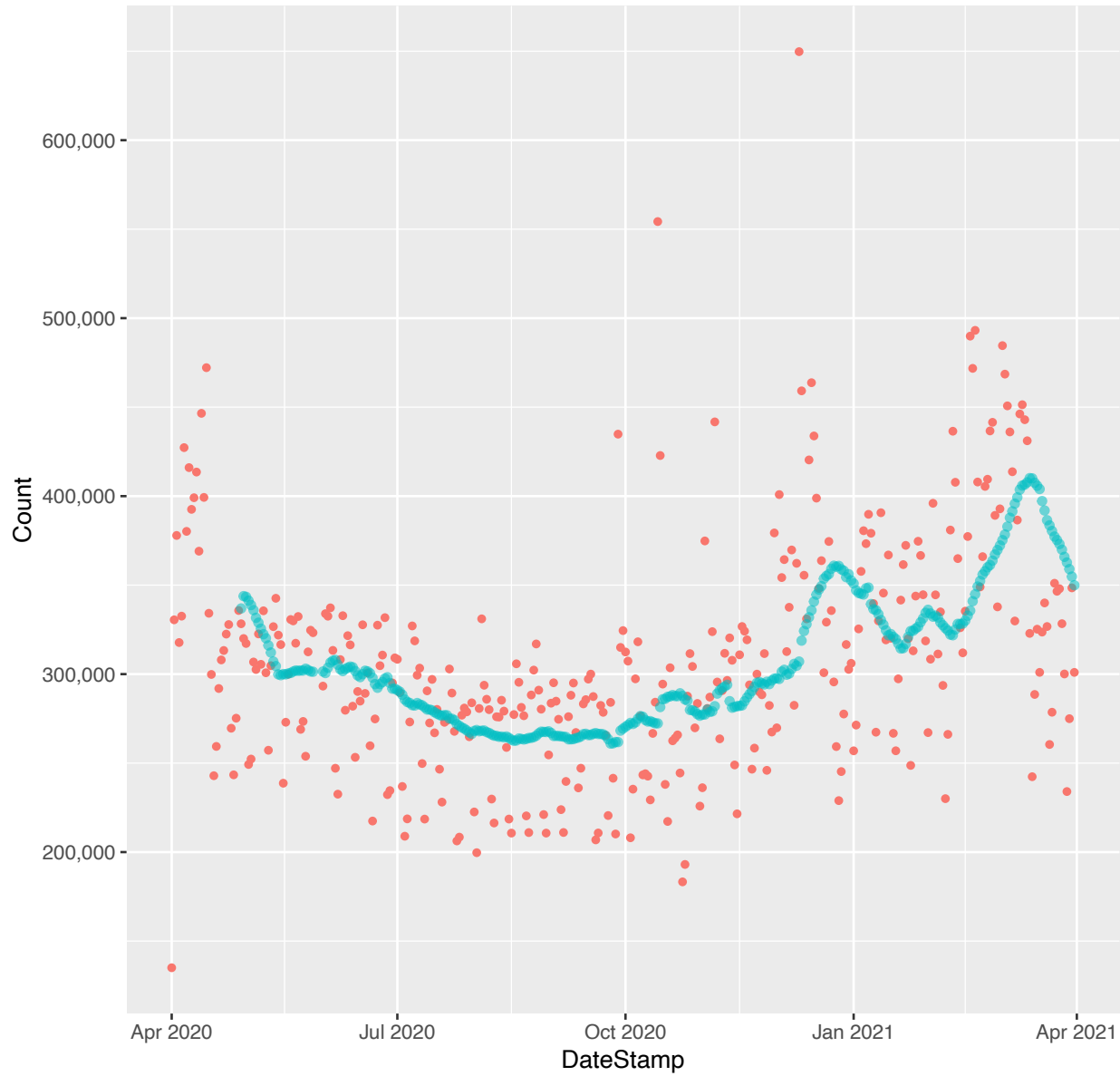
29. nd.edu:

⬤ U shaped

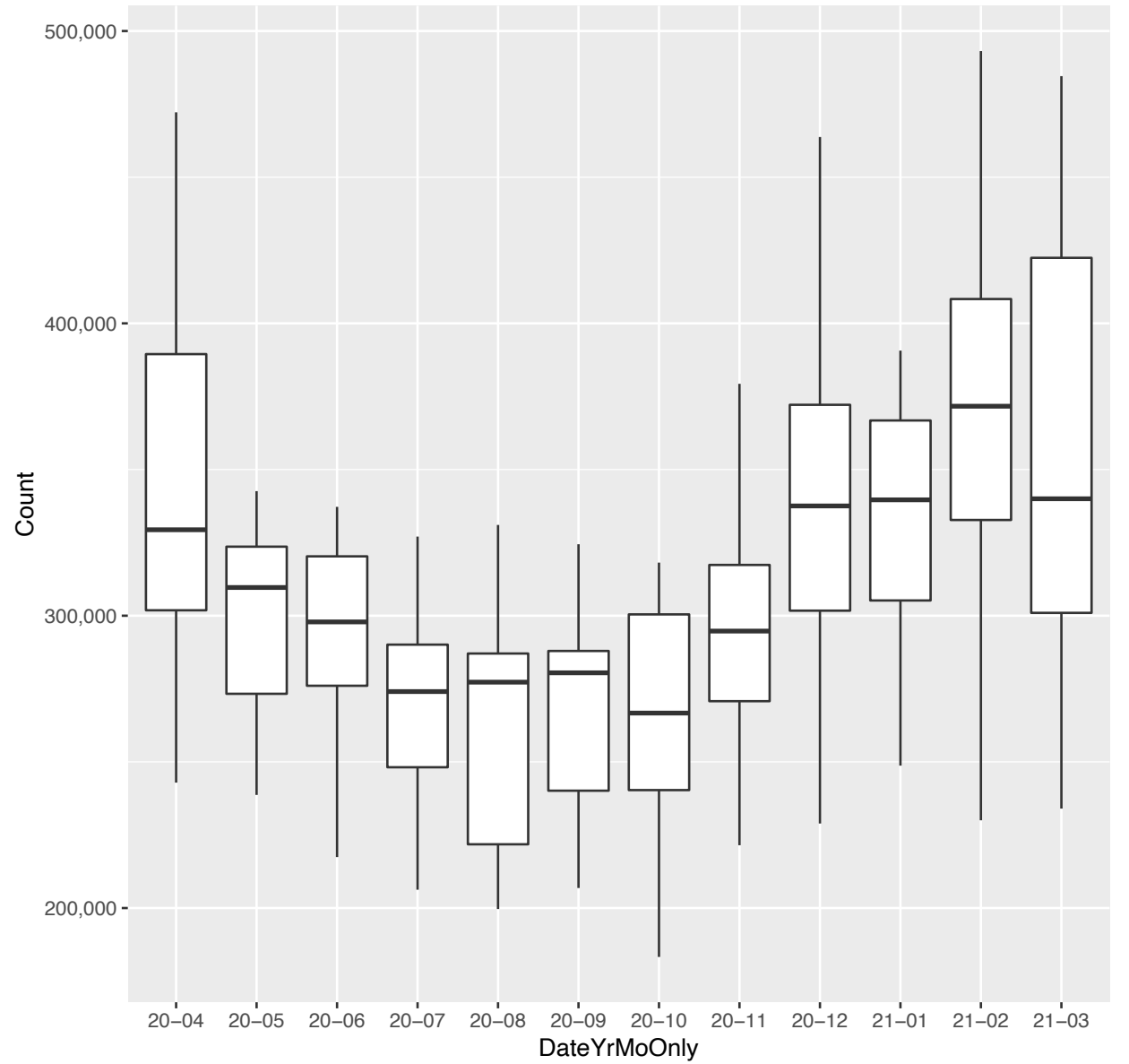


30. northwestern.edu: ○ shaped

*. northwestern.edu (day-by-day counts and 28 day moving average)



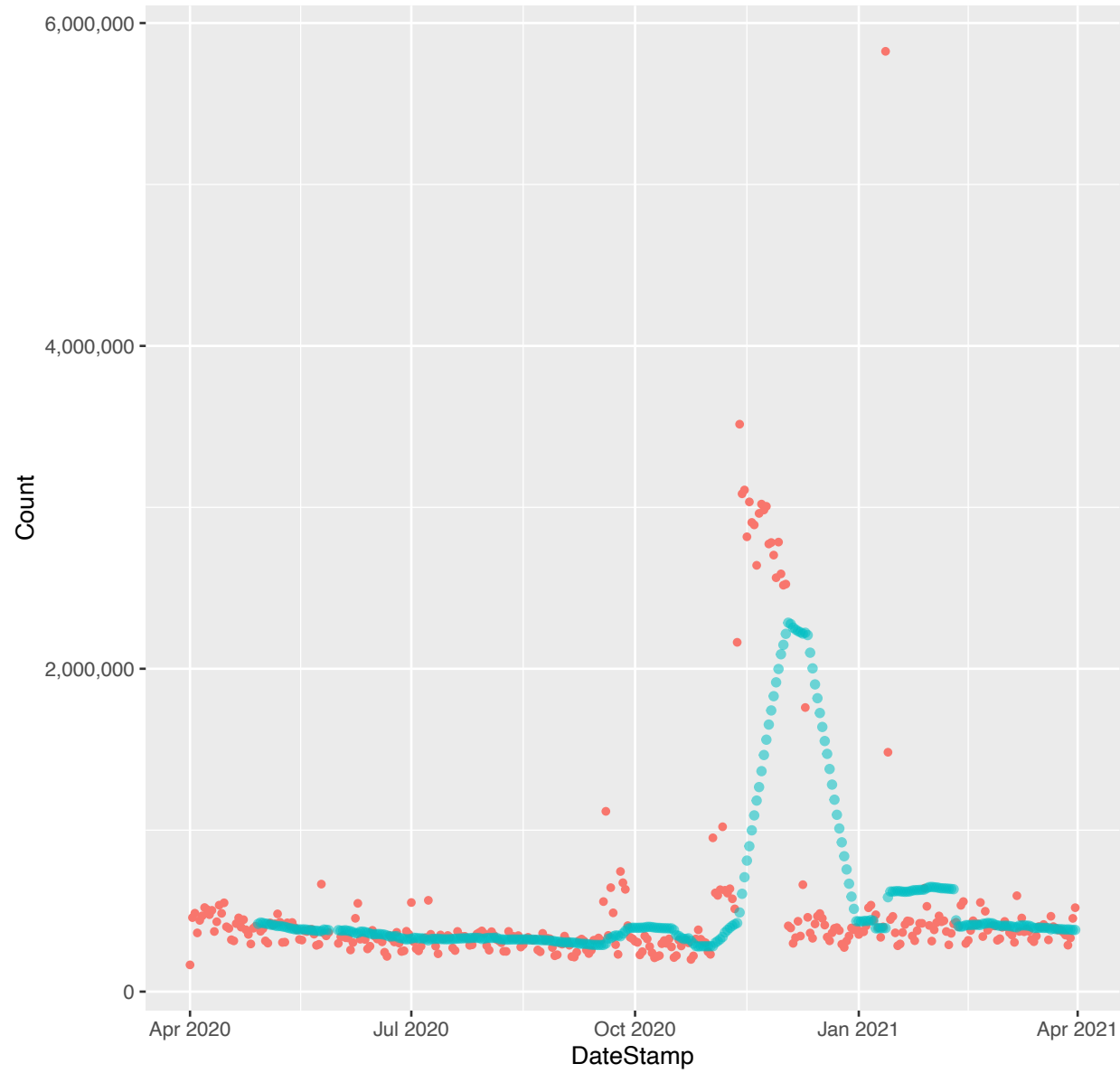
*. northwestern.edu (monthly boxplots (outliers trimmed))



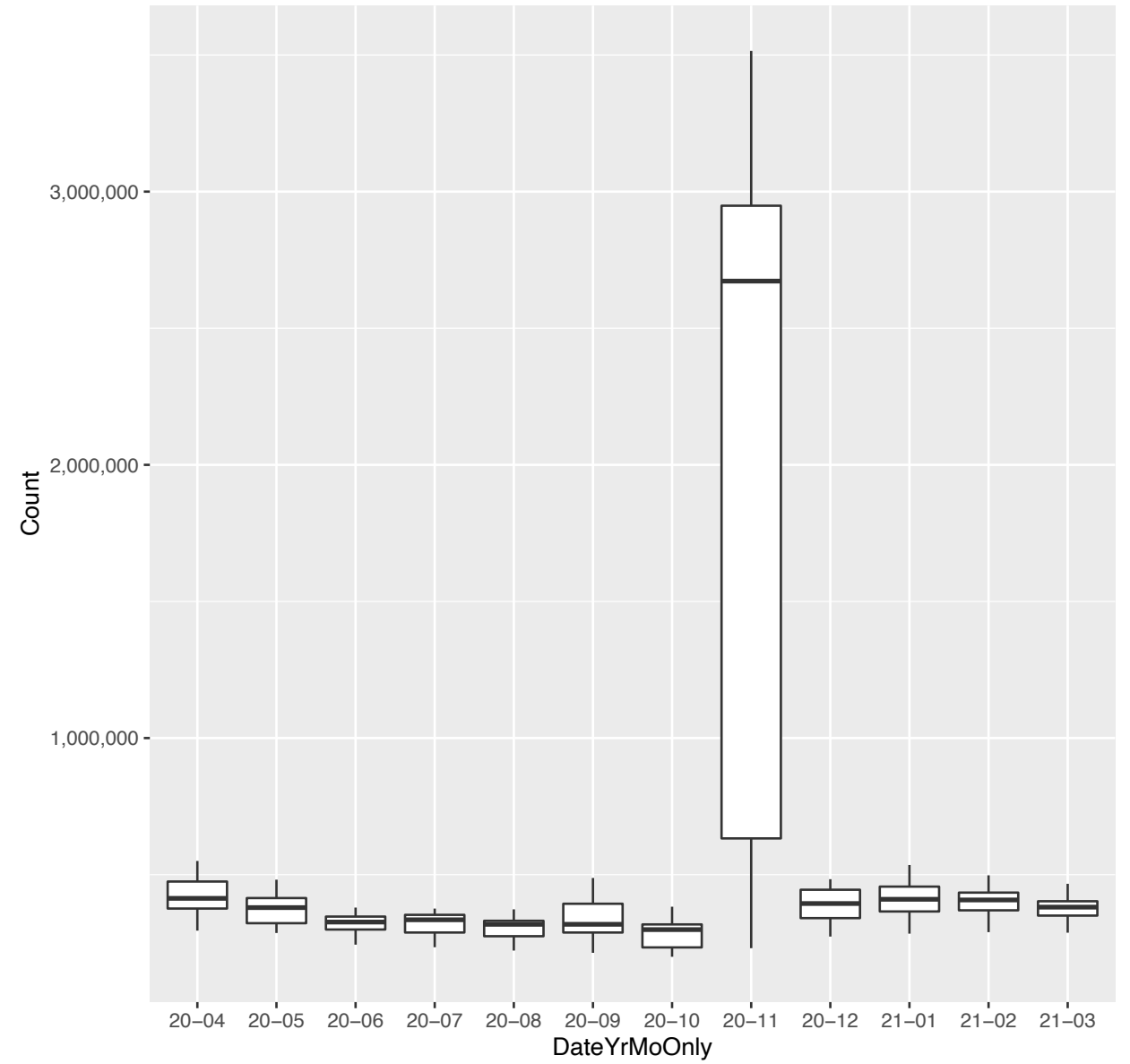
31. nyu.edu:



*. nyu.edu (day-by-day counts and 28 day moving average)

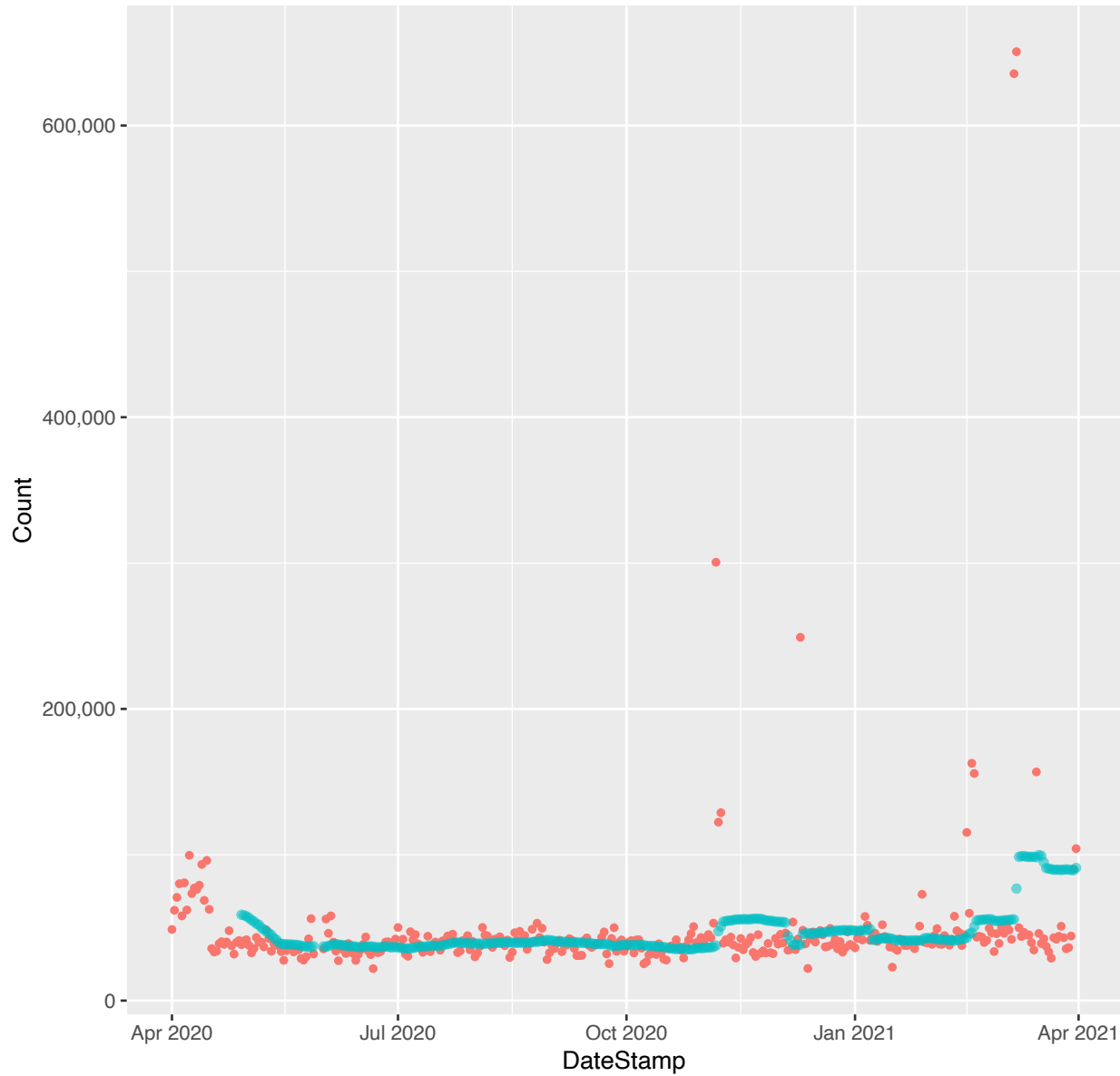


*. nyu.edu (monthly boxplots (outliers trimmed))

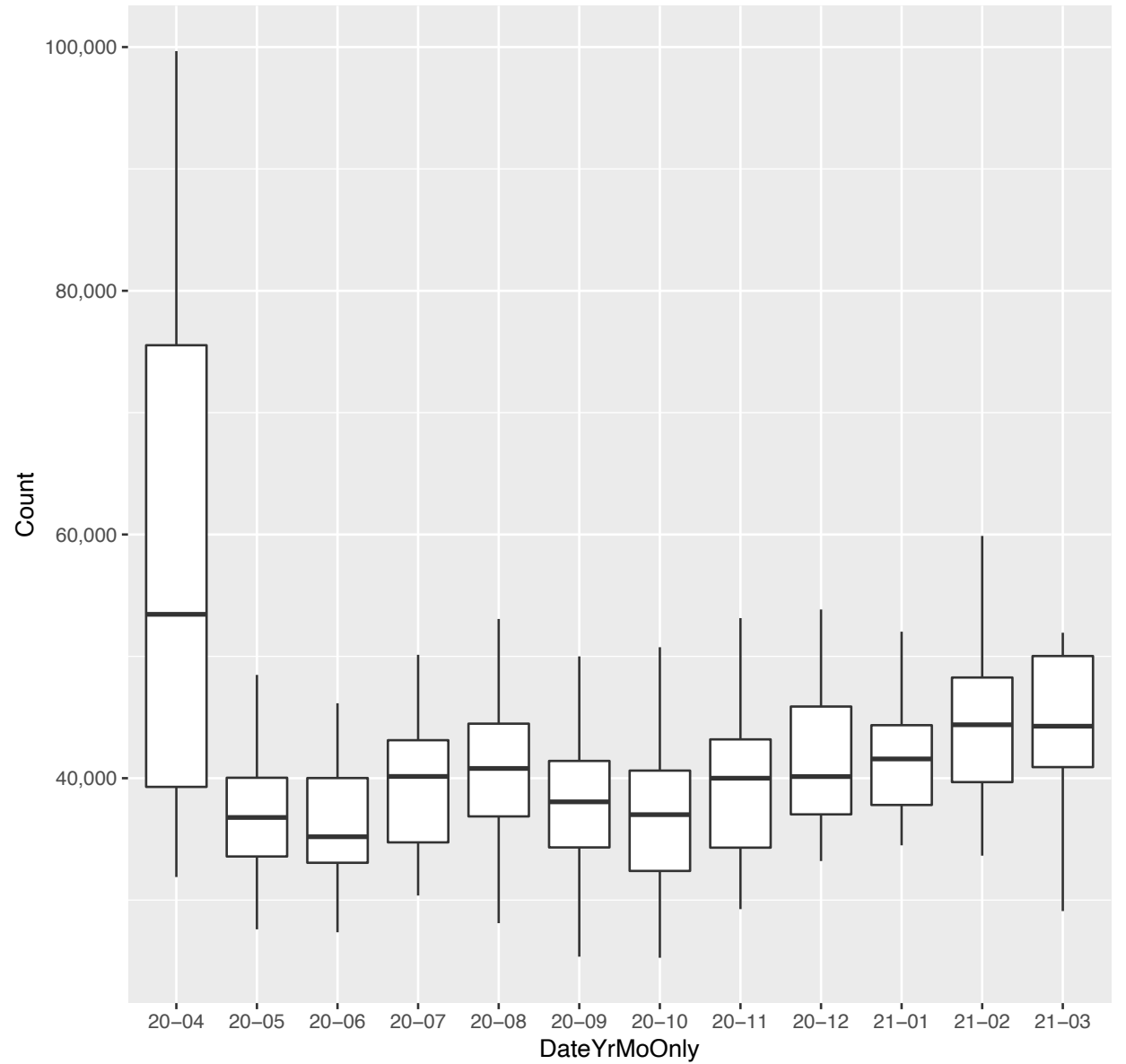


32. olemiss.edu: * L shaped

*. olemiss.edu (day-by-day counts and 28 day moving average)

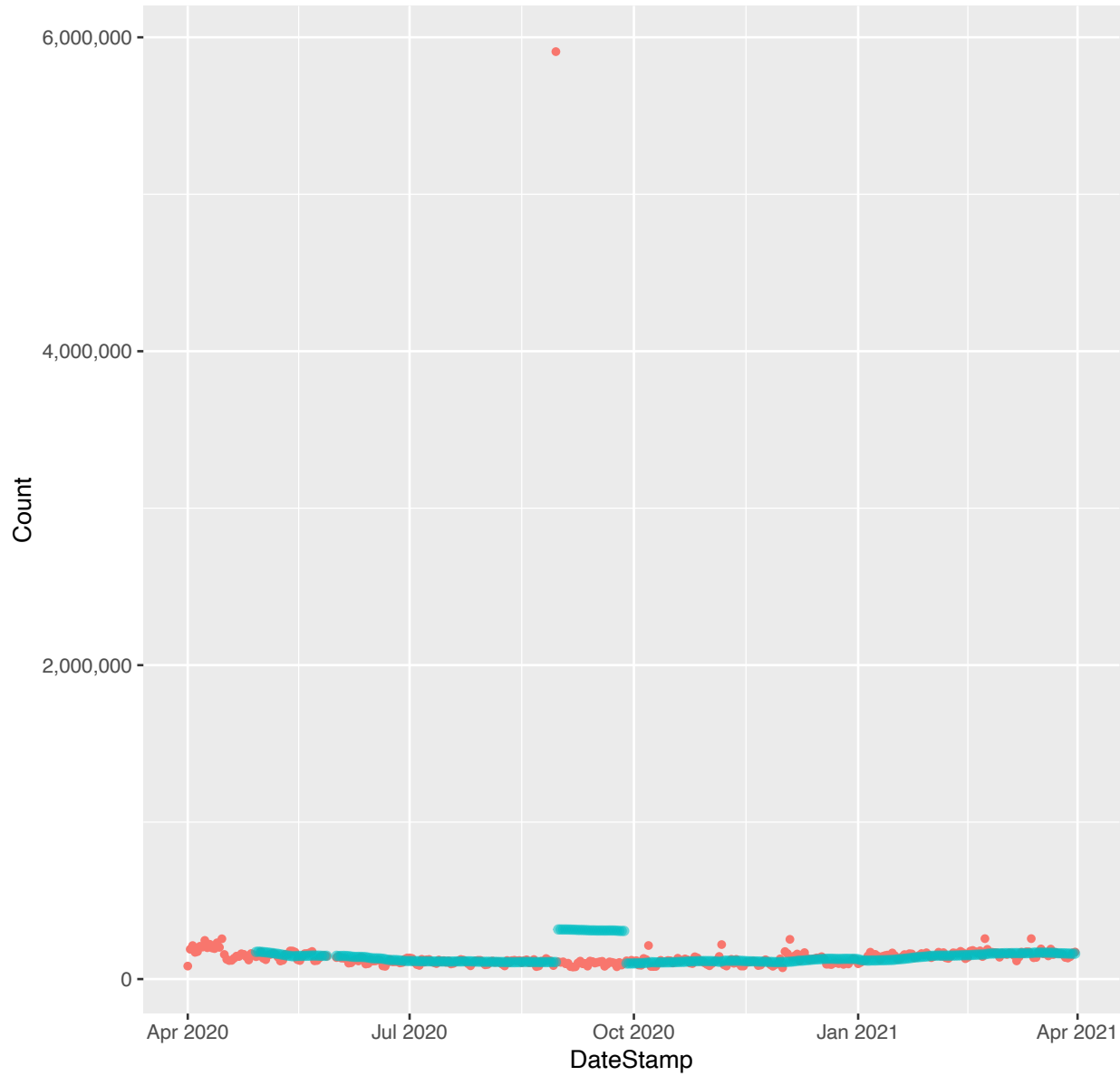


*. olemiss.edu (monthly boxplots (outliers trimmed))

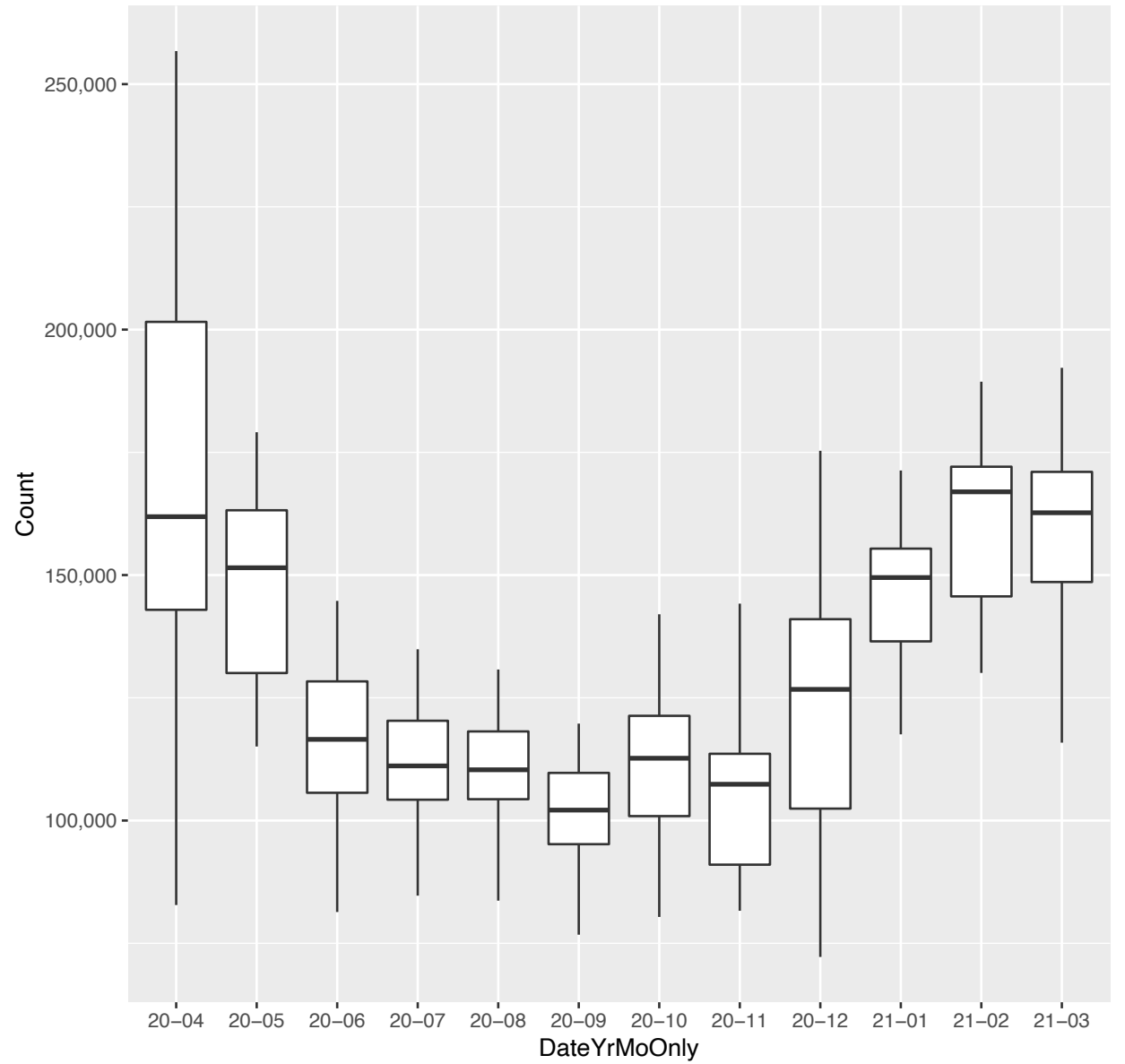


33. oregonstate.edu: * U shaped

*. oregonstate.edu (day-by-day counts and 28 day moving average)



*. oregonstate.edu (monthly boxplots (outliers trimmed))



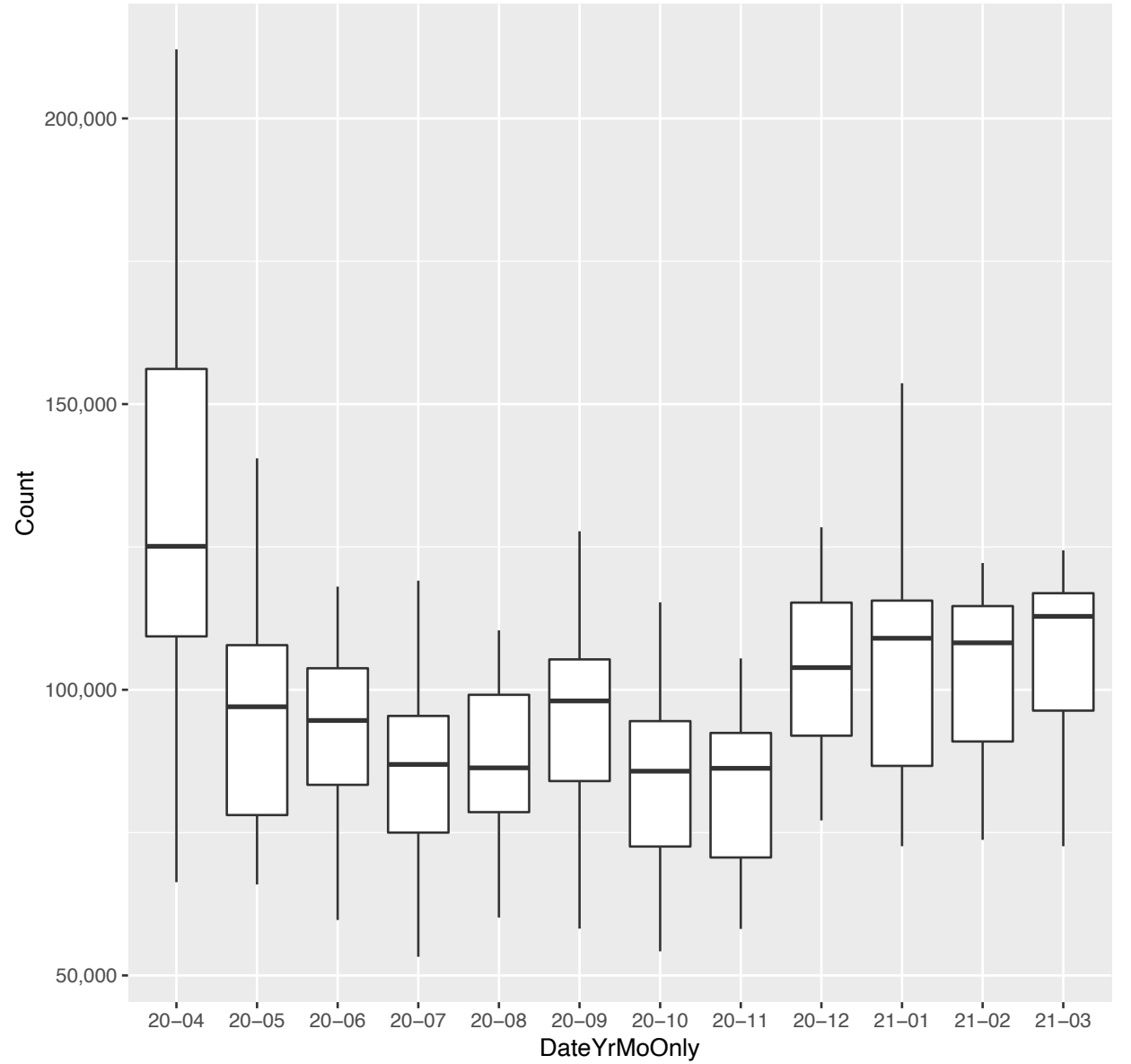
34. osu.edu:

L shaped

*. osu.edu (day-by-day counts and 28 day moving average)



*. osu.edu (monthly boxplots (outliers trimmed))



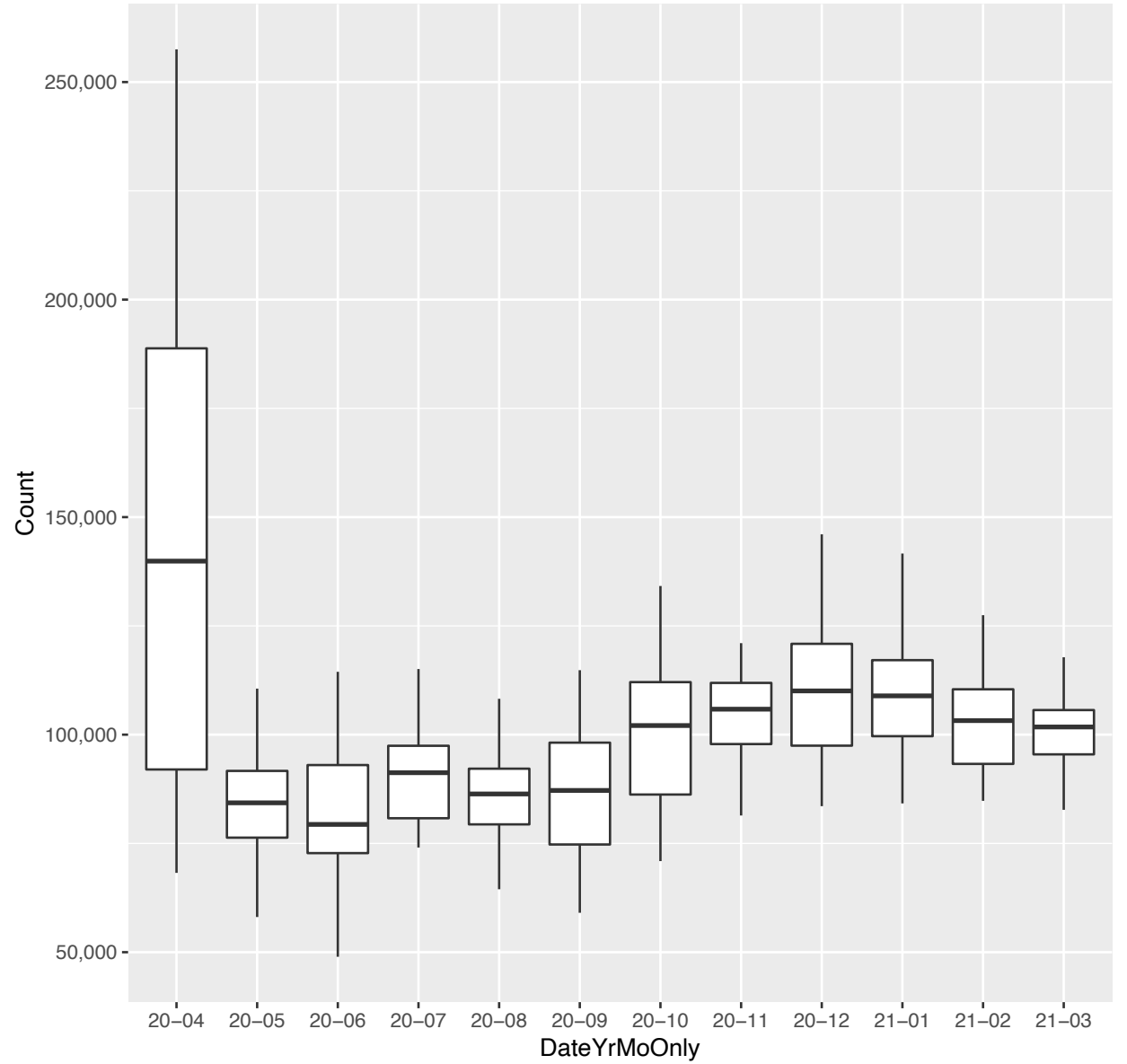
35. pitt.edu:

L shaped

*. pitt.edu (day-by-day counts and 28 day moving average)

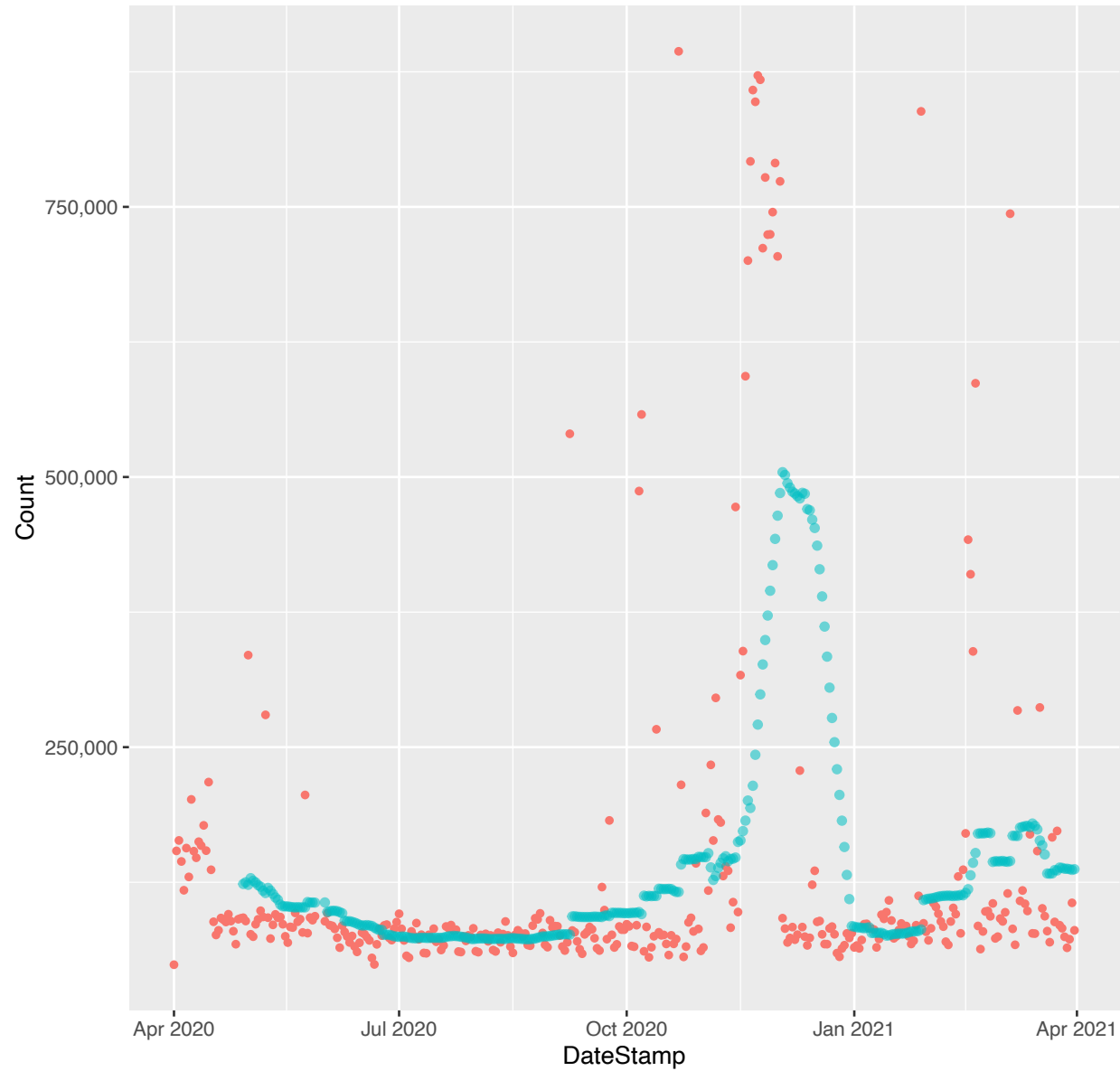


*. pitt.edu (monthly boxplots (outliers trimmed))

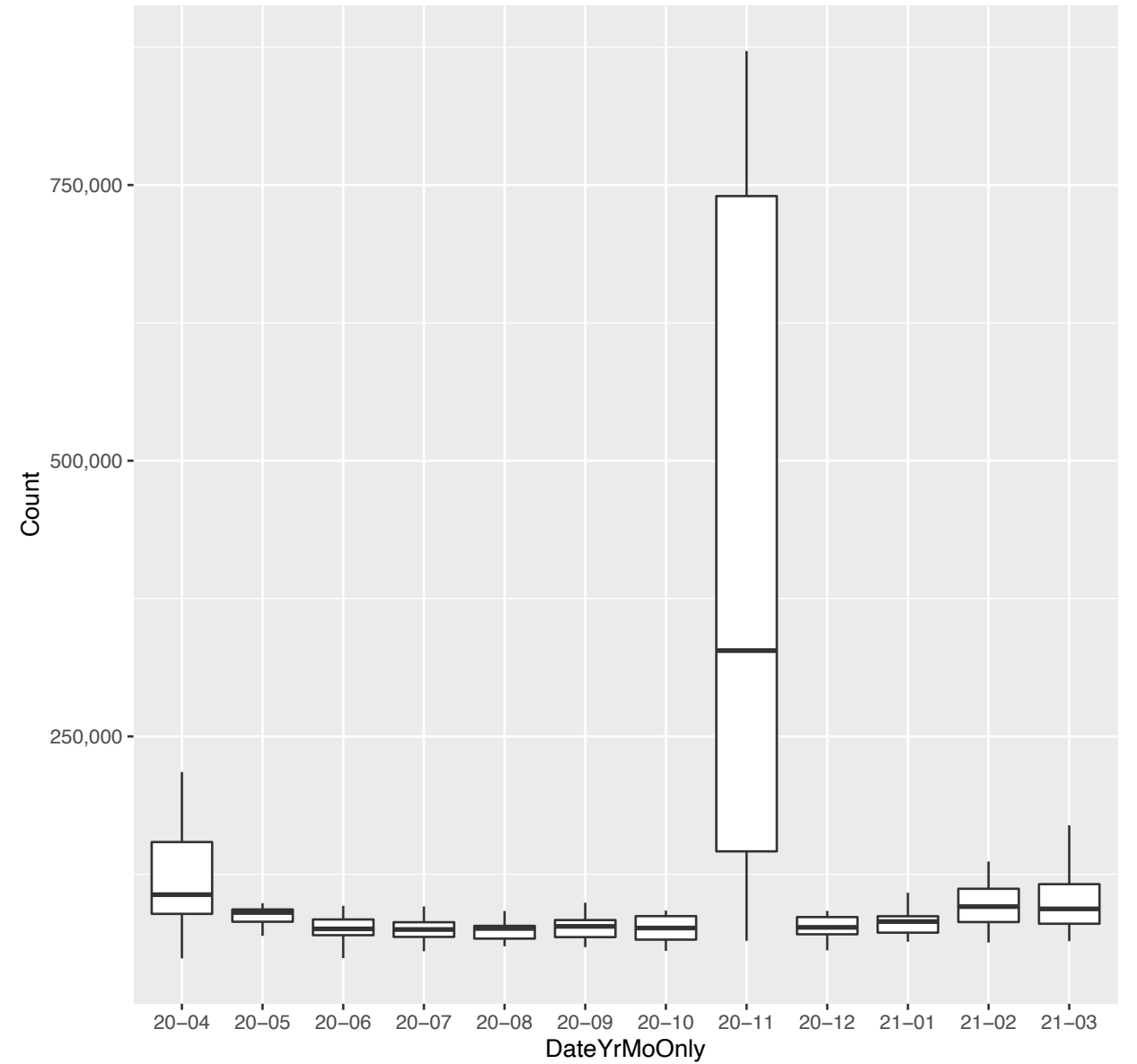


36. princeton.edu: ~

*. princeton.edu (day-by-day counts and 28 day moving average)



*. princeton.edu (monthly boxplots (outliers trimmed))



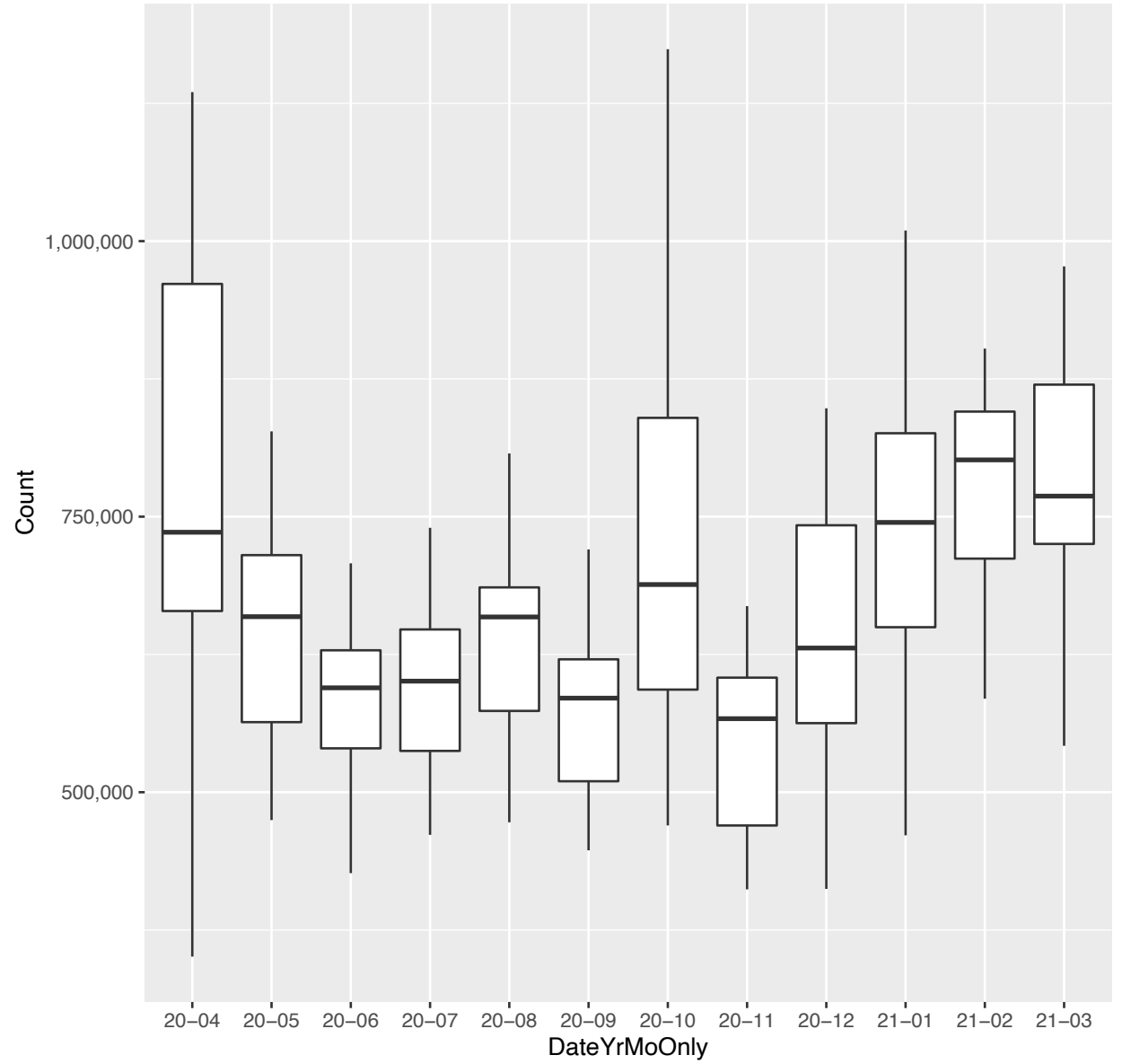
37. psu.edu:

~

*. psu.edu (day-by-day counts and 28 day moving average)



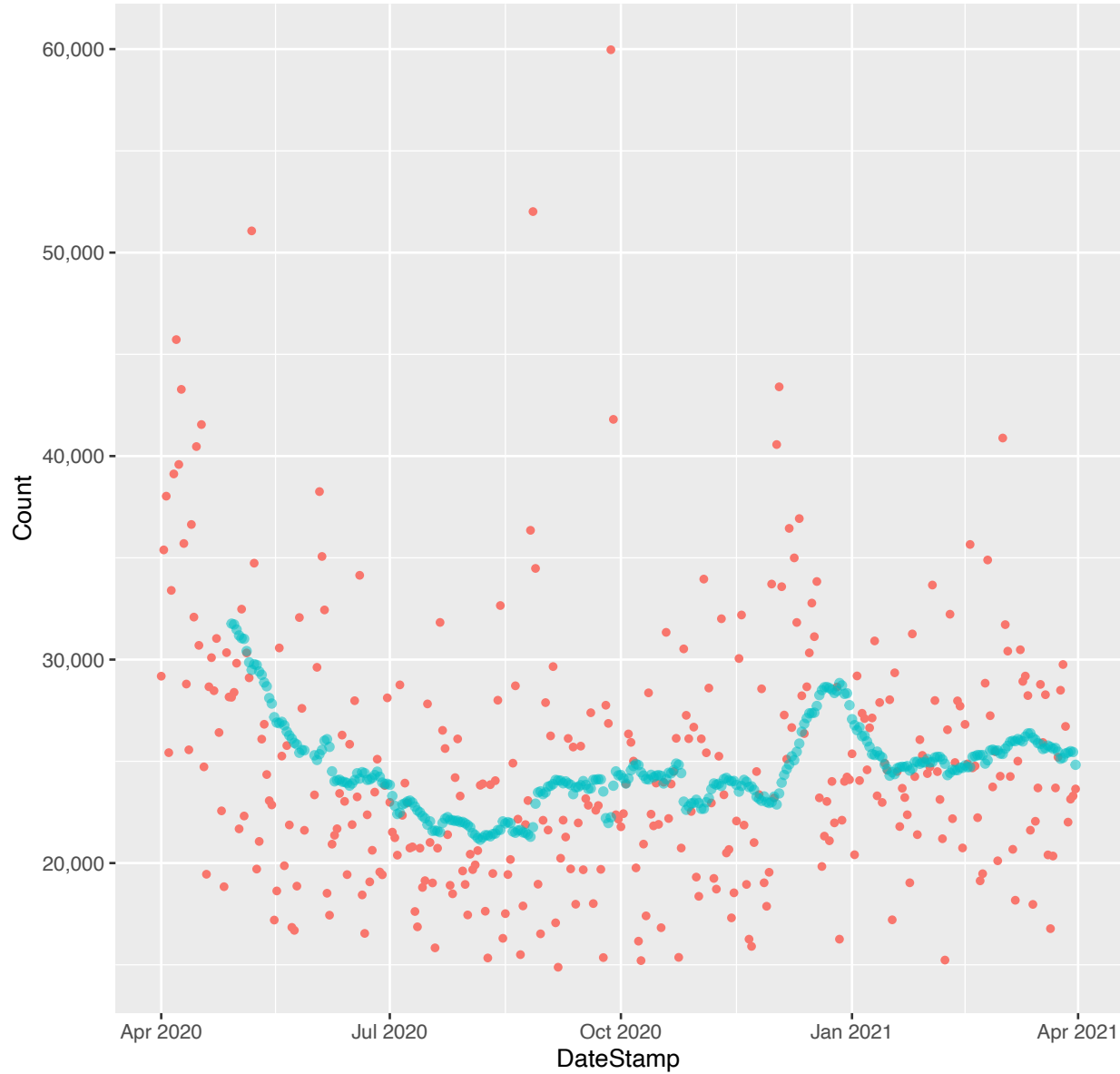
*. psu.edu (monthly boxplots (outliers trimmed))



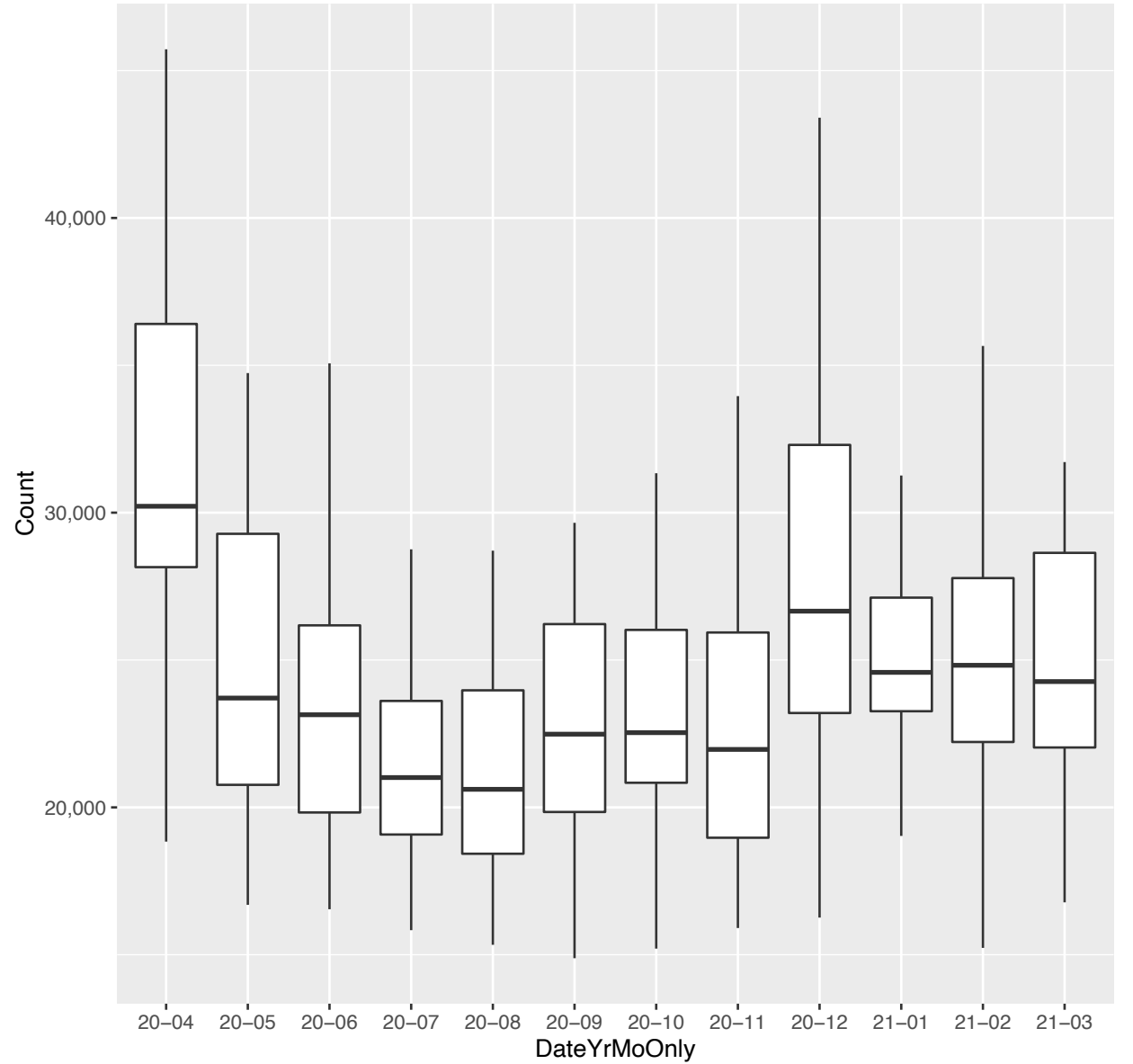
38. reed.edu:

~

*. reed.edu (day-by-day counts and 28 day moving average)



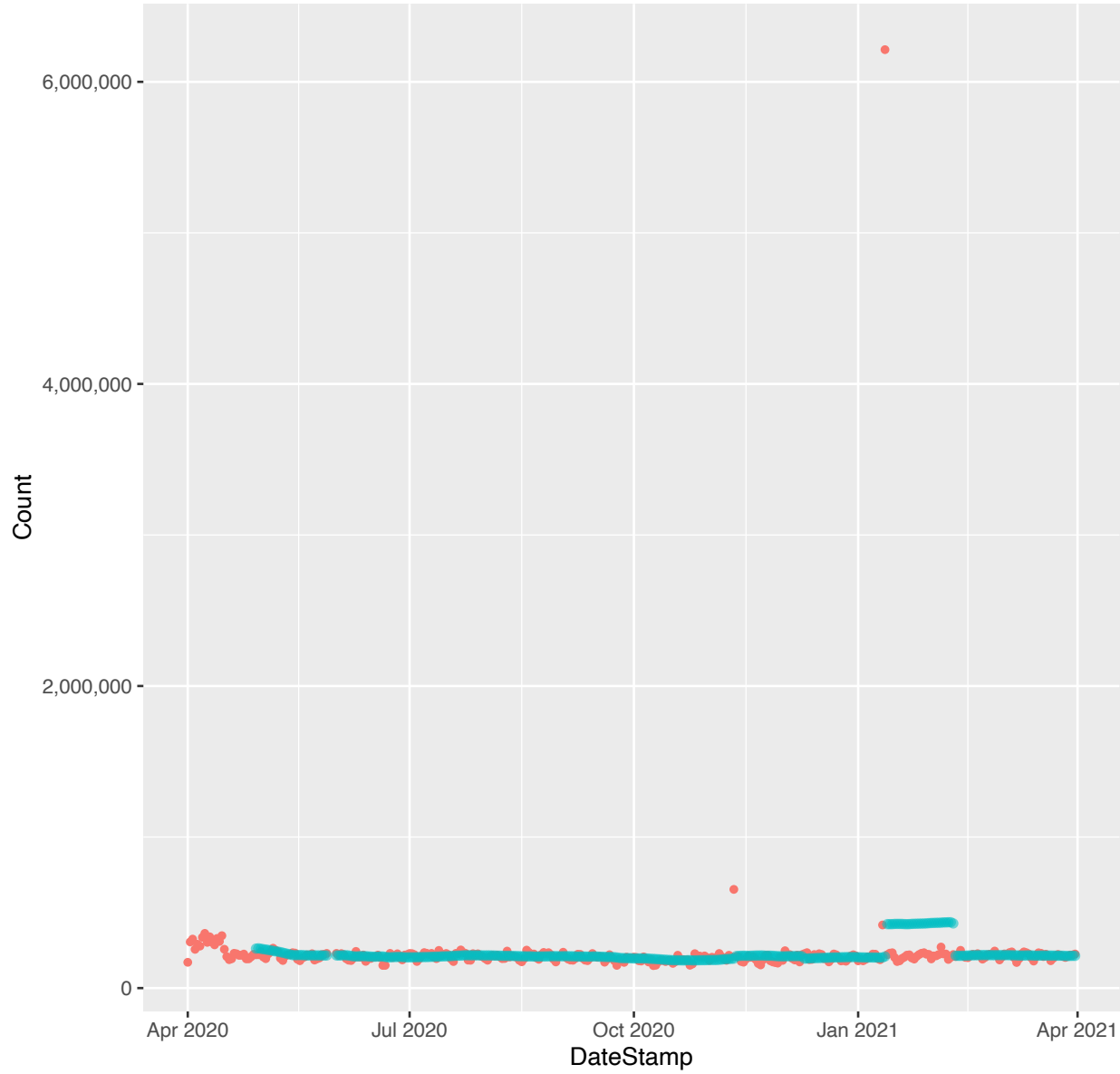
*. reed.edu (monthly boxplots (outliers trimmed))



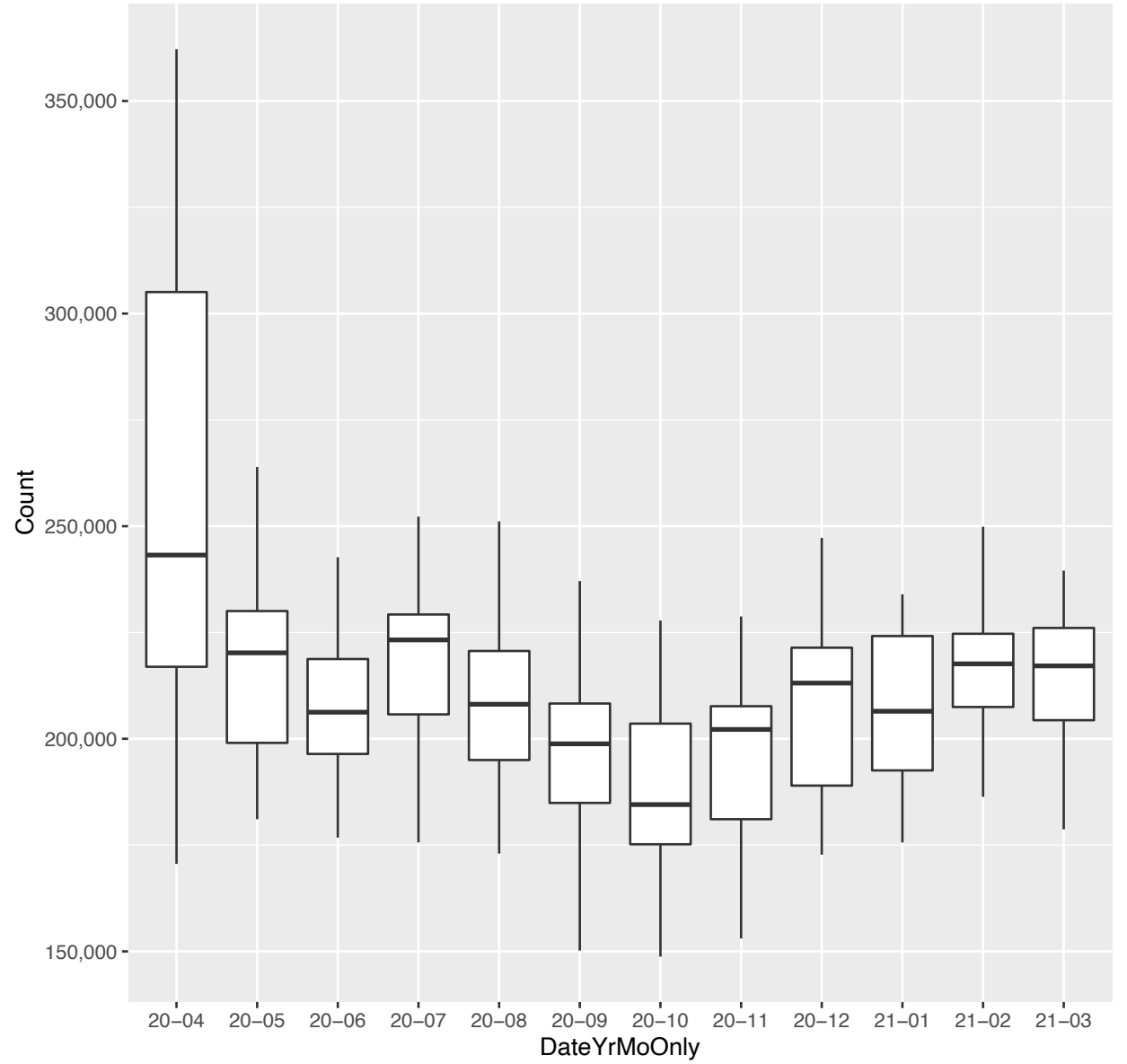
39. rice.edu:



*. rice.edu (day-by-day counts and 28 day moving average)



*. rice.edu (monthly boxplots (outliers trimmed))



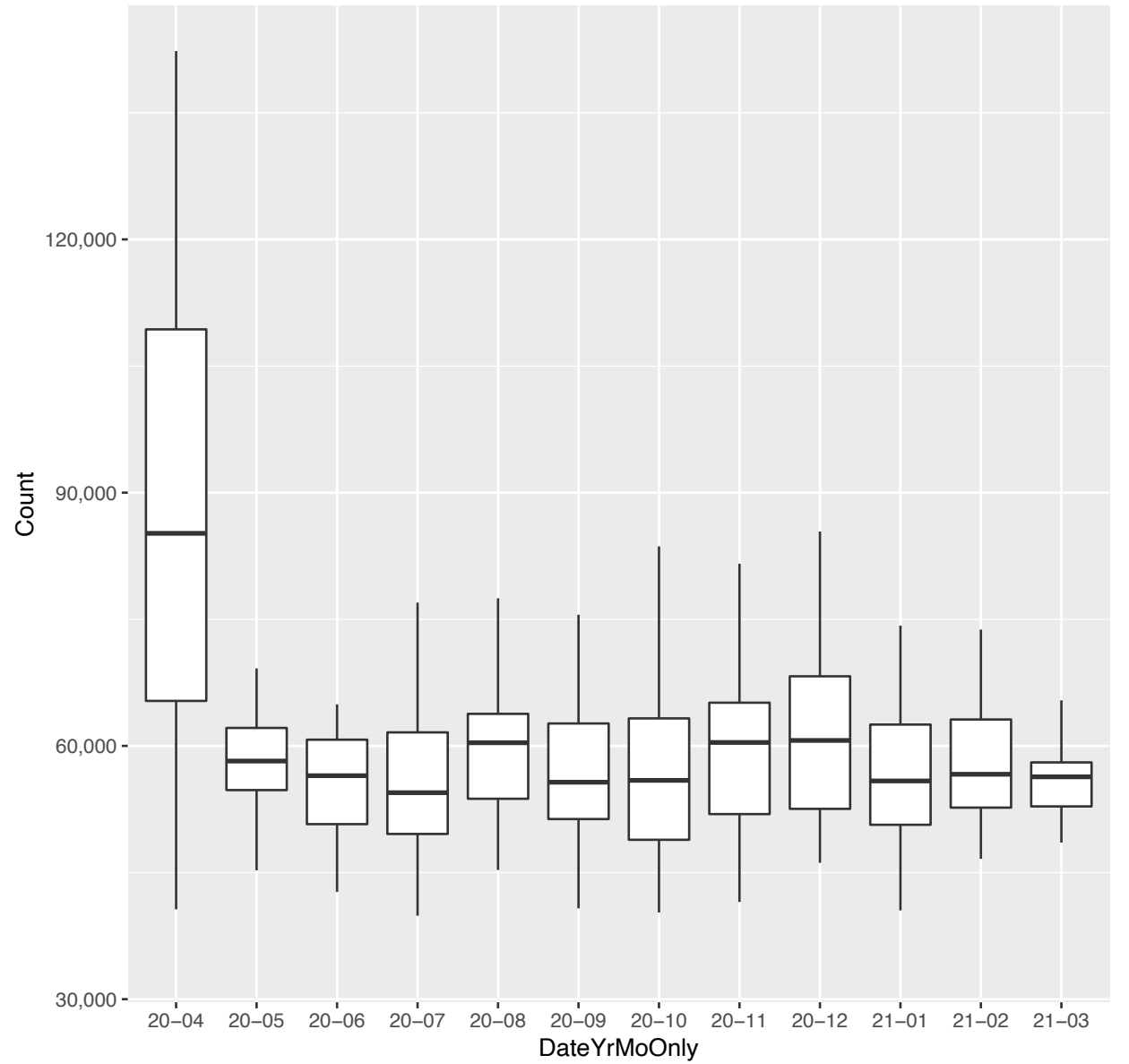
40. rpi.edu:

L shaped

*. rpi.edu (day-by-day counts and 28 day moving average)



*. rpi.edu (monthly boxplots (outliers trimmed))



41. stanford.edu:

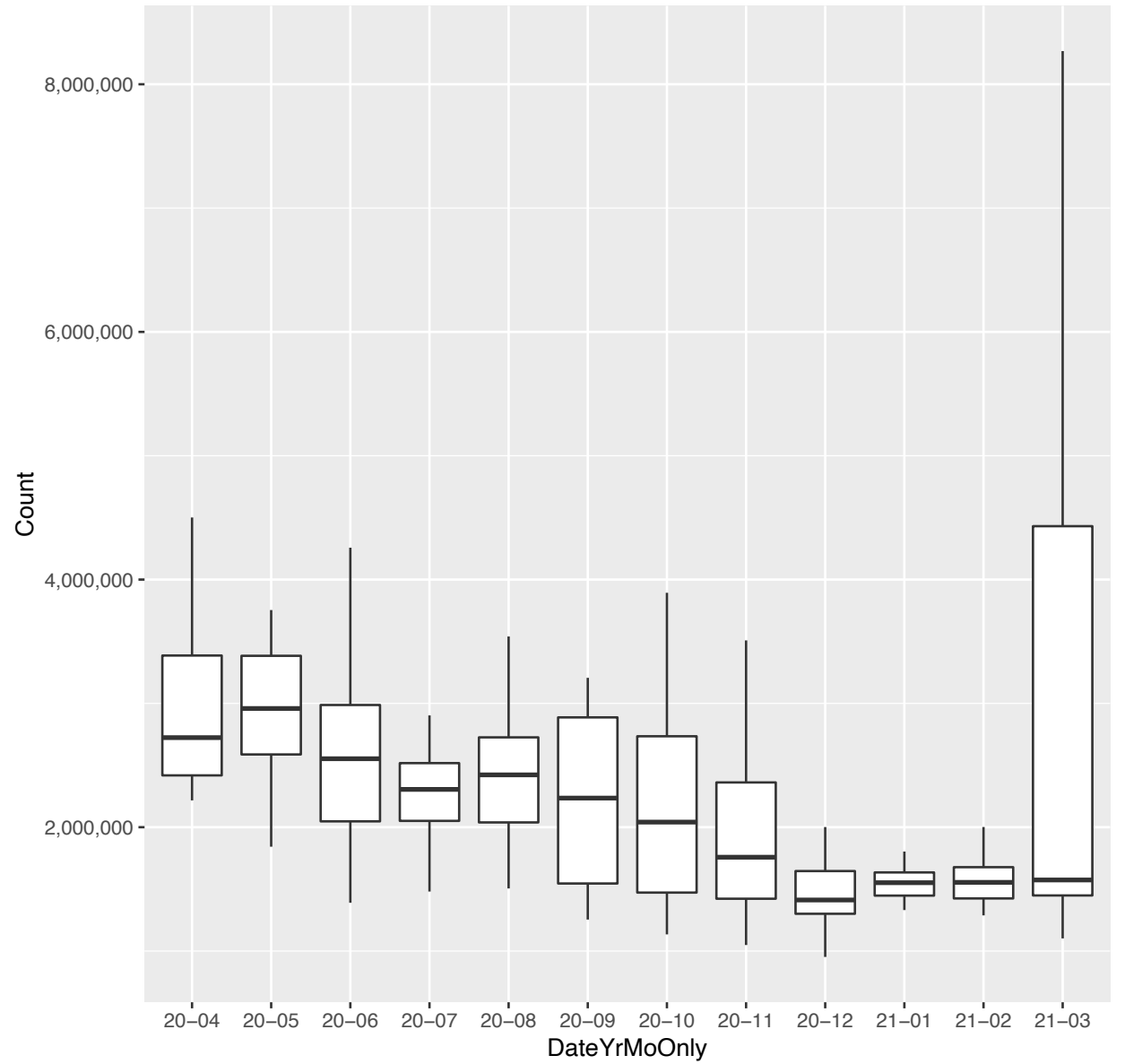
★ U shaped

M

*. stanford.edu (day-by-day counts and 28 day moving average)

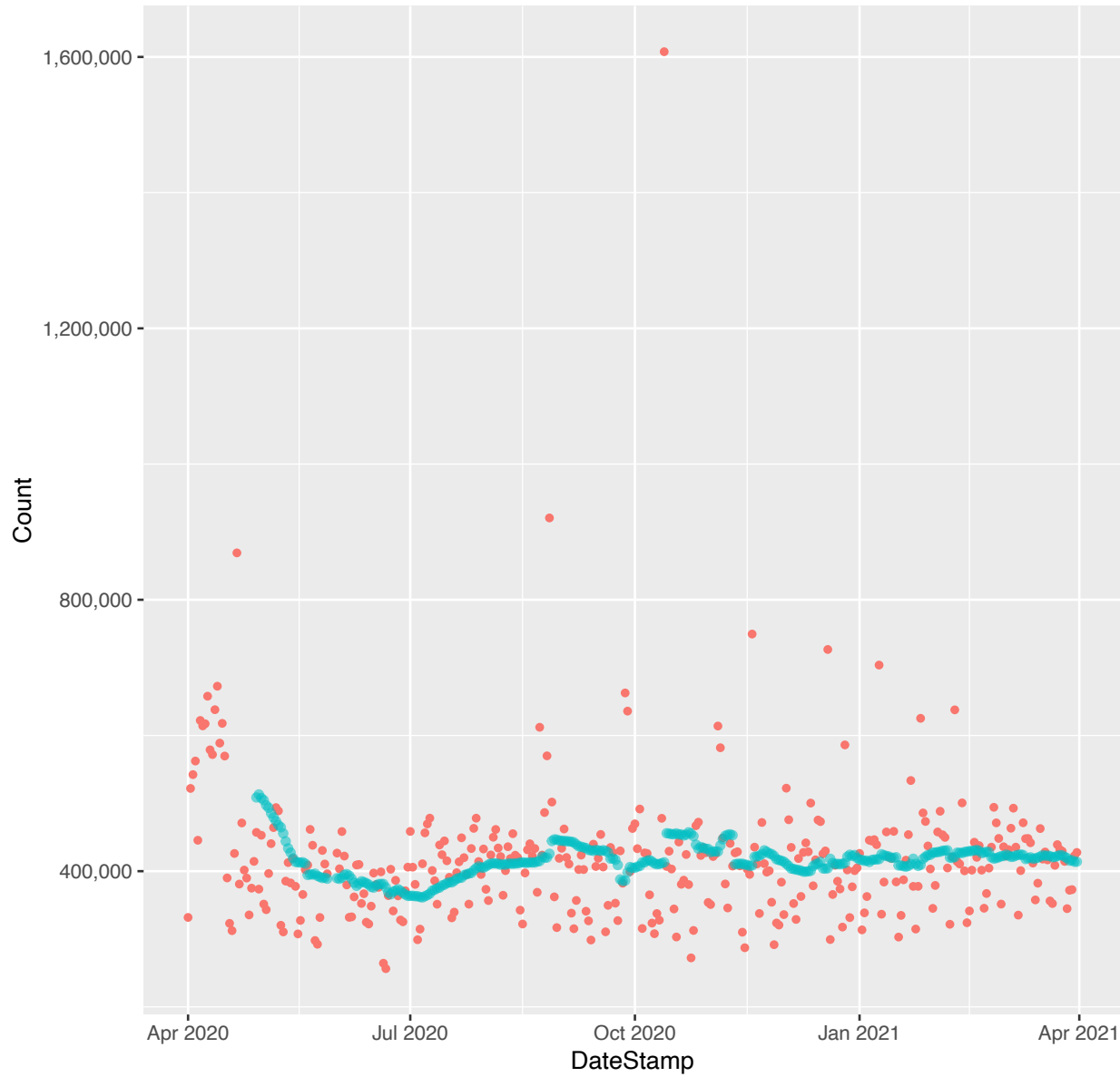


*. stanford.edu (monthly boxplots (outliers trimmed))

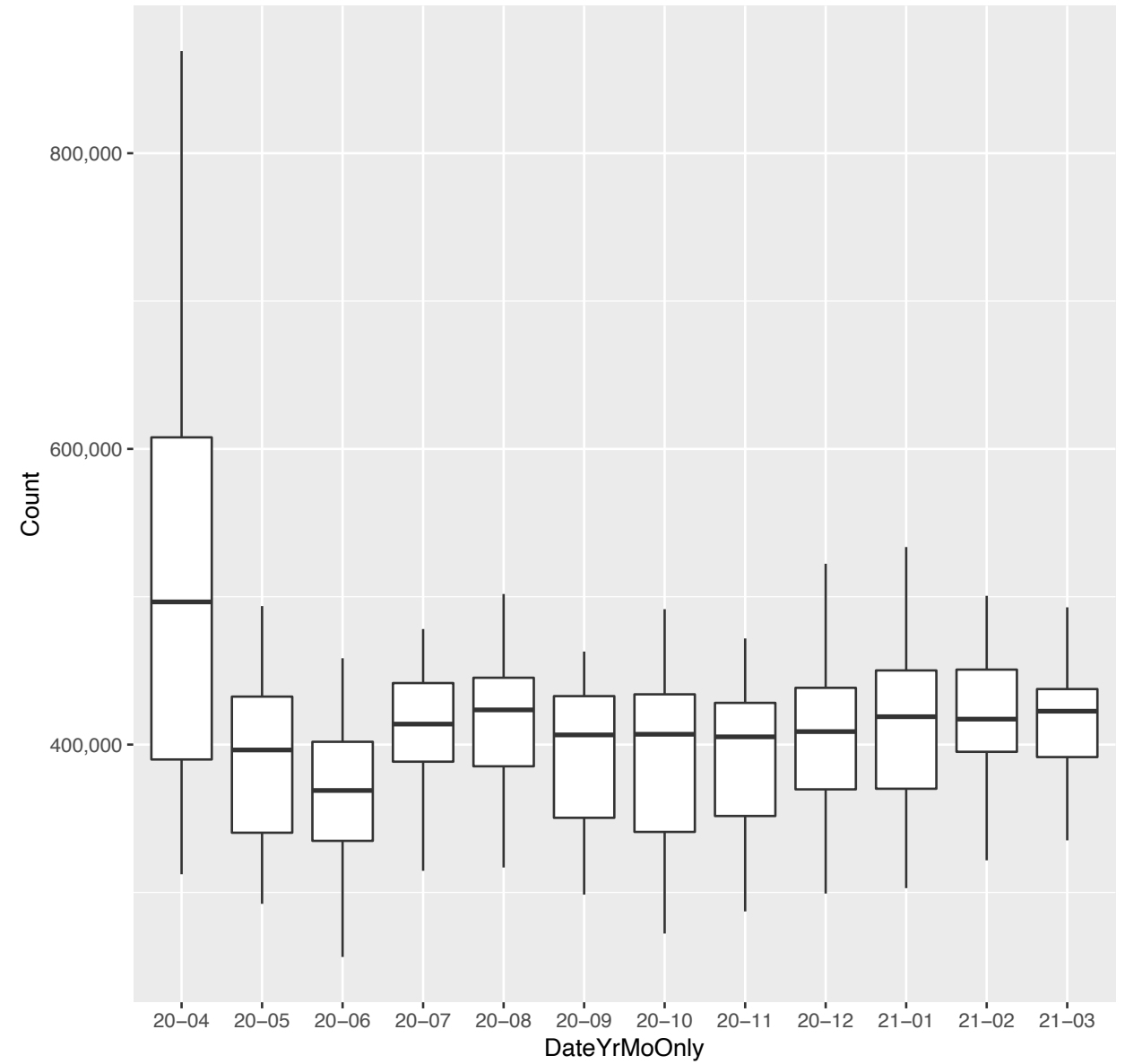


42. tamu.edu: * L shaped

*. tamu.edu (day-by-day counts and 28 day moving average)



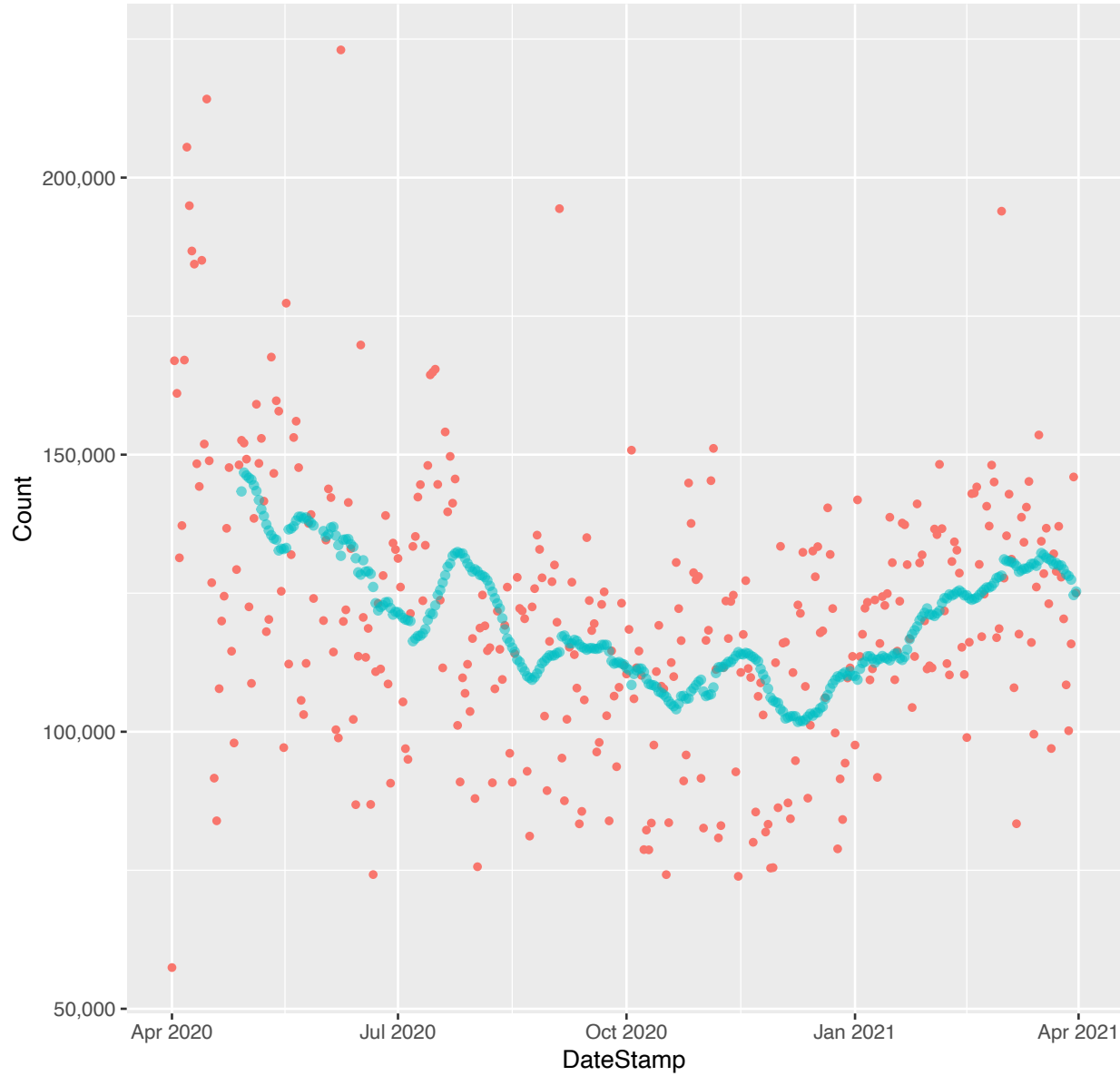
*. tamu.edu (monthly boxplots (outliers trimmed))



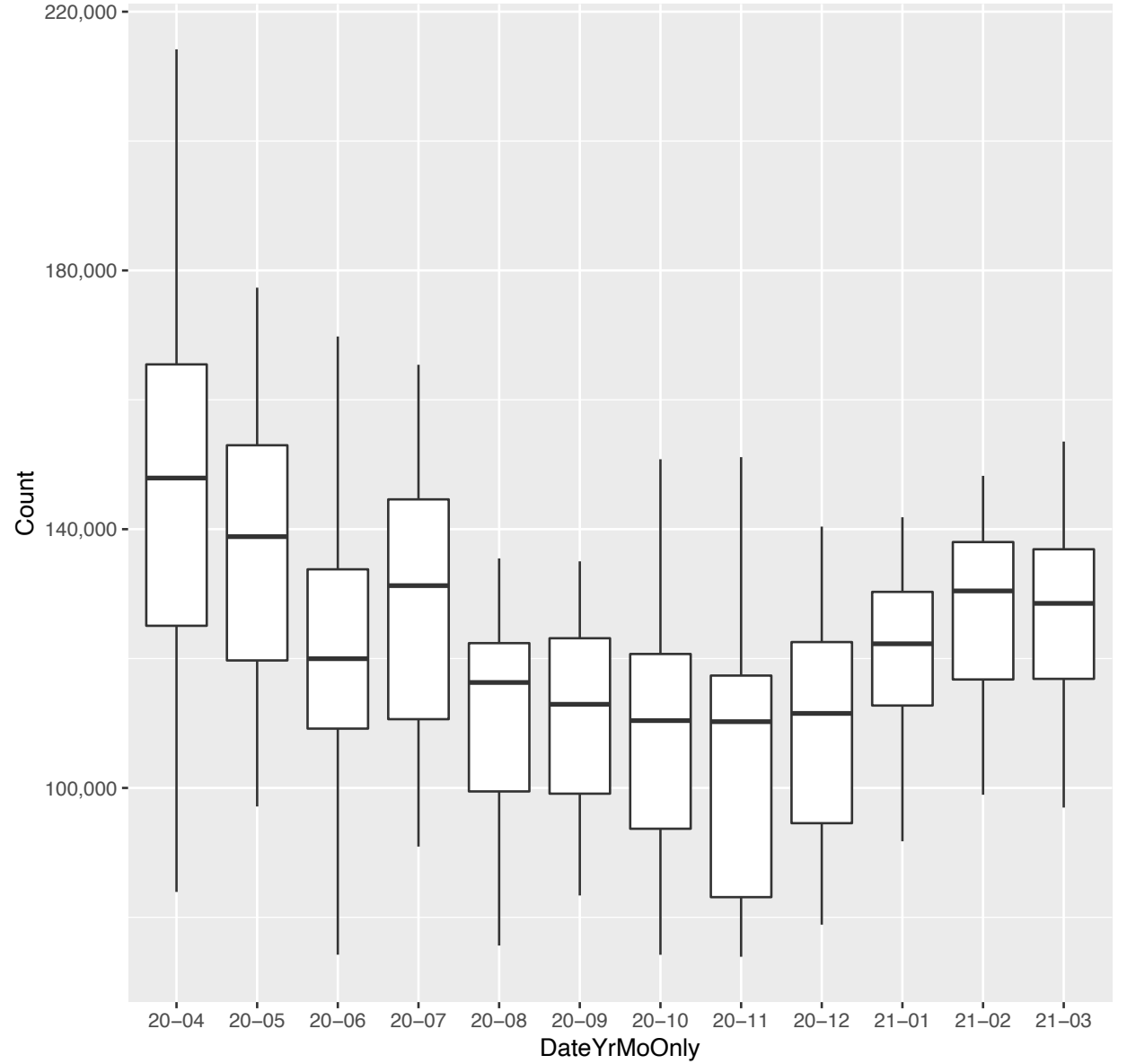
43. tufts.edu:

U shaped

*. tufts.edu (day-by-day counts and 28 day moving average)



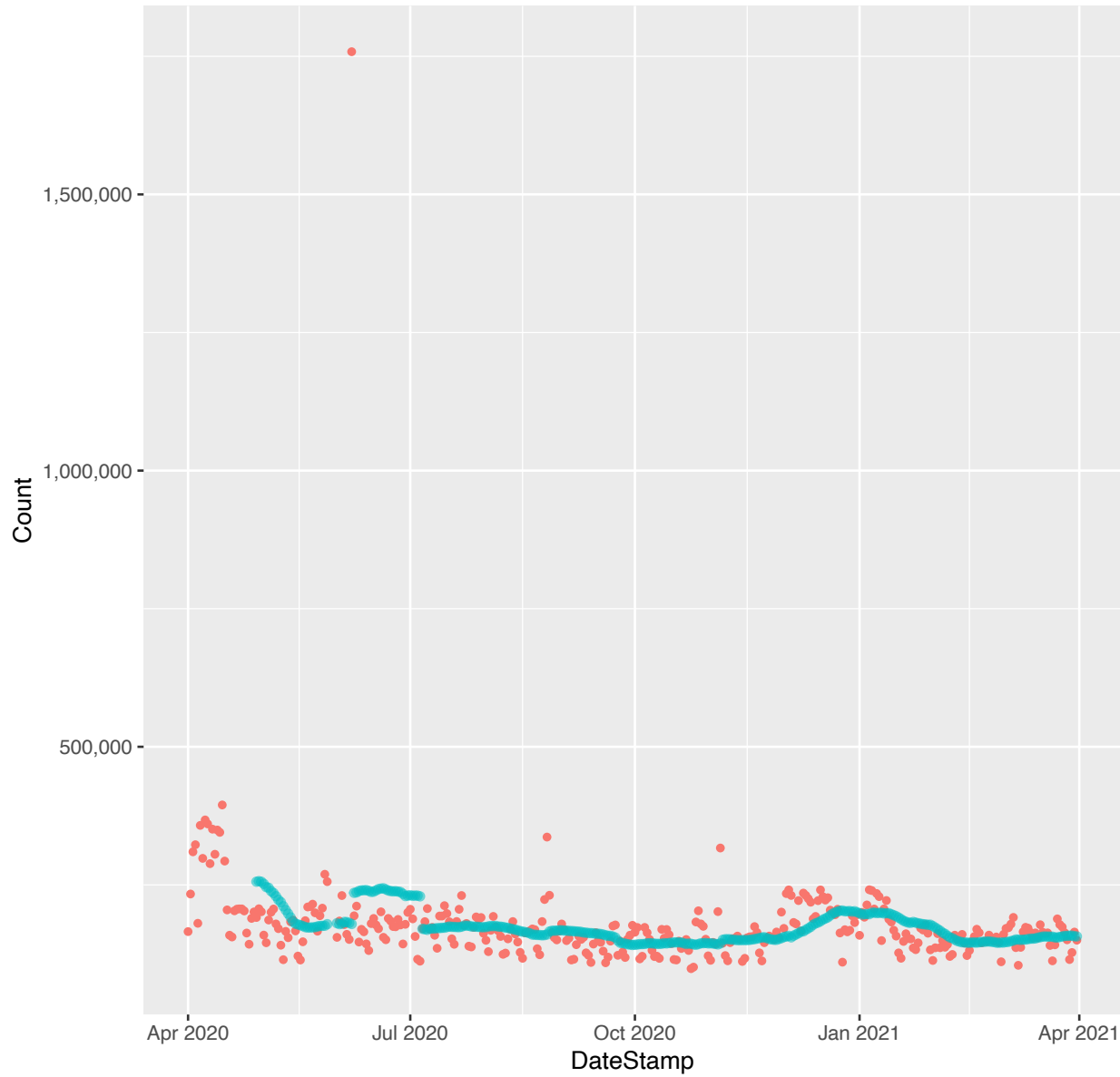
*. tufts.edu (monthly boxplots (outliers trimmed))



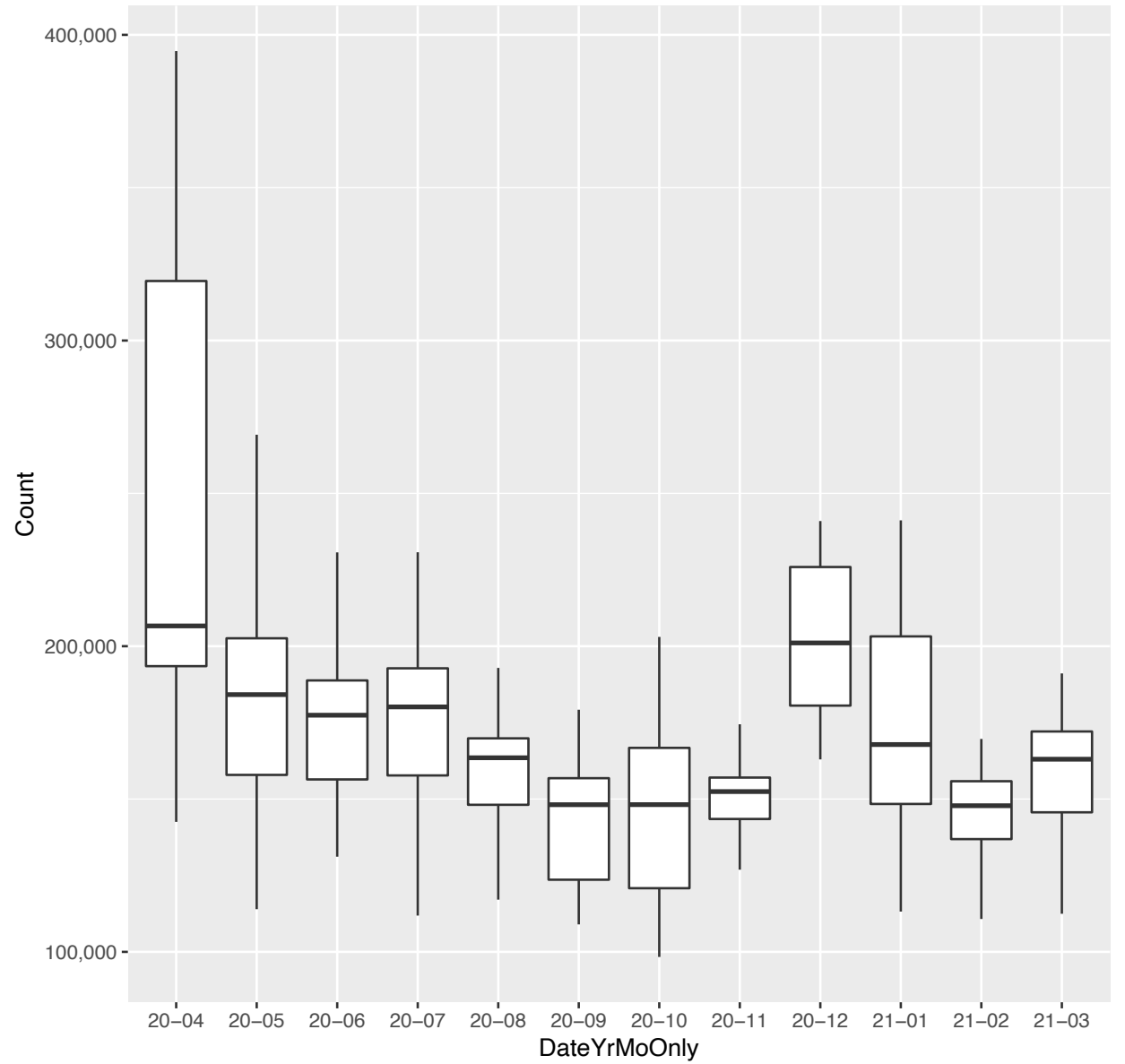
44. ua.edu:

★ L shaped

*. ua.edu (day-by-day counts and 28 day moving average)

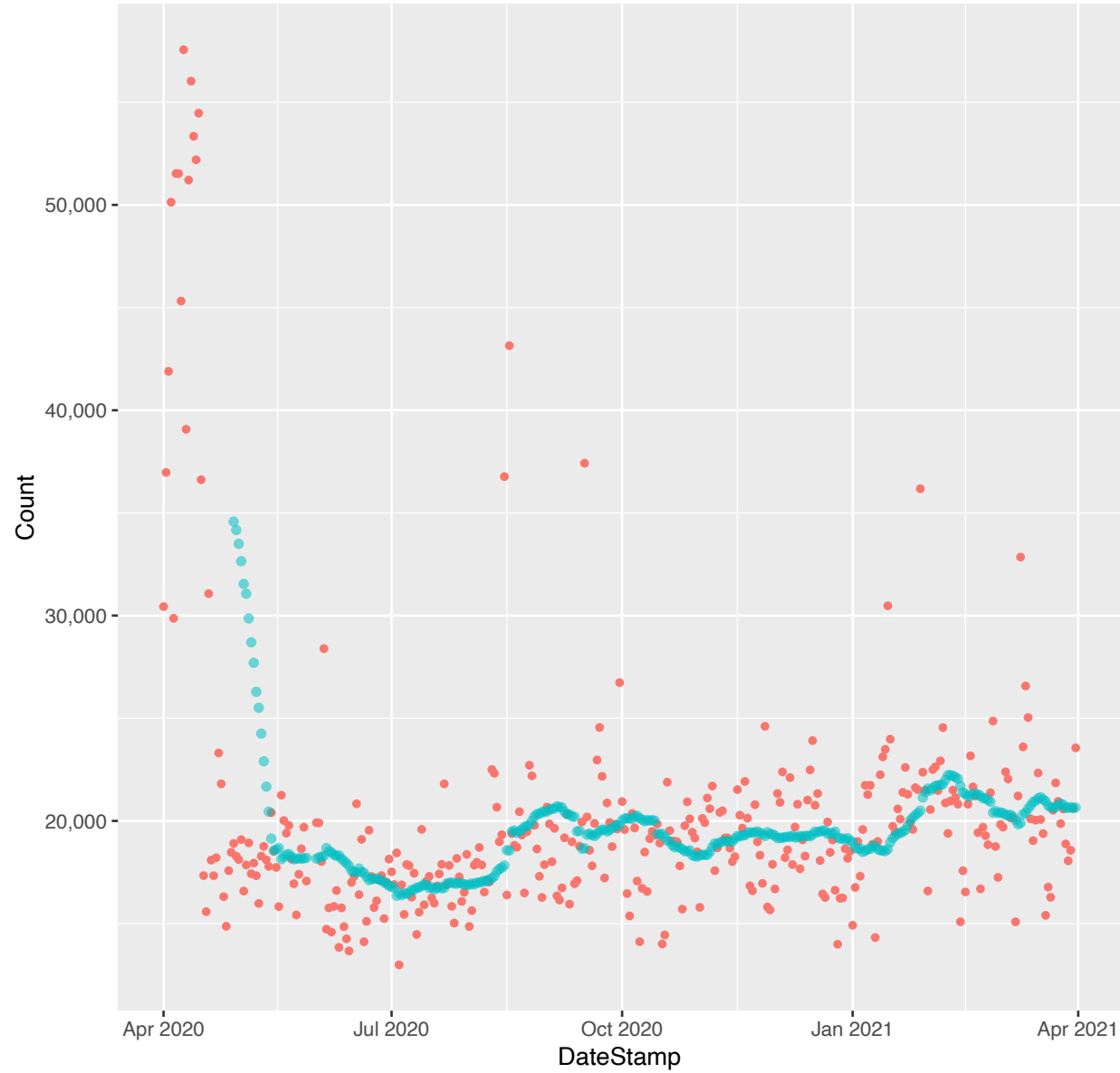


*. ua.edu (monthly boxplots (outliers trimmed))

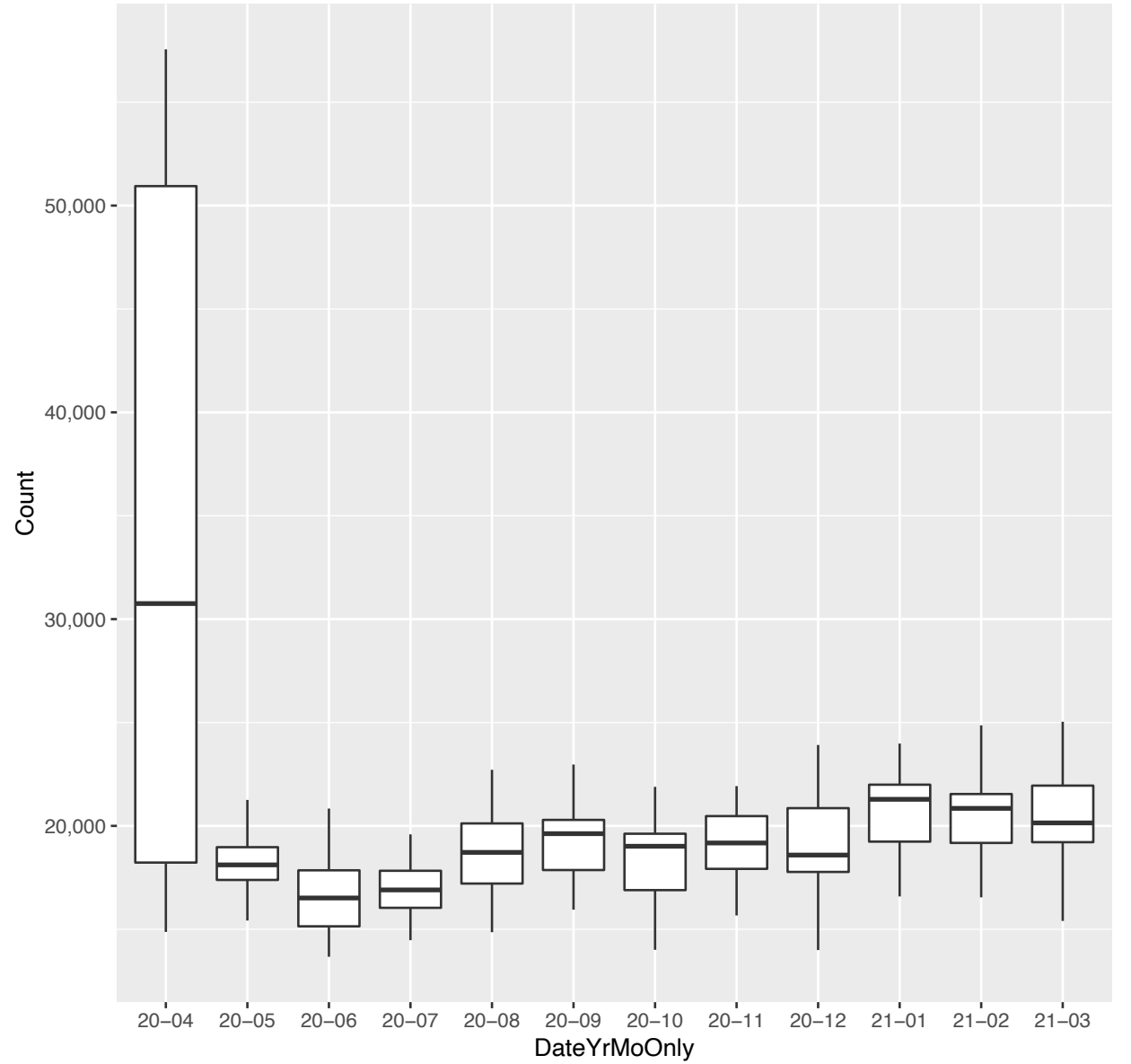


45. uaf.edu: L shaped

*. uaf.edu (day-by-day counts and 28 day moving average)

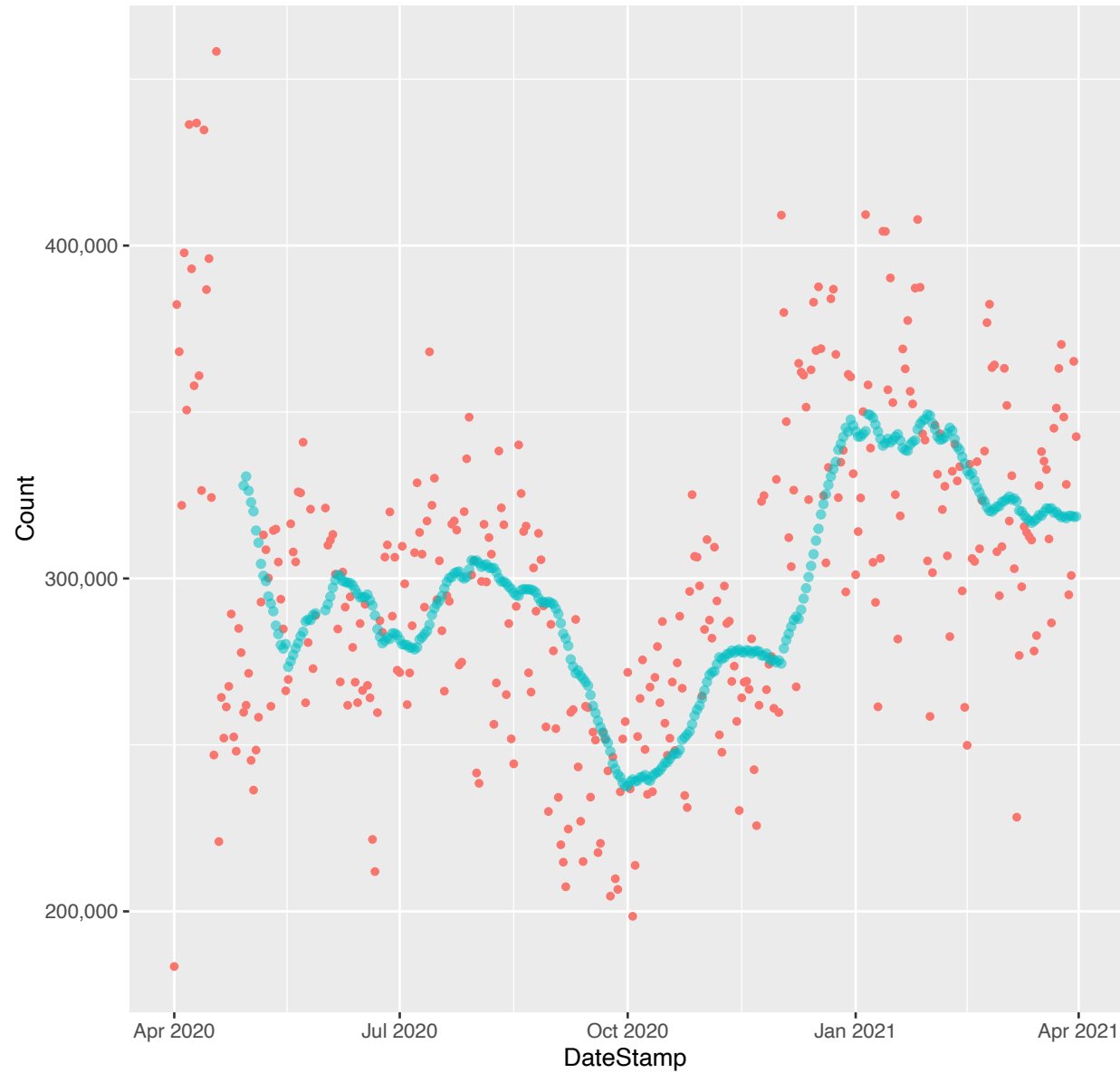


*. uaf.edu (monthly boxplots (outliers trimmed))

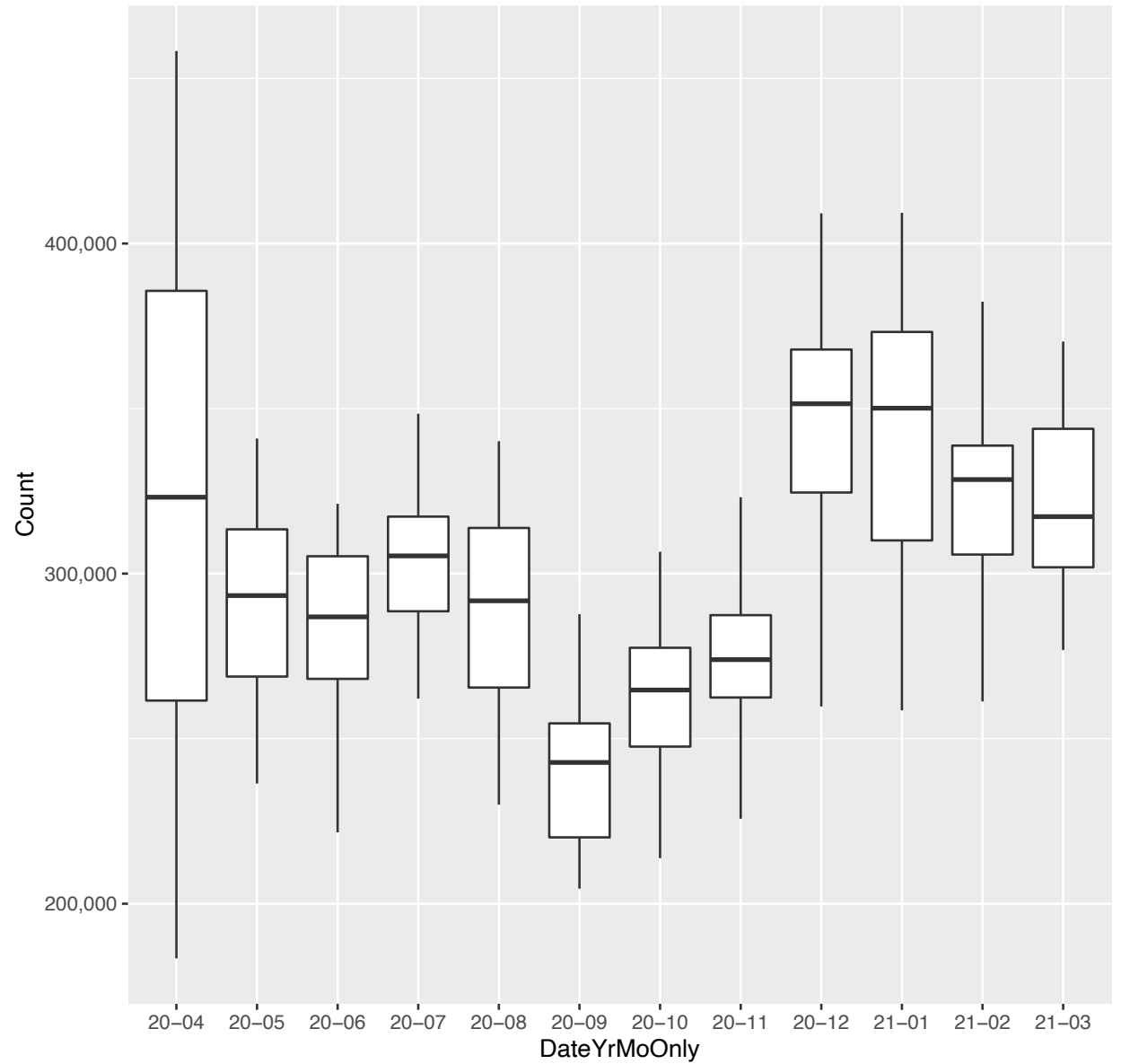


46. uchicago.edu: ~

*. uchicago.edu (day-by-day counts and 28 day moving average)



*. uchicago.edu (monthly boxplots (outliers trimmed))



47. ucla.edu:

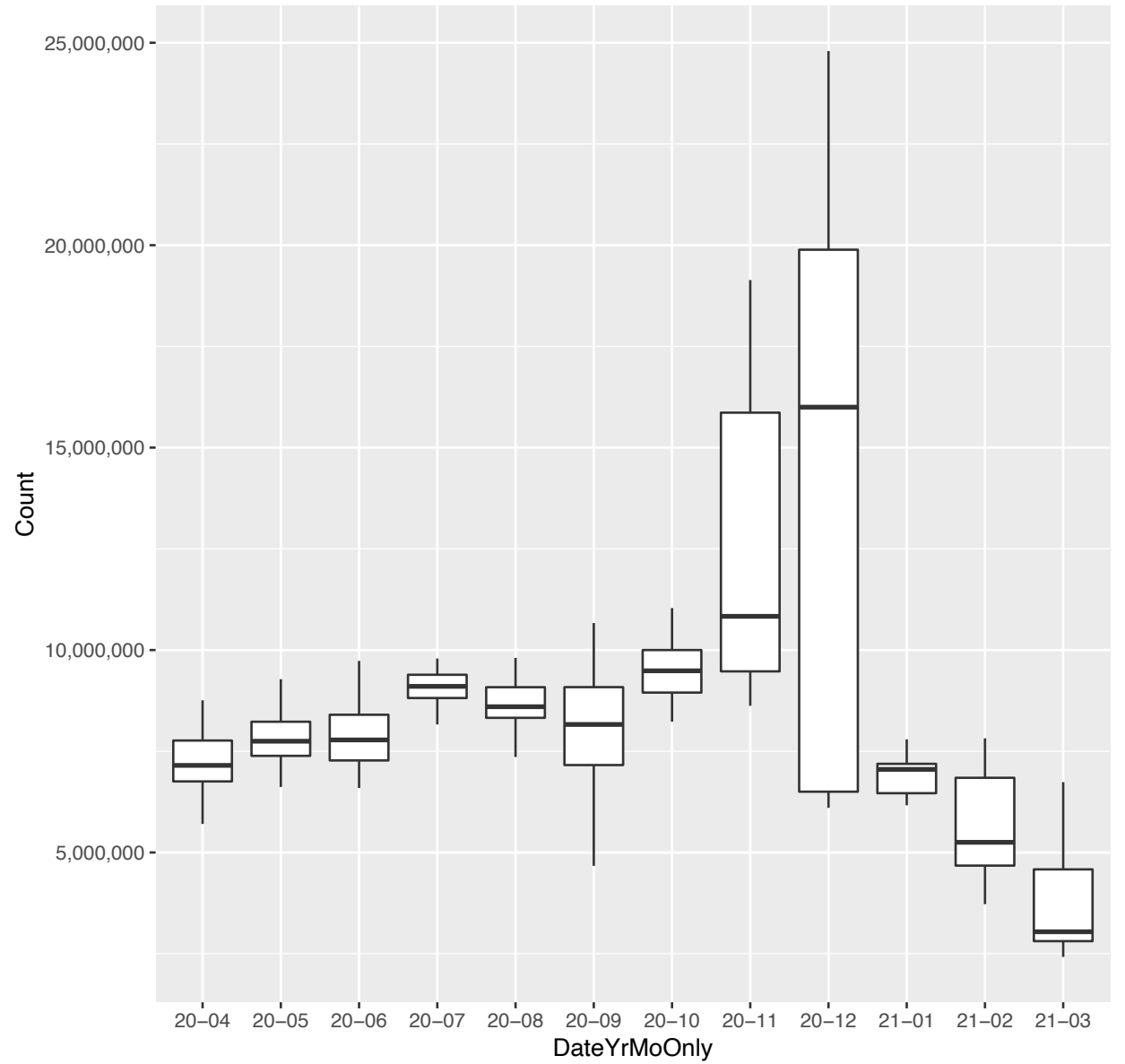


M

*. ucla.edu (day-by-day counts and 28 day moving average)



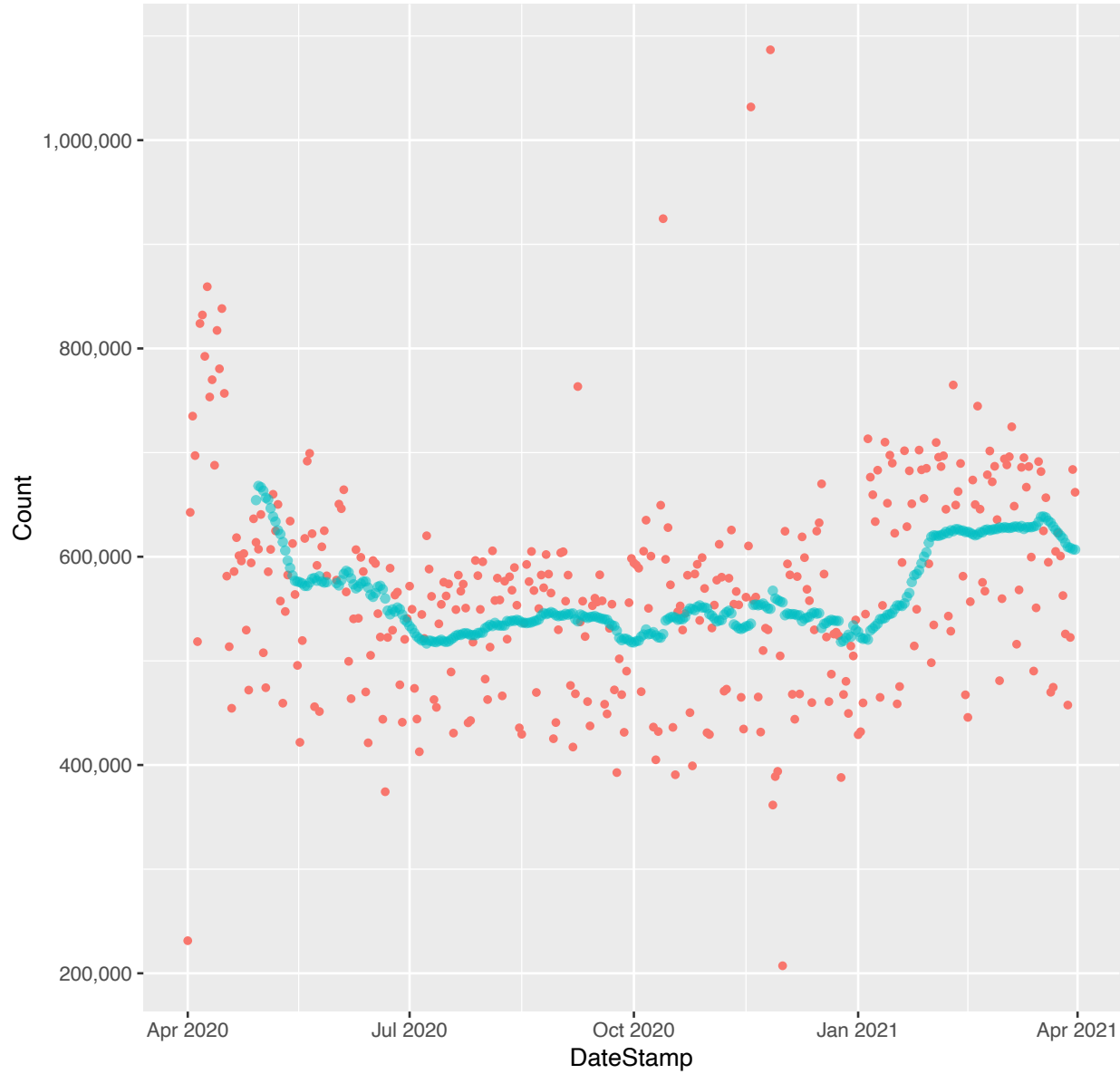
*. ucla.edu (monthly boxplots (outliers trimmed))



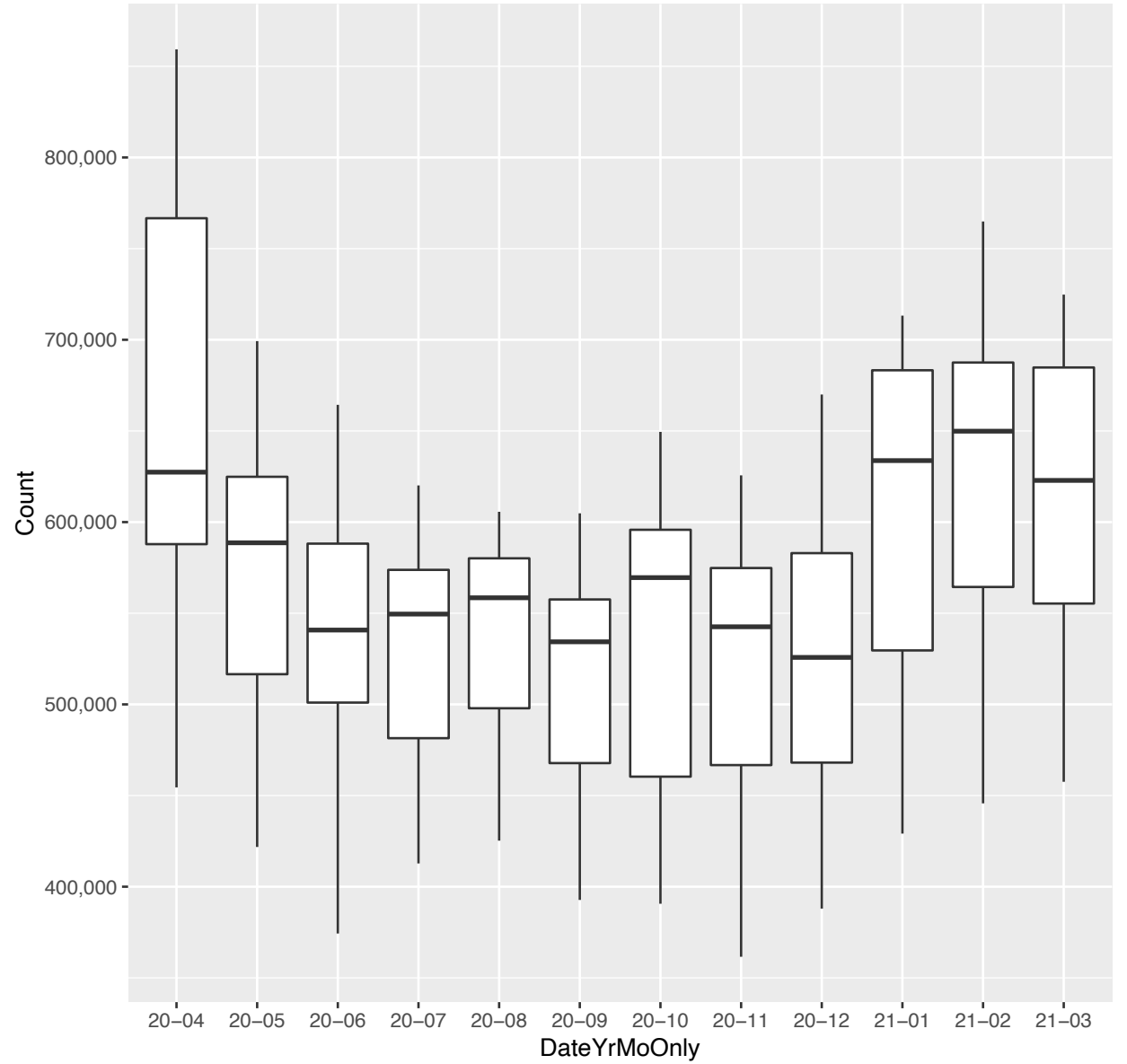
48. ucsb.edu

U shaped

*. ucsb.edu (day-by-day counts and 28 day moving average)



*. ucsb.edu (monthly boxplots (outliers trimmed))



49. ucsd.edu:

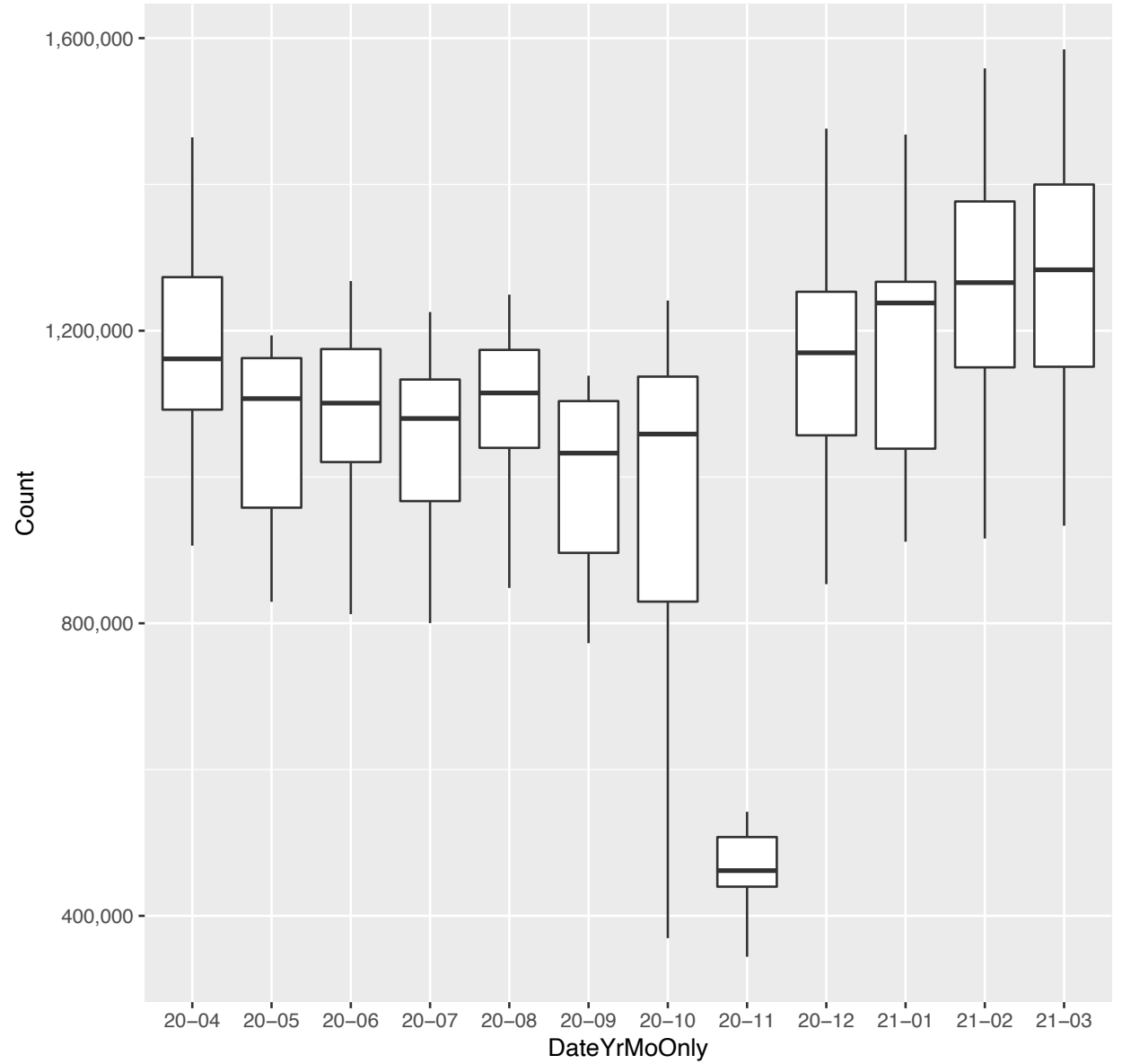
★ U shaped

M

*. ucsd.edu (day-by-day counts and 28 day moving average)



*. ucsd.edu (monthly boxplots (outliers trimmed))

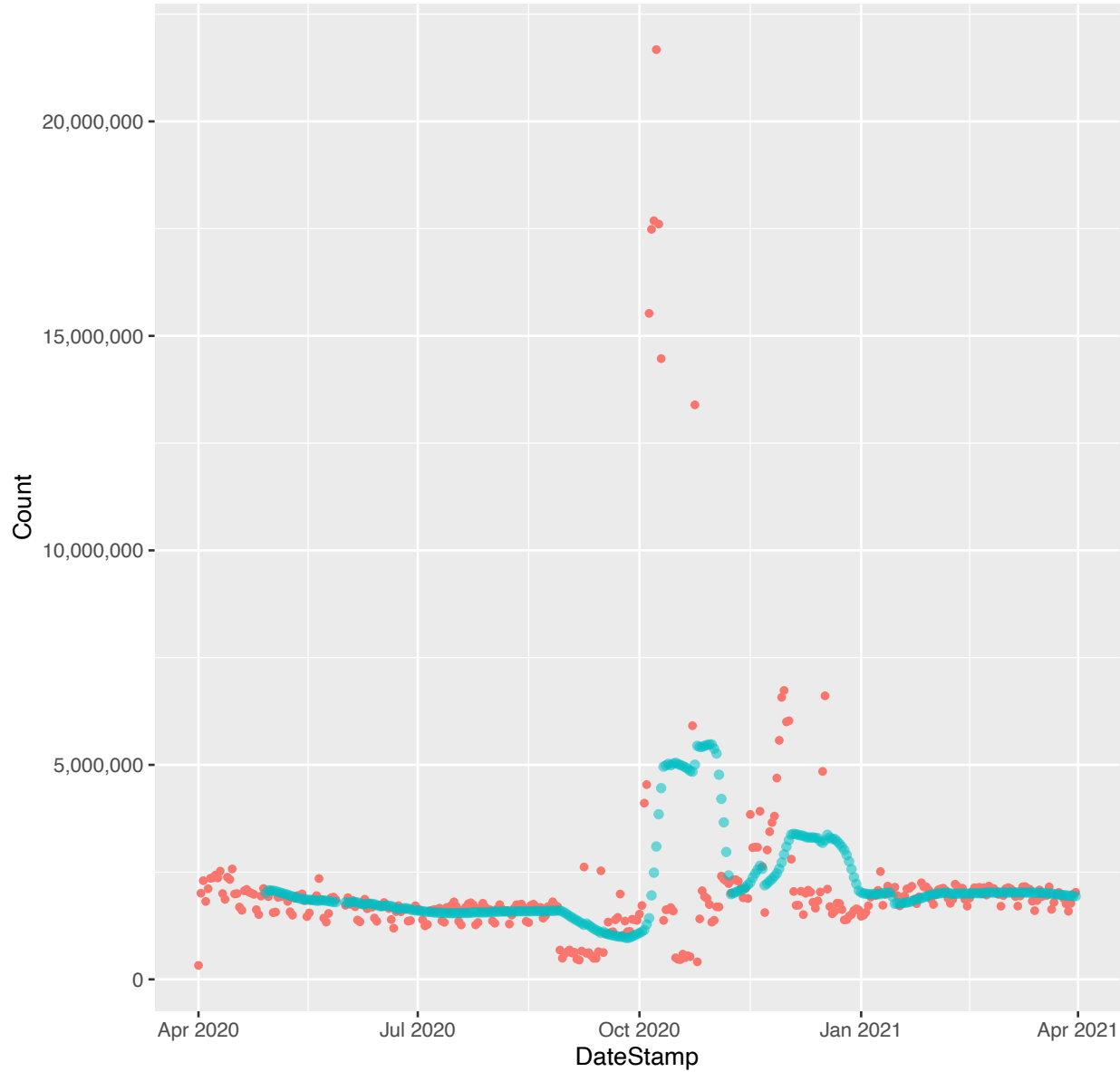


50. ufl.edu:

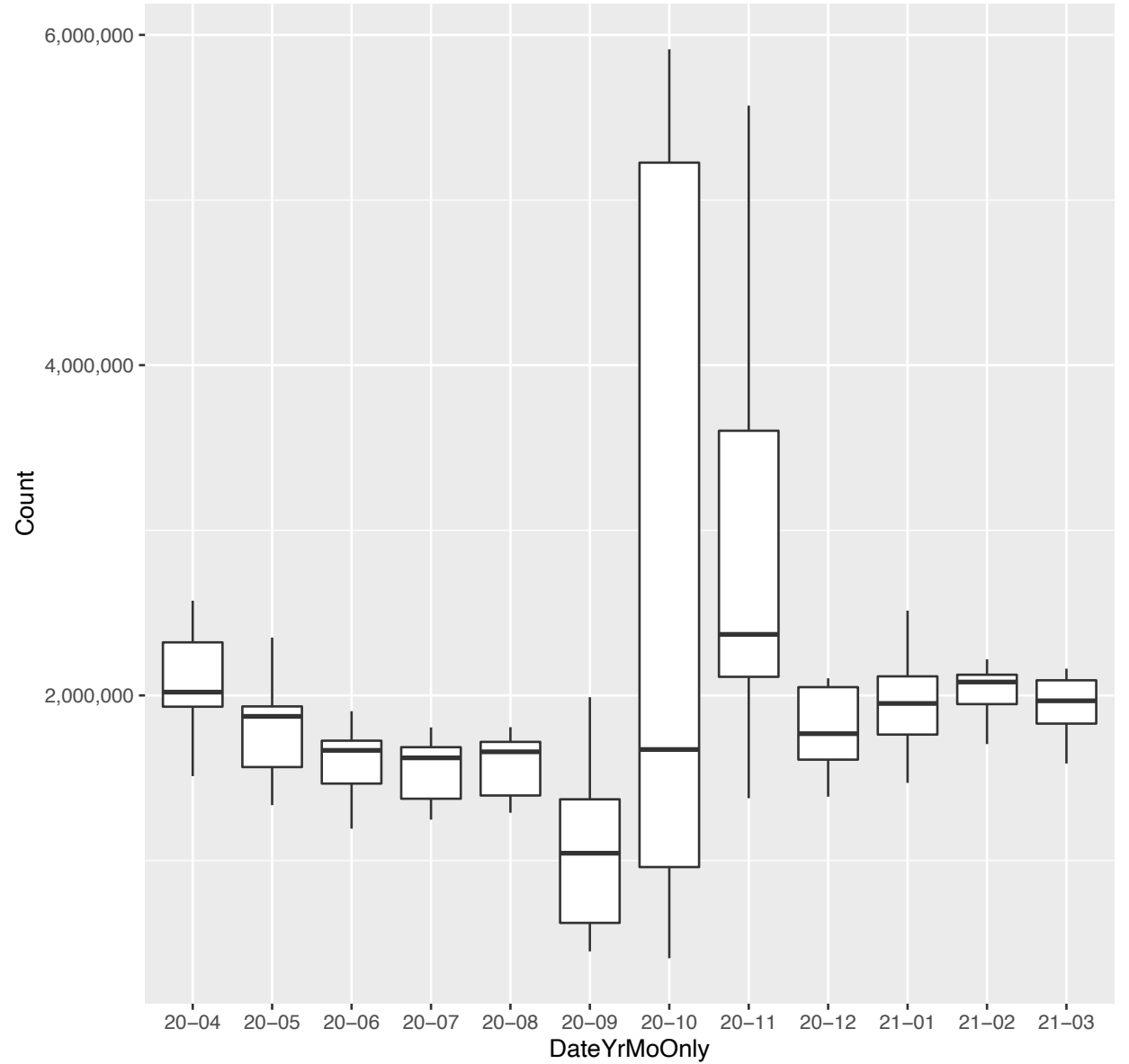


M

*. ufl.edu (day-by-day counts and 28 day moving average)



*. ufl.edu (monthly boxplots (outliers trimmed))



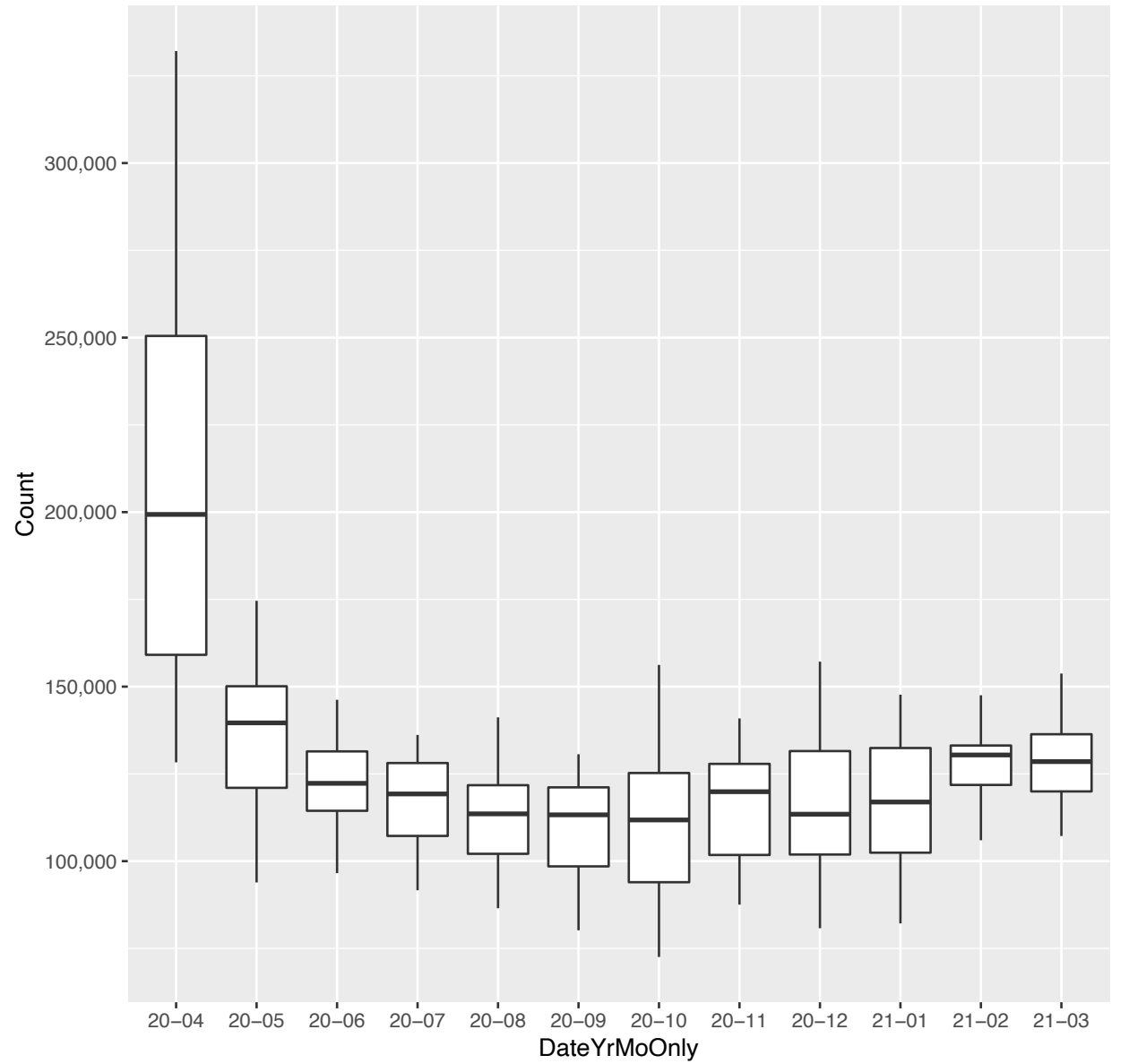
51. uga.edu:

L shaped

*. uga.edu (day-by-day counts and 28 day moving average)



*. uga.edu (monthly boxplots (outliers trimmed))



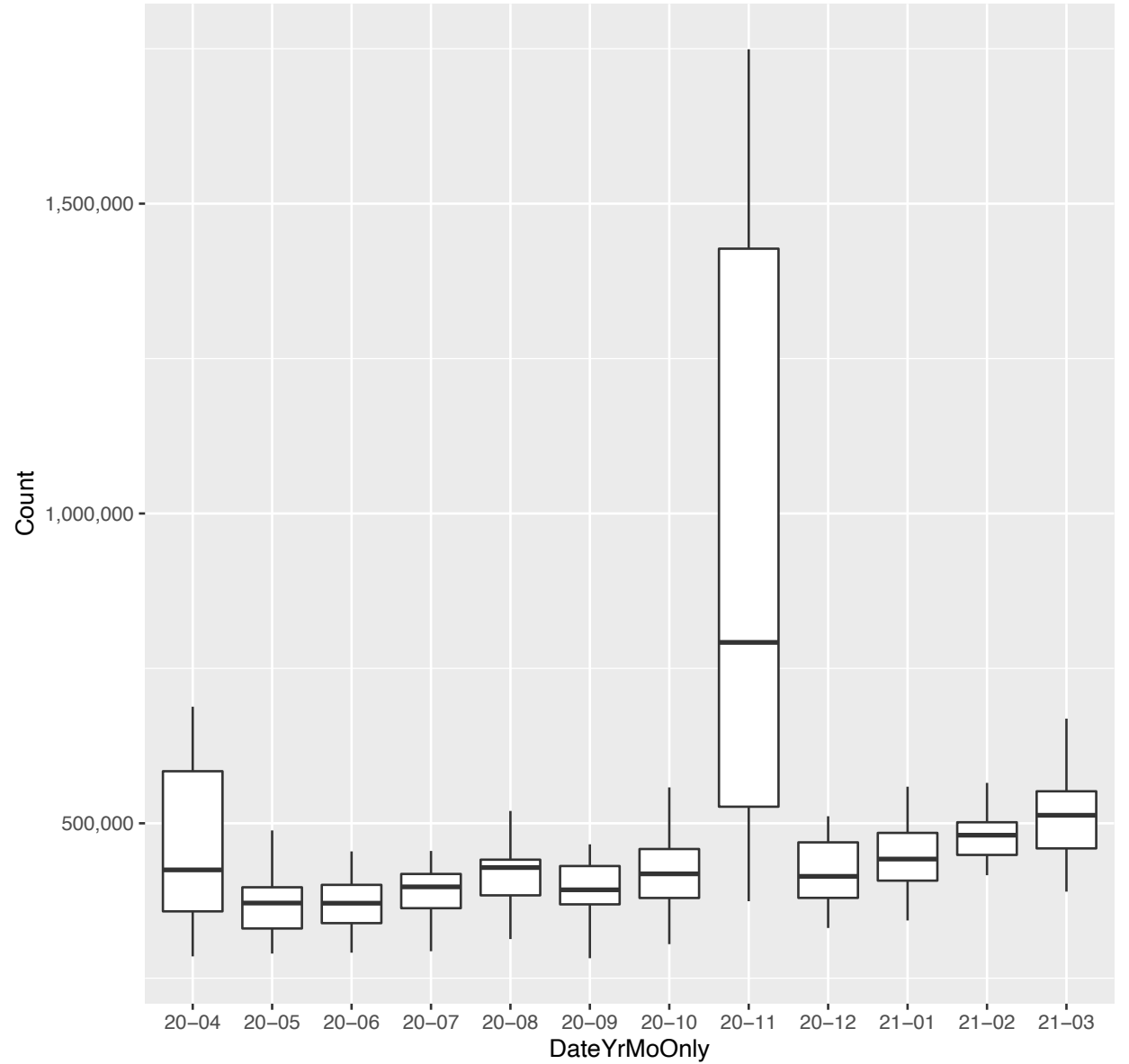
52. uiowa.edu:



*. uiowa.edu (day-by-day counts and 28 day moving average)



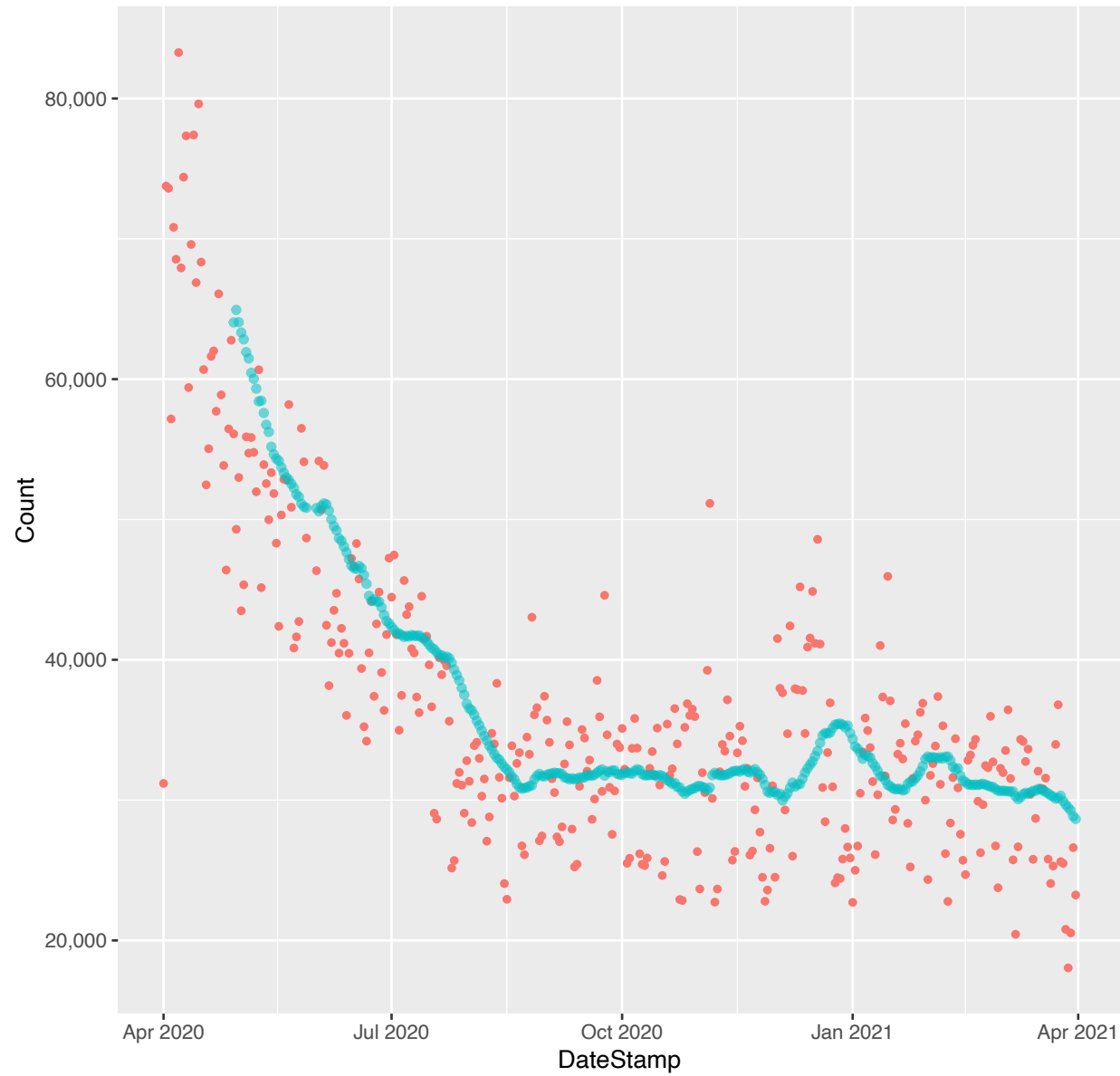
*. uiowa.edu (monthly boxplots (outliers trimmed))



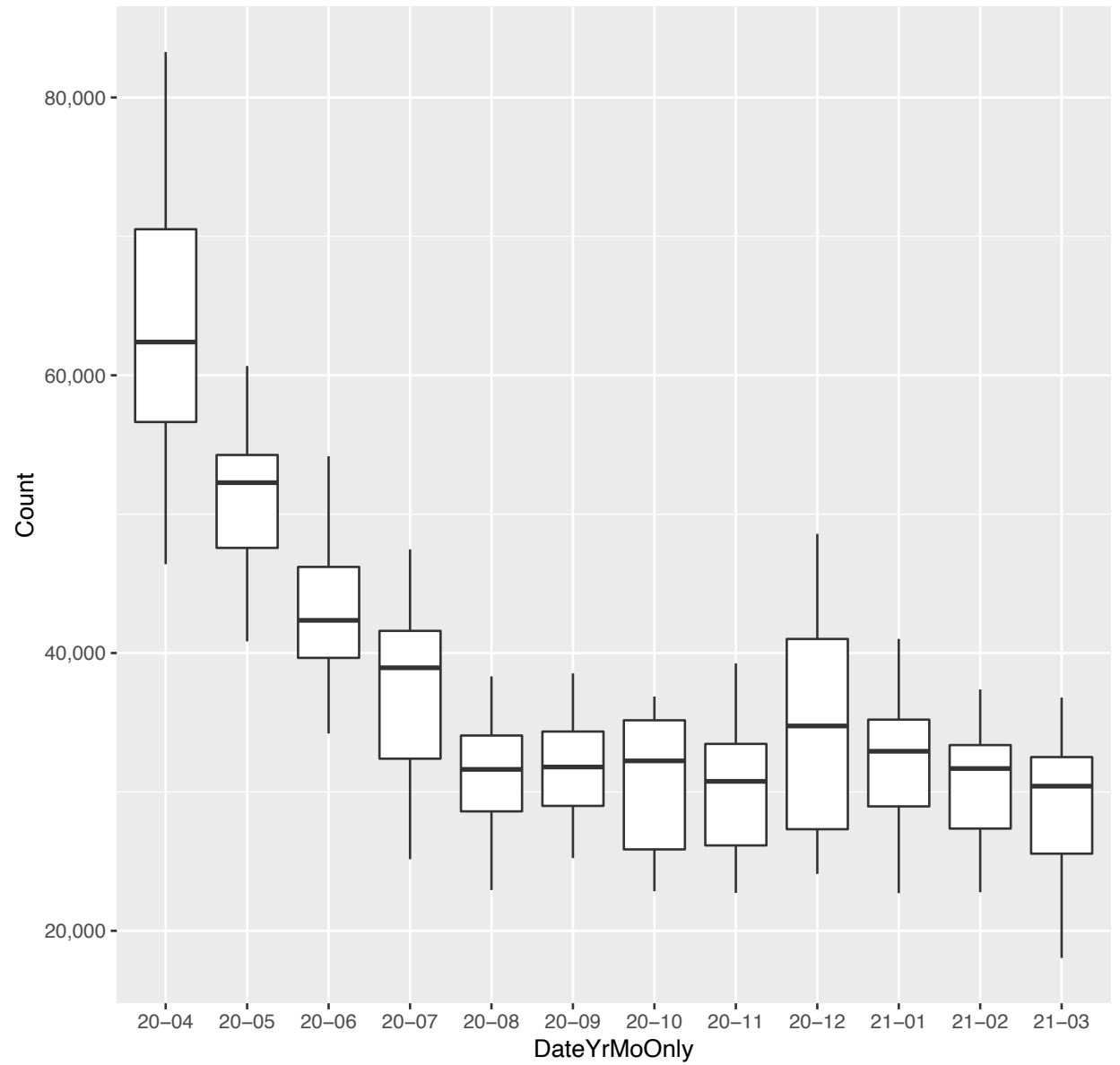
53. uiuc.edu:



*. uiuc.edu (day-by-day counts and 28 day moving average)



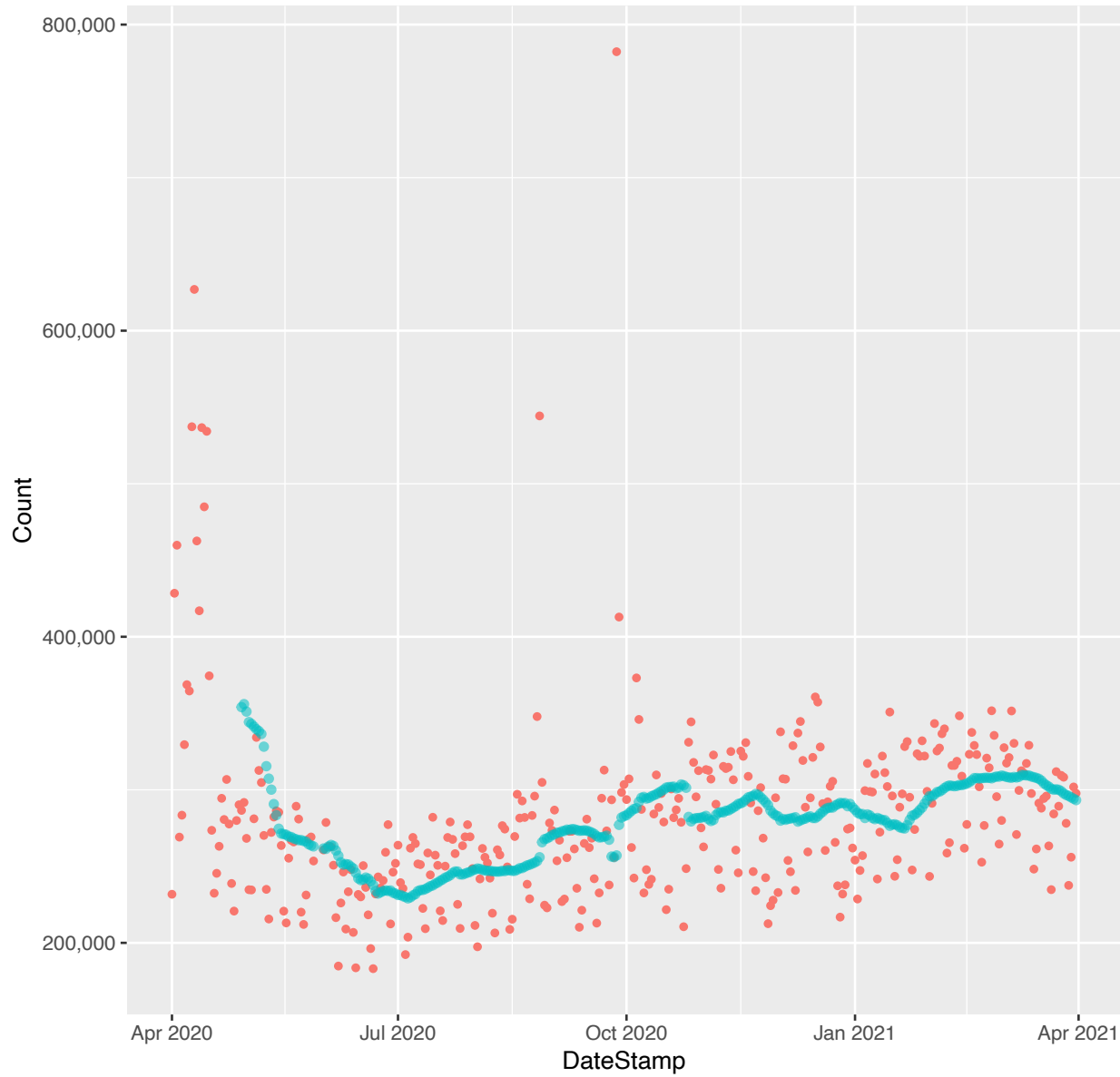
*. uiuc.edu (monthly boxplots (outliers trimmed))



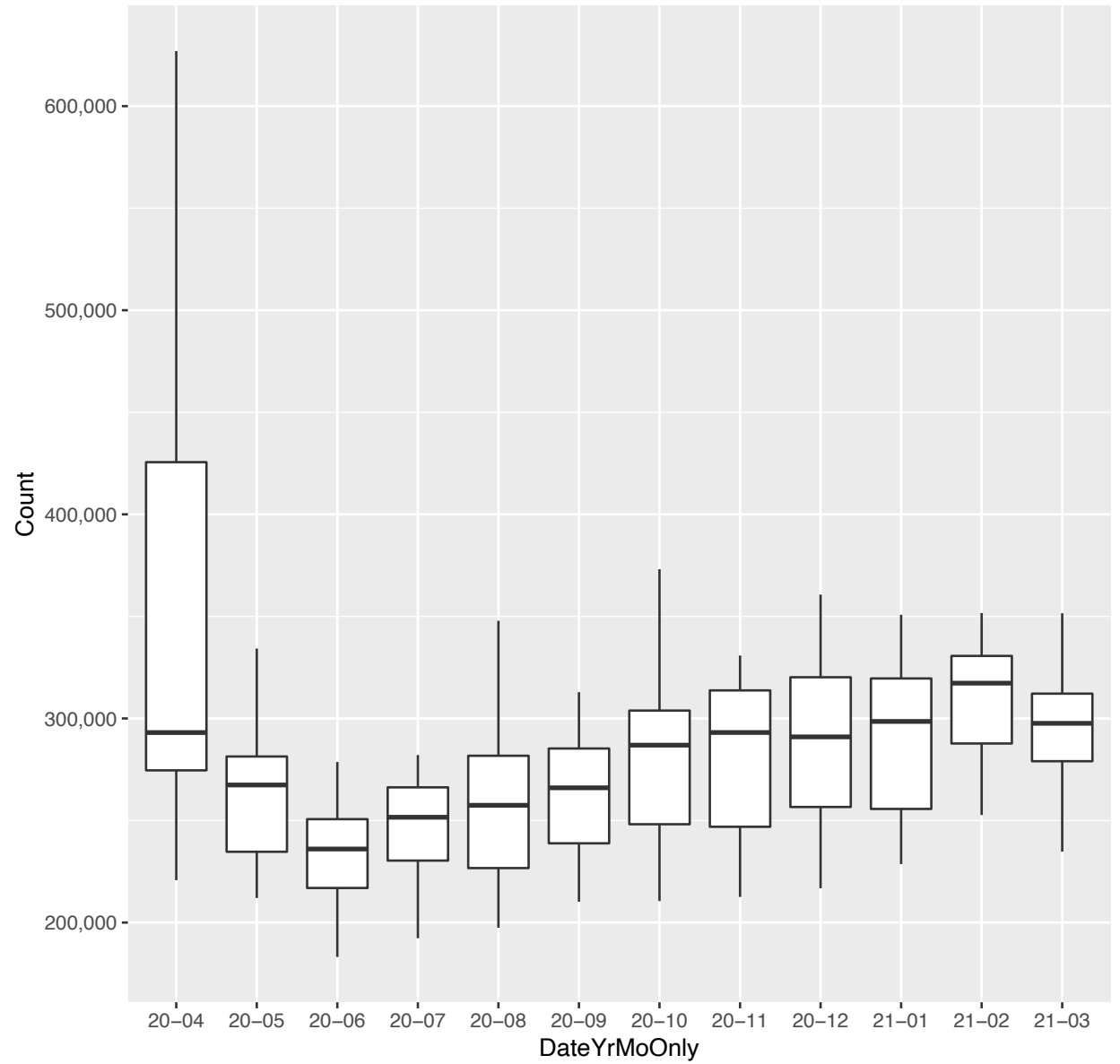
54. umd.edu:

✱ L shaped

*. umd.edu (day-by-day counts and 28 day moving average)



*. umd.edu (monthly boxplots (outliers trimmed))

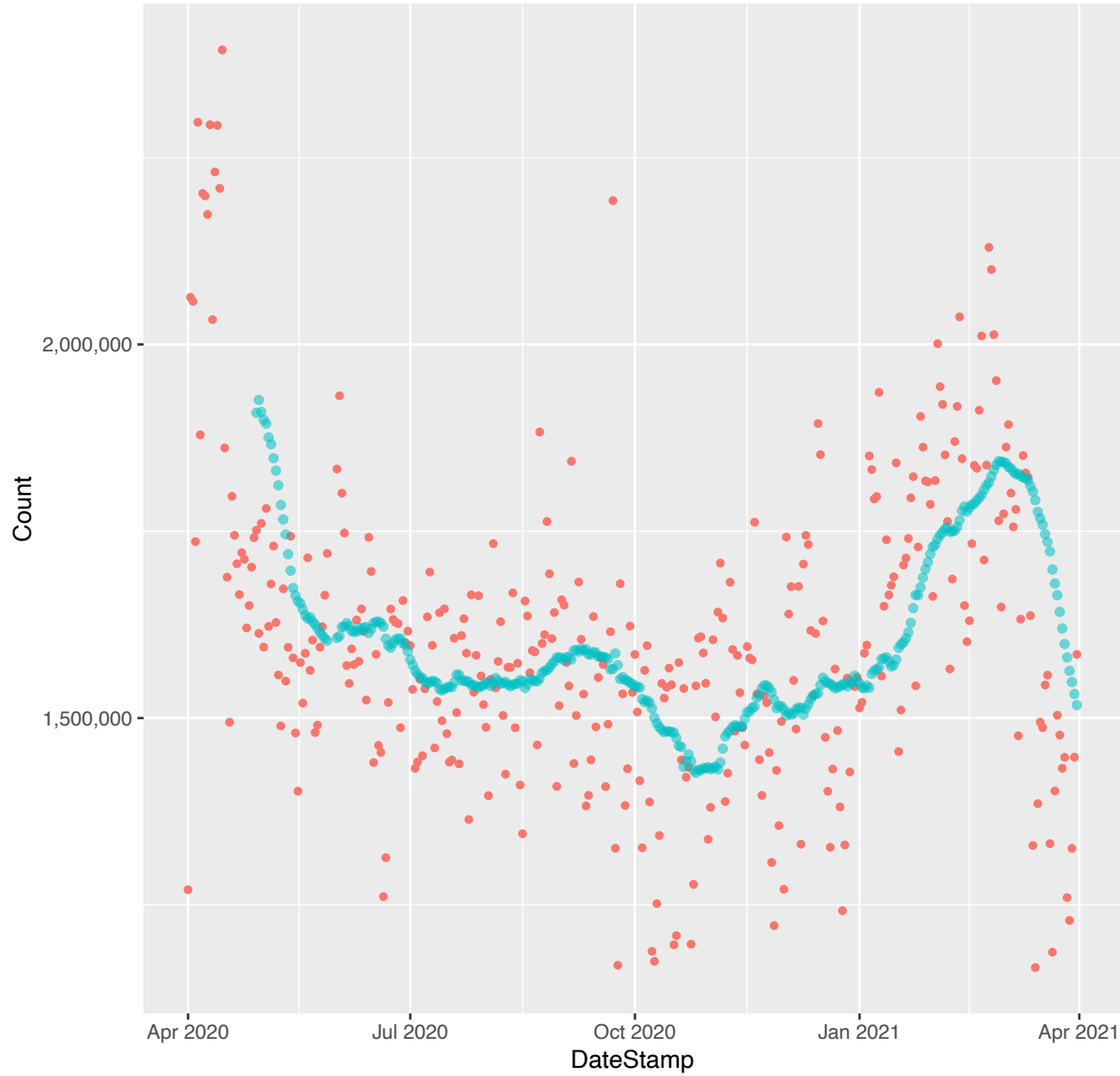


55. umich.edu:

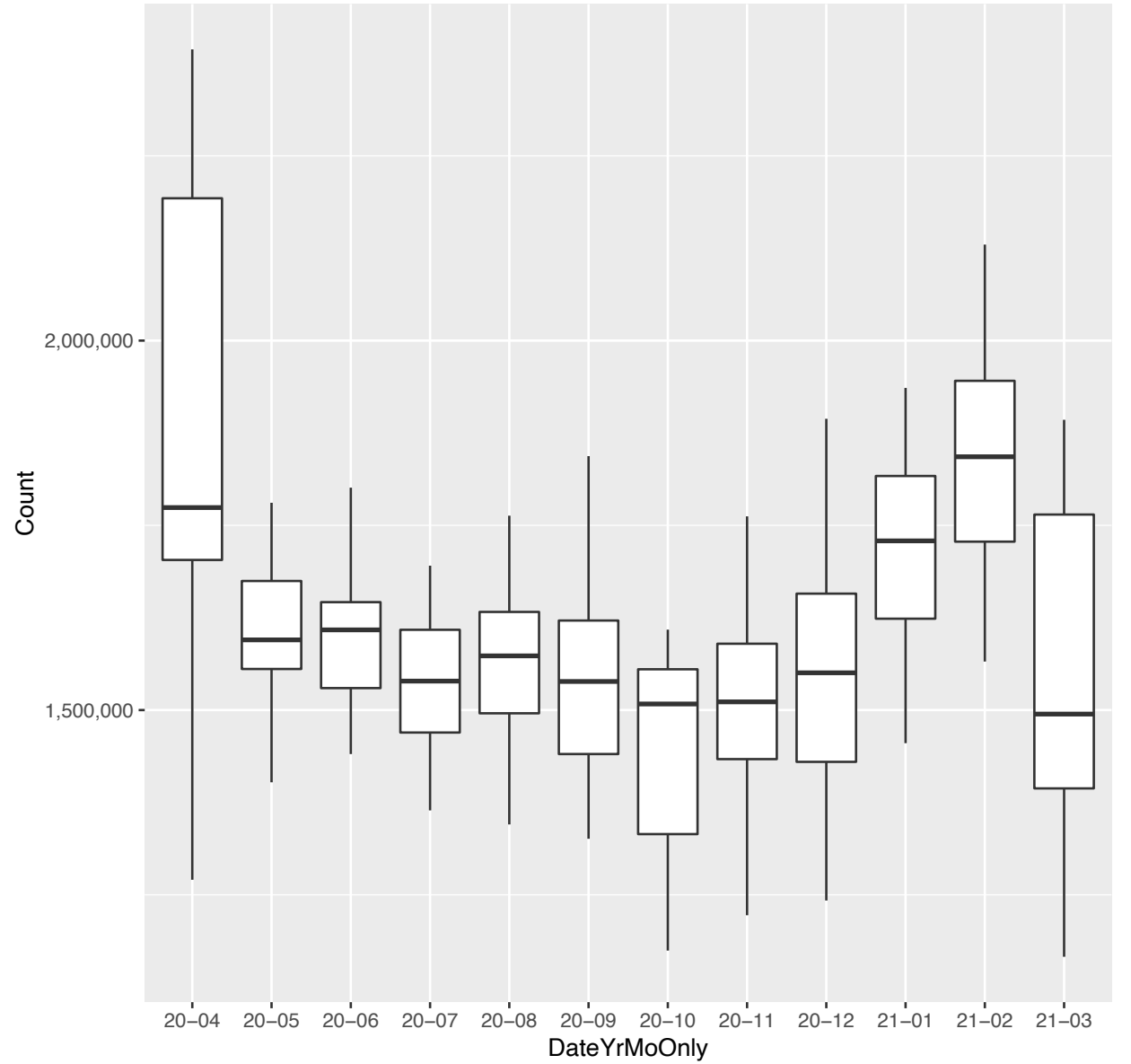
L shaped

M

*. umich.edu (day-by-day counts and 28 day moving average)



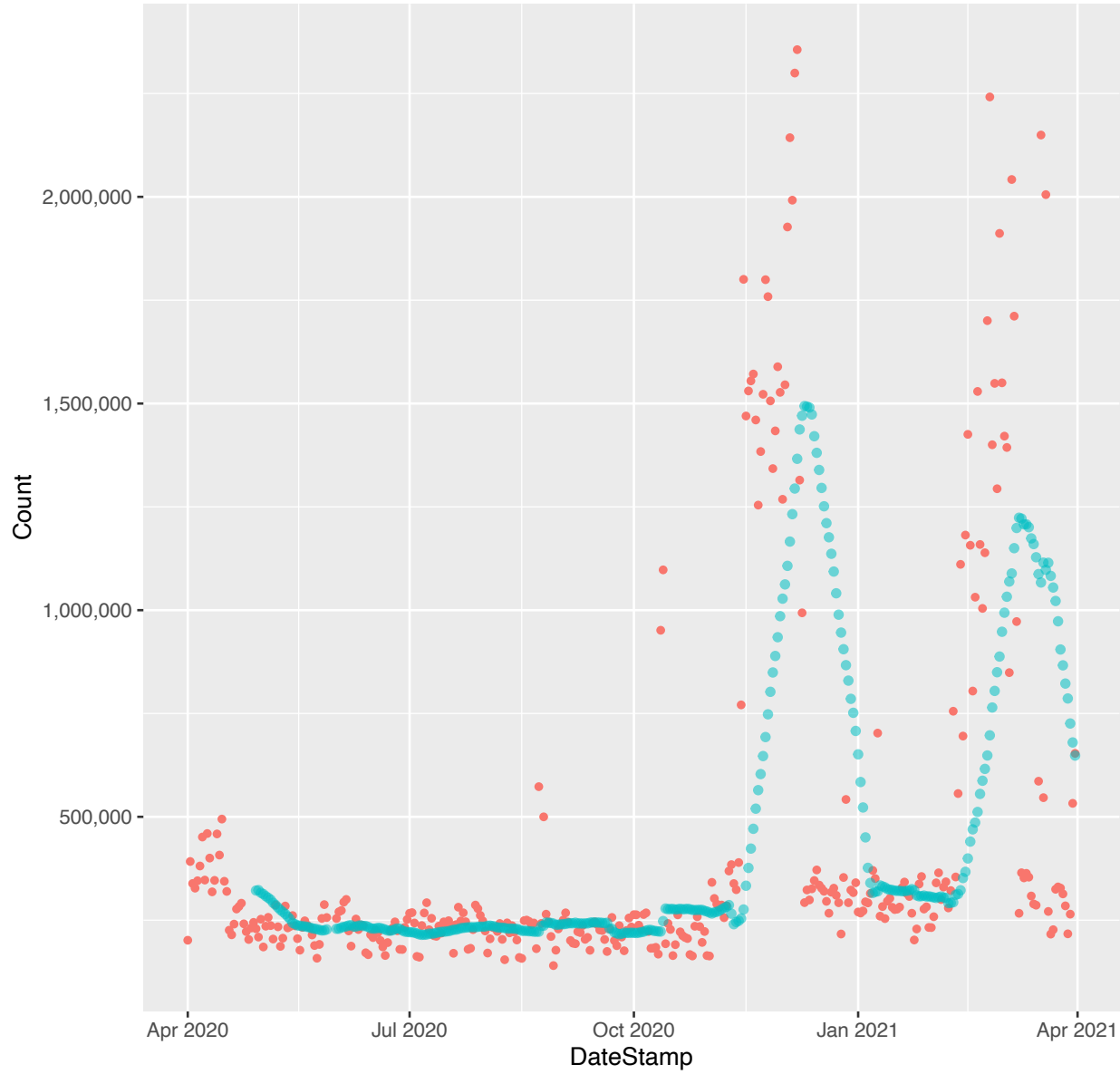
*. umich.edu (monthly boxplots (outliers trimmed))



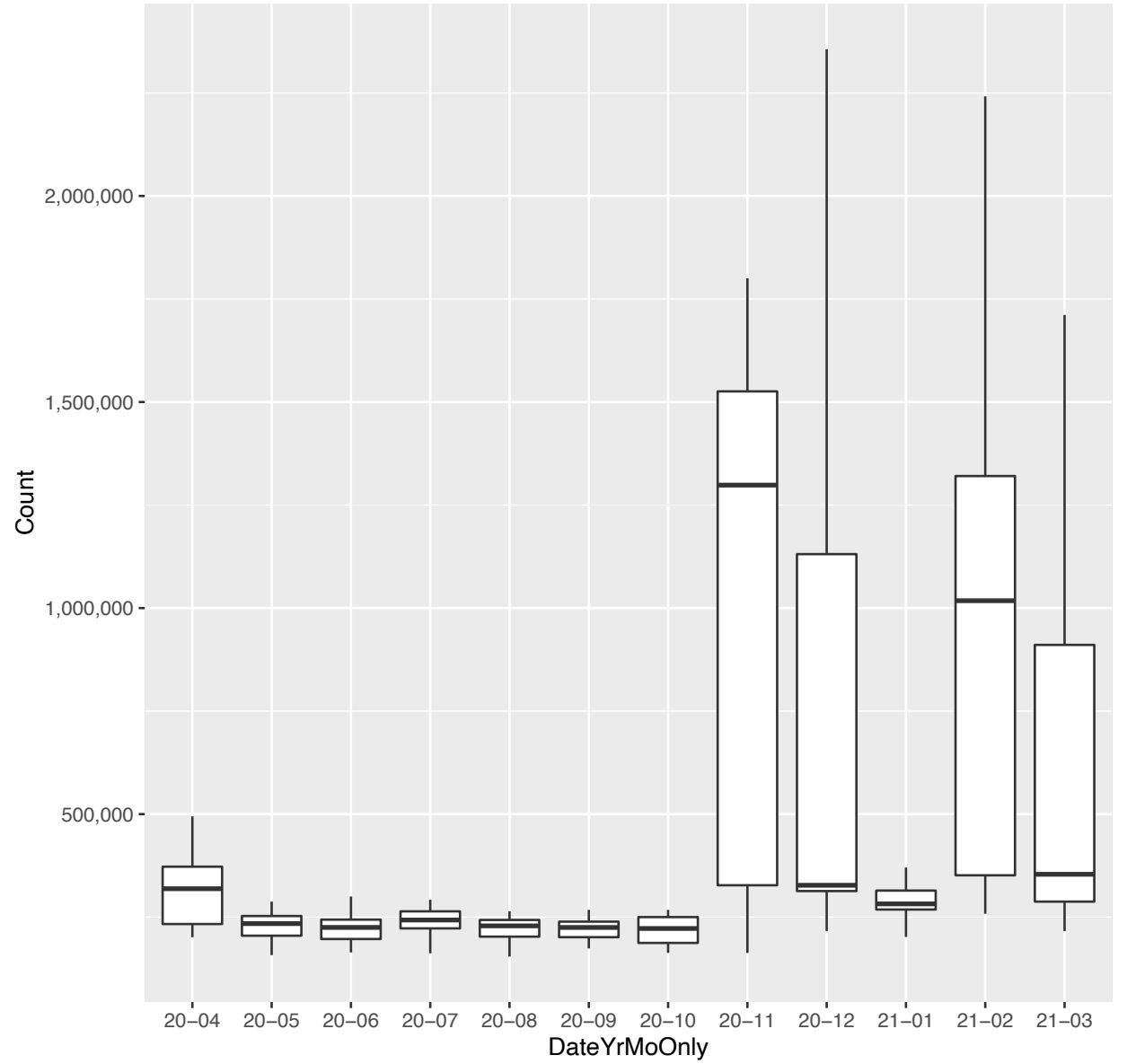
56. umn.edu:



*. umn.edu (day-by-day counts and 28 day moving average)



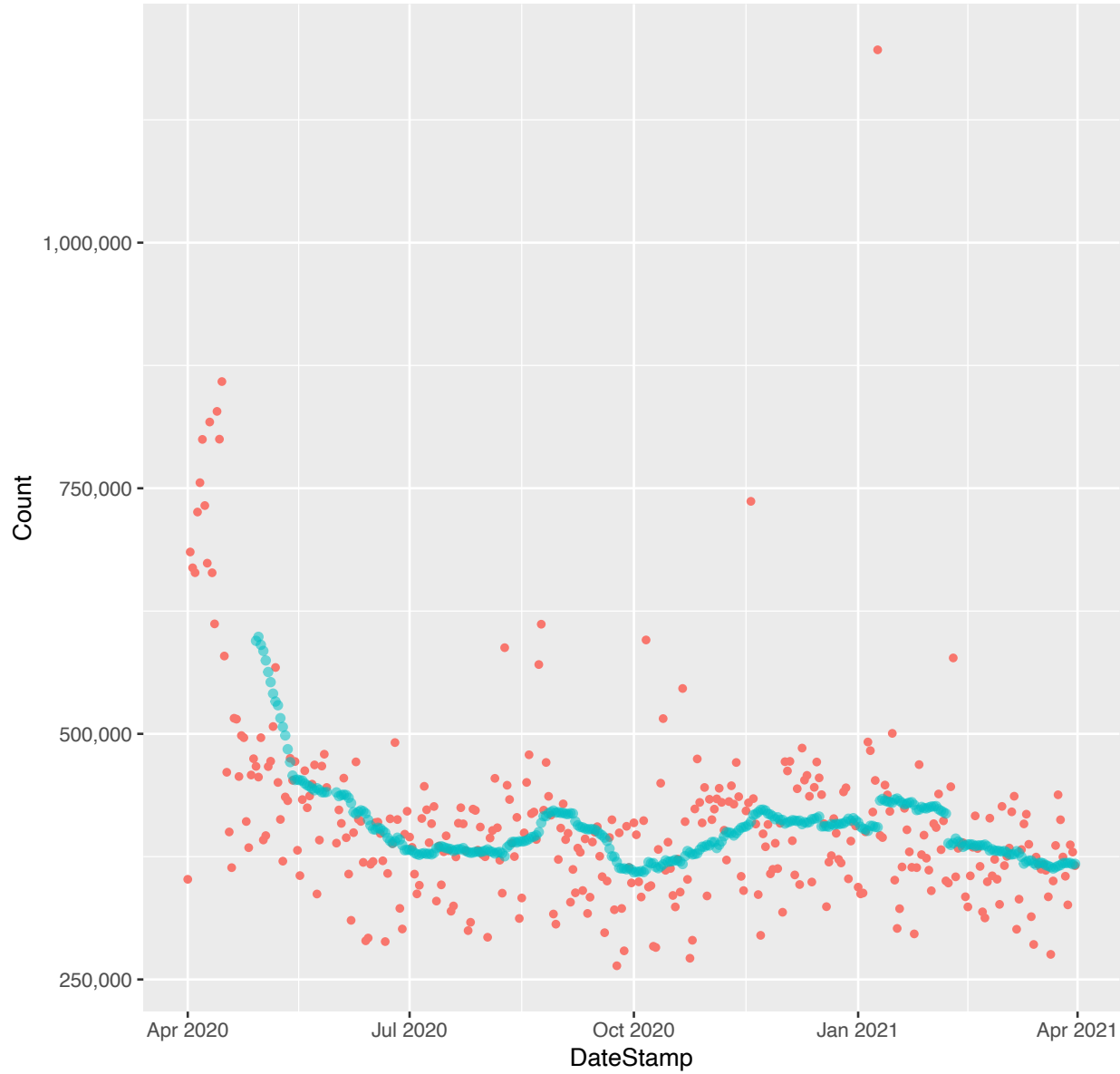
*. umn.edu (monthly boxplots (outliers trimmed))



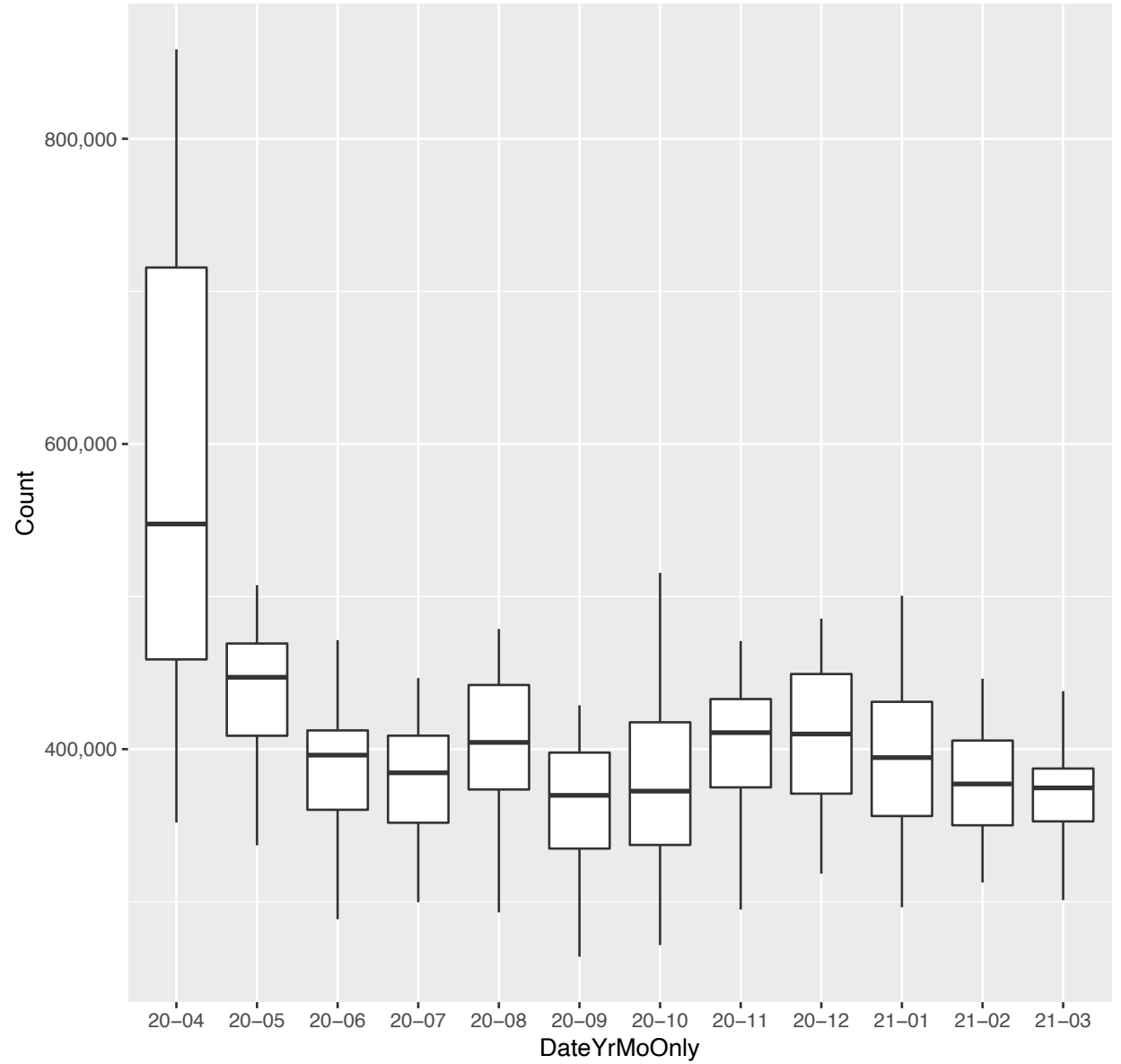
57. unc.edu:

L shaped

*. unc.edu (day-by-day counts and 28 day moving average)



*. unc.edu (monthly boxplots (outliers trimmed))



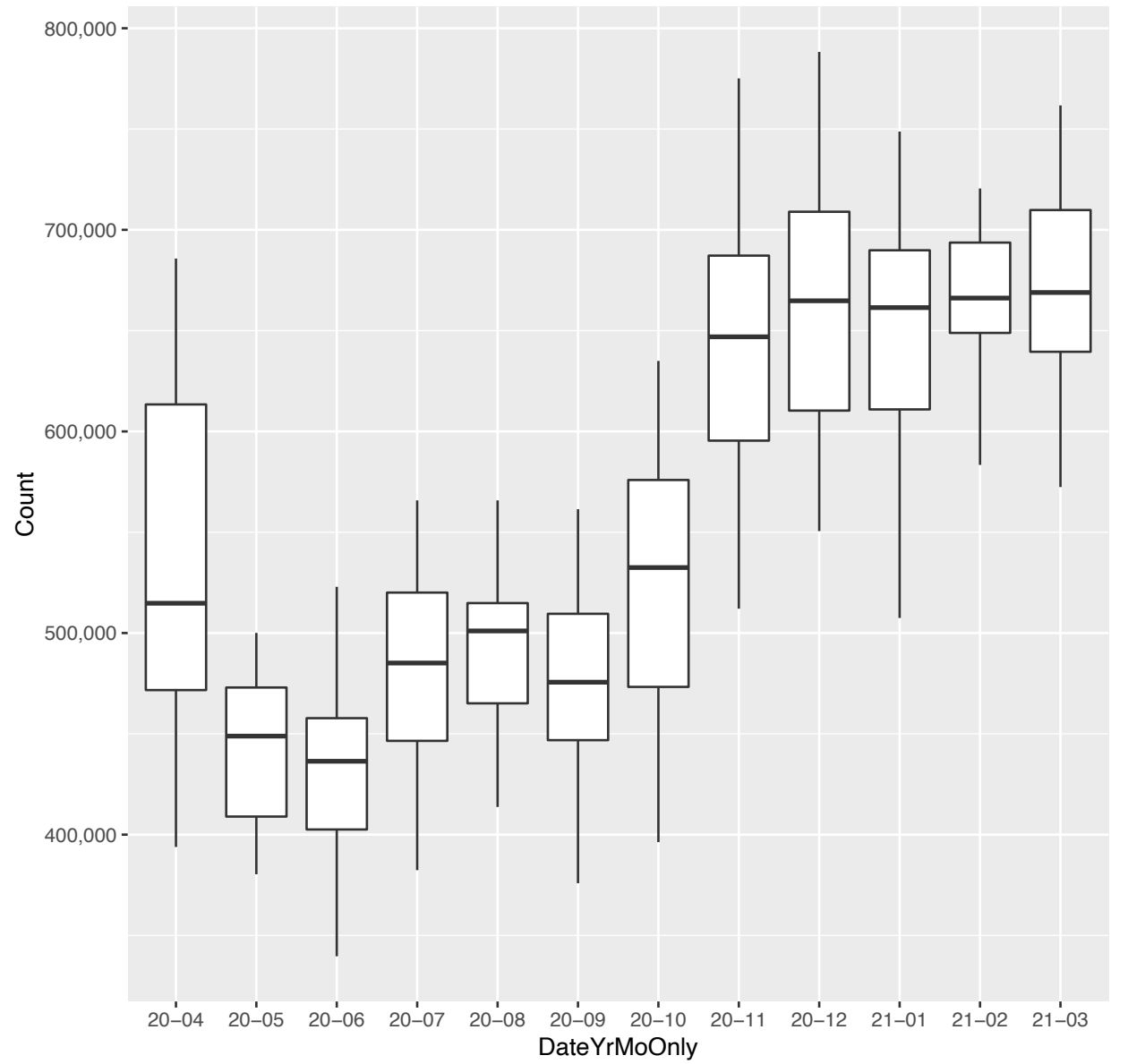
58. uoregon.edu:



*. uoregon.edu (day-by-day counts and 28 day moving average)



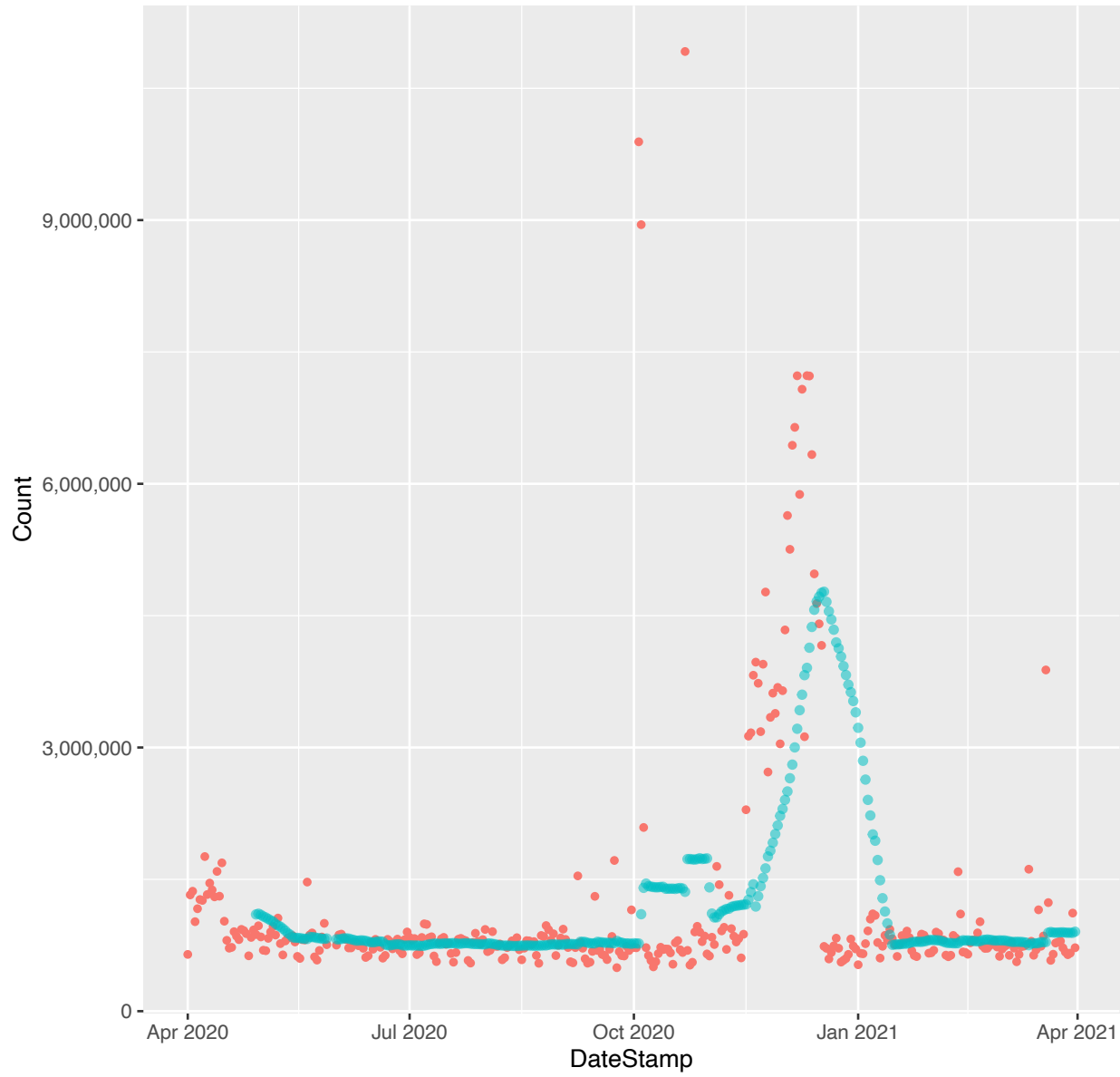
*. uoregon.edu (monthly boxplots (outliers trimmed))



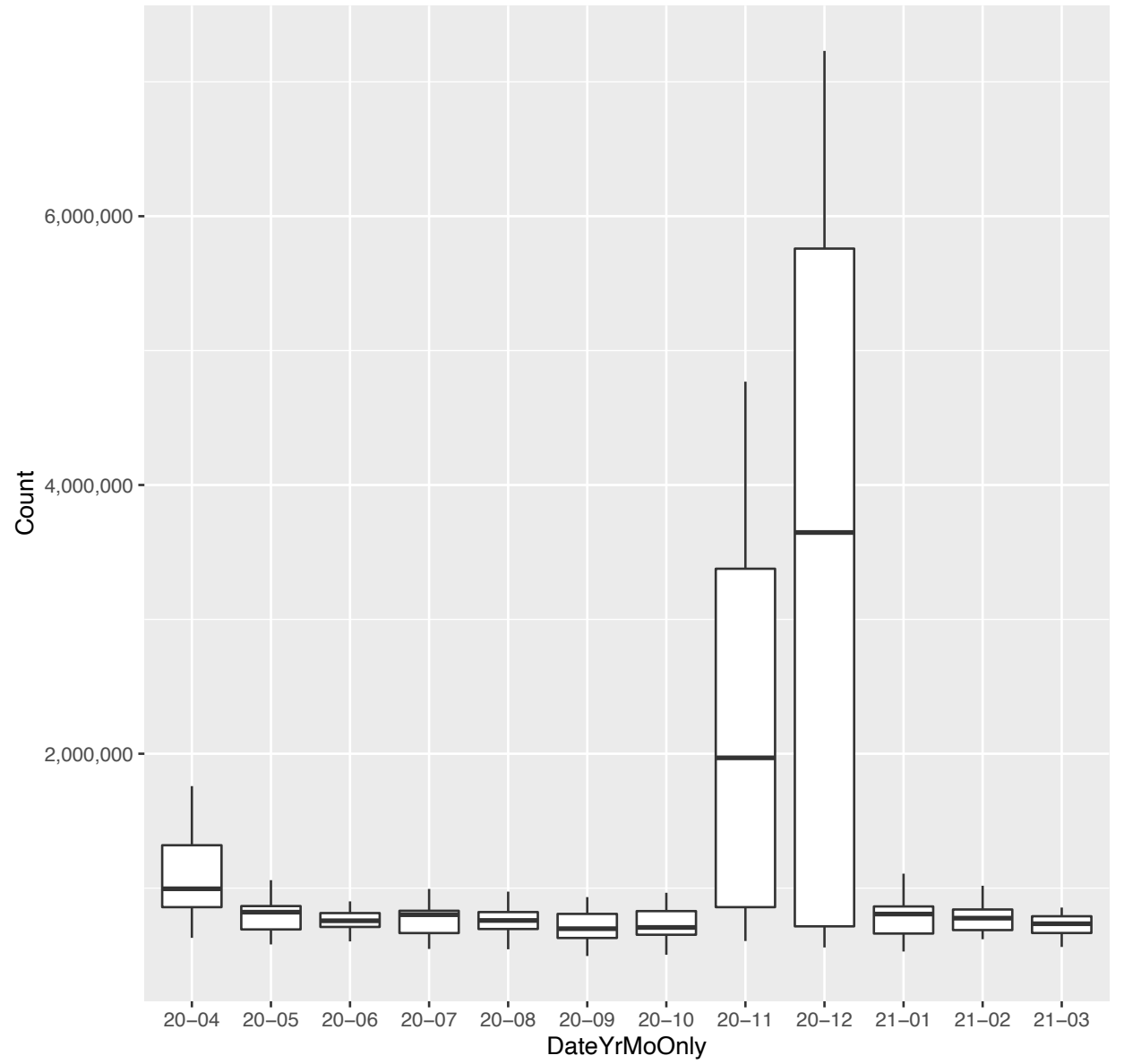
59. upenn.edu:



*. upenn.edu (day-by-day counts and 28 day moving average)



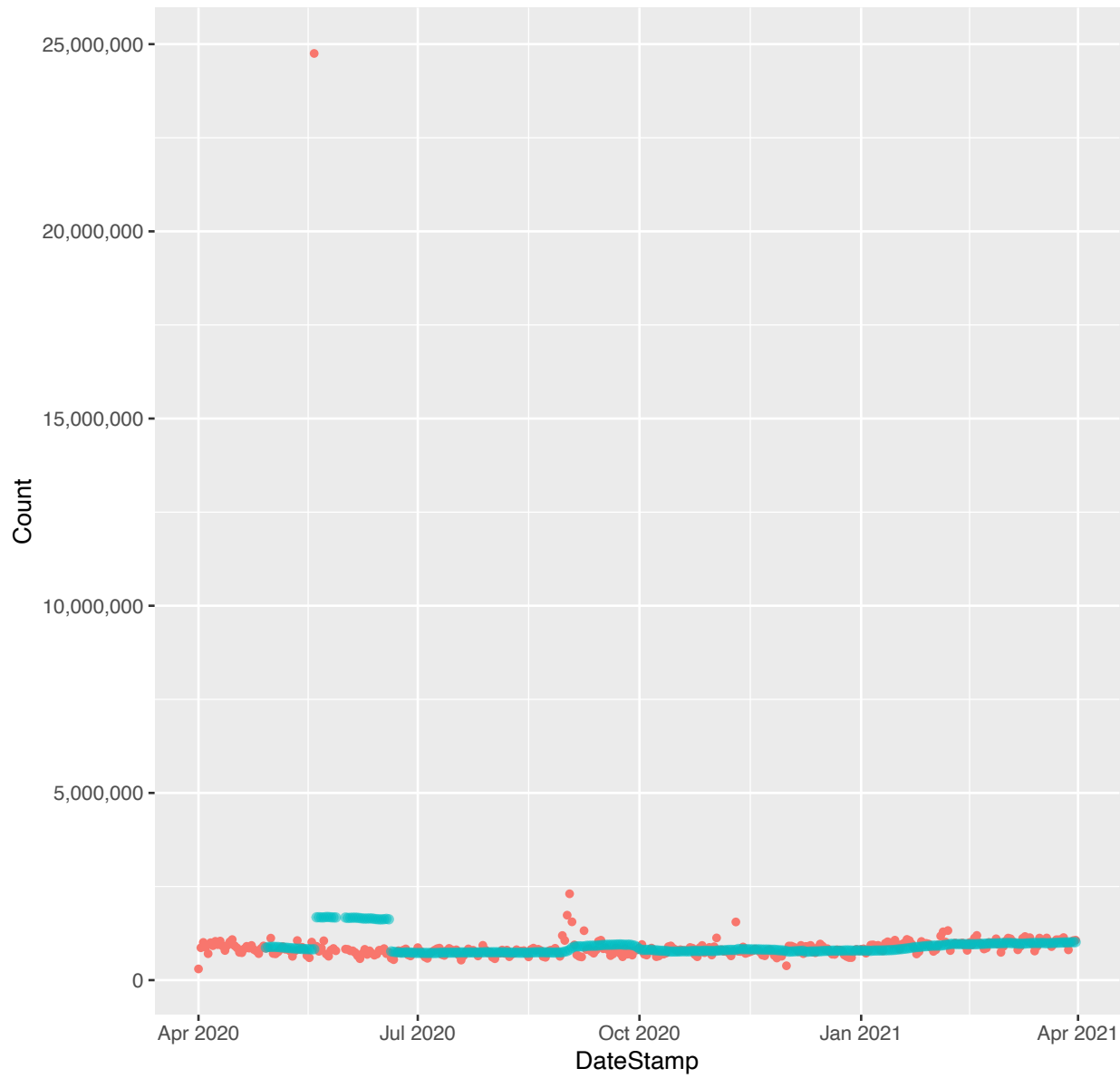
*. upenn.edu (monthly boxplots (outliers trimmed))



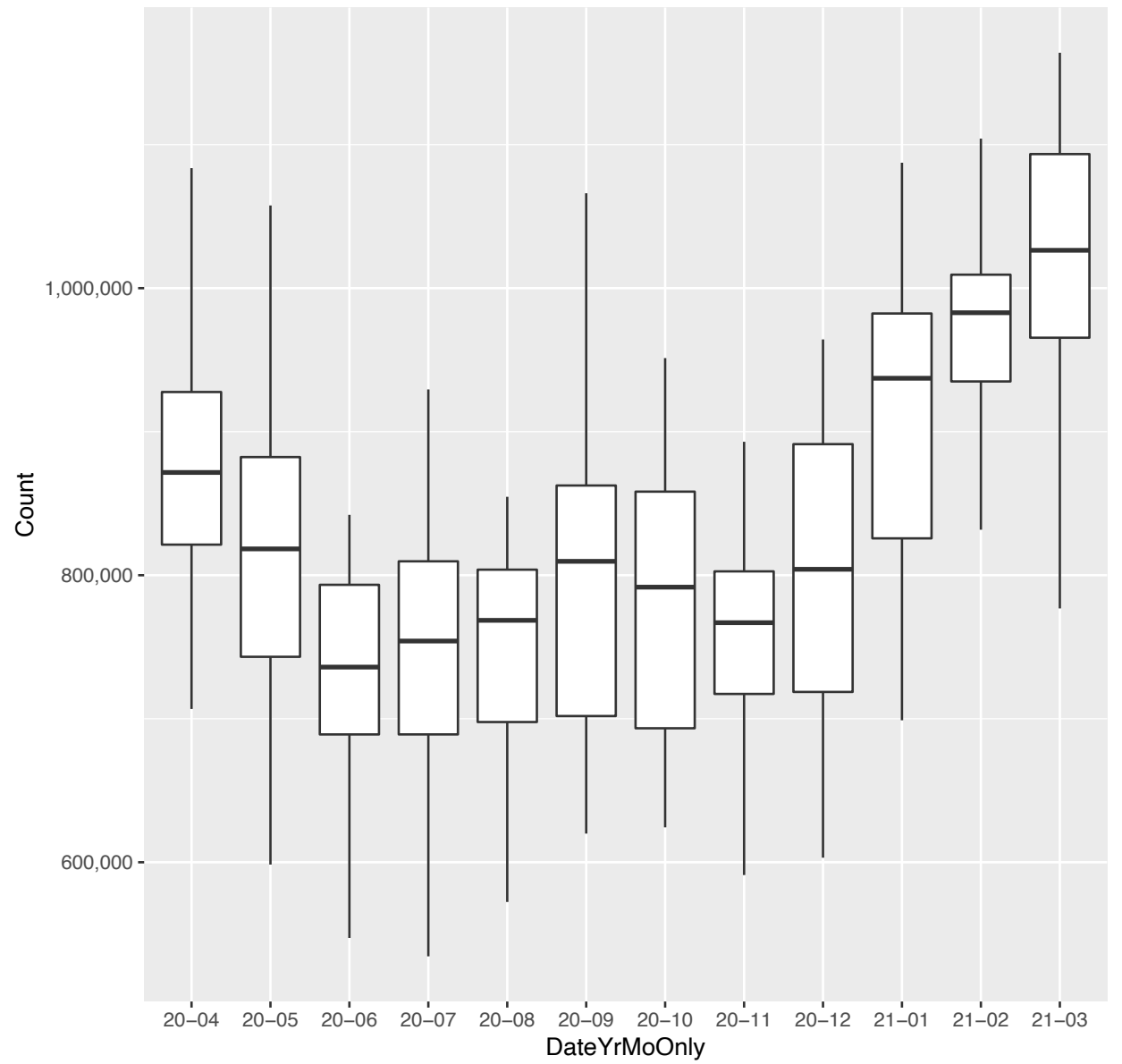
60. usc.edu:

★ ◡ shaped (ending higher)

*. usc.edu (day-by-day counts and 28 day moving average)



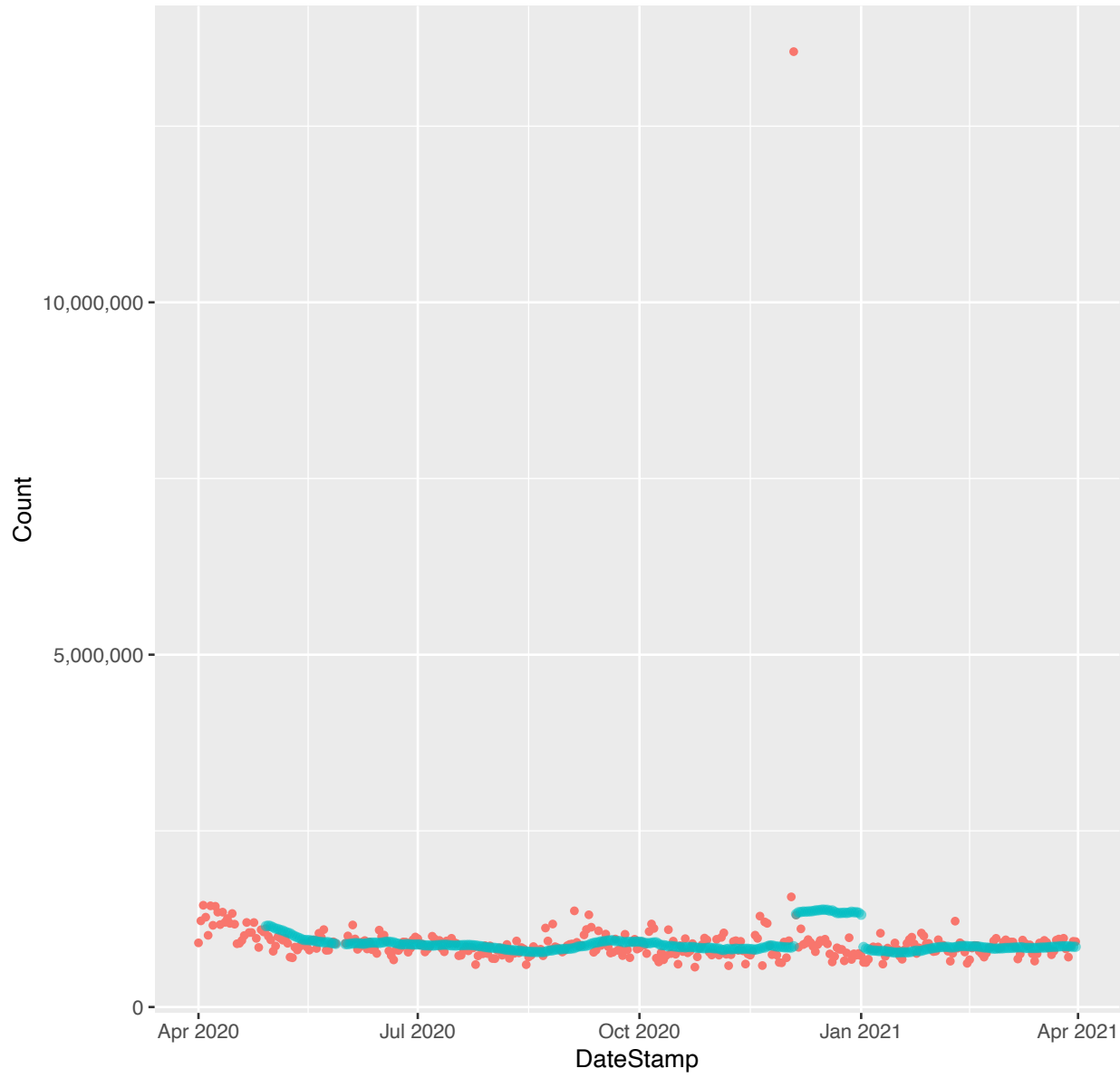
*. usc.edu (monthly boxplots (outliers trimmed))



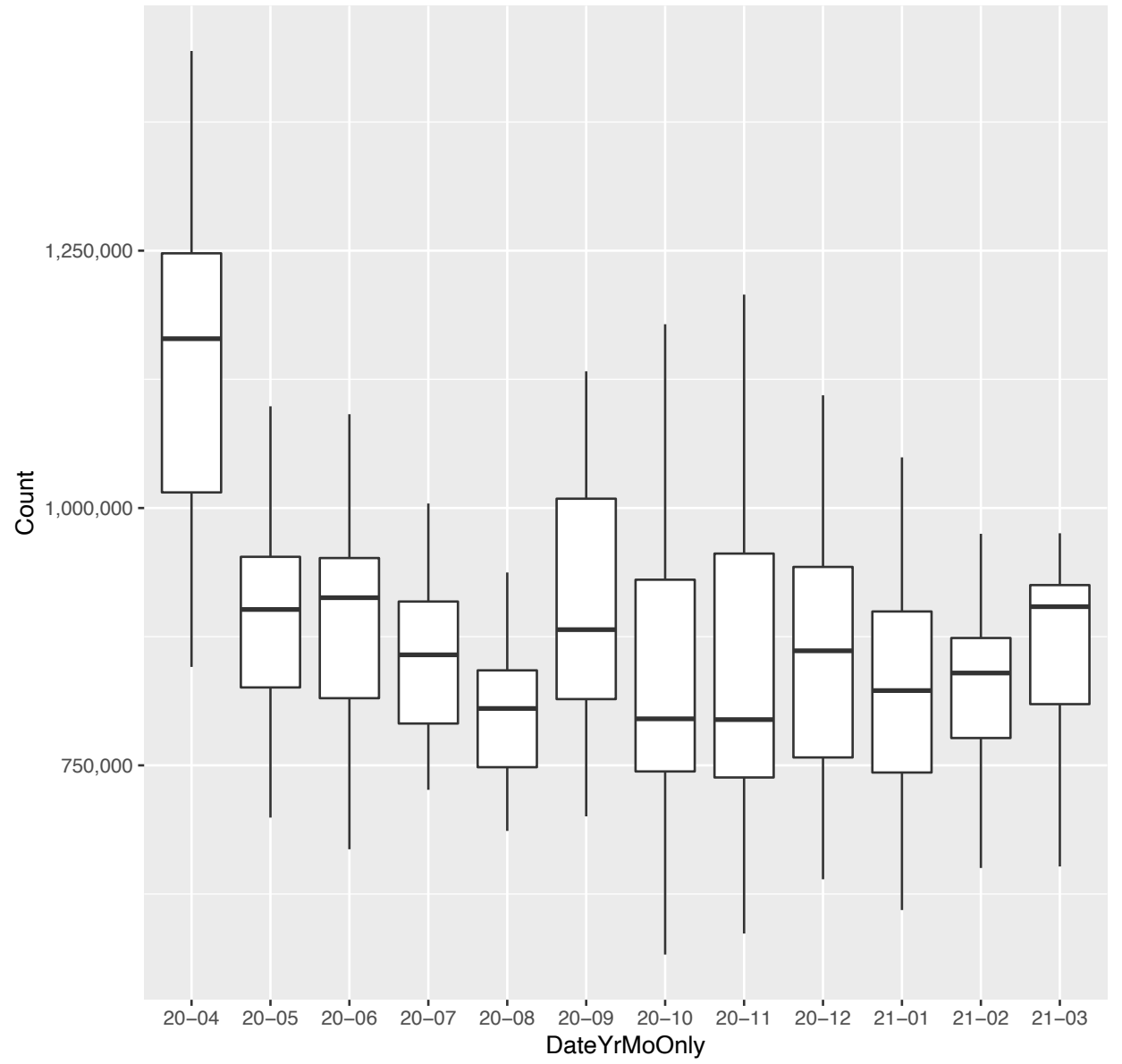
61. utexas.edu:

✱ L shaped

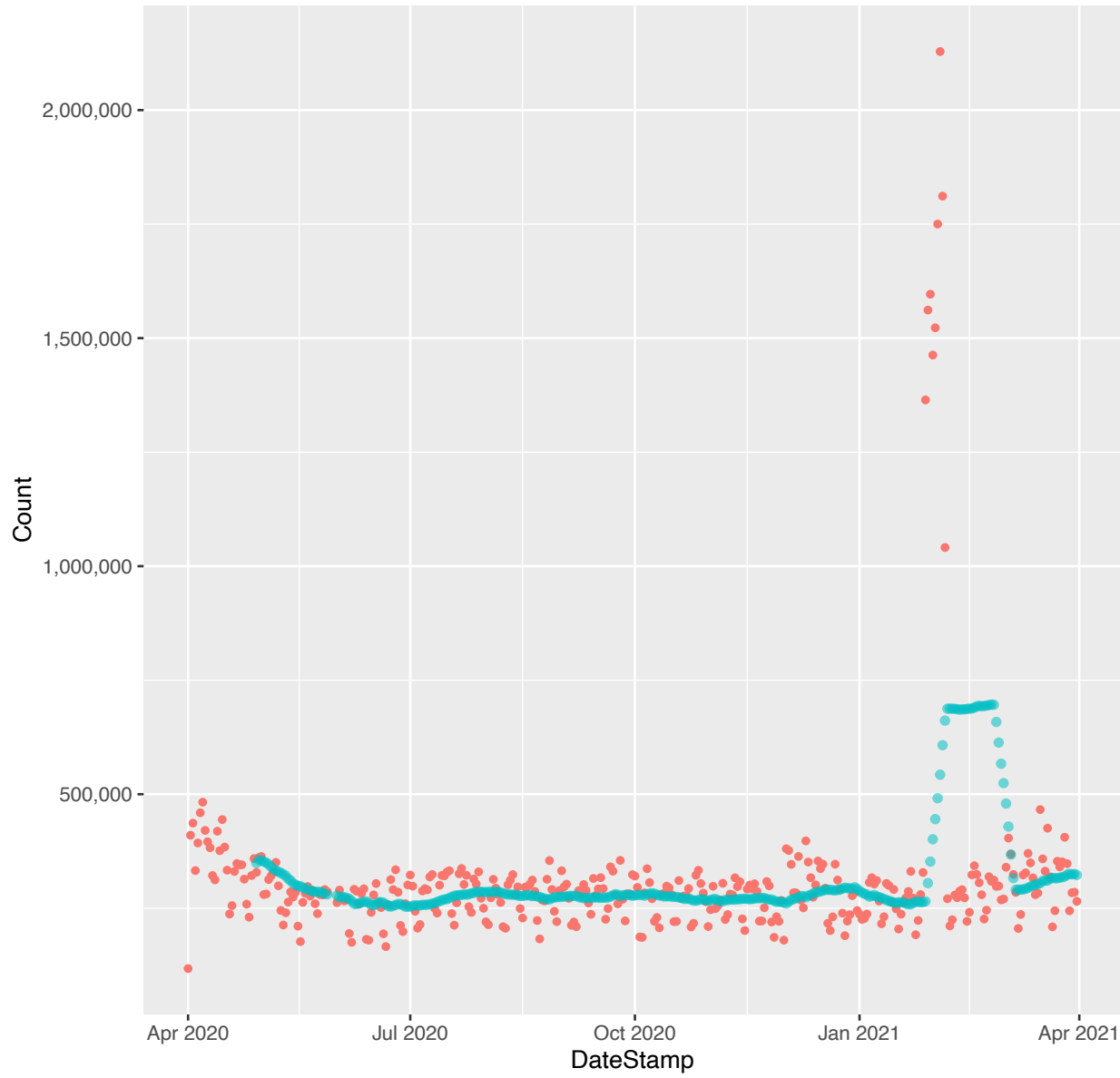
*. utexas.edu (day-by-day counts and 28 day moving average)



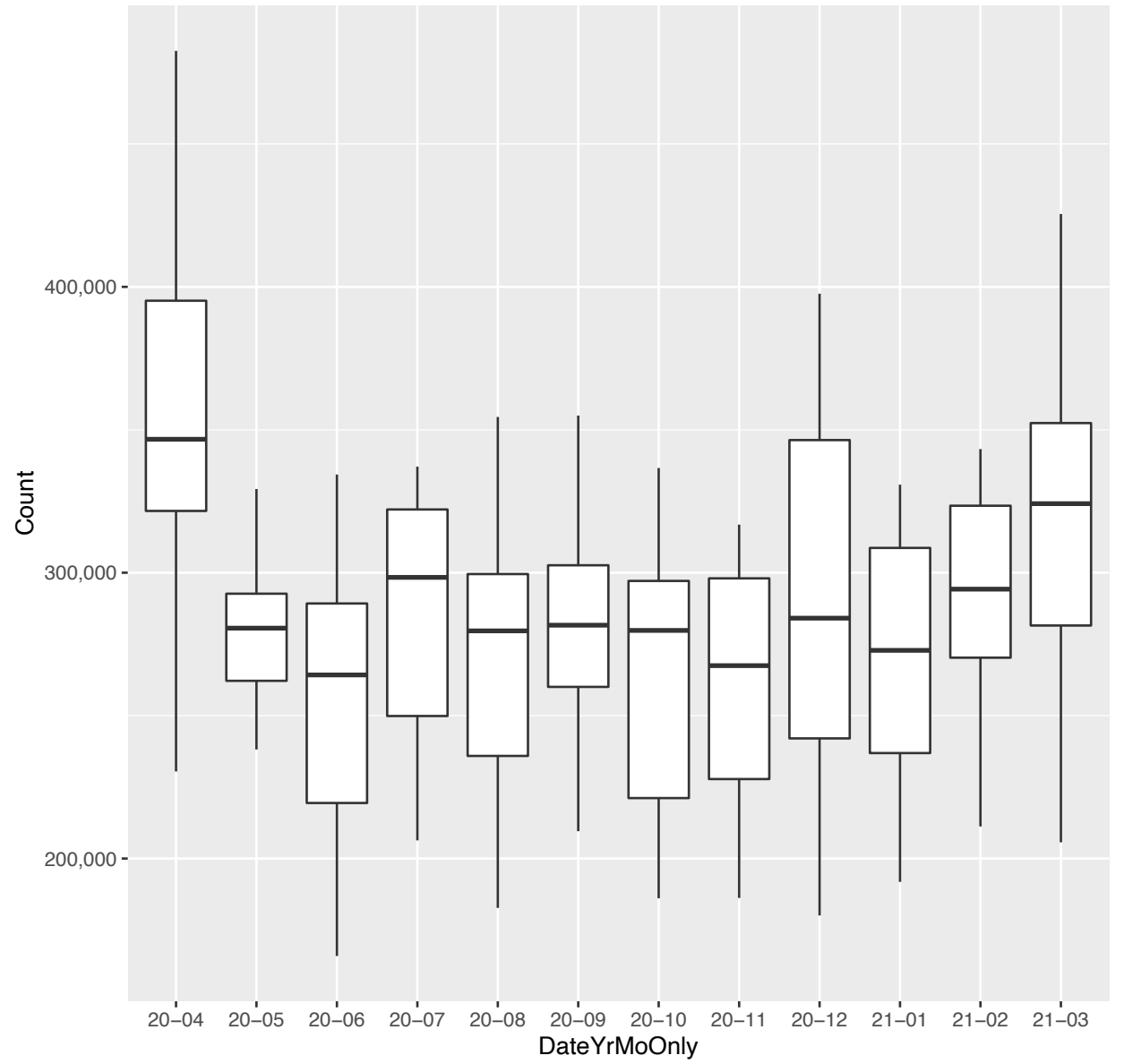
*. utexas.edu (monthly boxplots (outliers trimmed))



*. vanderbilt.edu (day-by-day counts and 28 day moving average)

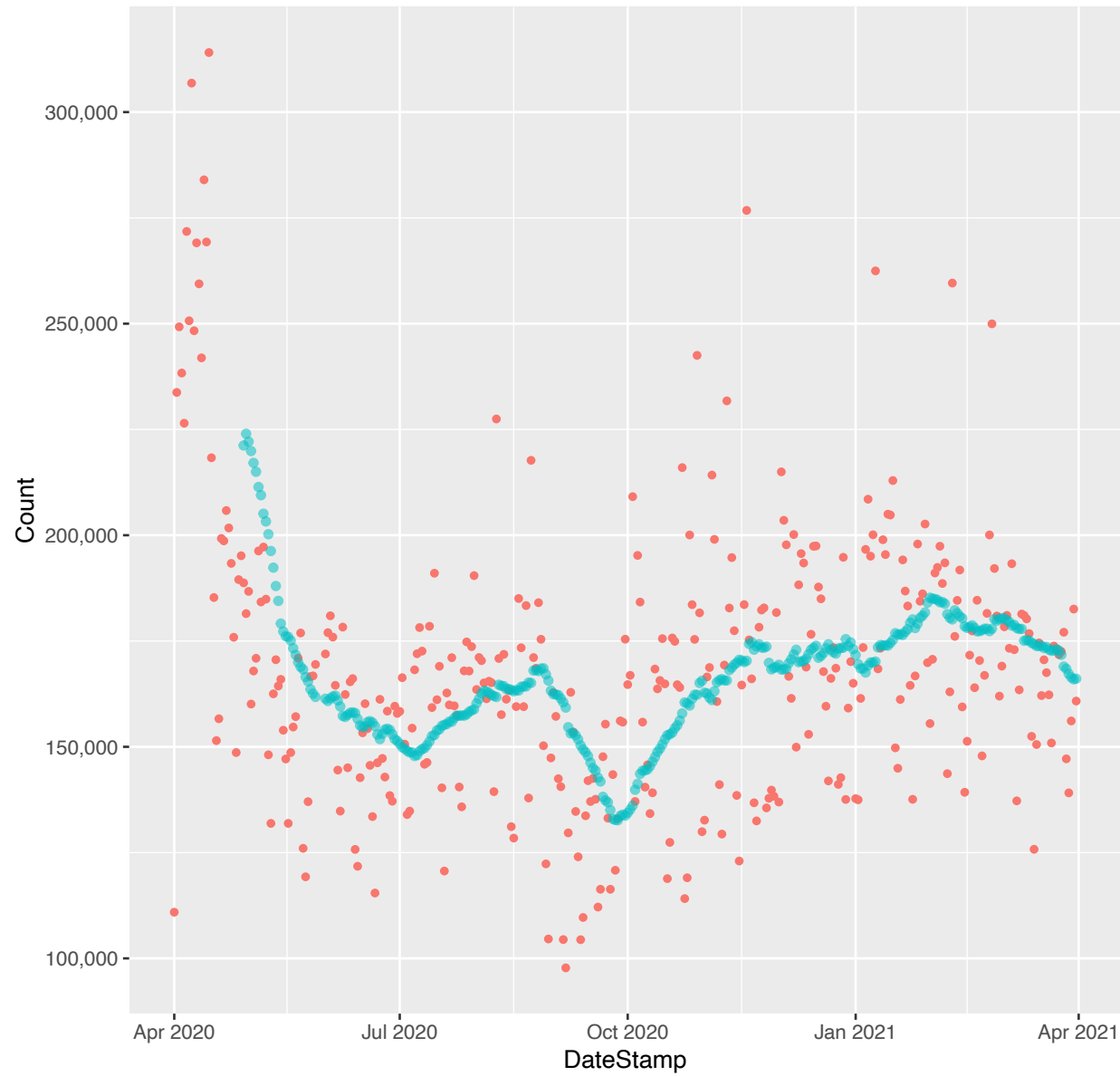


*. vanderbilt.edu (monthly boxplots (outliers trimmed))

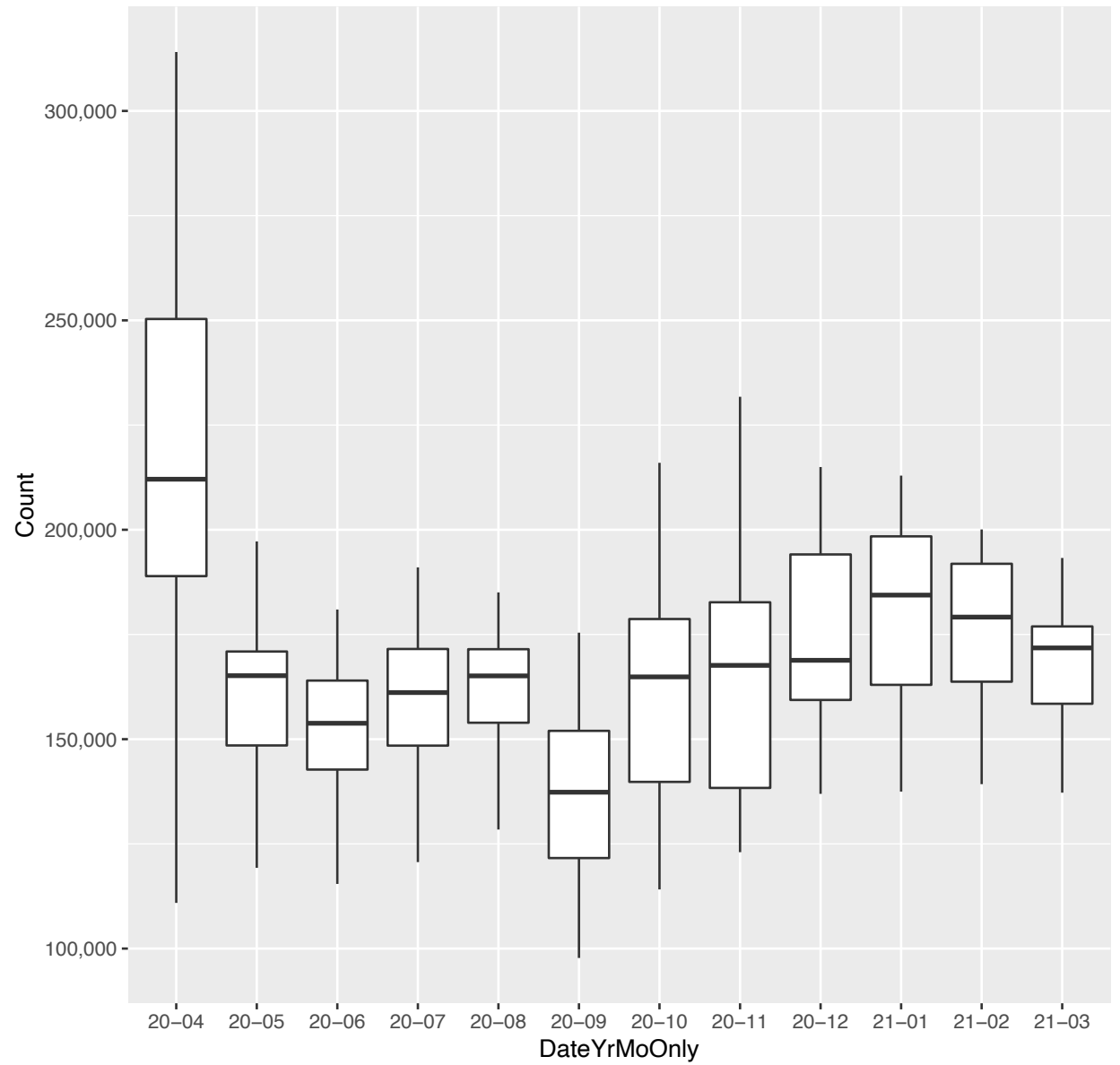


63. virginia.edu: L shaped

*. virginia.edu (day-by-day counts and 28 day moving average)



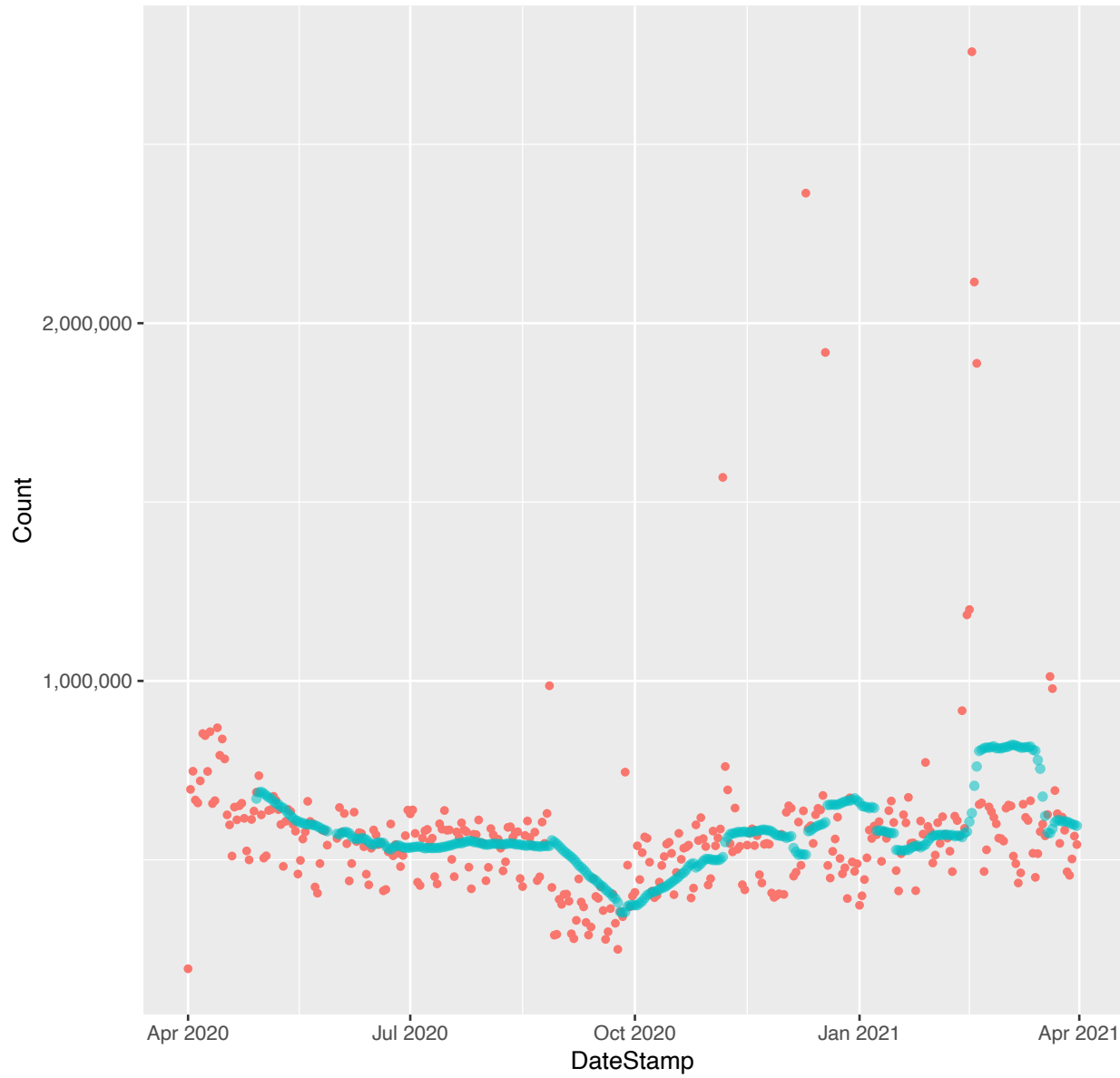
*. virginia.edu (monthly boxplots (outliers trimmed))



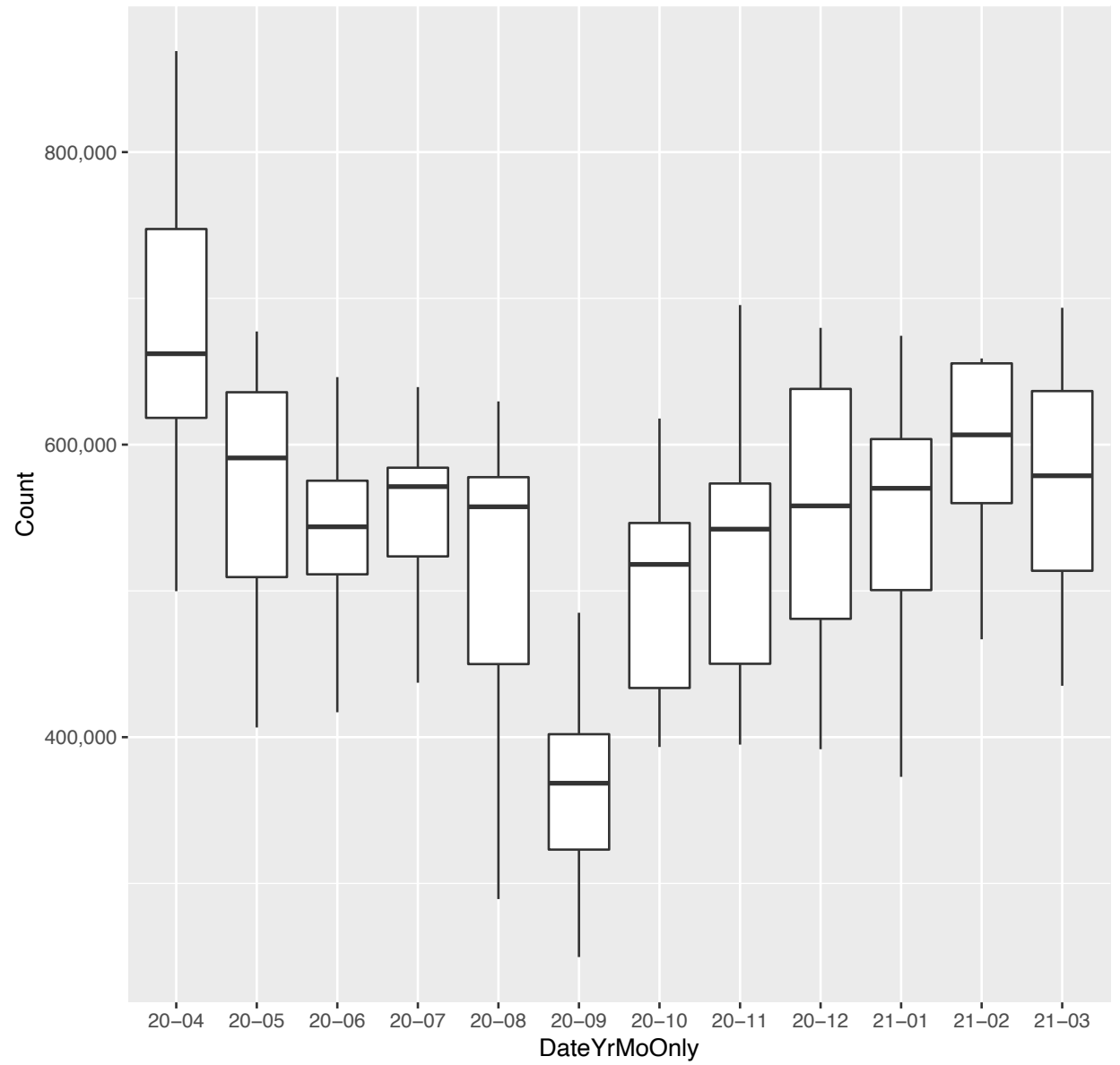
64. vt.edu:

⬤ ◡ shaped

*. vt.edu (day-by-day counts and 28 day moving average)



*. vt.edu (monthly boxplots (outliers trimmed))

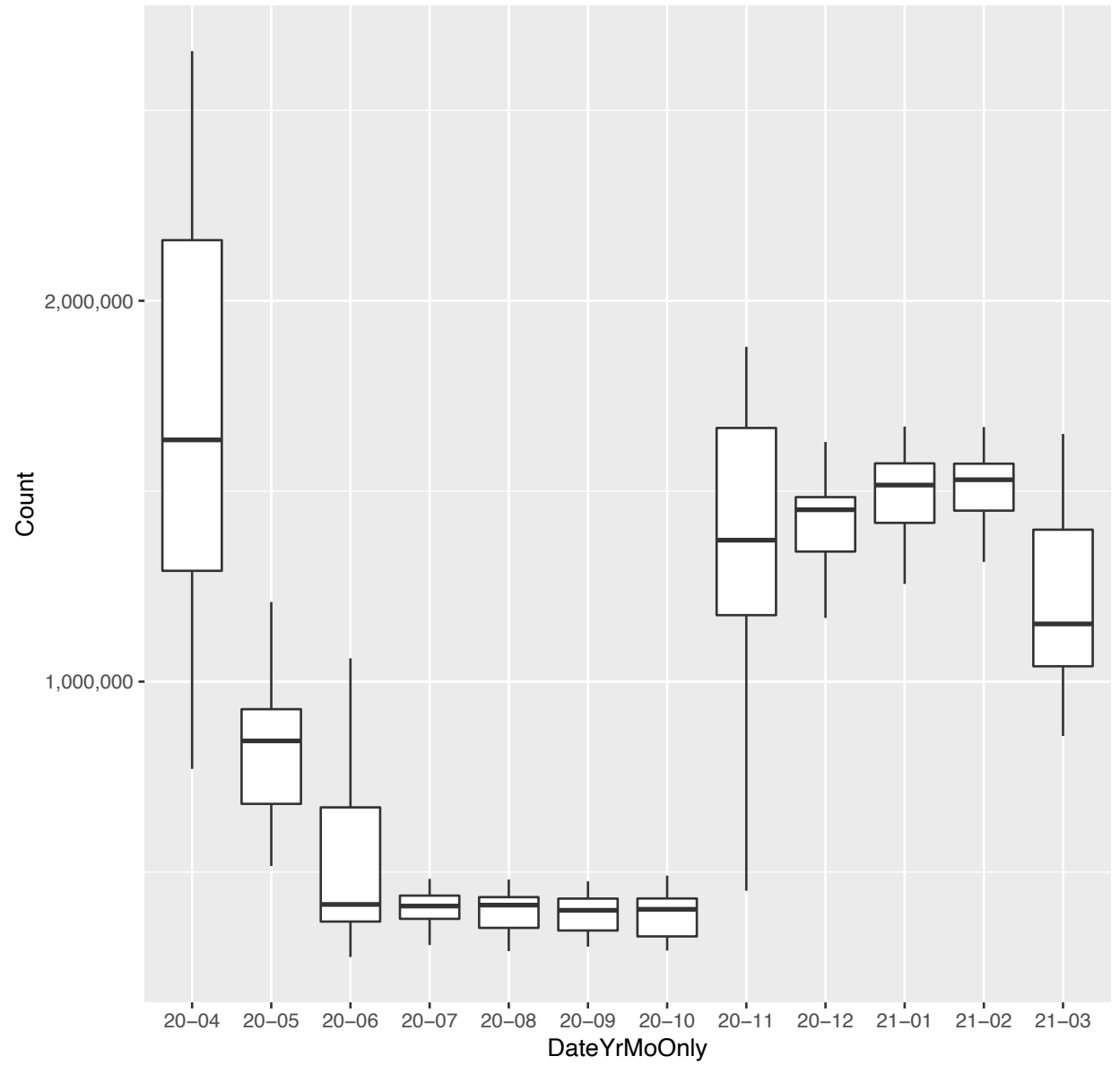


65. **washington.edu**: ◡ shaped (ending lower) **M**

*. washington.edu (day-by-day counts and 28 day moving average)



*. washington.edu (monthly boxplots (outliers trimmed))

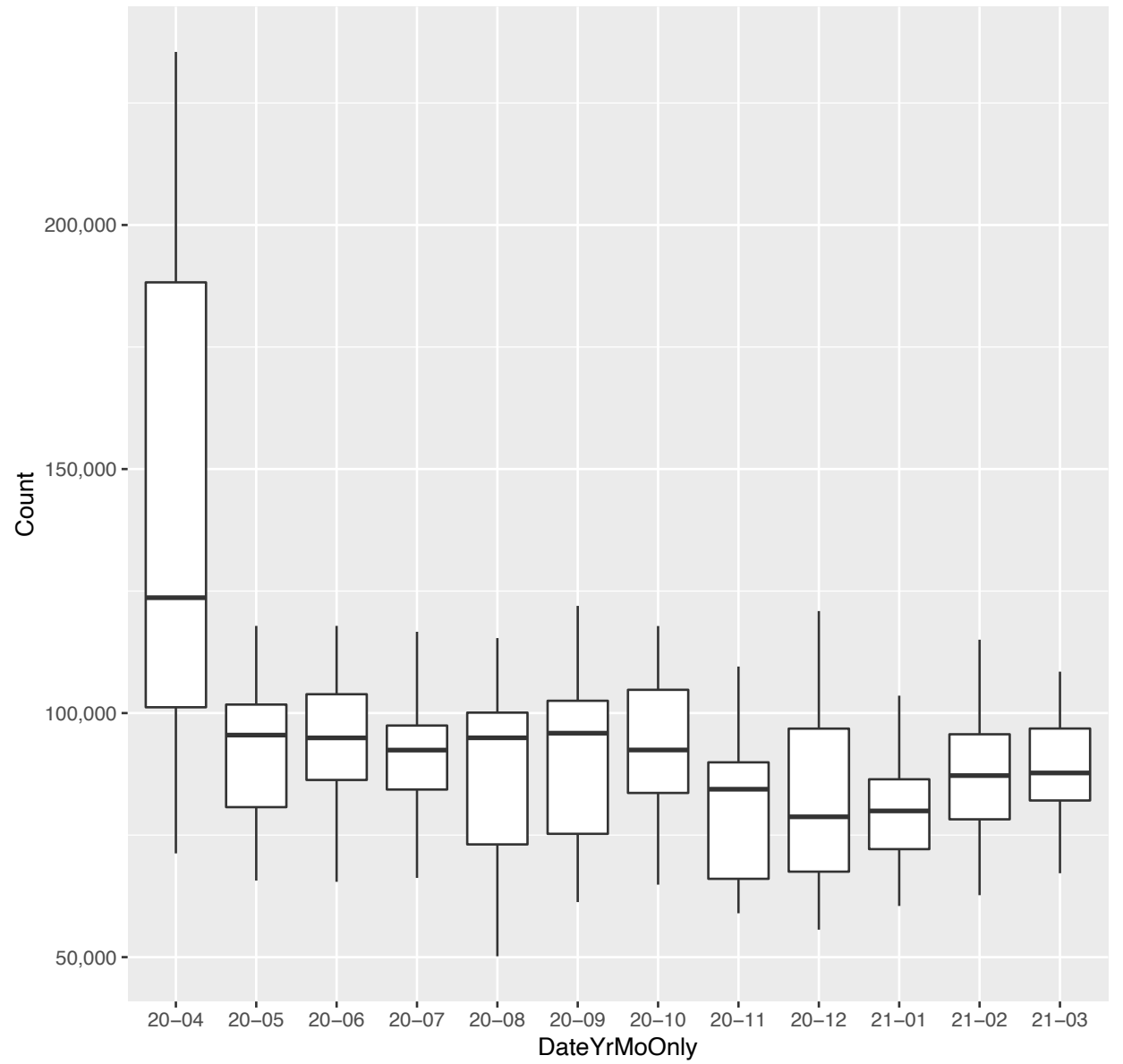


66. wesleyan.edu: L shaped

*. wesleyan.edu (day-by-day counts and 28 day moving average)



*. wesleyan.edu (monthly boxplots (outliers trimmed))



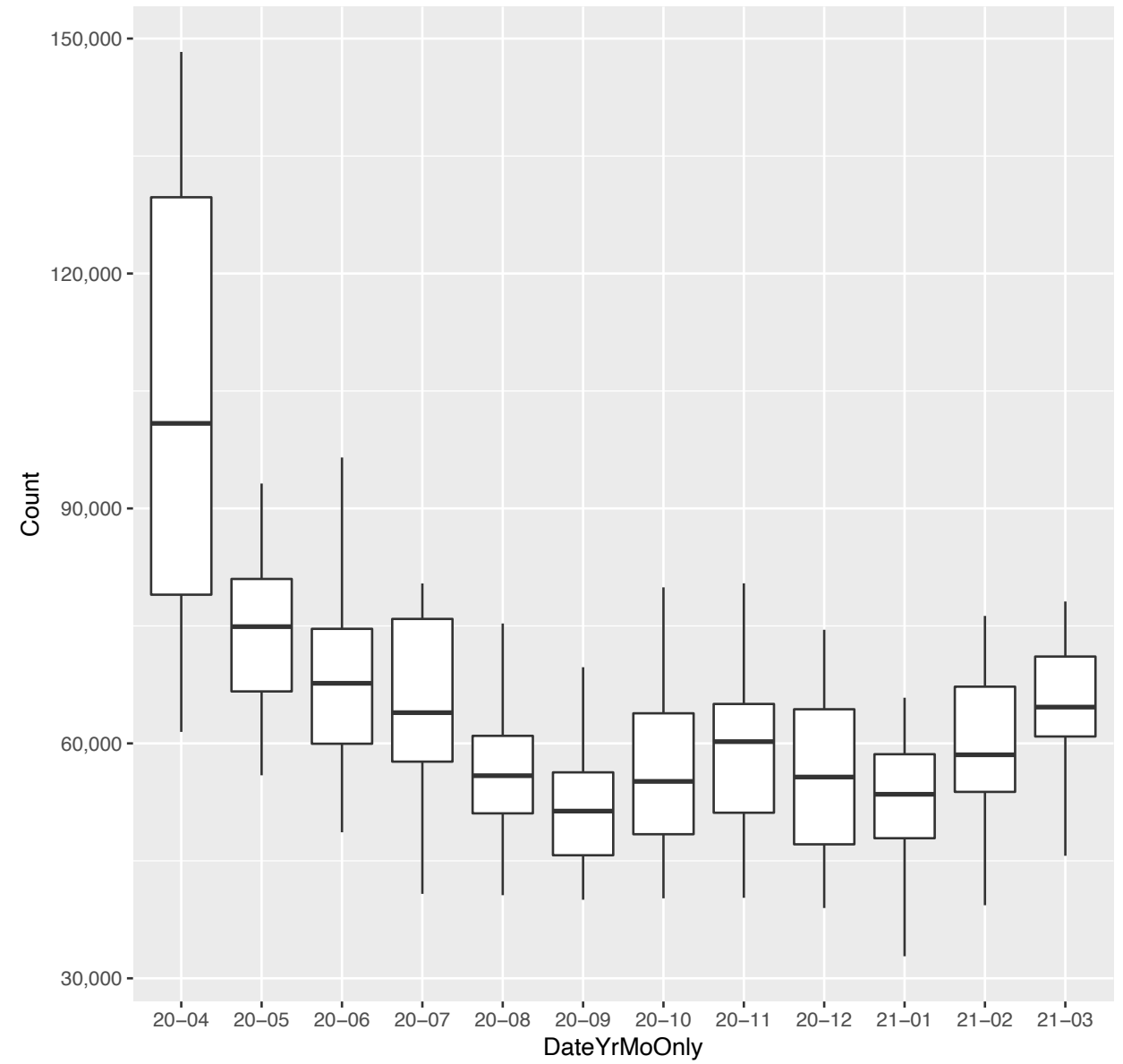
67. wfu.edu:

✱ L shaped

*. wfu.edu (day-by-day counts and 28 day moving average)



*. wfu.edu (monthly boxplots (outliers trimmed))

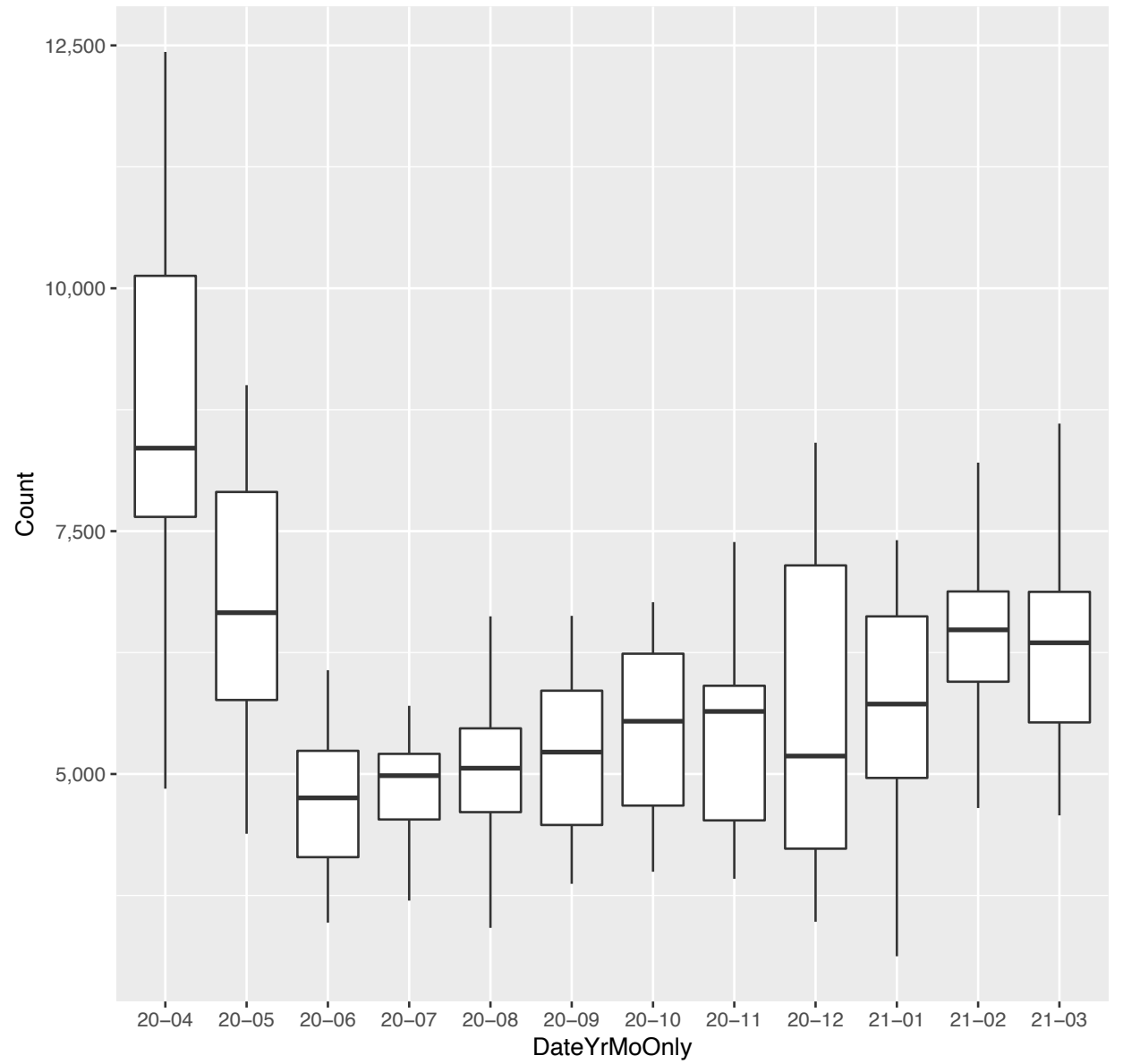


68. whitman.edu: L shaped

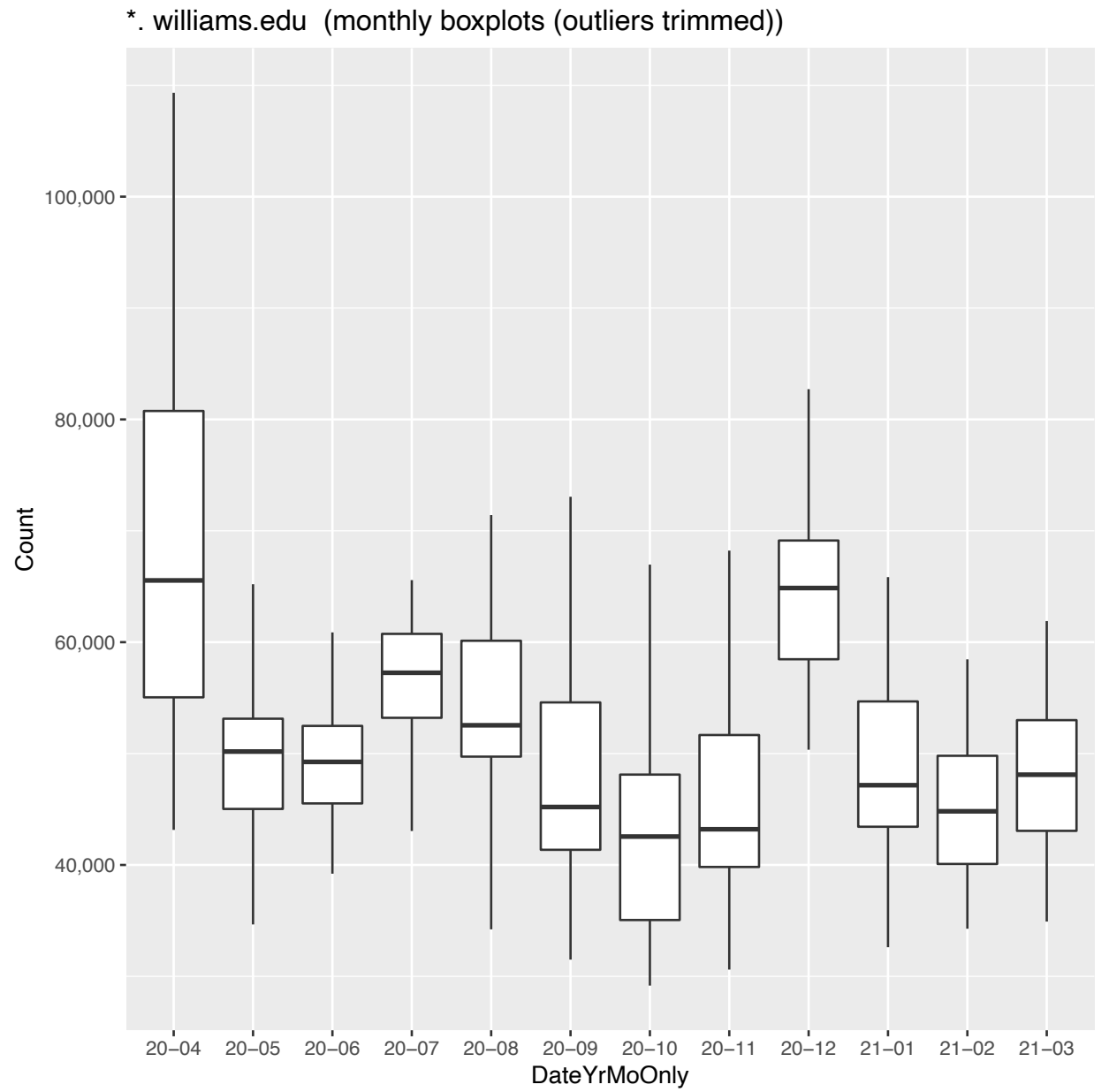
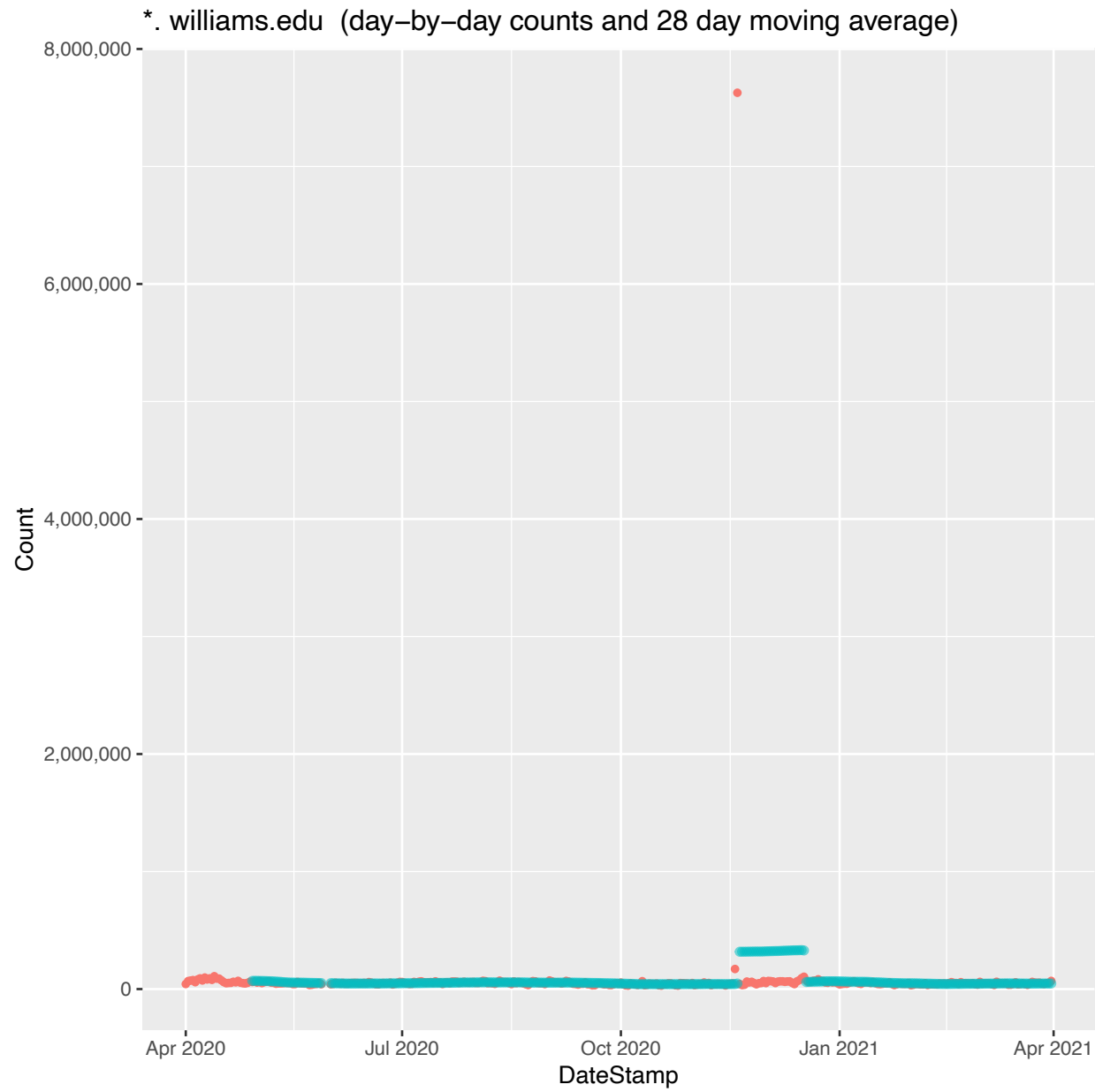
*. whitman.edu (day-by-day counts and 28 day moving average)



*. whitman.edu (monthly boxplots (outliers trimmed))



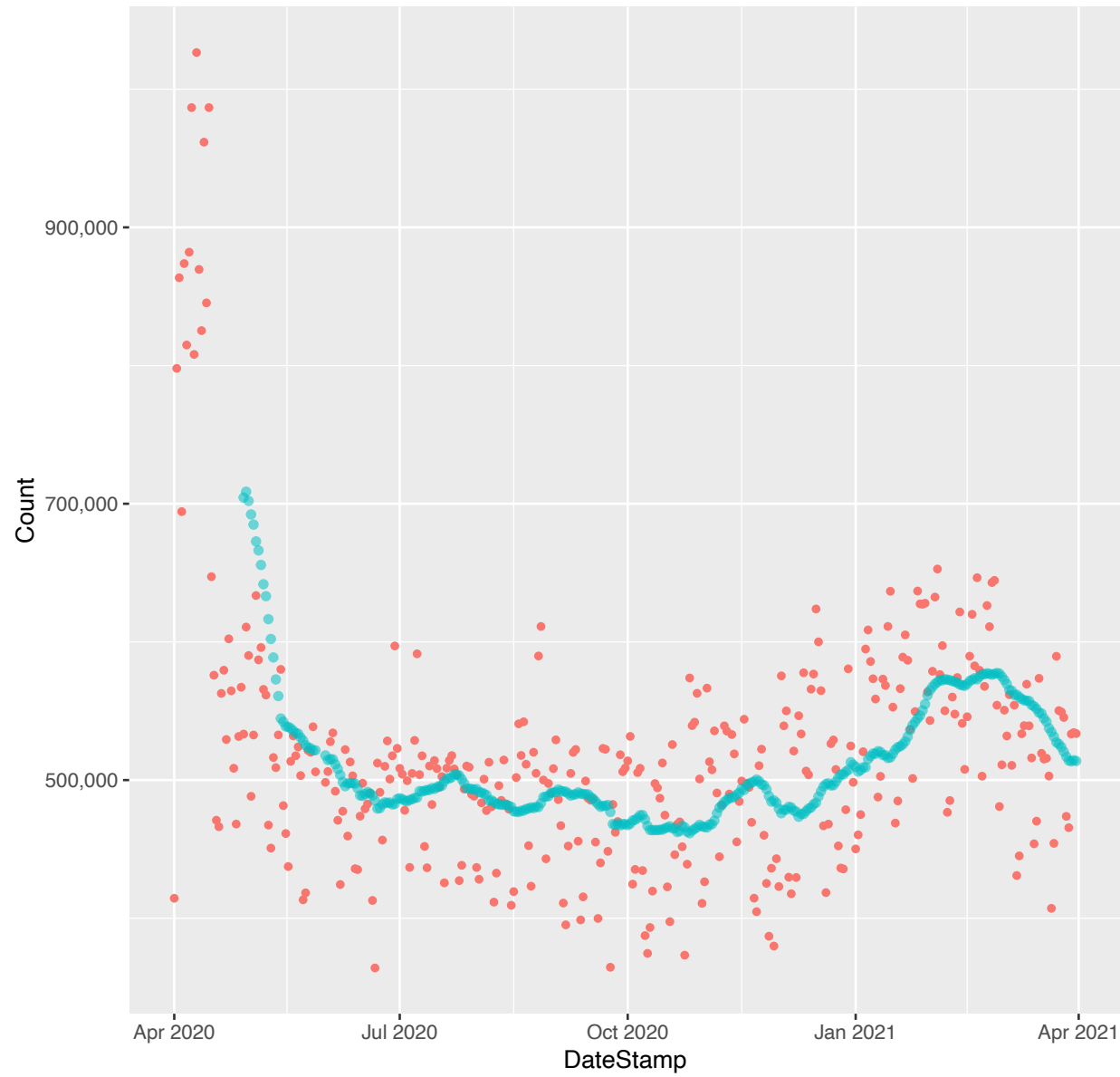
69. williams.edu: * L shaped



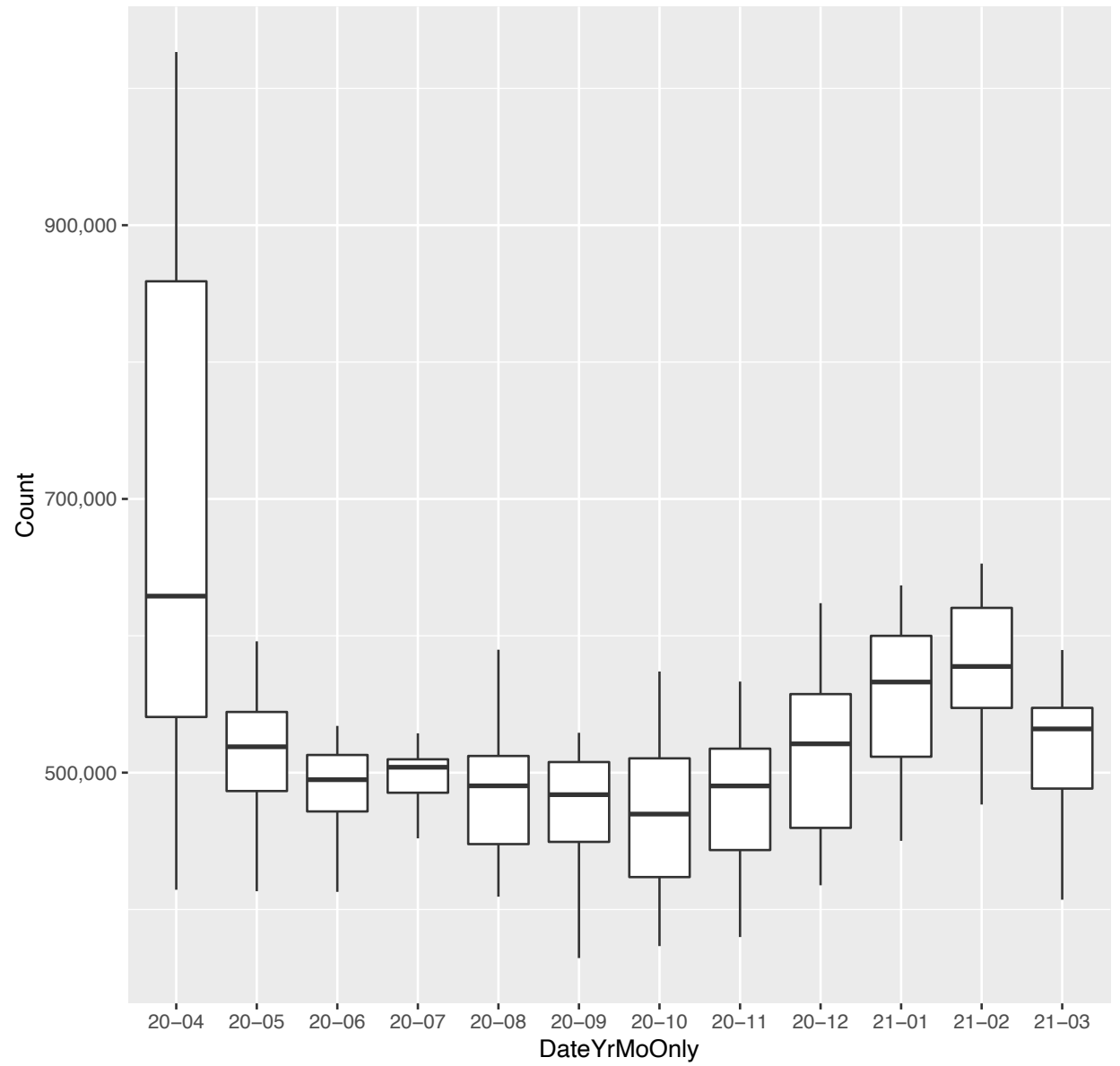
70. wisc.edu:

L shaped

*. wisc.edu (day-by-day counts and 28 day moving average)



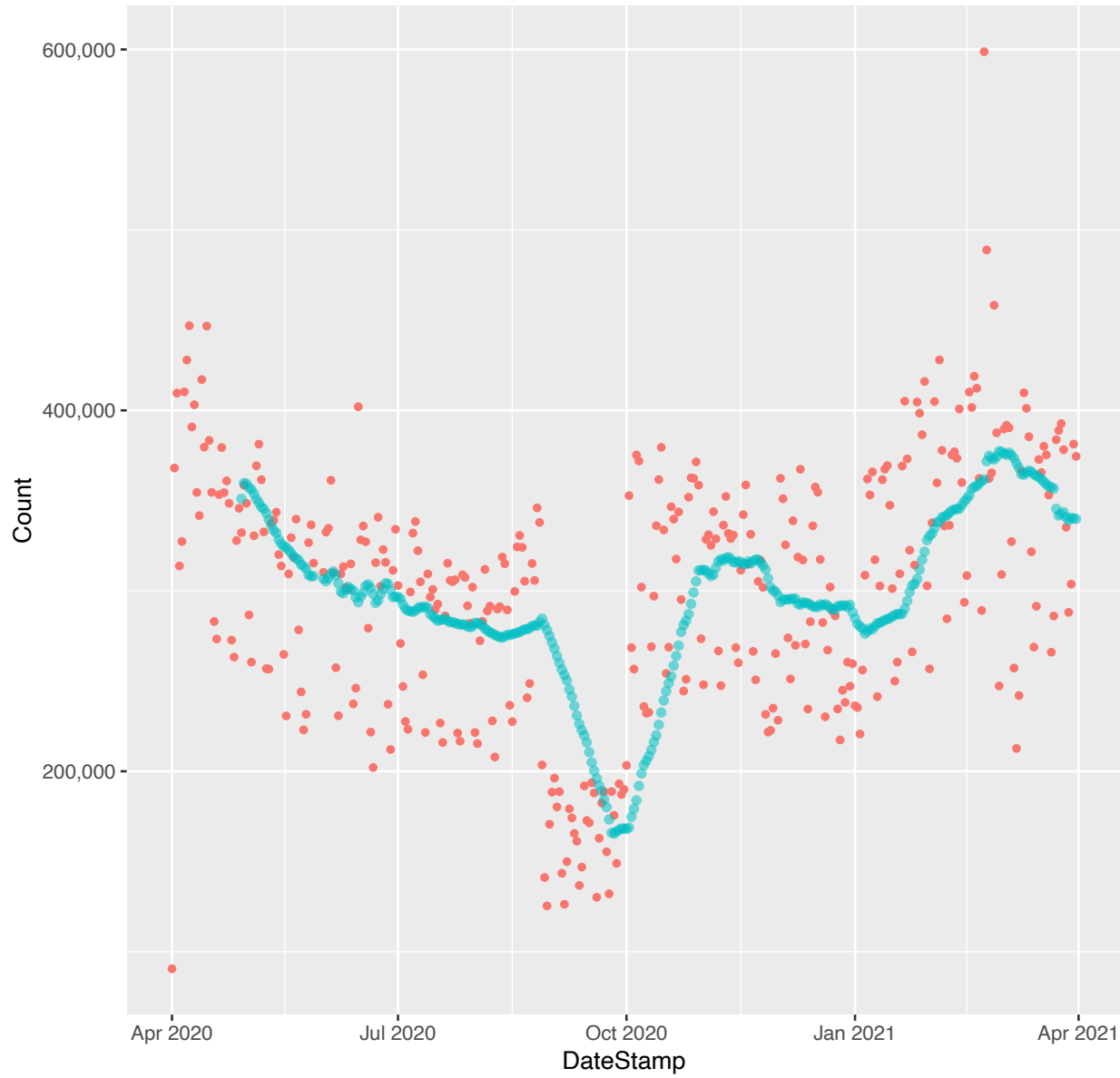
*. wisc.edu (monthly boxplots (outliers trimmed))



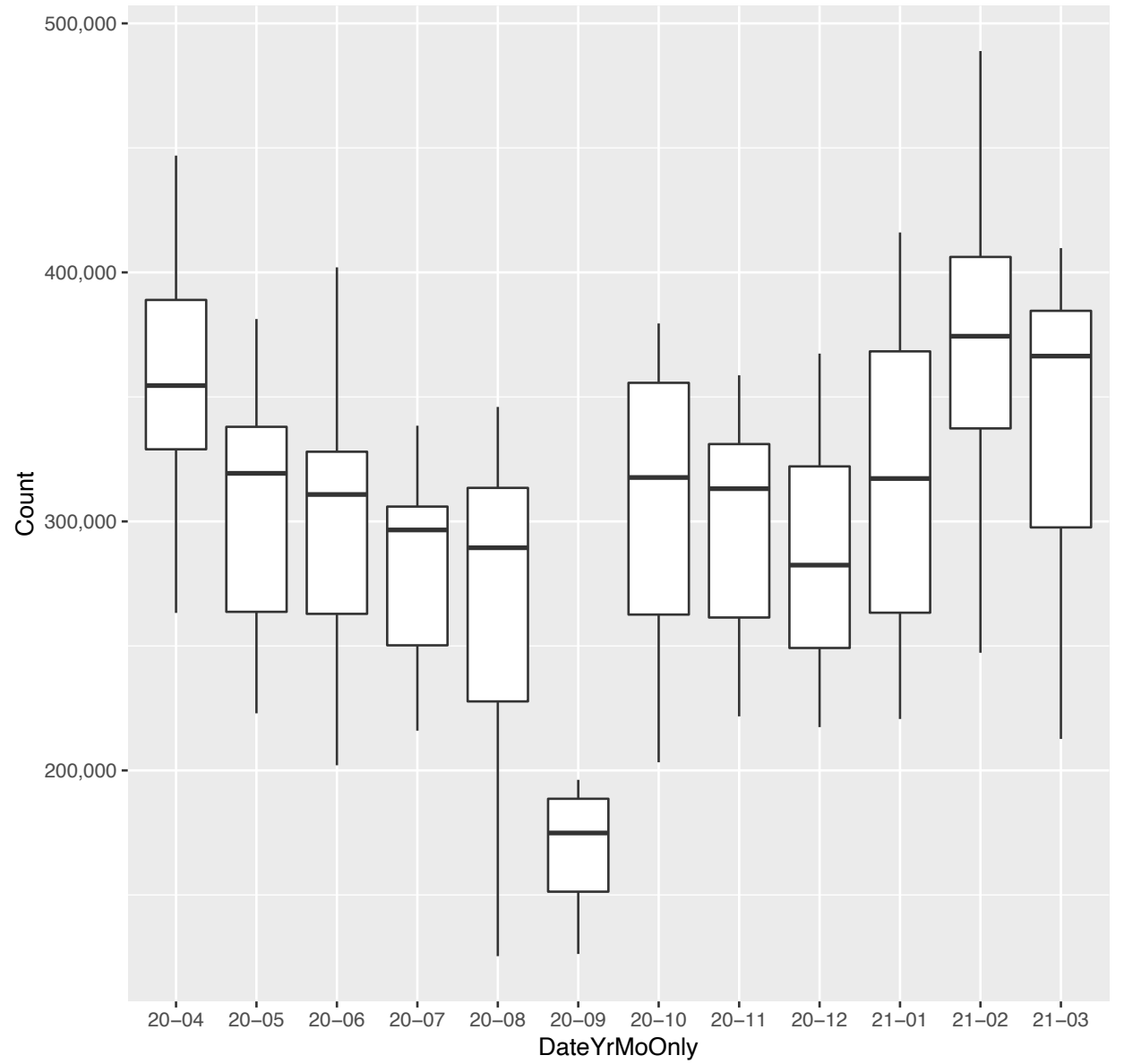
71. wm.edu:

U shaped

*. wm.edu (day-by-day counts and 28 day moving average)



*. wm.edu (monthly boxplots (outliers trimmed))



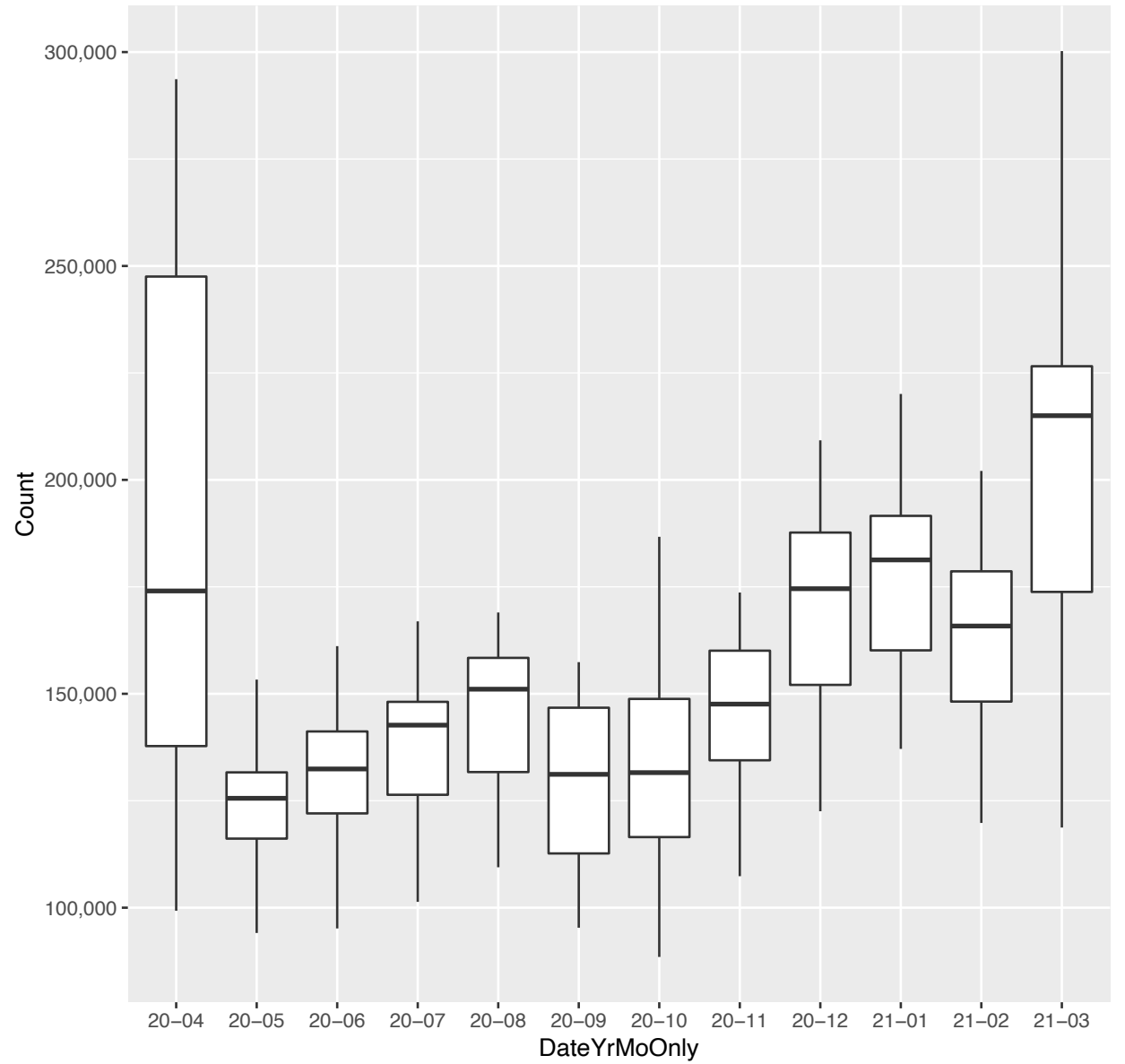
72. wustl.edu:

U shaped

*. wustl.edu (day-by-day counts and 28 day moving average)



*. wustl.edu (monthly boxplots (outliers trimmed))



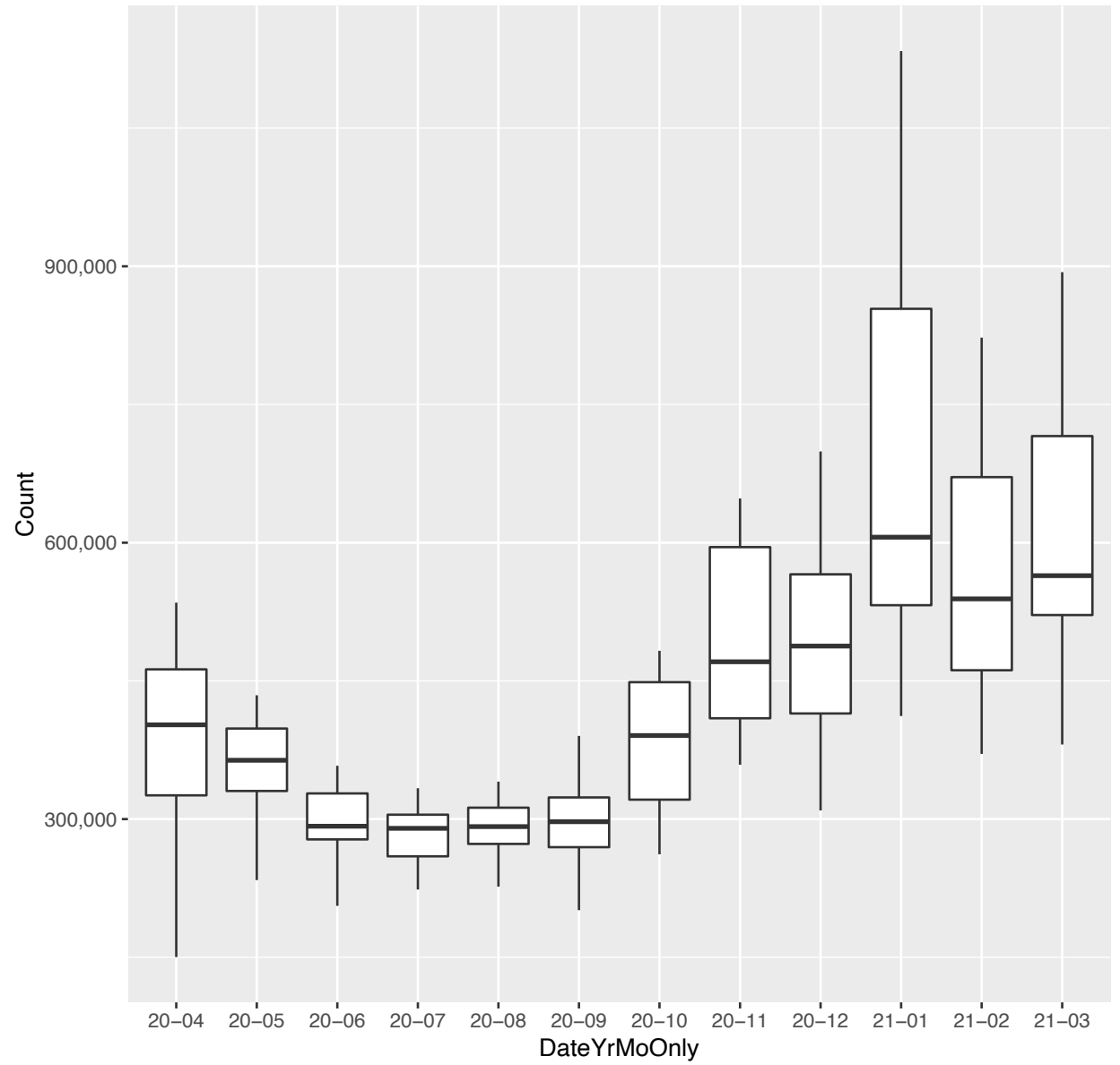
73. yale.edu:

⬤ ◡ shaped (ending higher)

*. yale.edu (day-by-day counts and 28 day moving average)



*. yale.edu (monthly boxplots (outliers trimmed))



b) Australian

[\[back to University Sites\]](#)

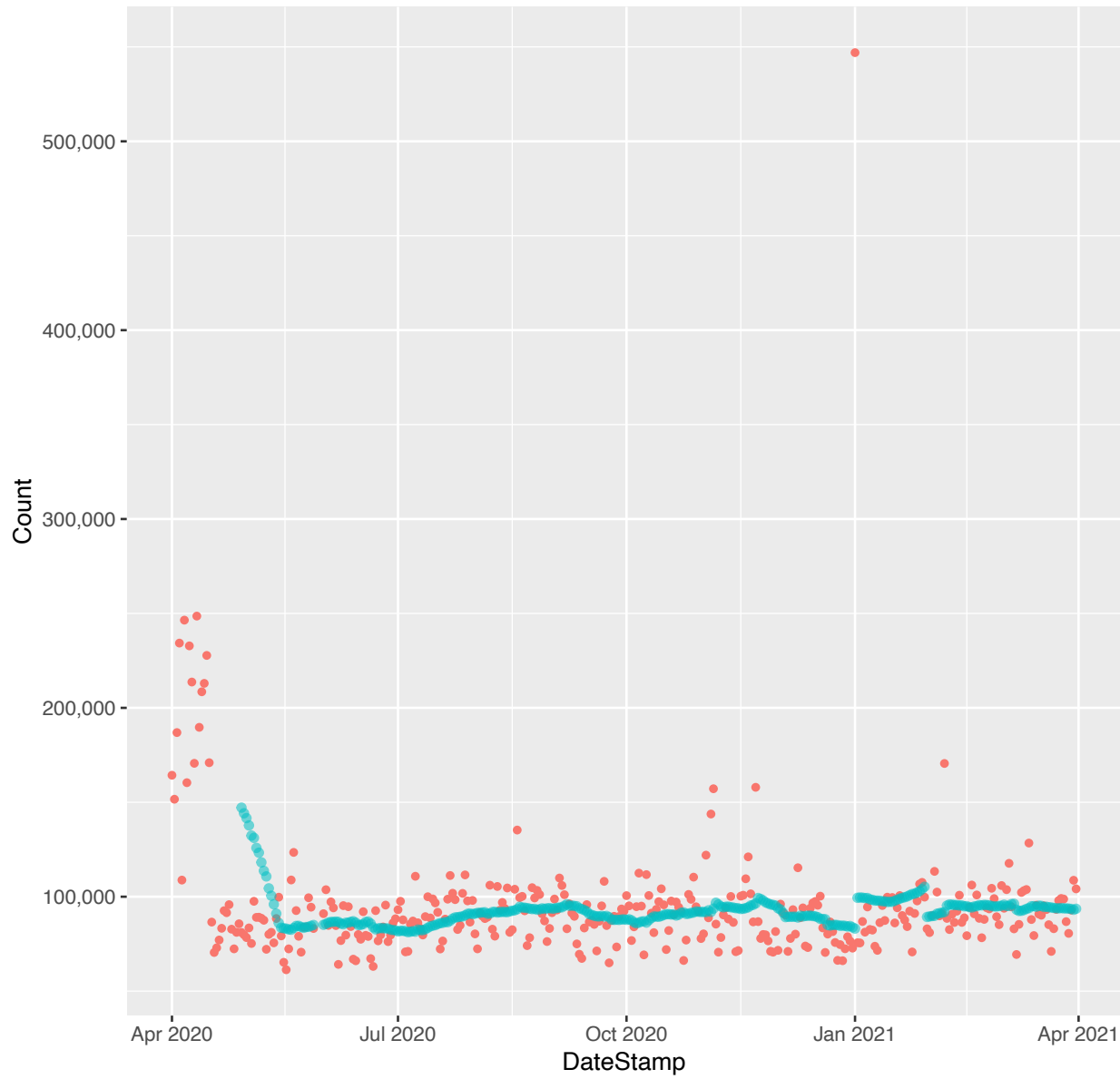
[\[back to TOC\]](#)

- 74 *.anu.edu.au L shaped
- 75 *.unimelb.edu.au  L shaped

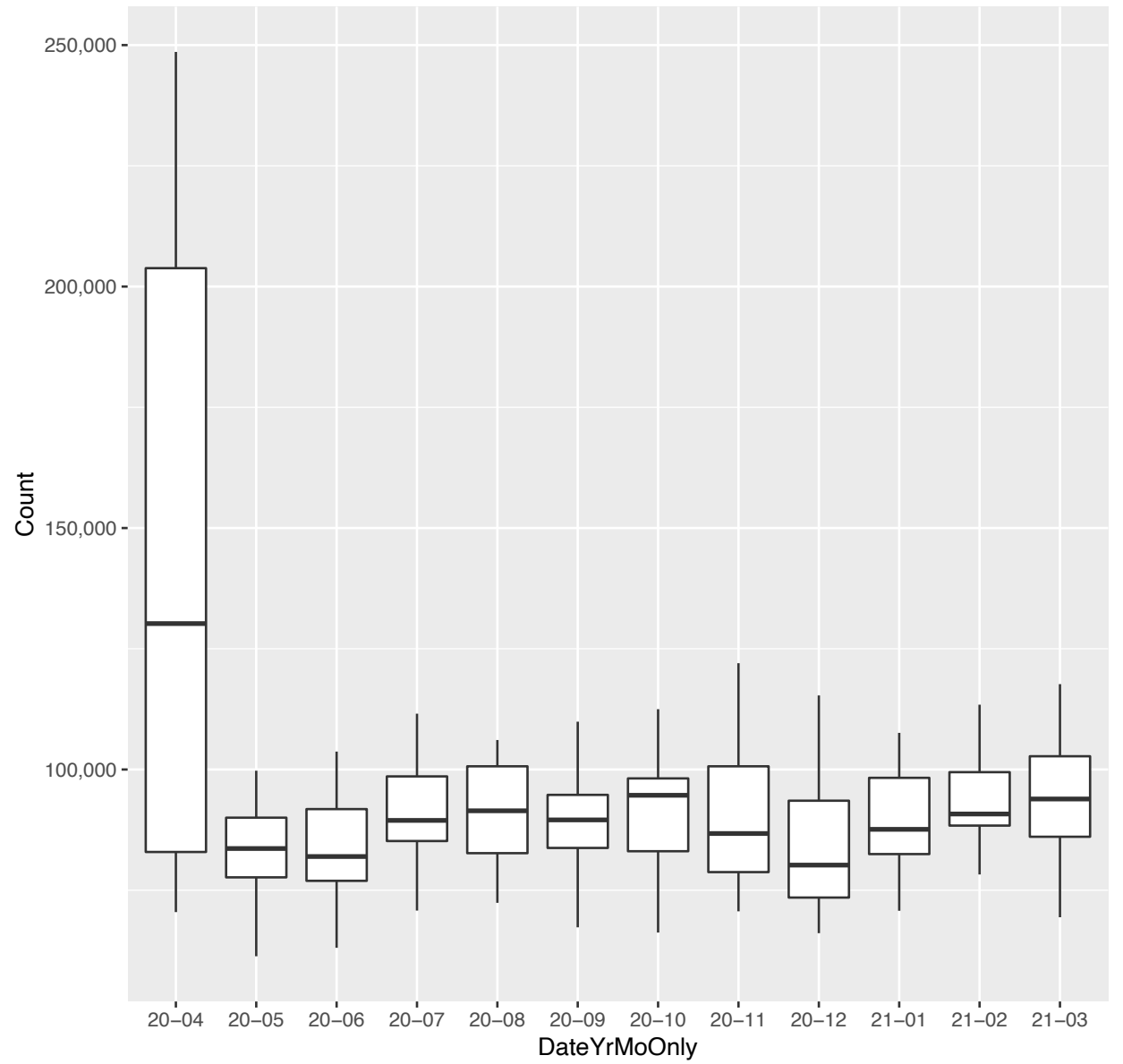
74. anu.edu.au:

L shaped

*. anu.edu.au (day-by-day counts and 28 day moving average)

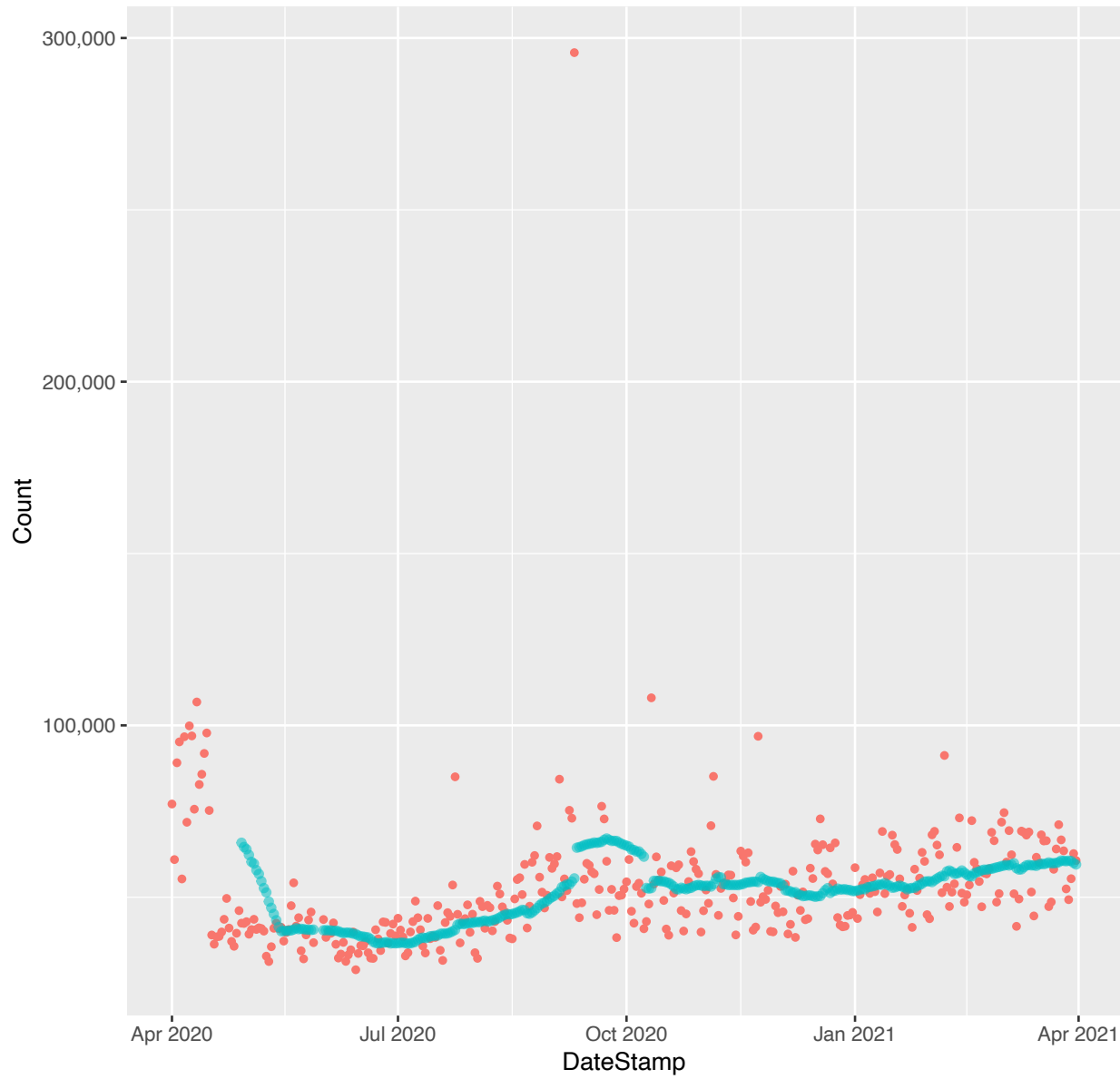


*. anu.edu.au (monthly boxplots (outliers trimmed))

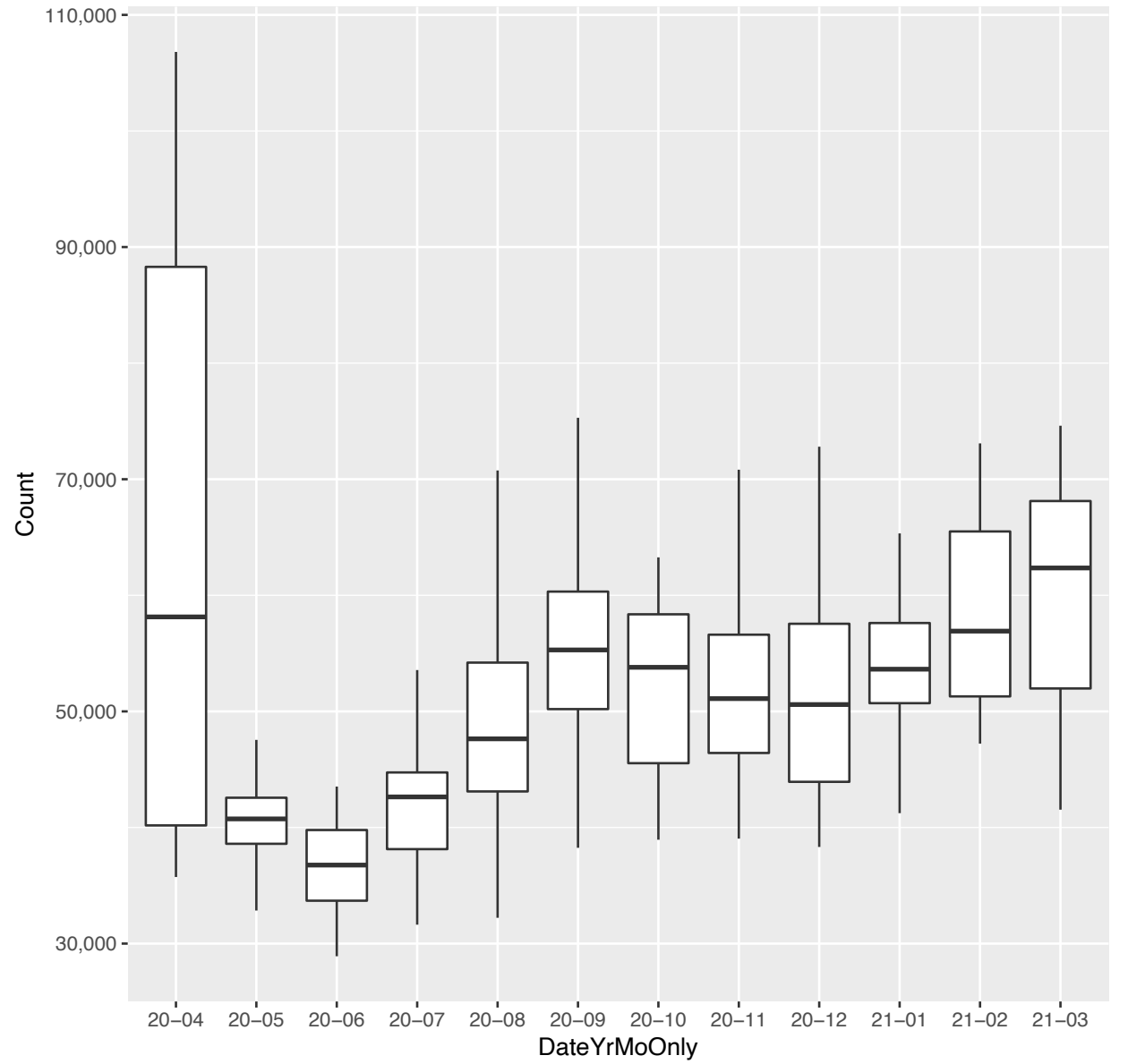


75. unimelb.edu.au: * L shaped

*. unimelb.edu.au (day-by-day counts and 28 day moving average)



*. unimelb.edu.au (monthly boxplots (outliers trimmed))



c) British

[\[back to University Sites\]](#)

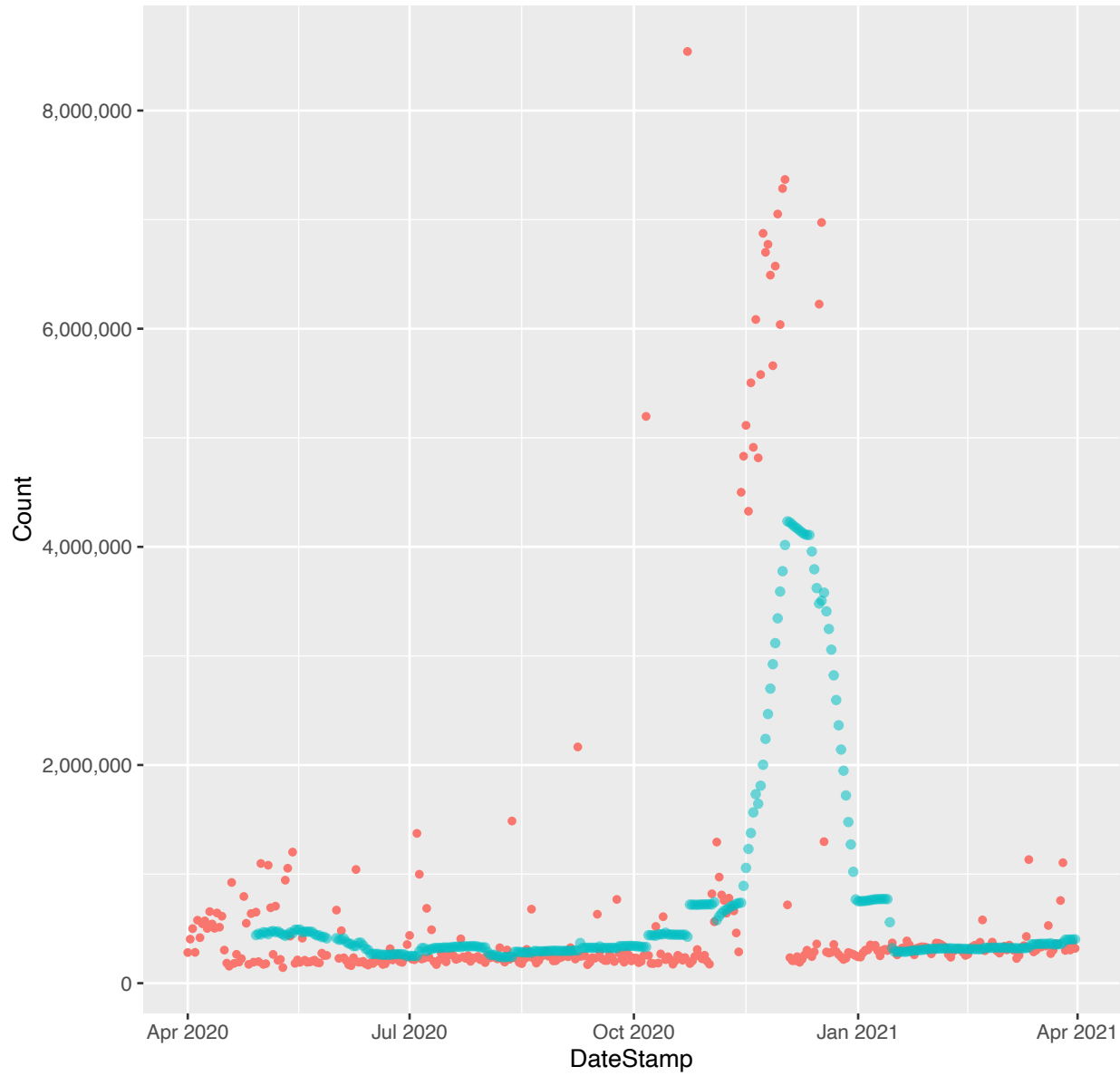
[\[back to TOC\]](#)

- 76 *.cam.ac.uk ✱ ~
- 77 *.ed.ac.uk ✱ ~
- 78 *.ox.ac.uk ✱ U shaped (ending higher)
- 79 *.ucl.ac.uk ✱ ~

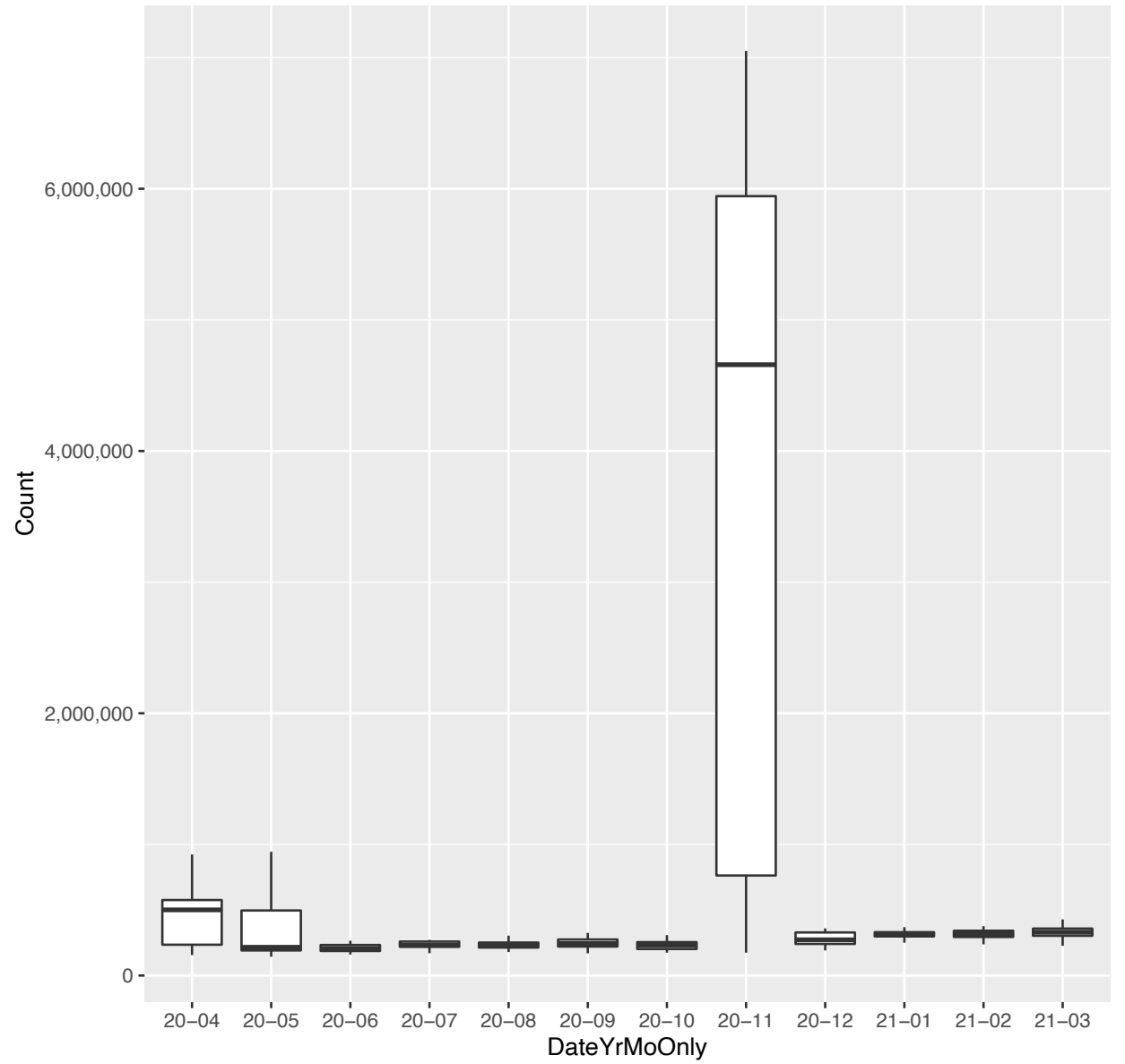
76. cam.ac.uk:



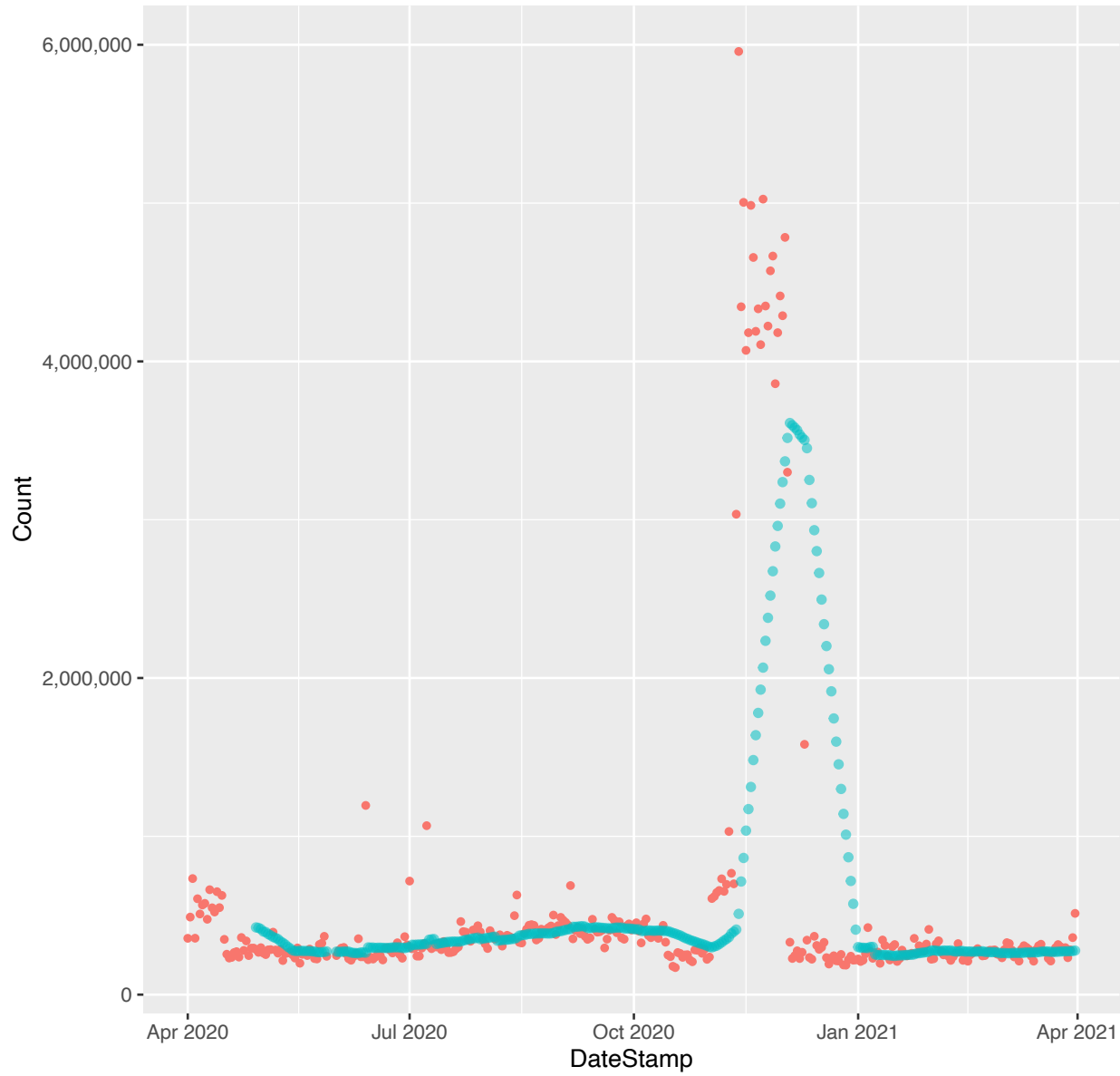
*. cam.ac.uk (day-by-day counts and 28 day moving average)



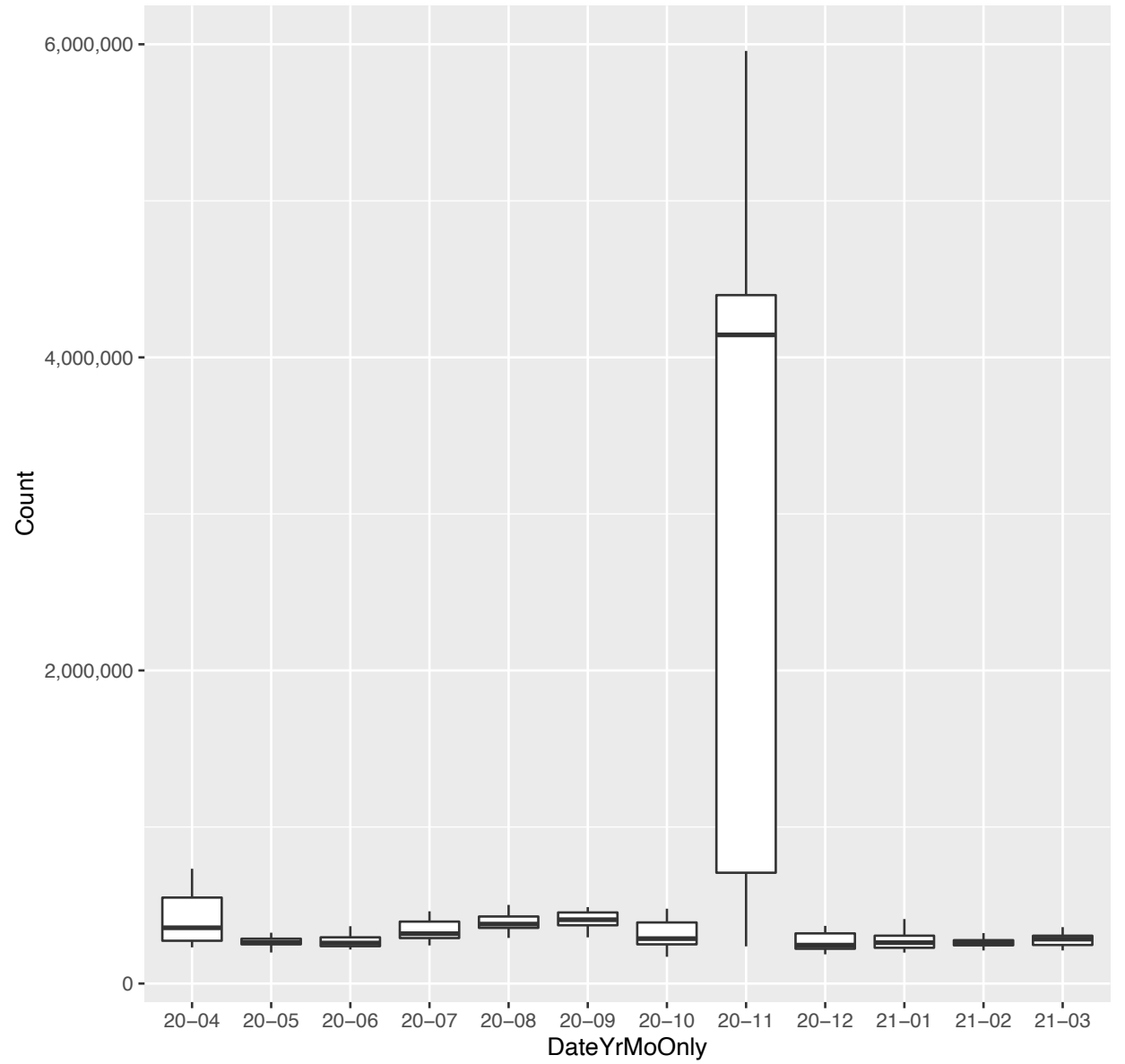
*. cam.ac.uk (monthly boxplots (outliers trimmed))



*. ed.ac.uk (day-by-day counts and 28 day moving average)



*. ed.ac.uk (monthly boxplots (outliers trimmed))

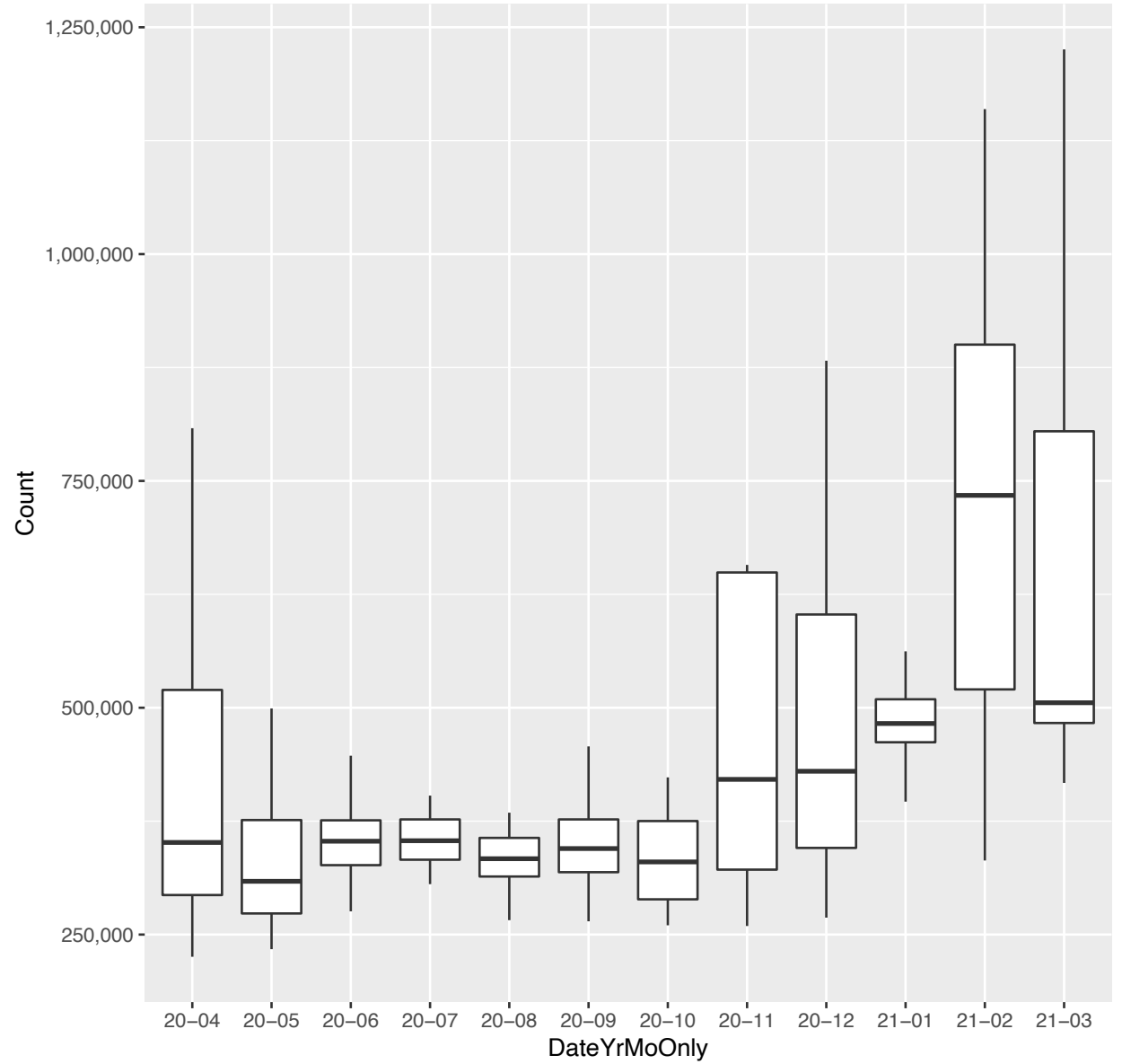


78. ox.ac.uk: * ◉ shaped (ending higher)

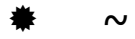
*. ox.ac.uk (day-by-day counts and 28 day moving average)



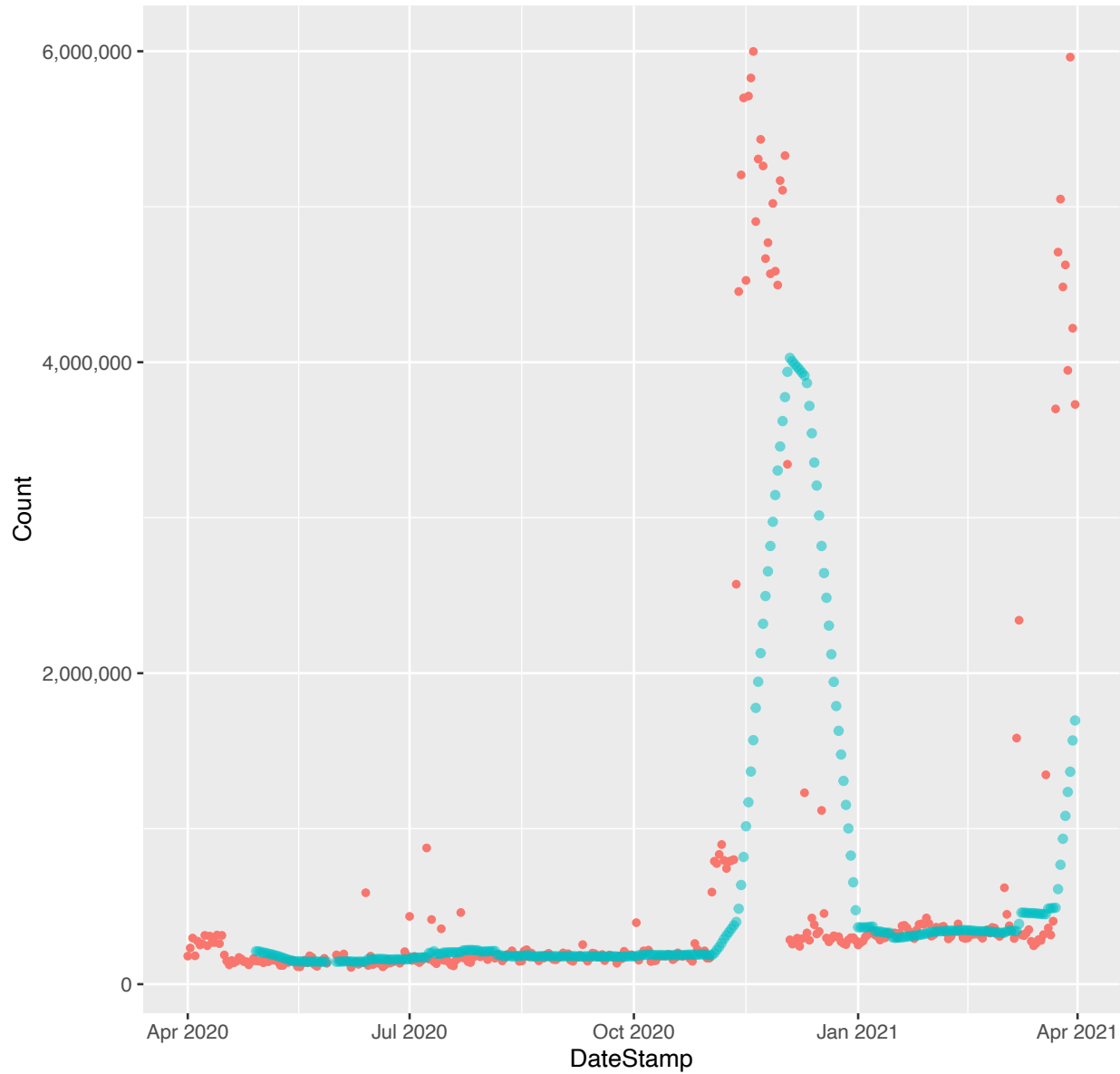
*. ox.ac.uk (monthly boxplots (outliers trimmed))



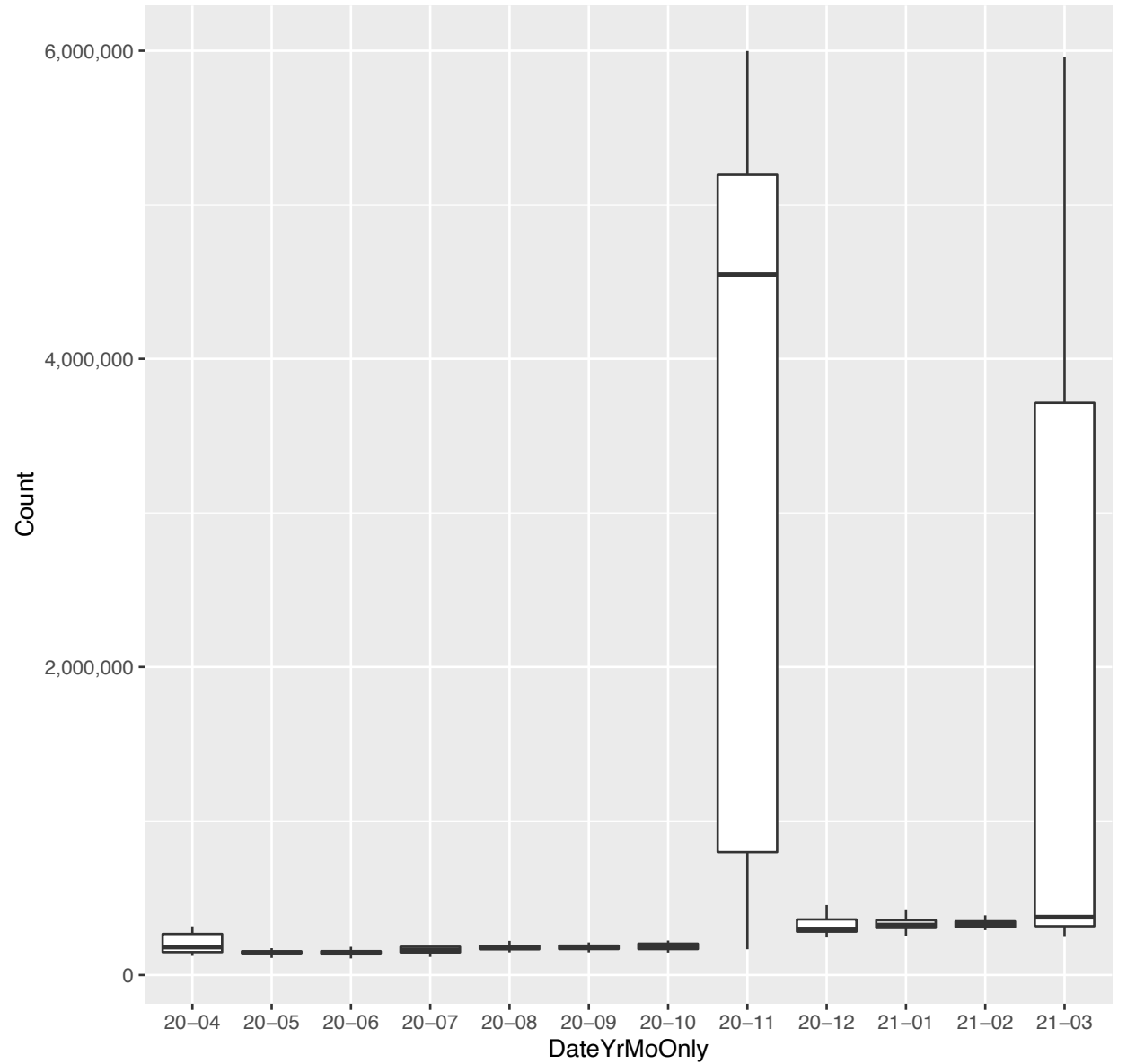
79. ucl.ac.uk:



*. ucl.ac.uk (day-by-day counts and 28 day moving average)



*. ucl.ac.uk (monthly boxplots (outliers trimmed))



d) Canada

[\[back to University Sites\]](#)

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- 80 *.mcgill.ca ↘
- 81 *.ubc.ca L shaped
- 82 *.utoronto.ca ✱ L shaped

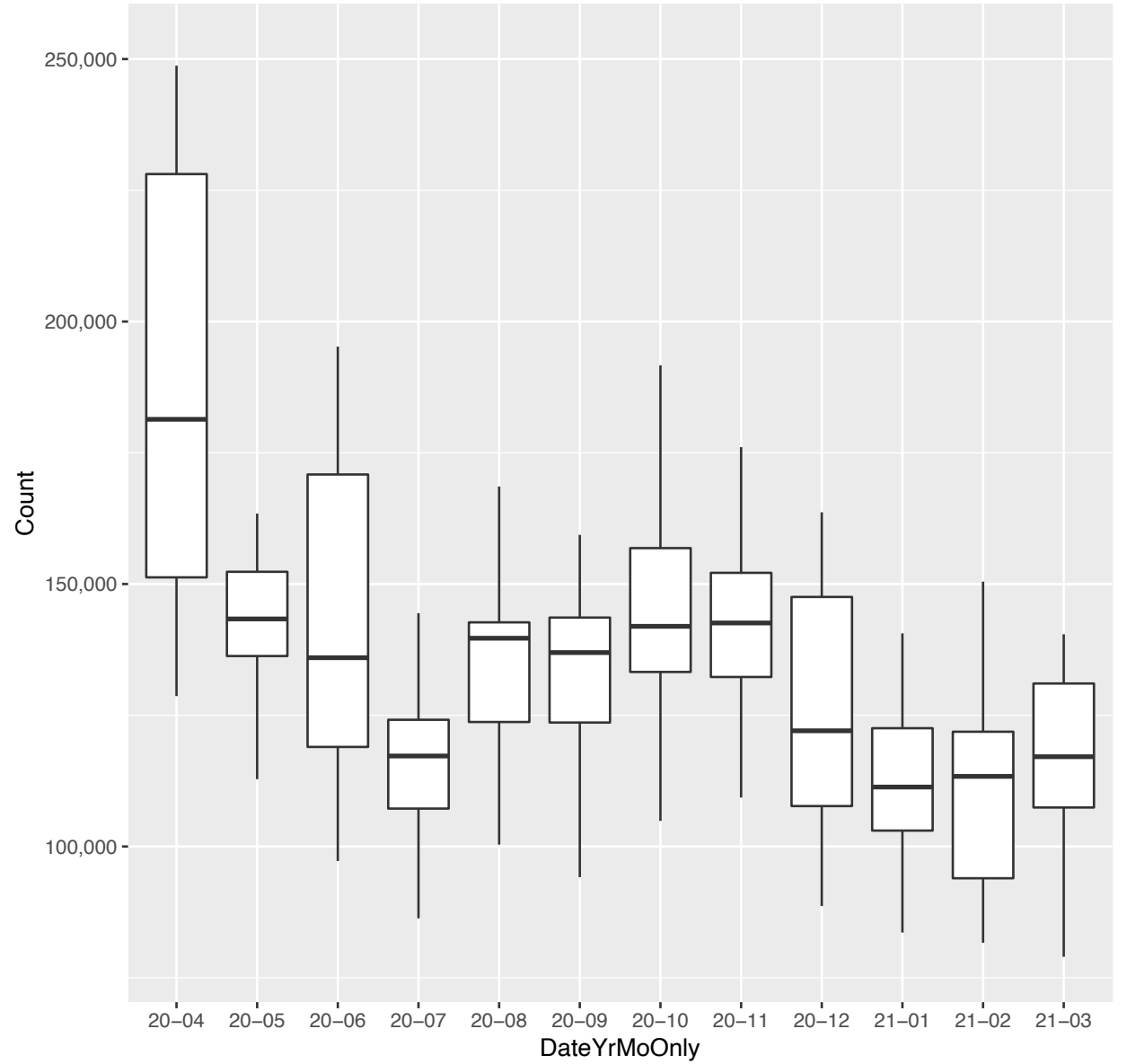
80. mcgill.ca:



*. mcgill.ca (day-by-day counts and 28 day moving average)



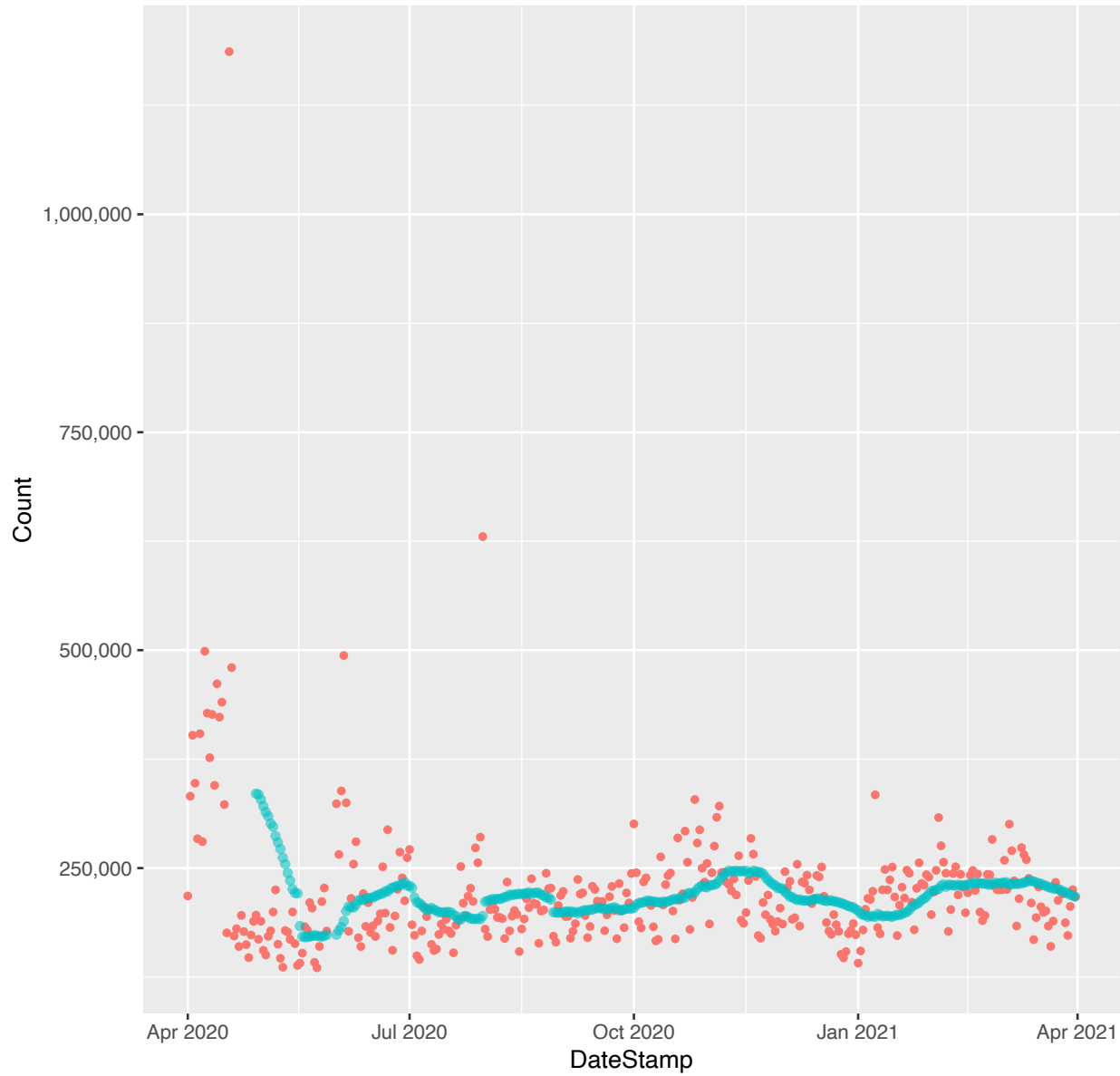
*. mcgill.ca (monthly boxplots (outliers trimmed))



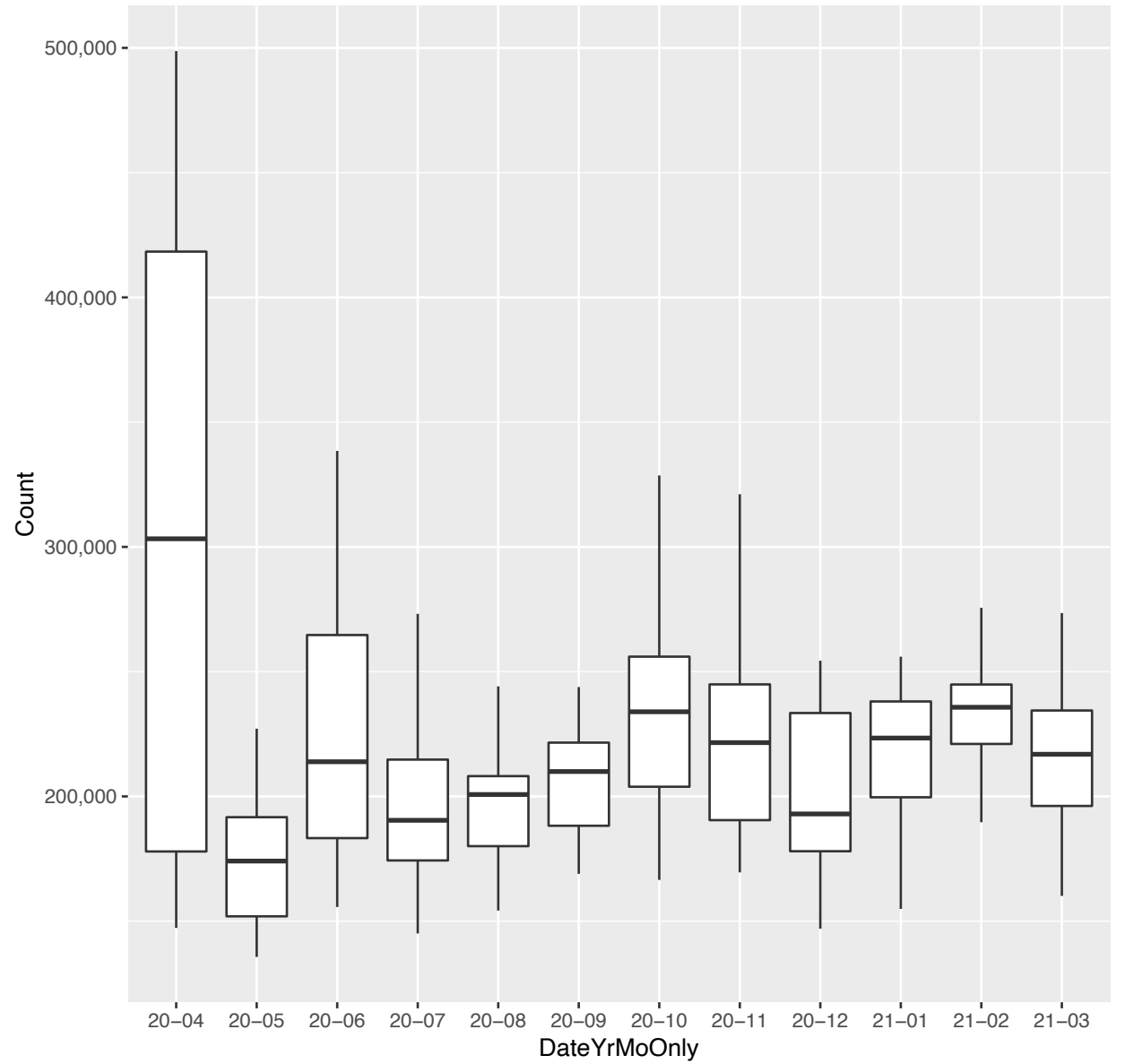
81. ubc.ca:

L shaped

*. ubc.ca (day-by-day counts and 28 day moving average)

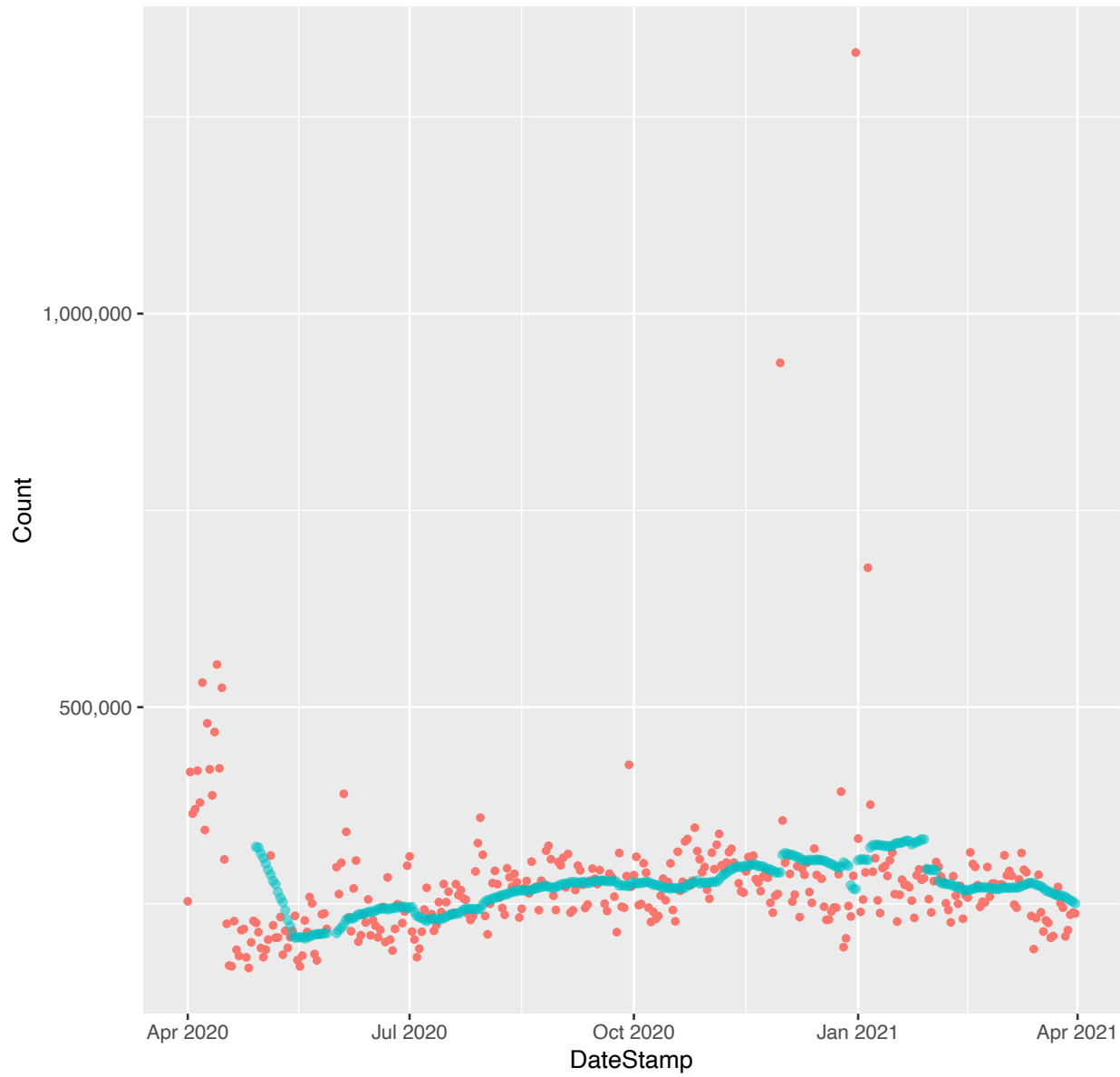


*. ubc.ca (monthly boxplots (outliers trimmed))

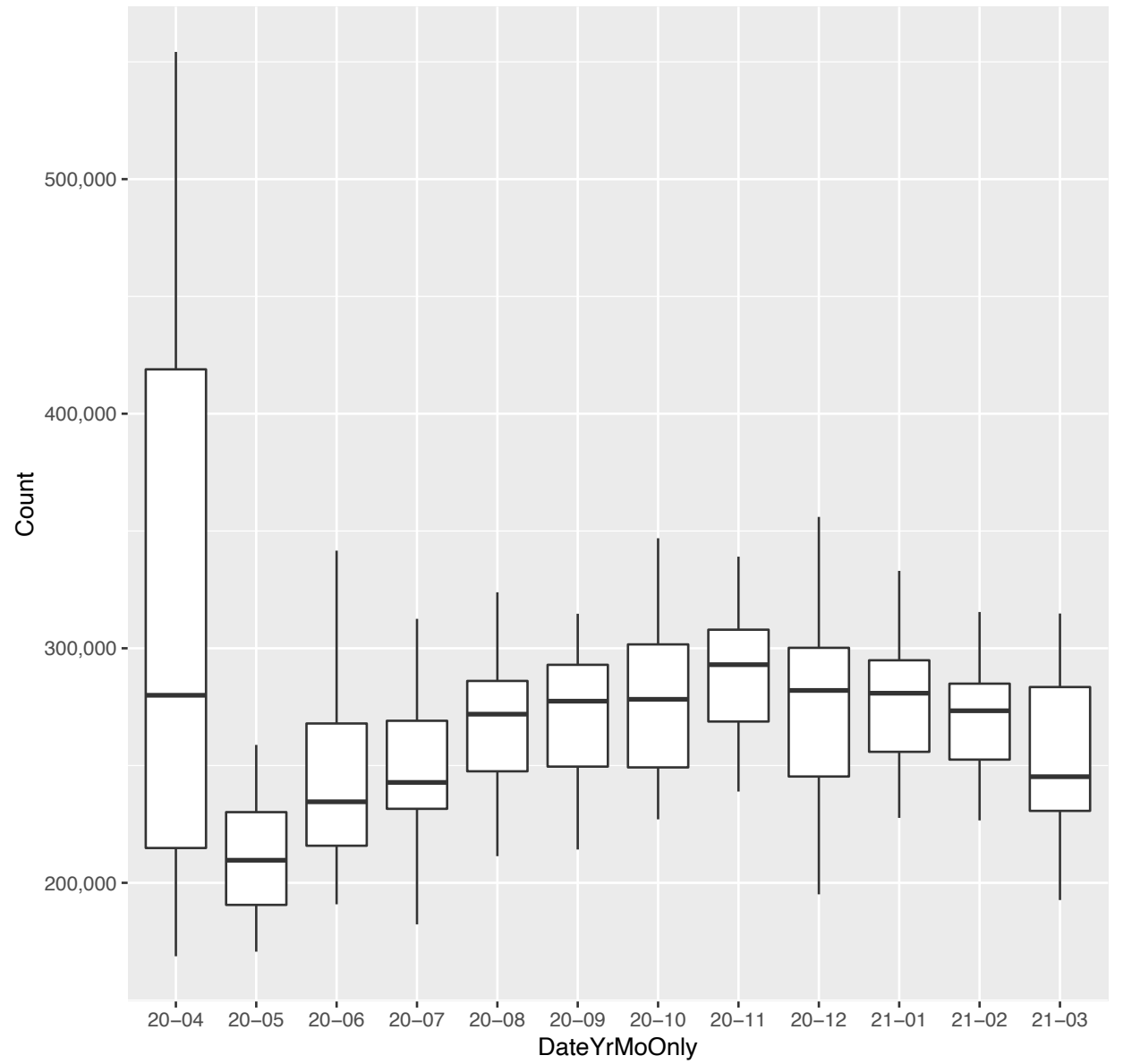


82. utoronto.ca: * L shaped

*. utoronto.ca (day-by-day counts and 28 day moving average)



*. utoronto.ca (monthly boxplots (outliers trimmed))



e) China

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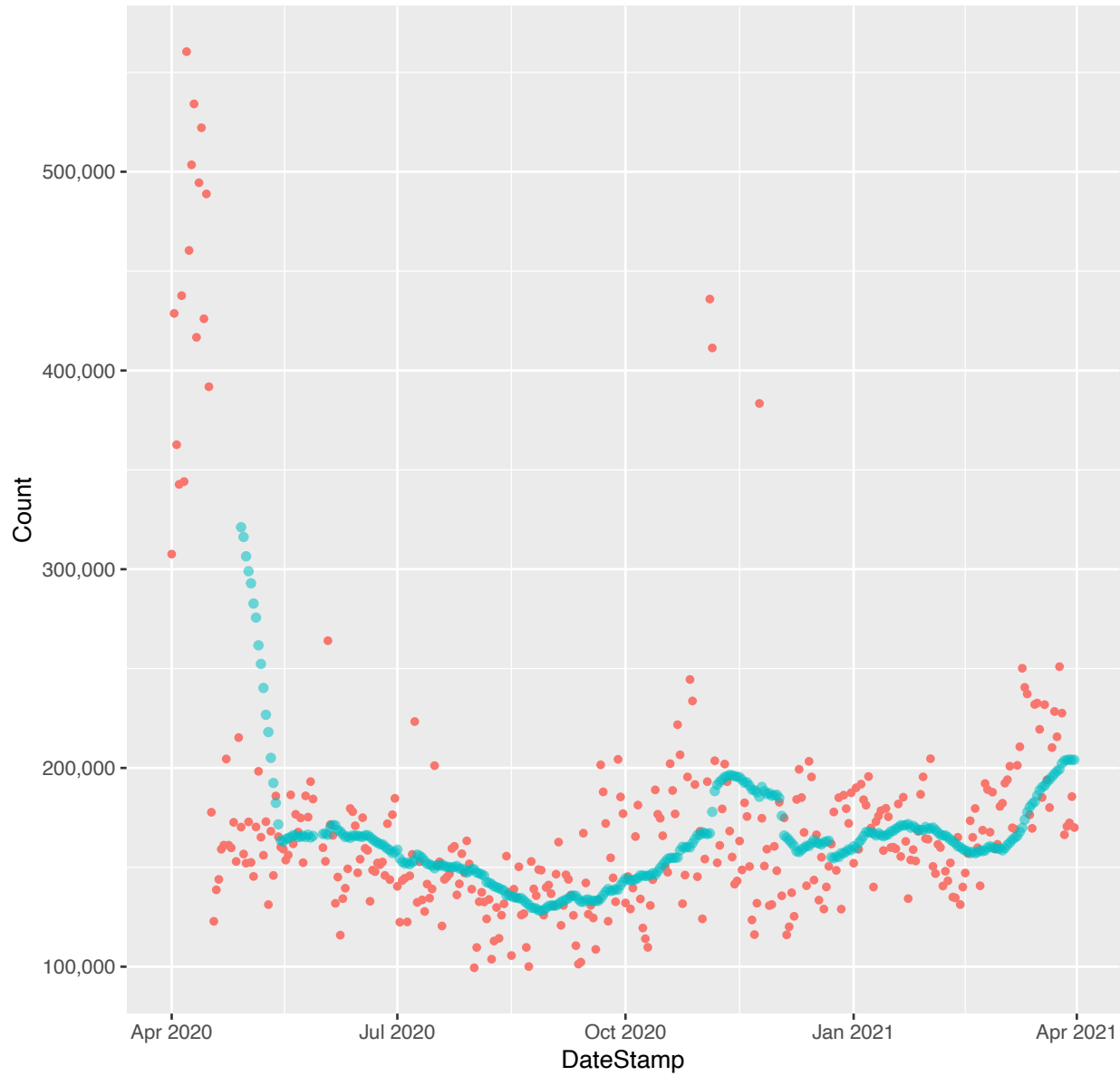
[\[back to TOC\]](#)

- 83 *.pku.edu.cn L shaped
- 84 *.tsinghua.edu.cn ↗

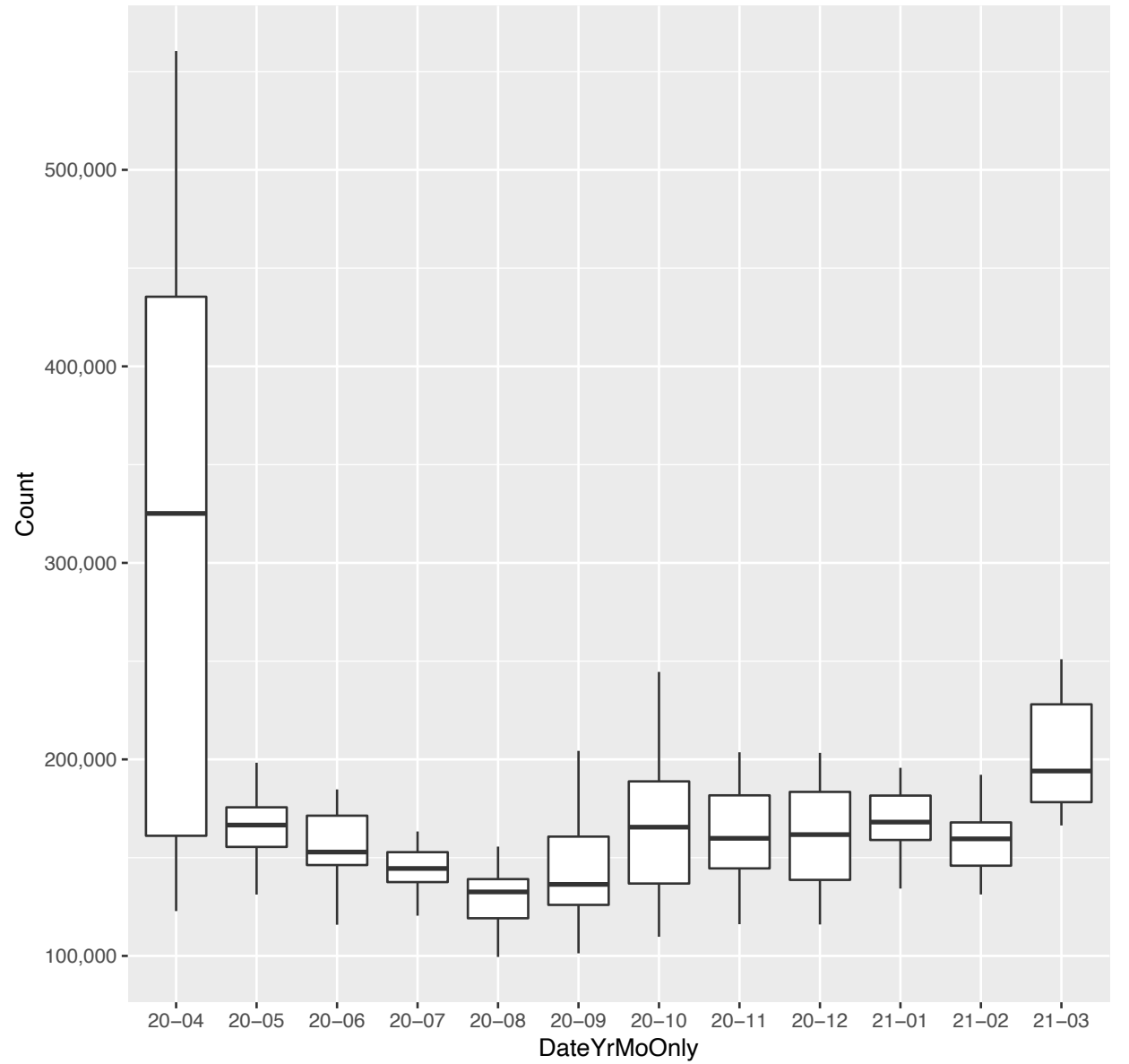
83. pku.edu.cn:

L shaped

*. pku.edu.cn (day-by-day counts and 28 day moving average)

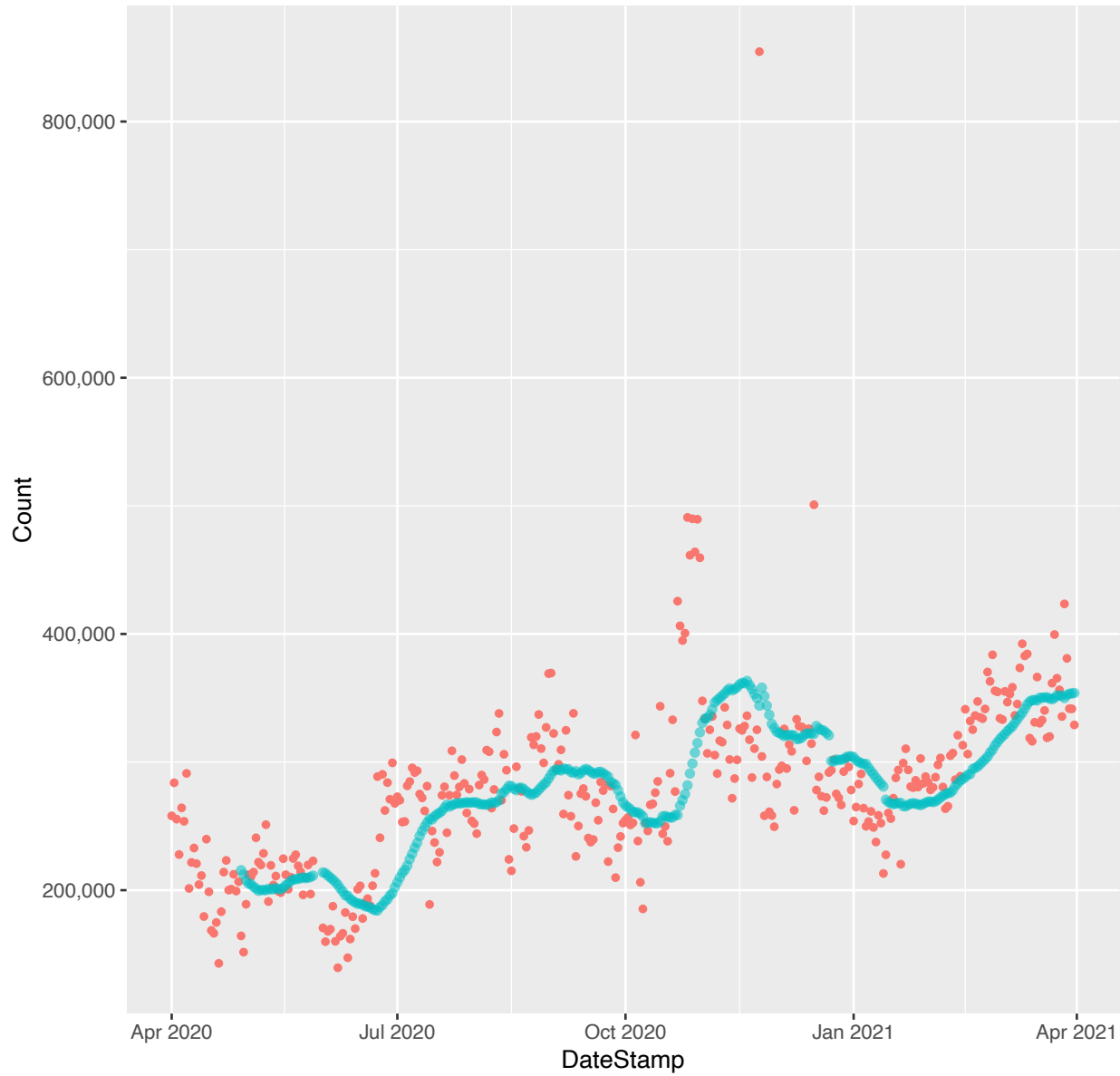


*. pku.edu.cn (monthly boxplots (outliers trimmed))

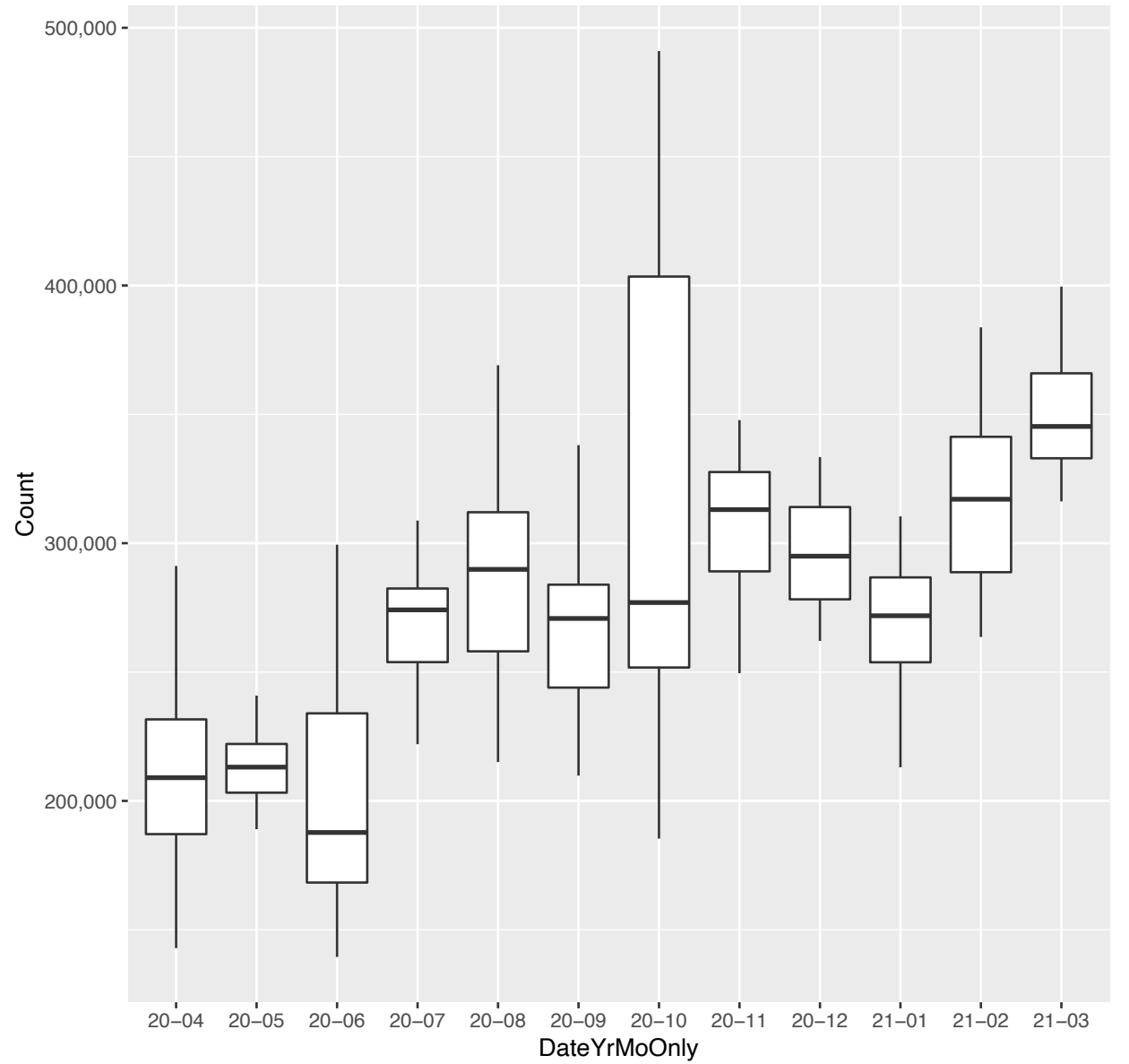


84. tsinghua.edu.cn: ↗

*. tsinghua.edu.cn (day-by-day counts and 28 day moving average)



*. tsinghua.edu.cn (monthly boxplots (outliers trimmed))



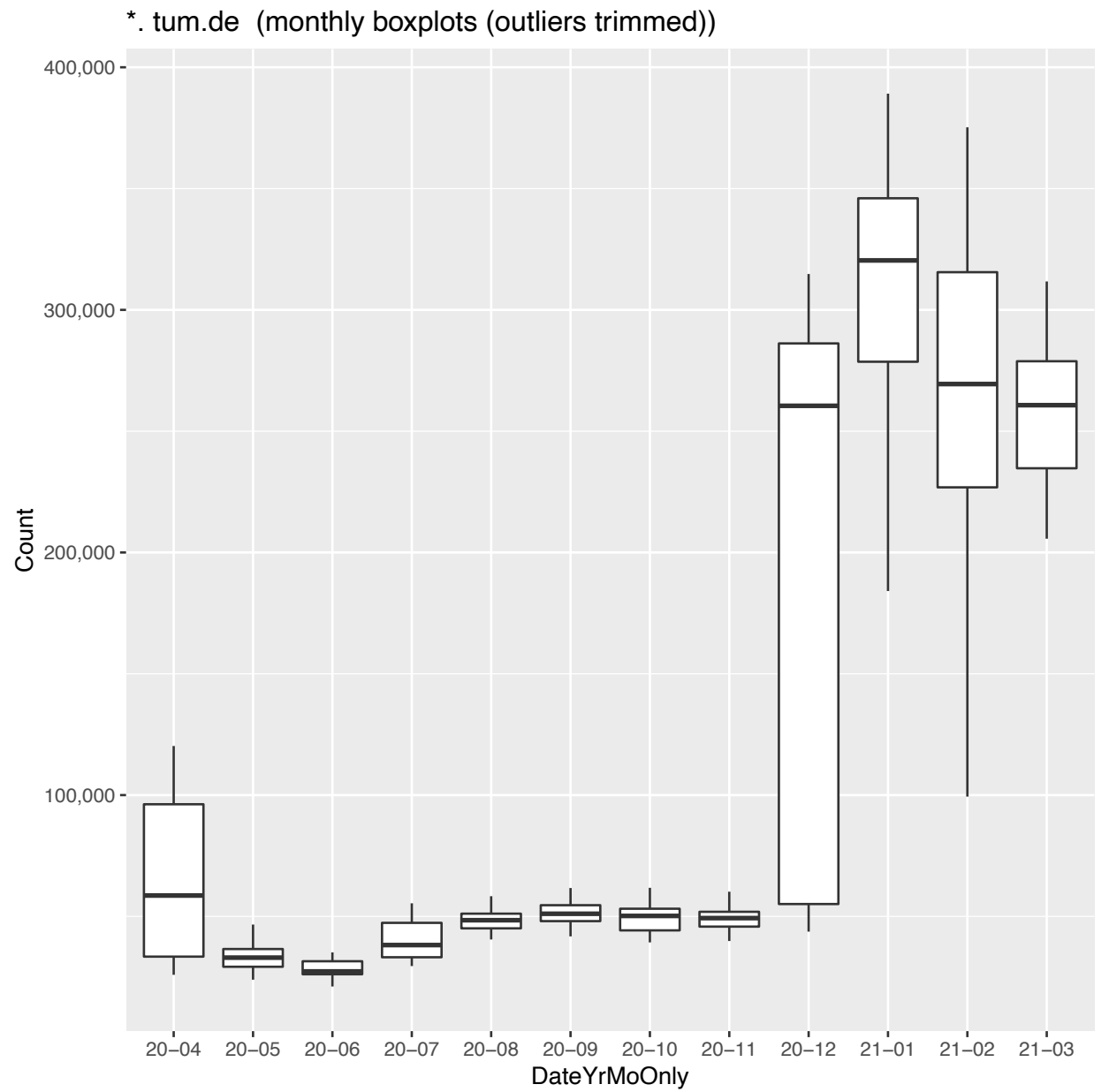
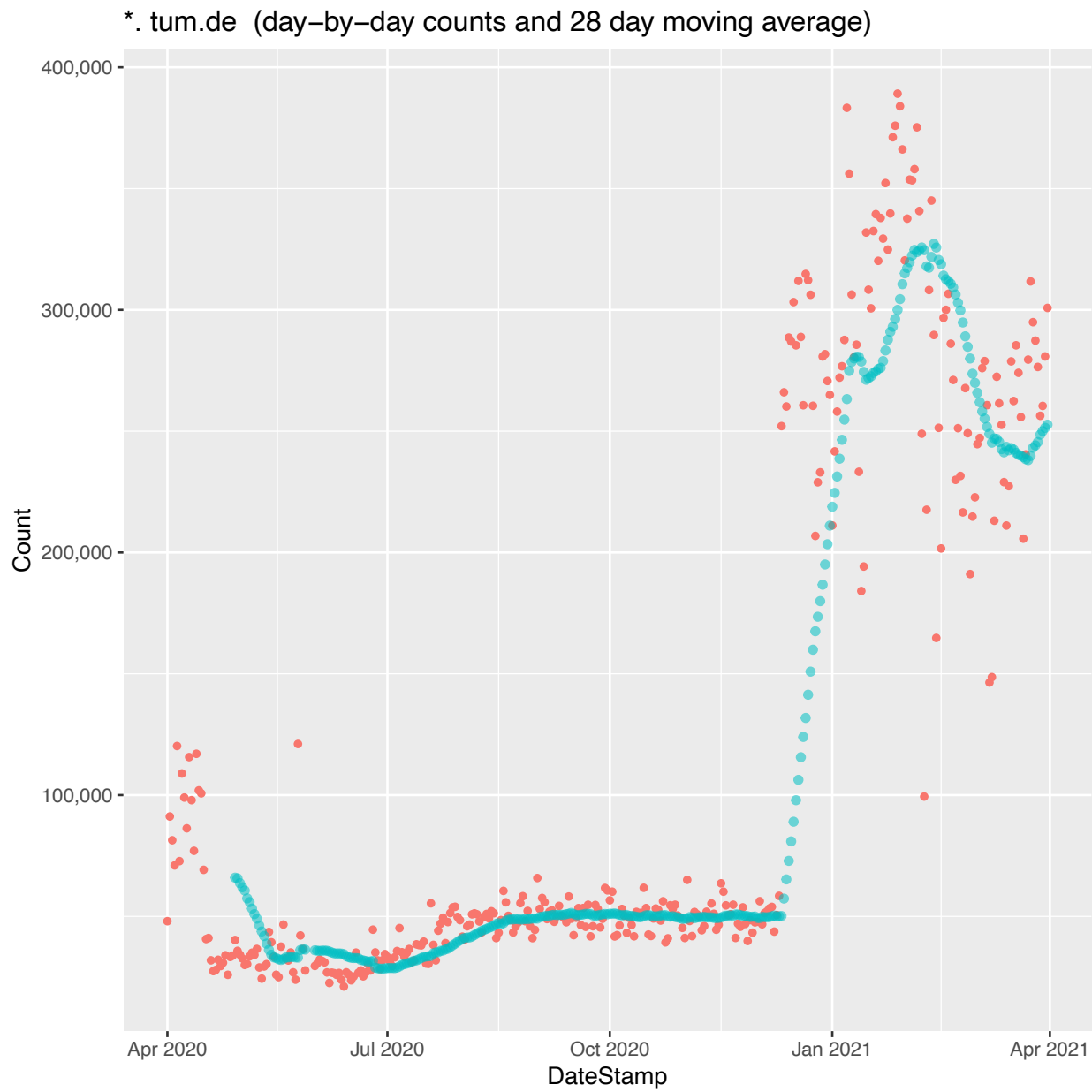
f) Germany

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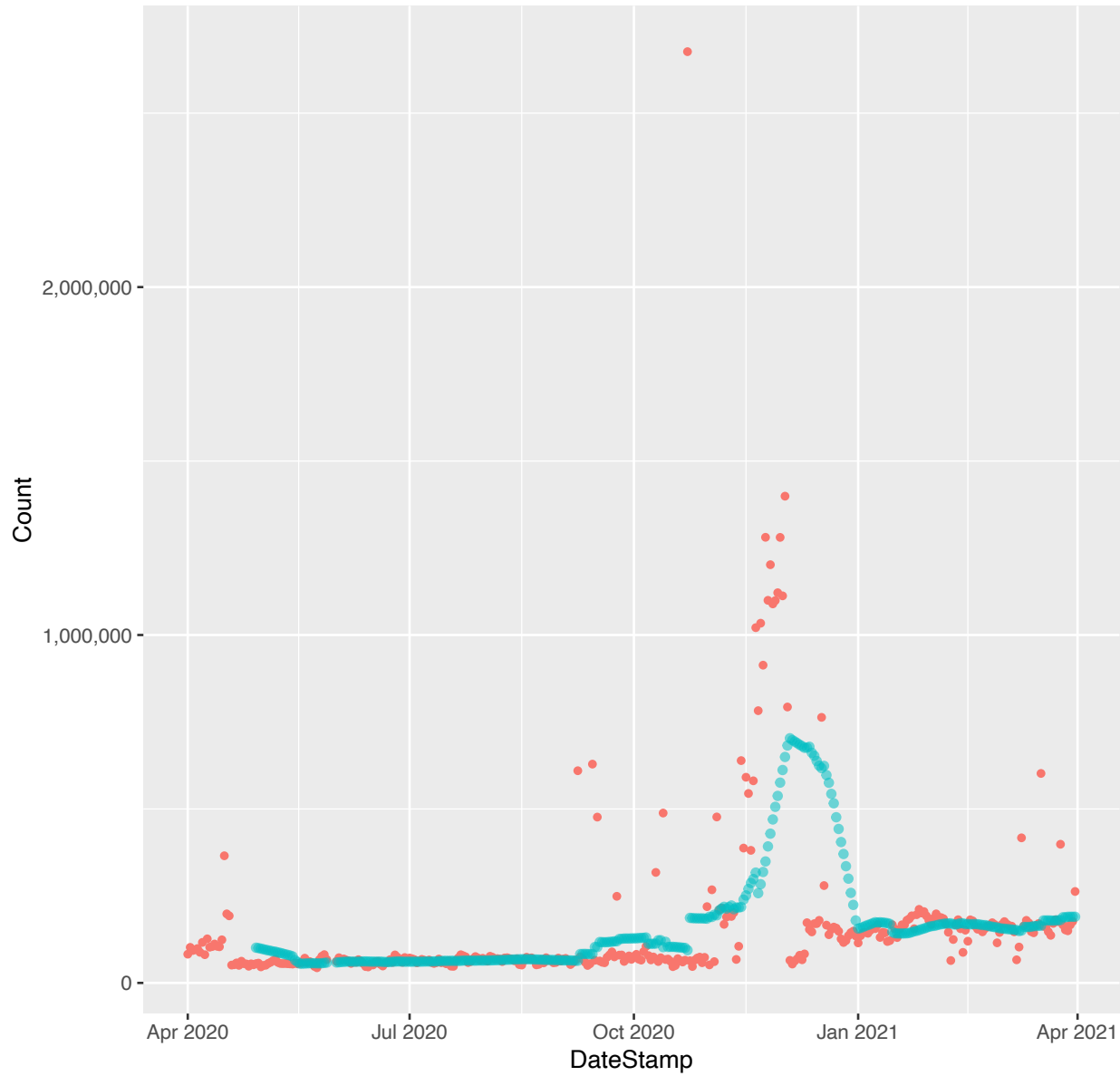
- 85 *.tum.de ↗
- 86 *.uni-heidelberg.de ✱ ↗
- 87 *.uni-muenchen.de ↗

85. tum.de:

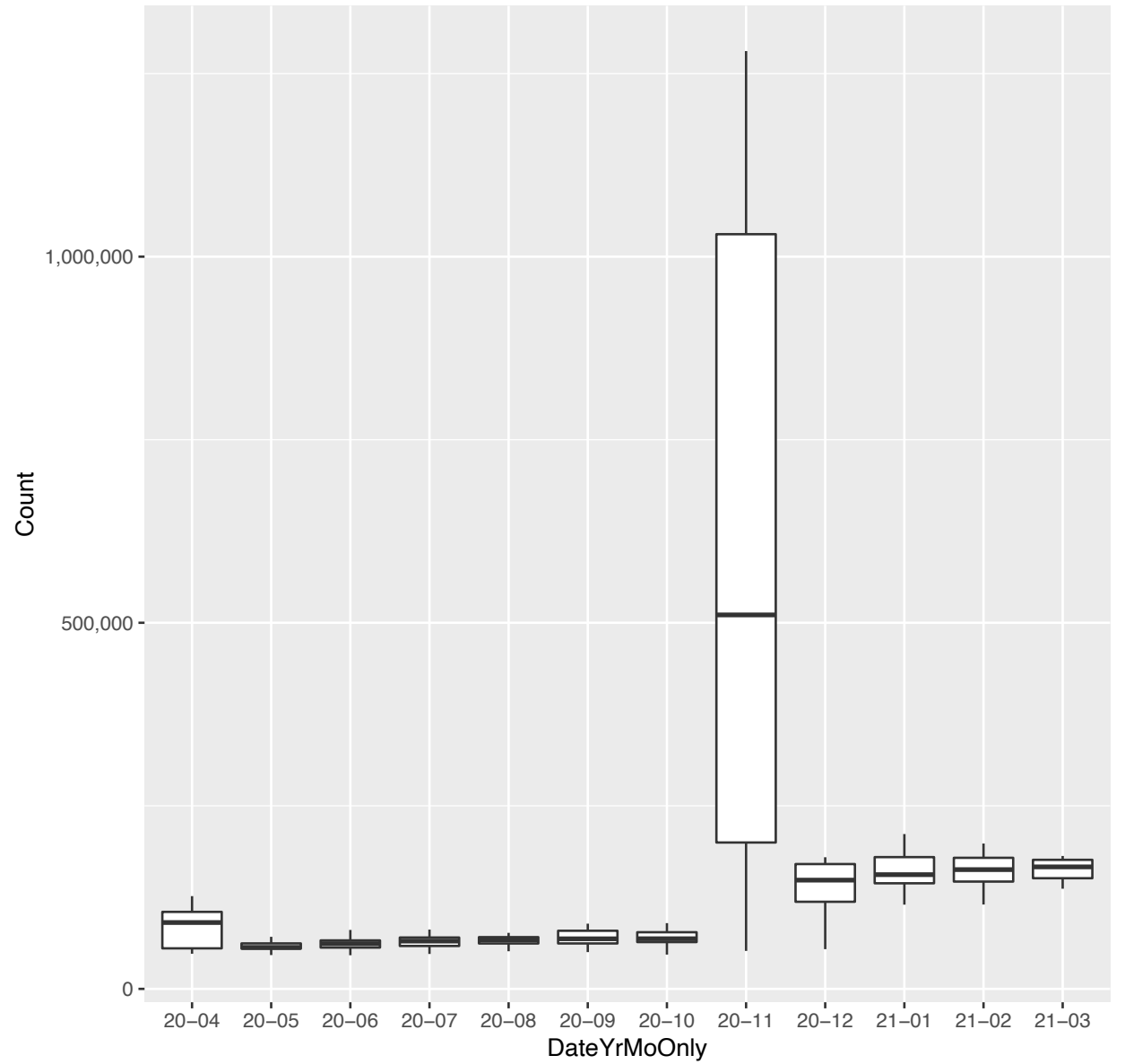




*. uni-heidelberg.de (day-by-day counts and 28 day moving average)

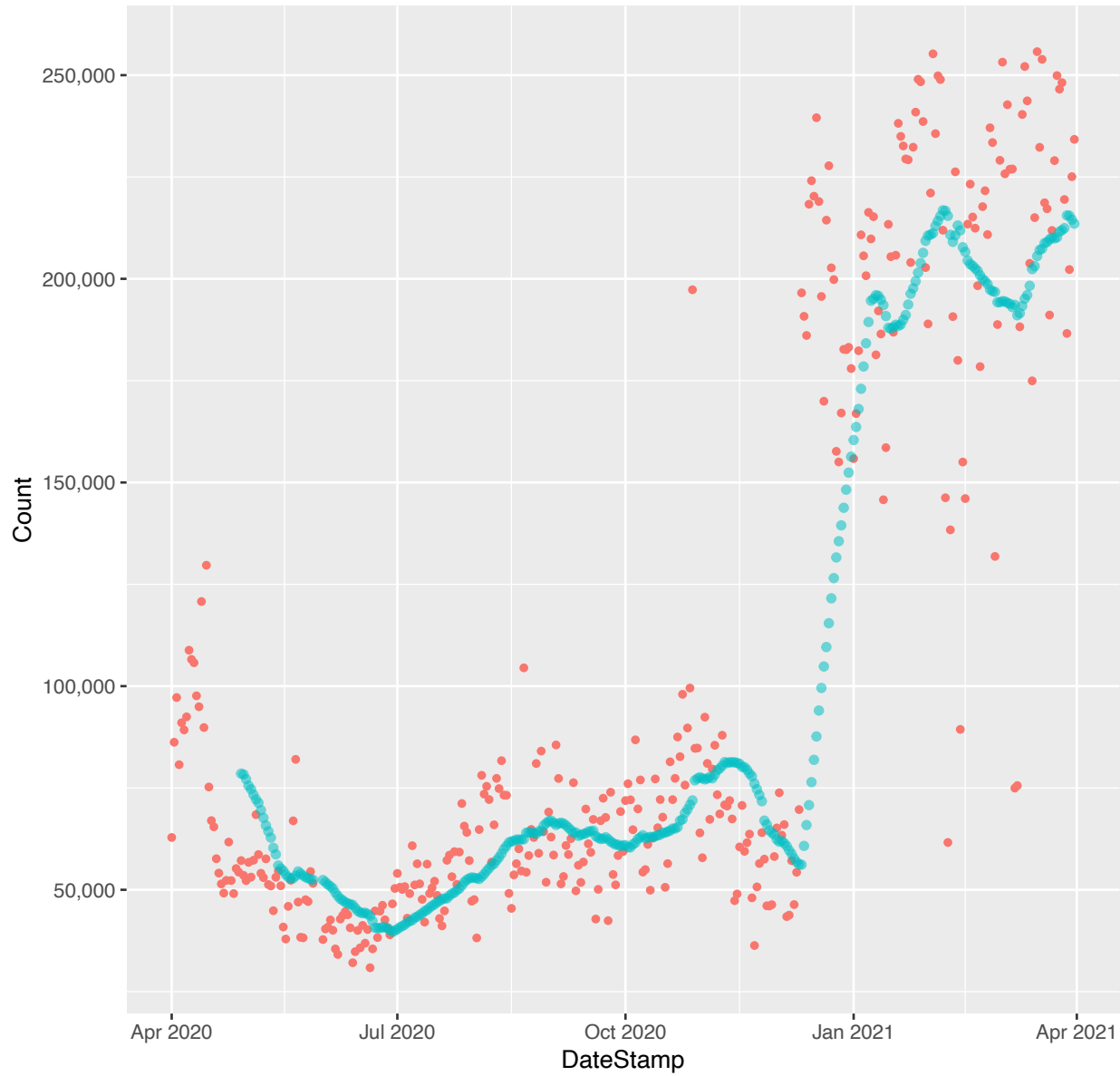


*. uni-heidelberg.de (monthly boxplots (outliers trimmed))

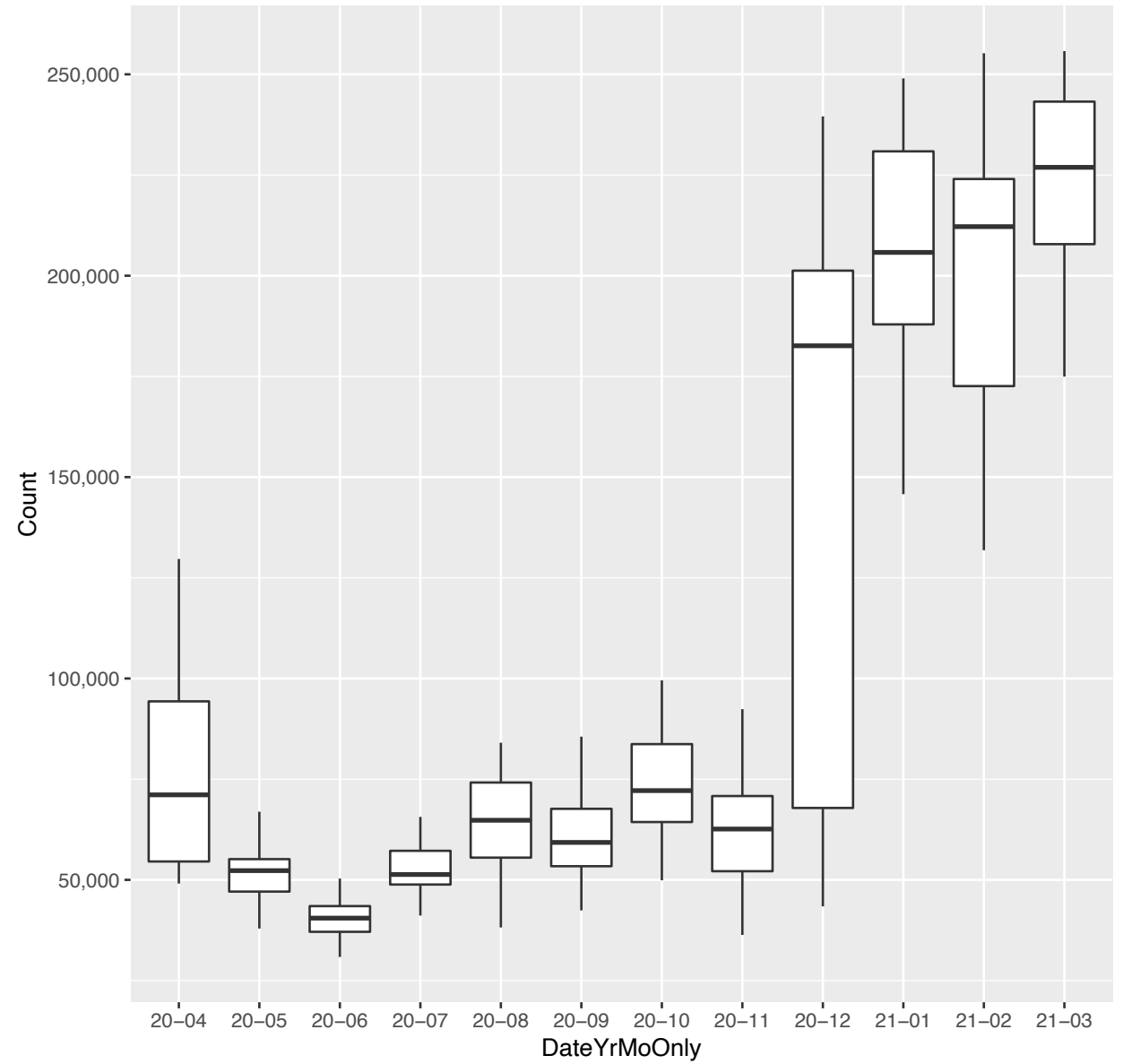


87. uni-muenchen.de: ↗

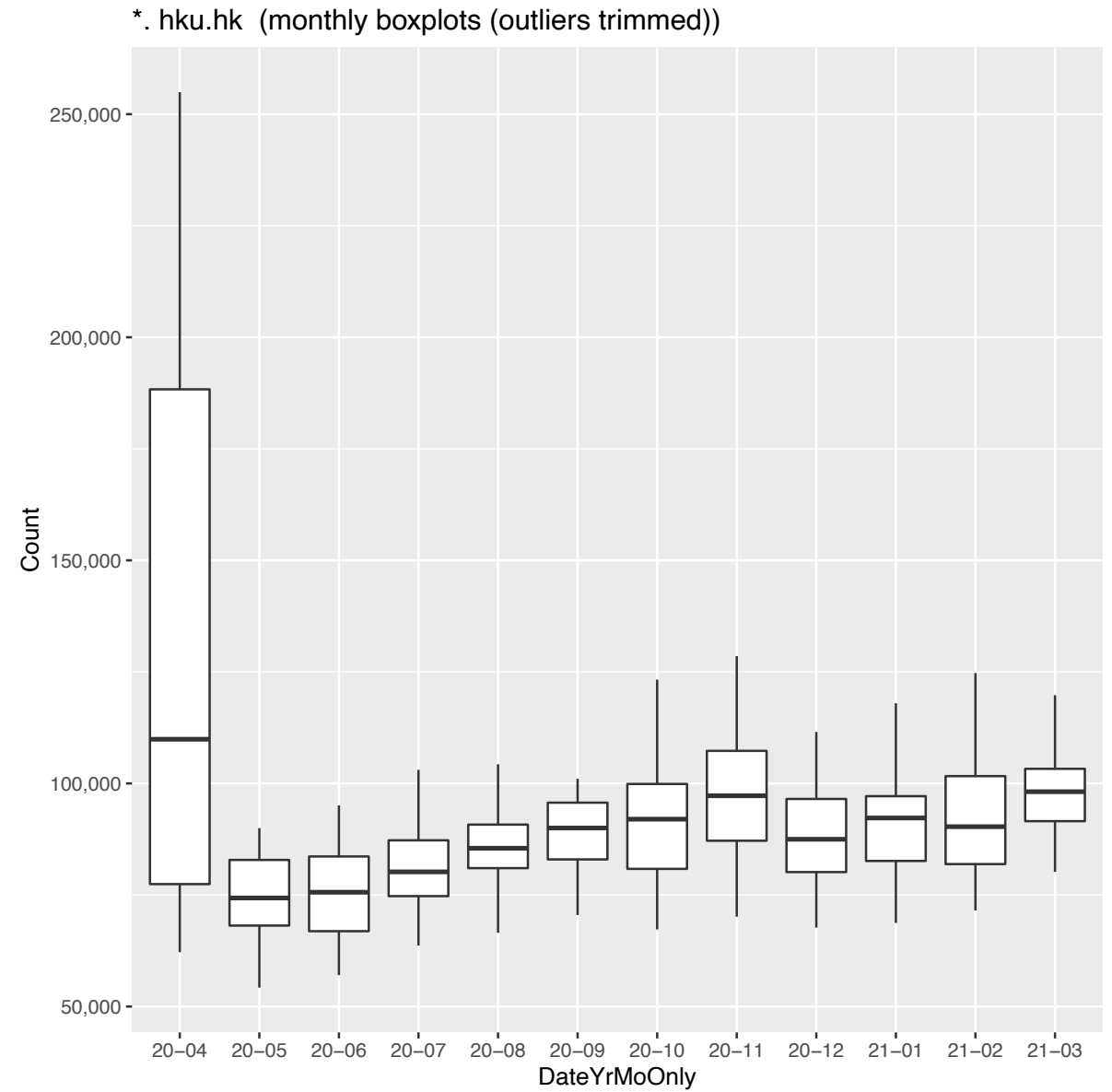
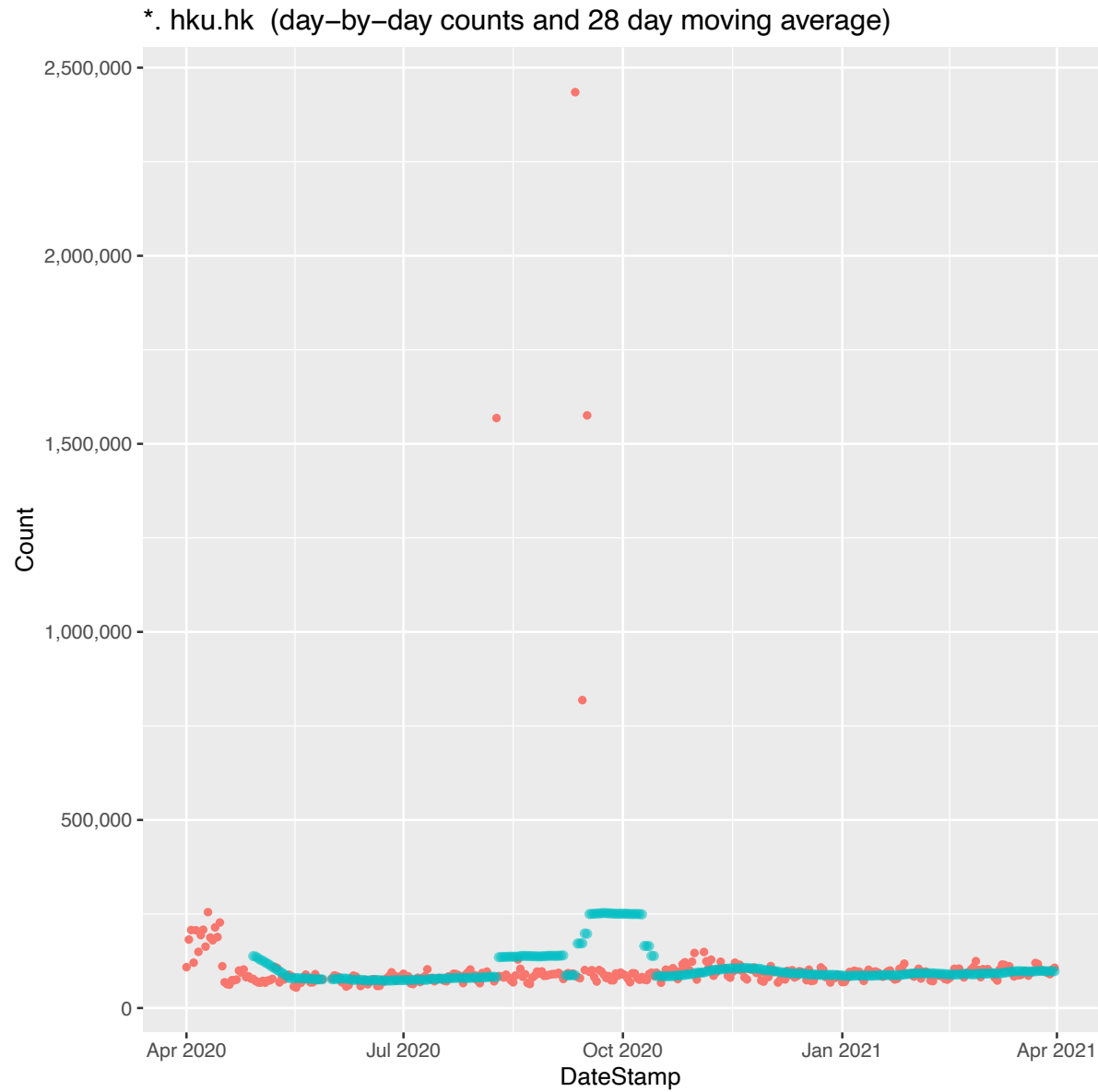
*. uni-muenchen.de (day-by-day counts and 28 day moving average)



*. uni-muenchen.de (monthly boxplots (outliers trimmed))



88 hku.hk: * L shaped



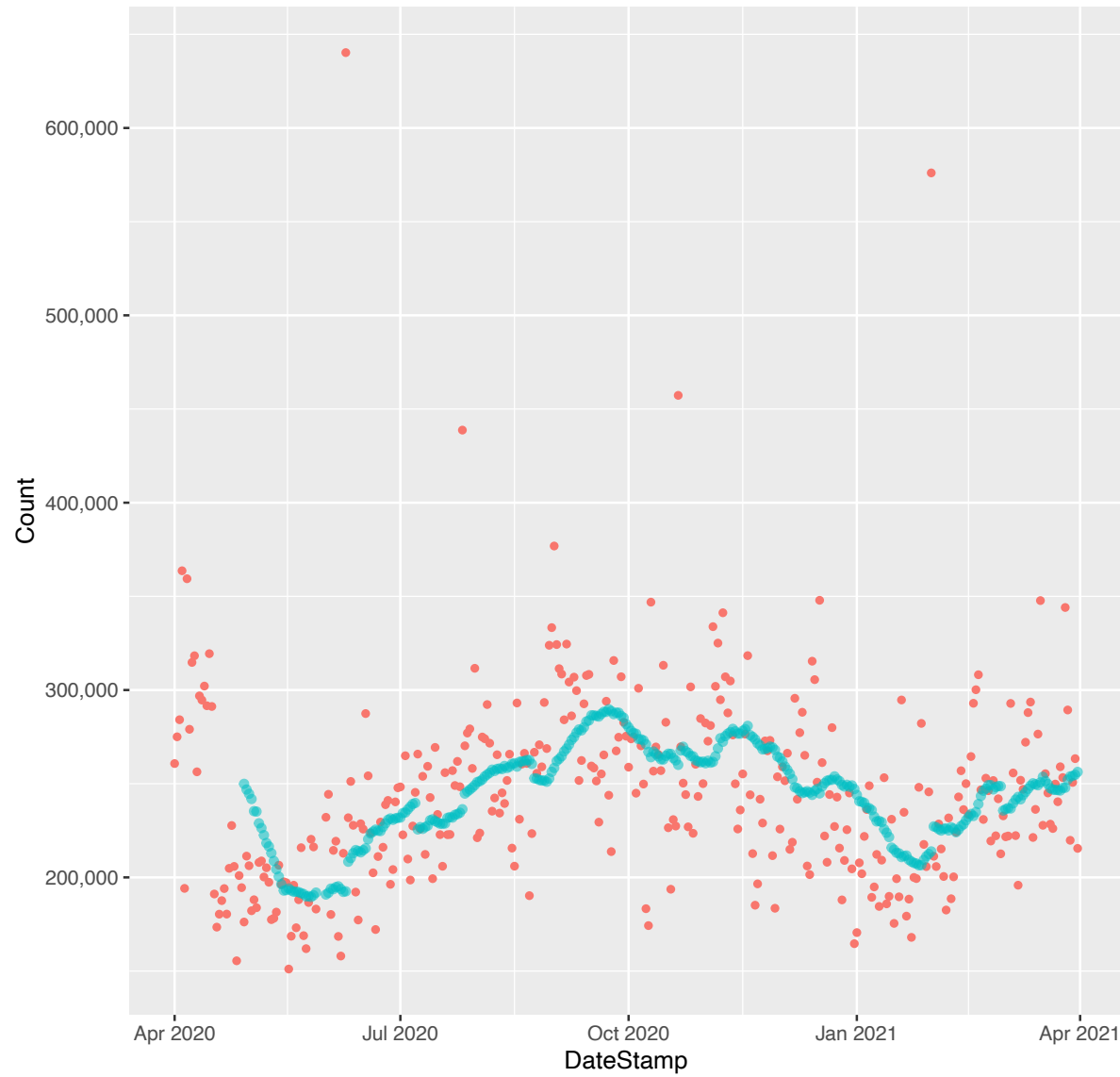
h) Japan

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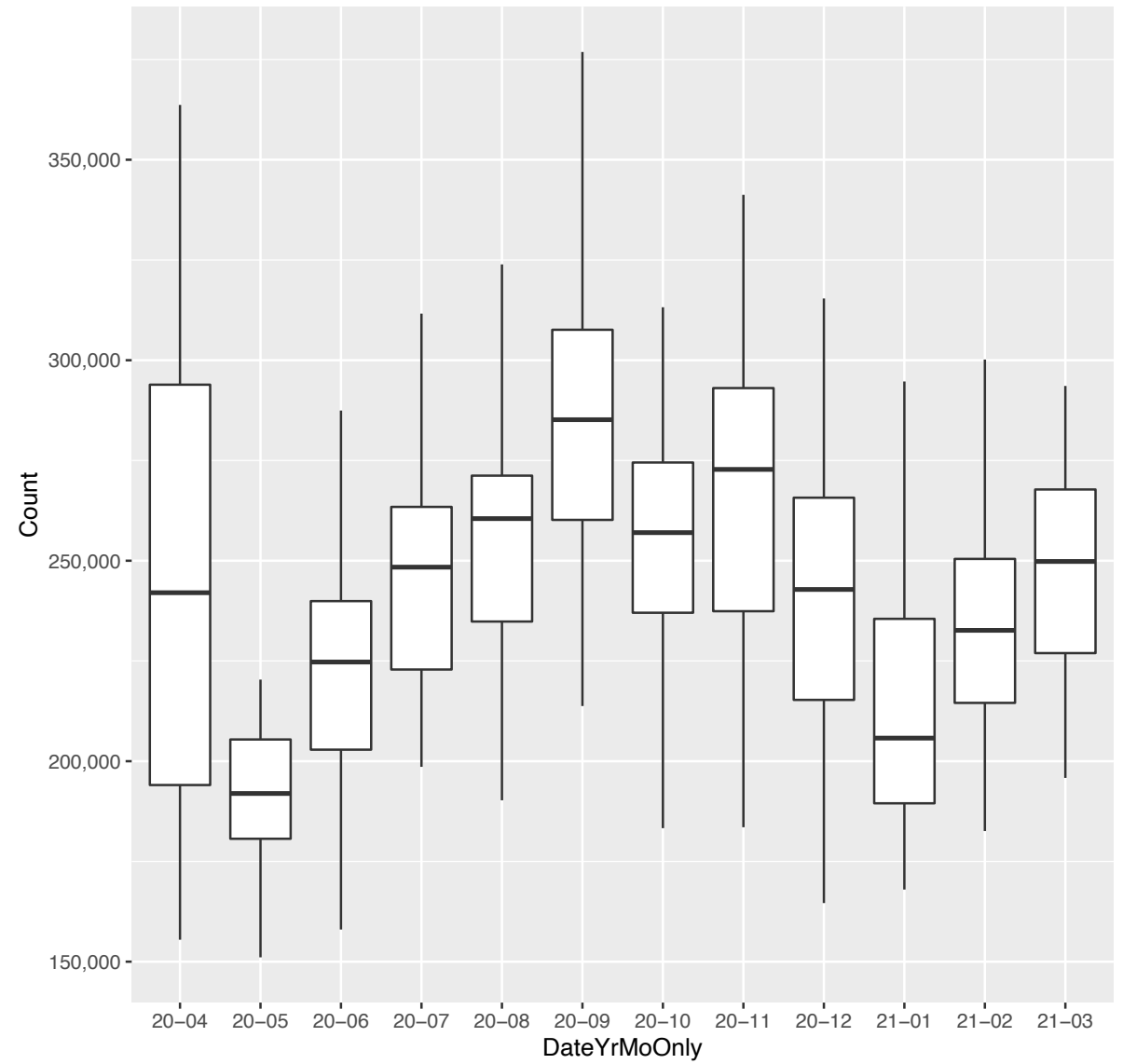
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89 u-tokyo.ac.jp: 🌟 ~

*. u-tokyo.ac.jp (day-by-day counts and 28 day moving average)



*. u-tokyo.ac.jp (monthly boxplots (outliers trimmed))



i) Singapore

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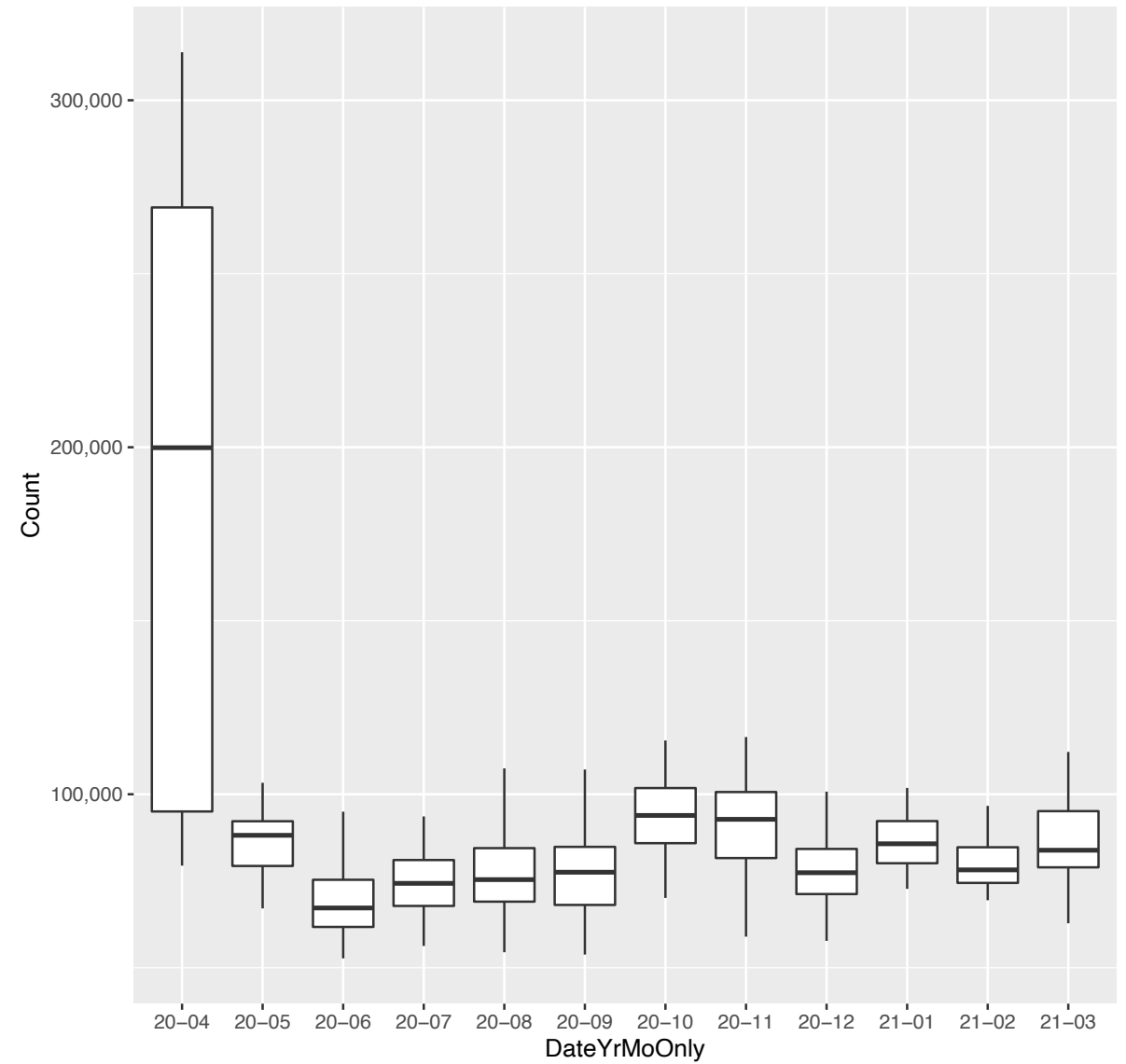
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90 nus.edu.sg: L shaped

*. nus.edu.sg (day-by-day counts and 28 day moving average)



*. nus.edu.sg (monthly boxplots (outliers trimmed))



j) Switzerland

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91 *.epfl.ch



L shaped

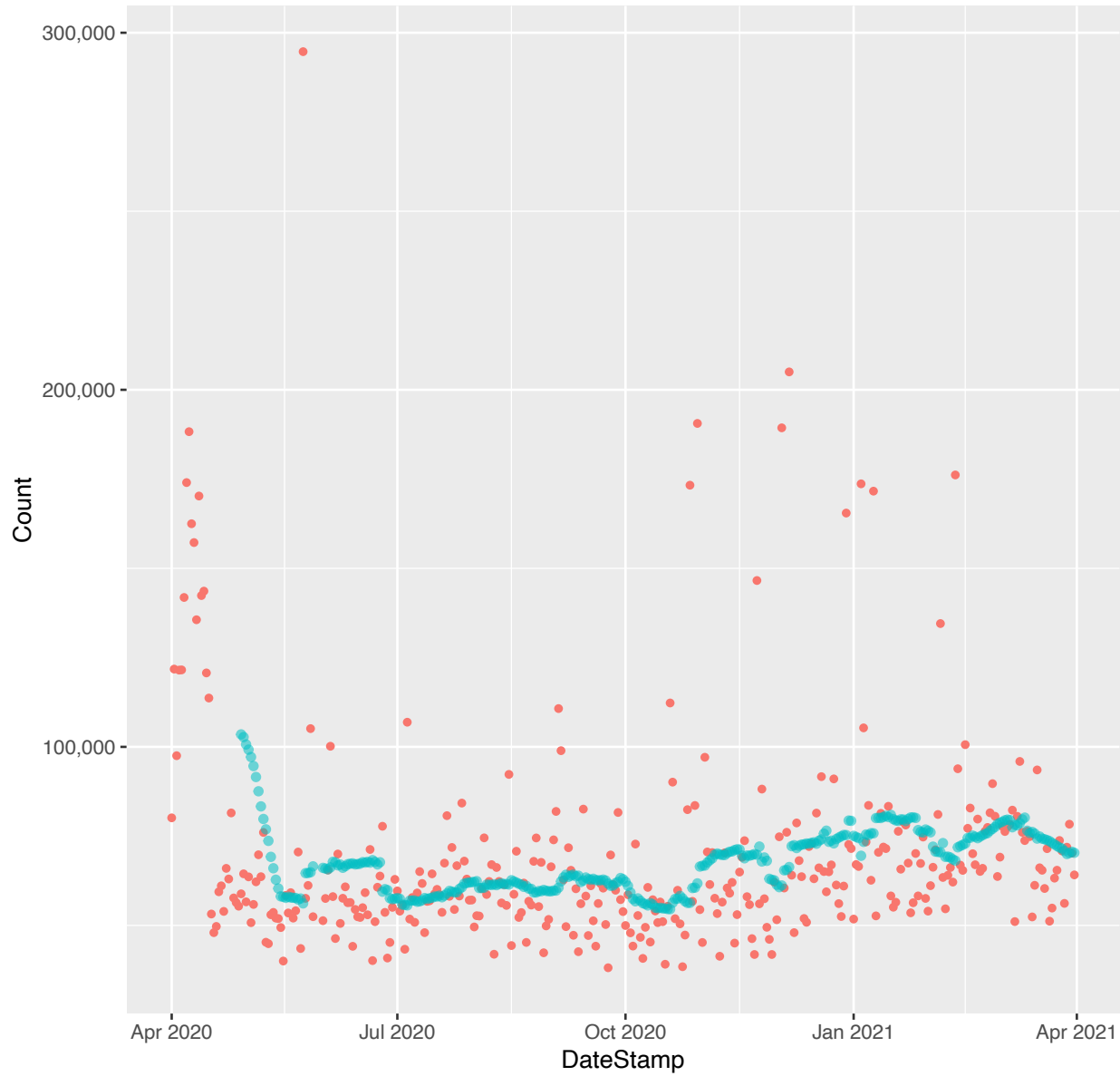
92 *.ethz.ch

U shaped

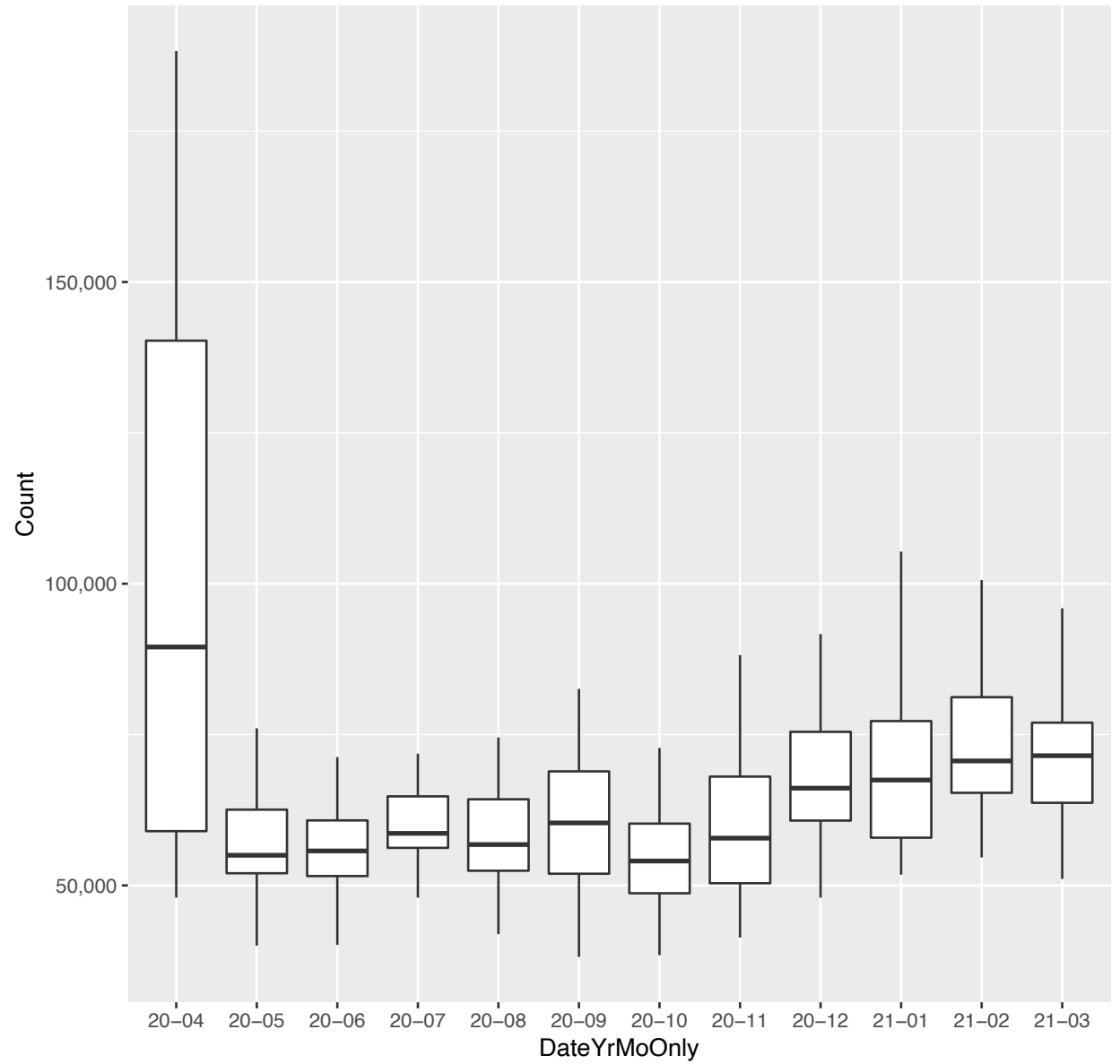
91. epfl.ch:

⚙ L shaped

*. epfl.ch (day-by-day counts and 28 day moving average)



*. epfl.ch (monthly boxplots (outliers trimmed))



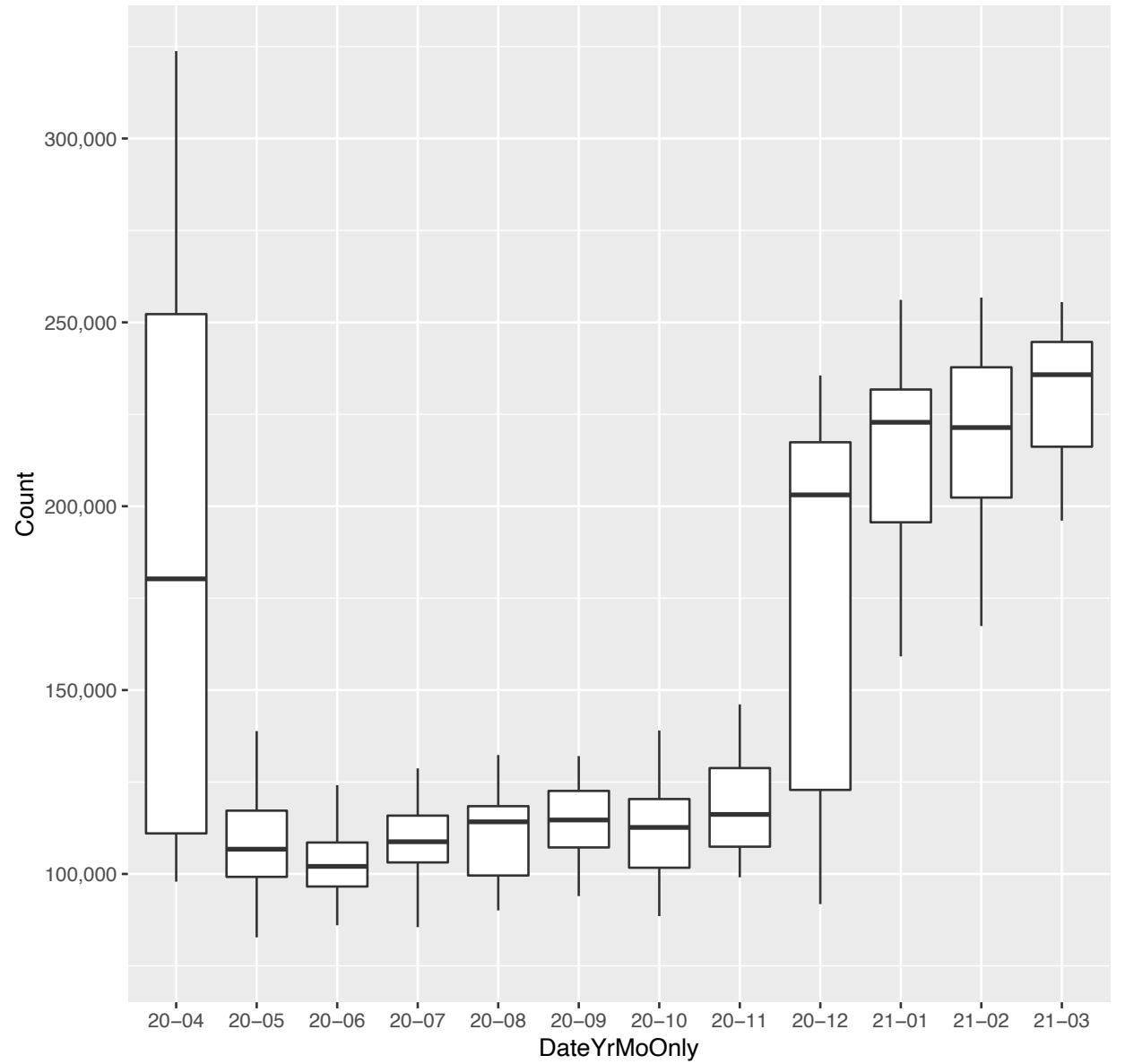
92. ethz.ch:

U shaped

*. ethz.ch (day-by-day counts and 28 day moving average)



*. ethz.ch (monthly boxplots (outliers trimmed))



XV. Videoconferencing Sites

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1	*.slack.com	☀	~	MM
2	*.skype.com	☀	∪ shaped	M
3	*.webex.com		↗	MMM
4	*.zoom.us	☀	↗	MM

1. slack.com:

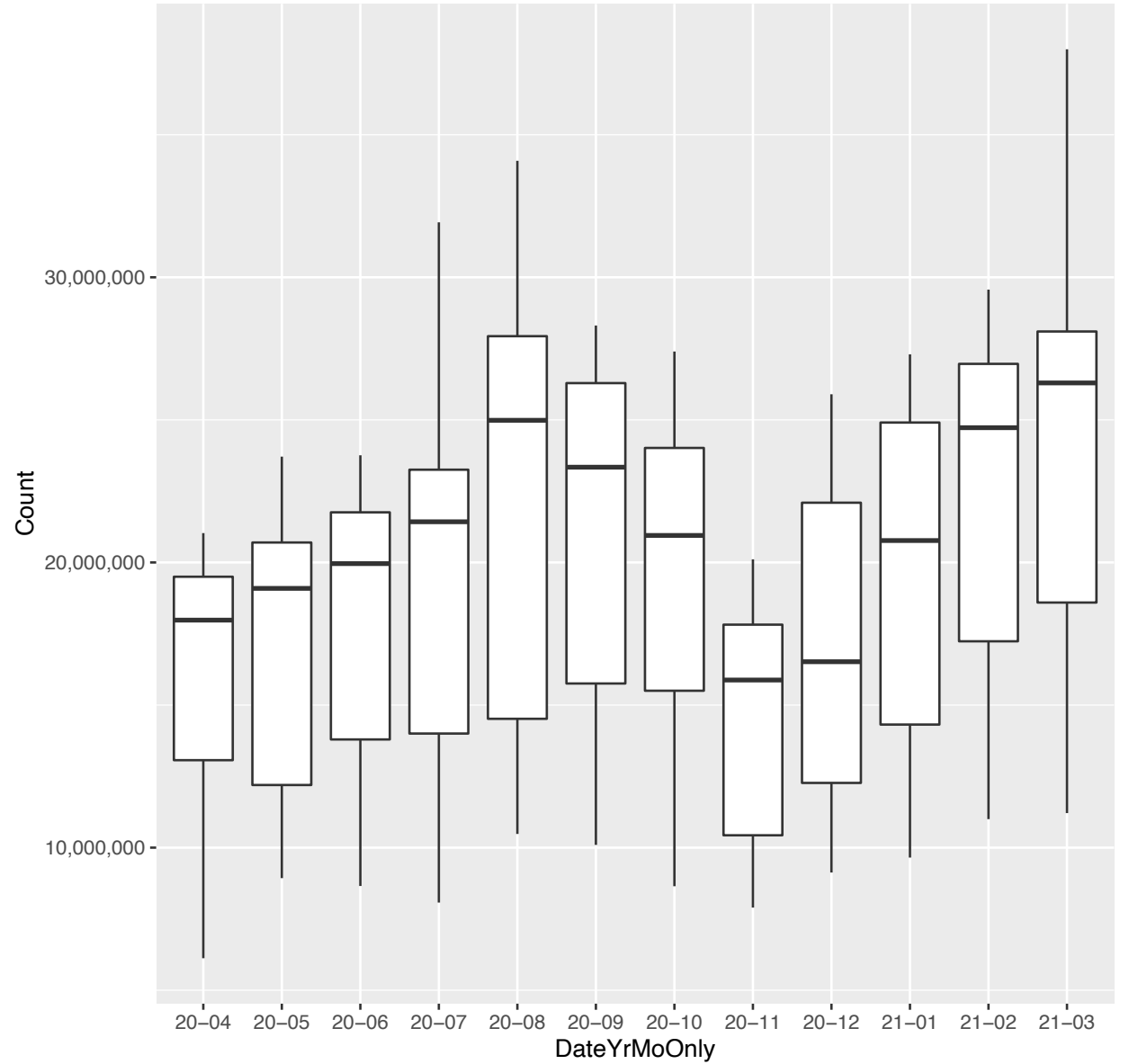


MM

slack.com (day-by-day counts and 28 day moving average)



slack.com (monthly boxplots (outliers trimmed))

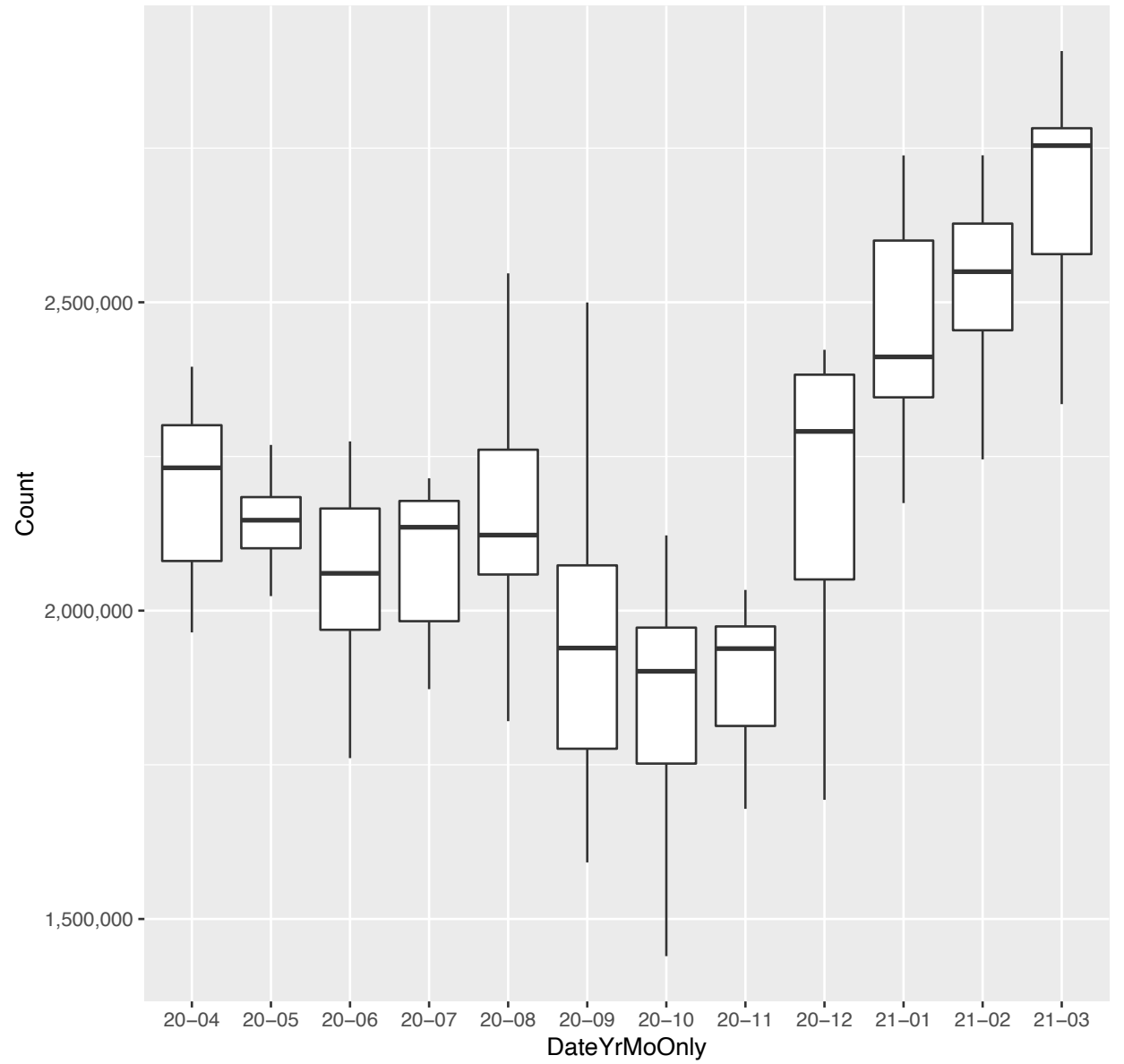


2. skype.com: * U shaped M

skype.com (day-by-day counts and 28 day moving average)



skype.com (monthly boxplots (outliers trimmed))



3. webex.com:

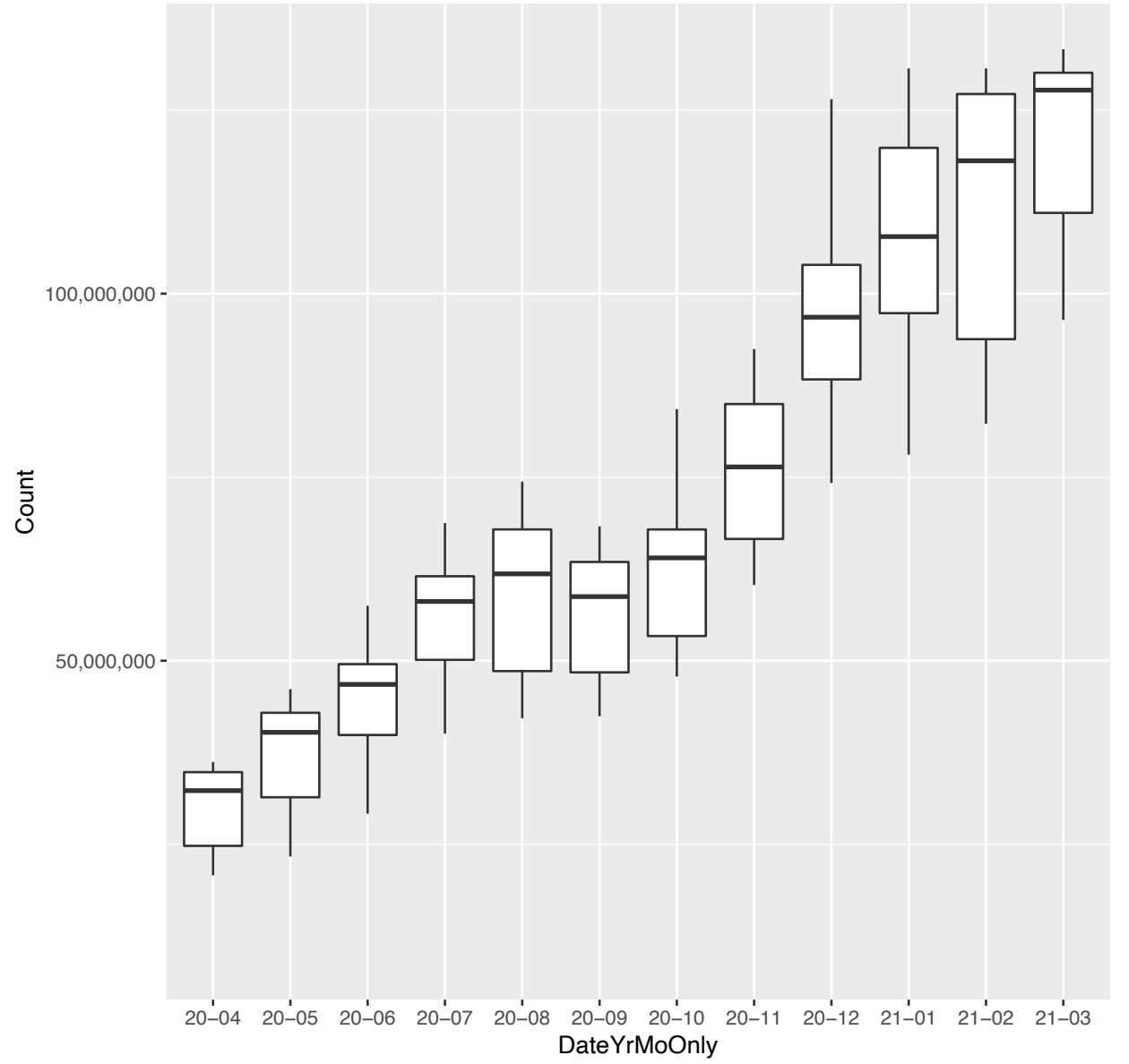


MMM

webex.com (day-by-day counts and 28 day moving average)



webex.com (monthly boxplots (outliers trimmed))



4. zoom.us:

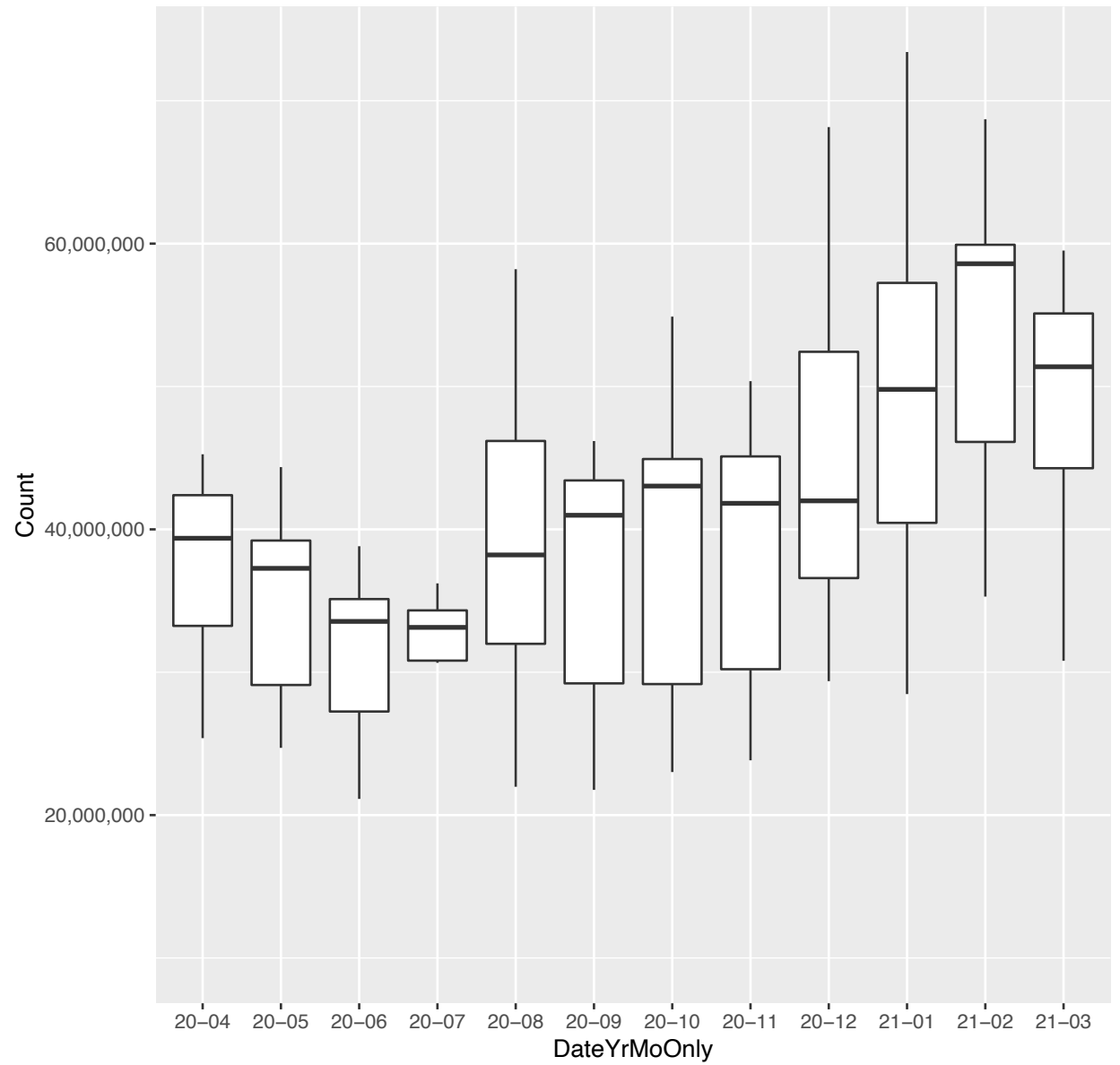


MM

zoom.us (day-by-day counts and 28 day moving average)



zoom.us (monthly boxplots (outliers trimmed))



XVI. Video Gaming Sites

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1	battle.net	✱	∪ shaped	M
2	blizzard.com	✱	∪ shaped	M
3	discordapp.com	✱	↗	M
4	ea.com	✱	∪ shaped	M
5	epicgames.com		↗	MM
6	minecraft.net		∪ shaped (ending lower)	M
7	nintendo.com	✱	~	M
8	playstation.com	✱	~	M
9	roblox.com		∩	MM
10	steampowered.com		~	M
11	xboxlive.com	✱	∪ shaped	M

1. battle.net:



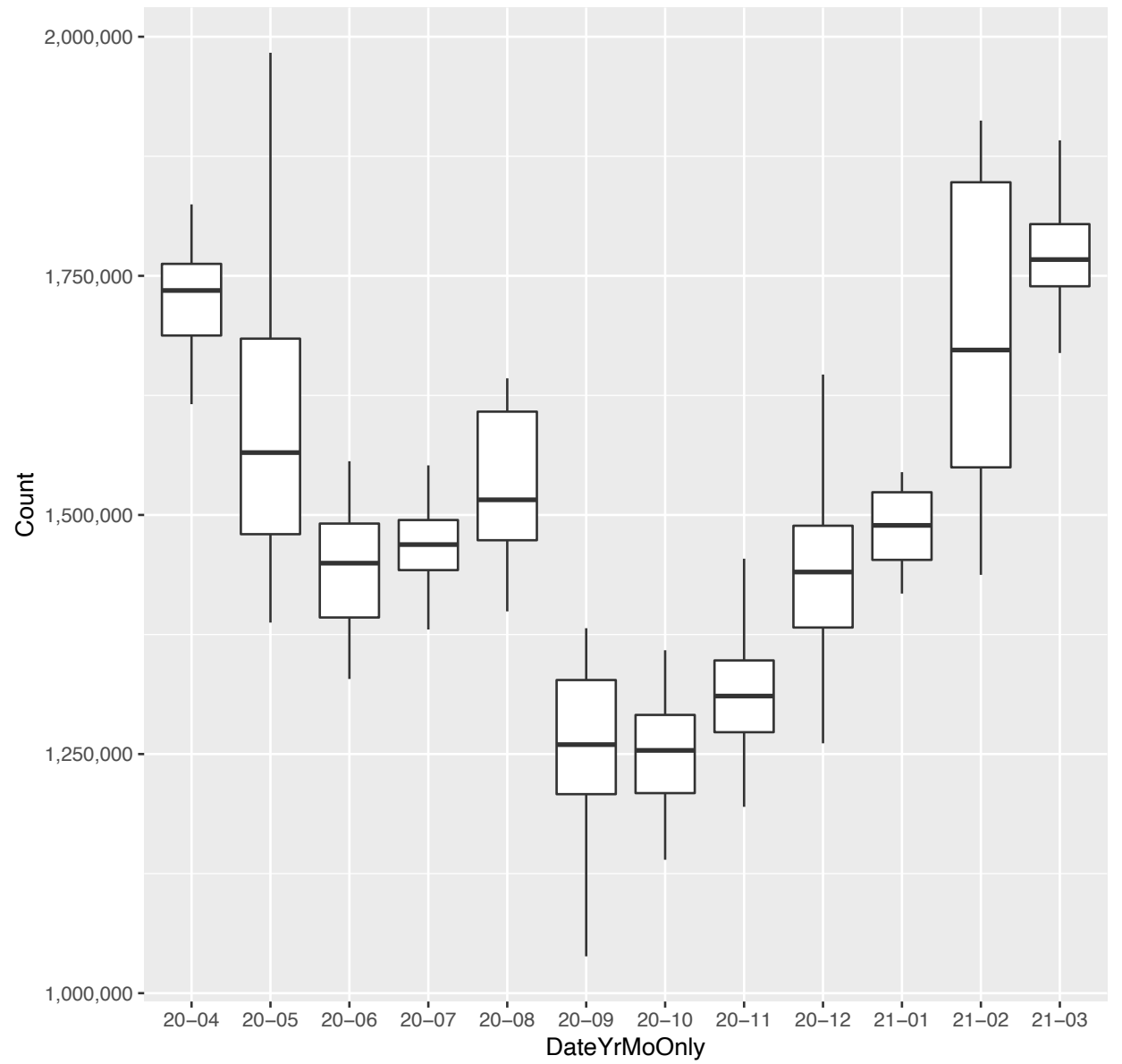
U shaped

M

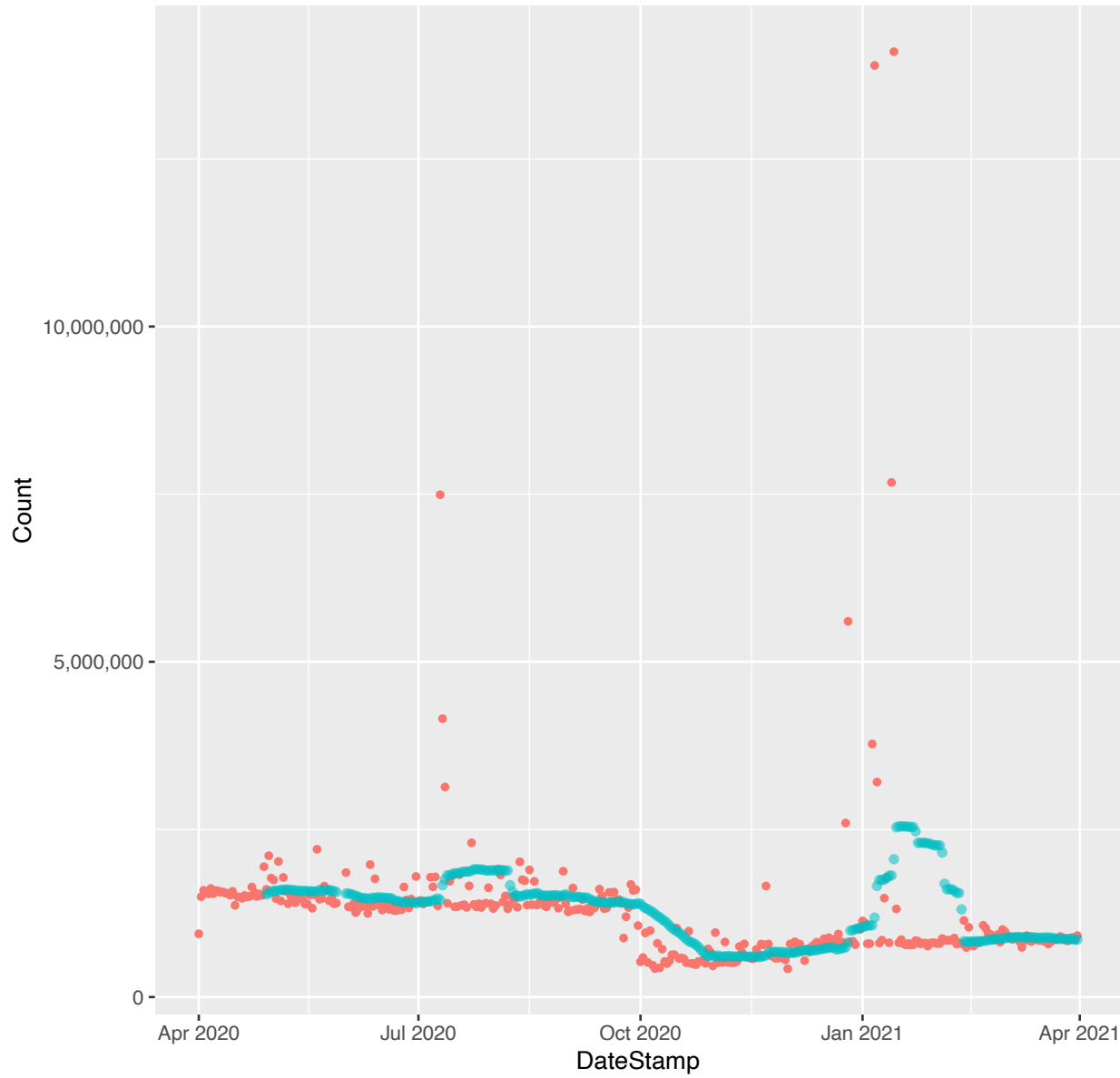
*. battle.net (day-by-day counts and 28 day moving average)



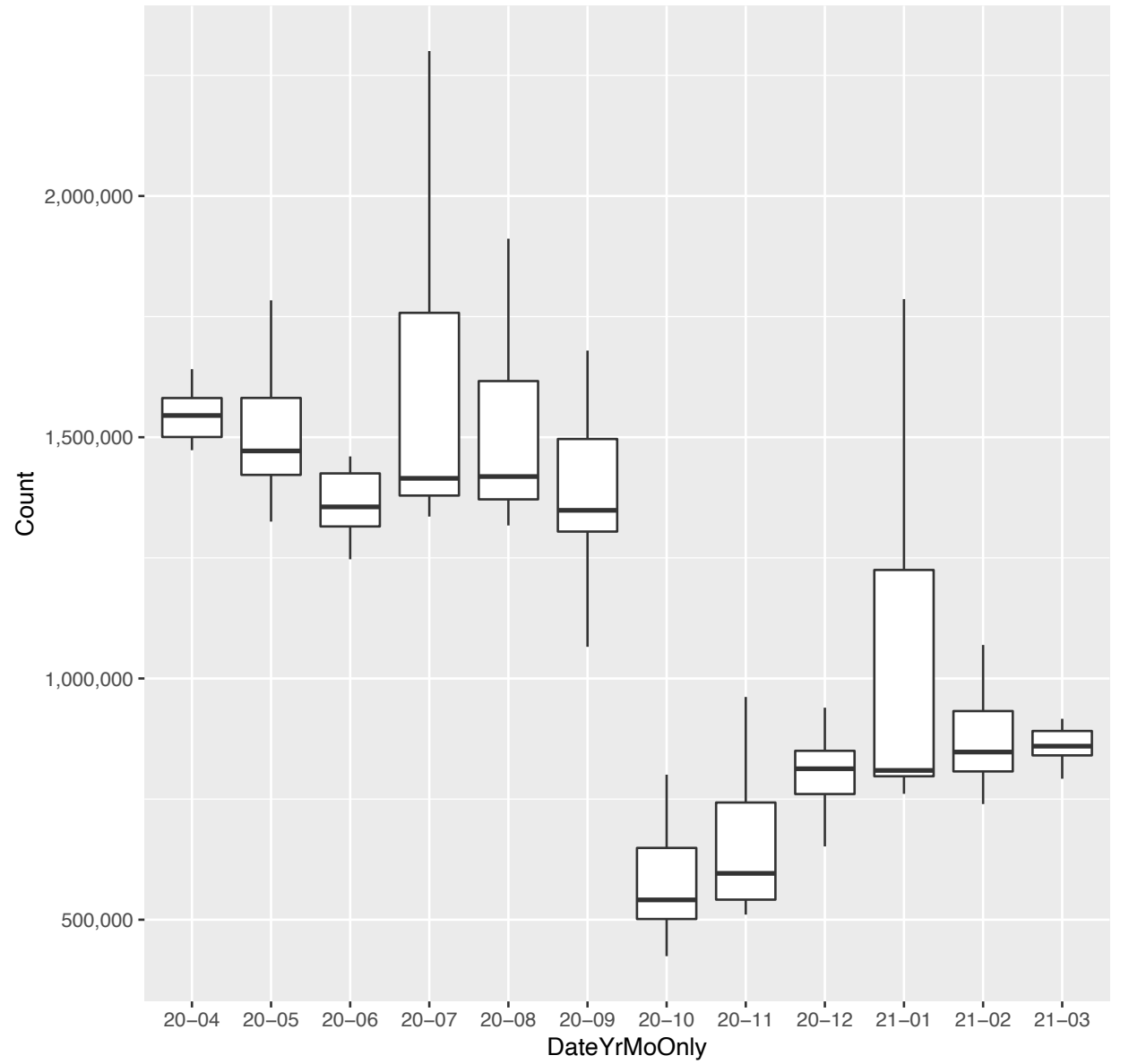
*. battle.net (monthly boxplots (outliers trimmed))



*. blizzard.com (day-by-day counts and 28 day moving average)

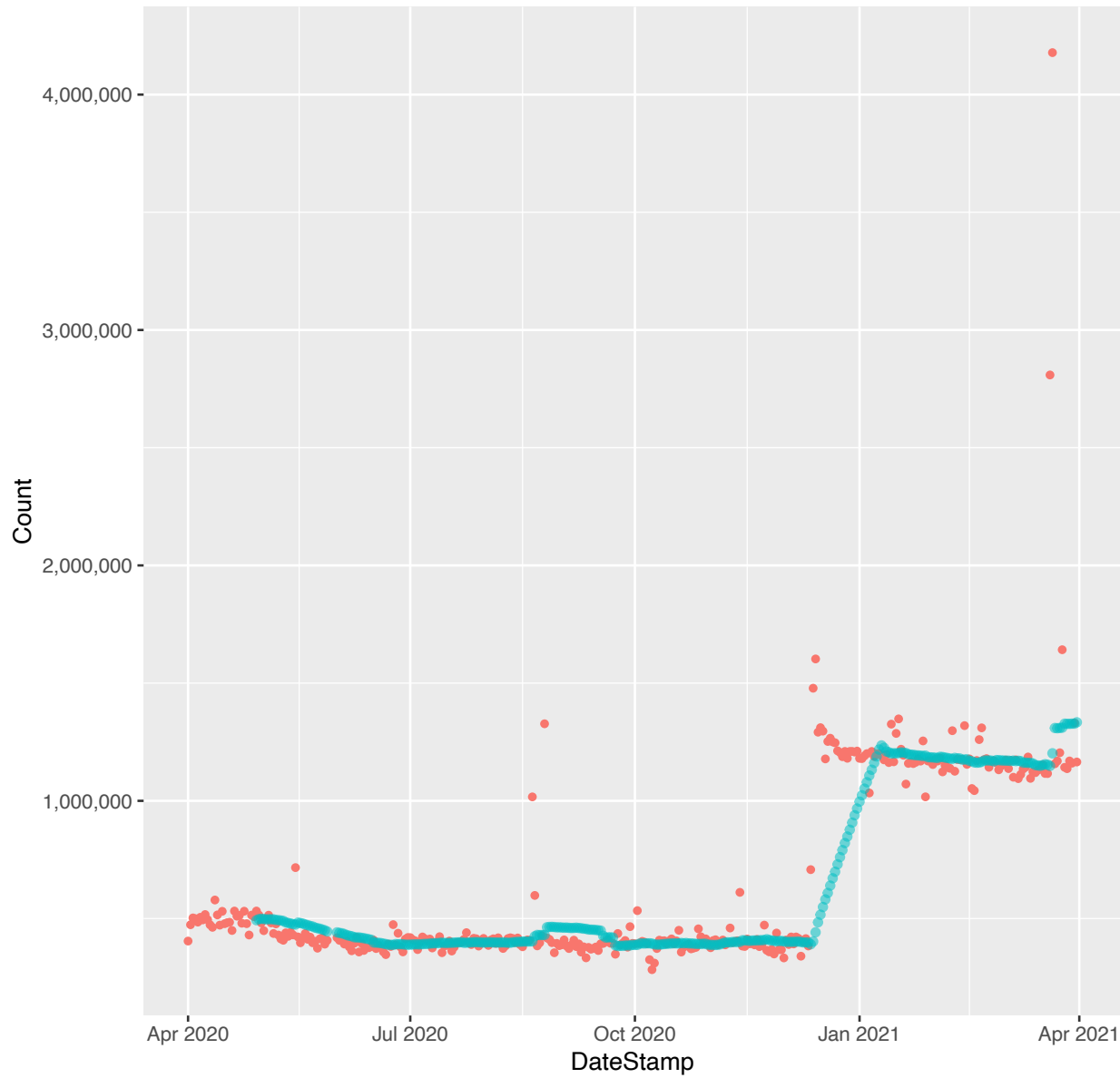


*. blizzard.com (monthly boxplots (outliers trimmed))

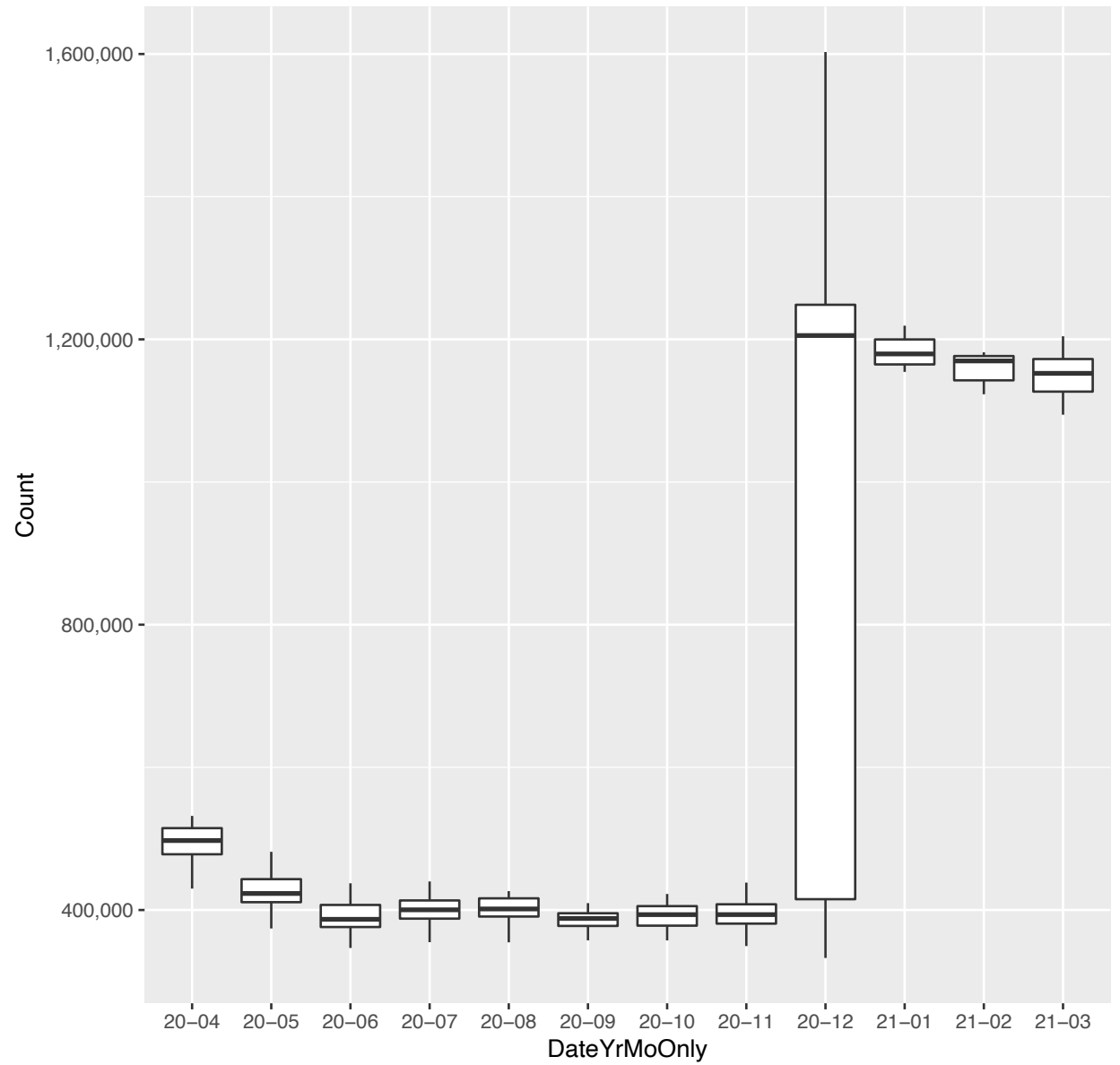




*. discordapp.com (day-by-day counts and 28 day moving average)



*. discordapp.com (monthly boxplots (outliers trimmed))



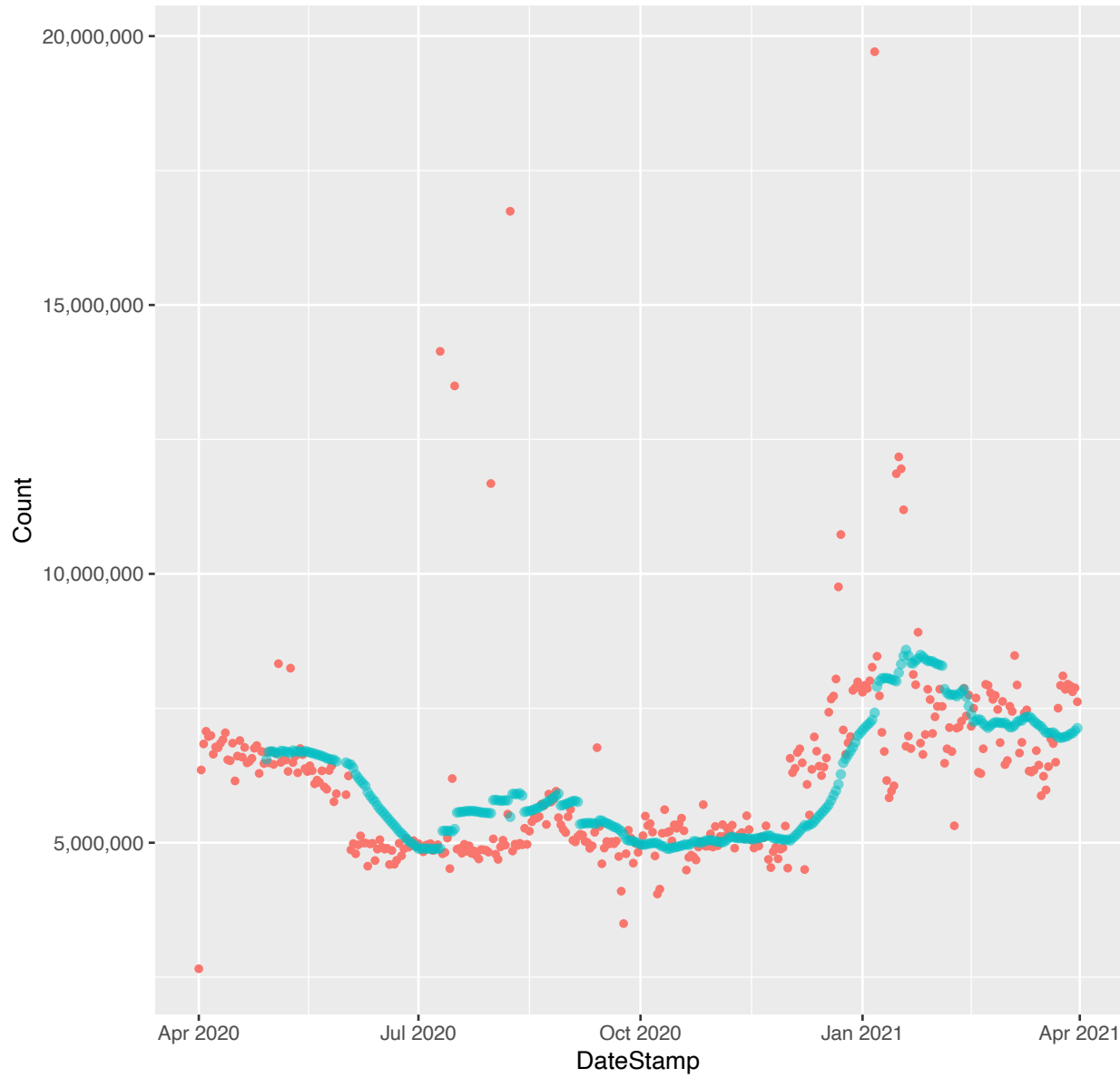
4. ea.com:



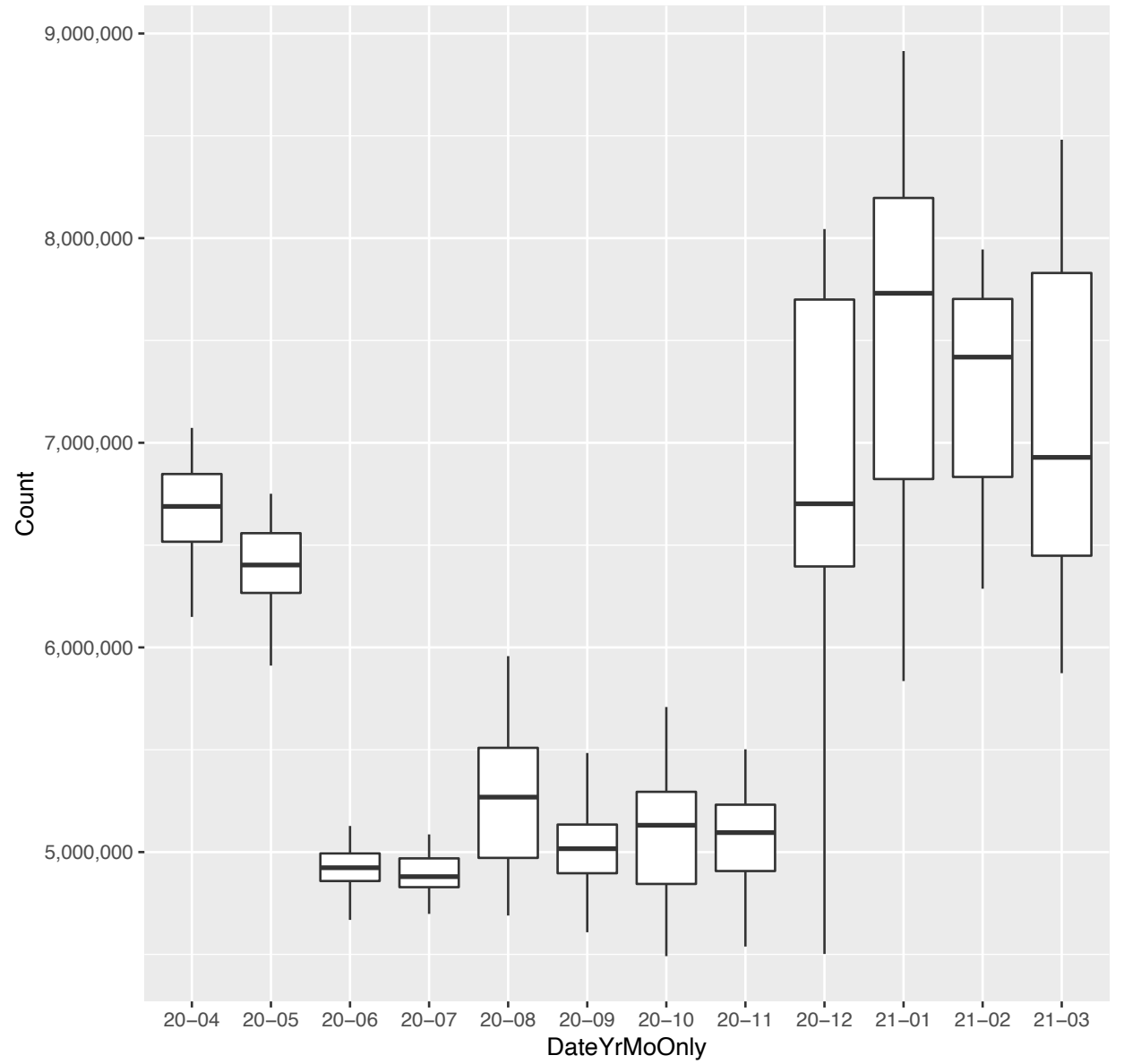
U shaped

M

*. ea.com (day-by-day counts and 28 day moving average)

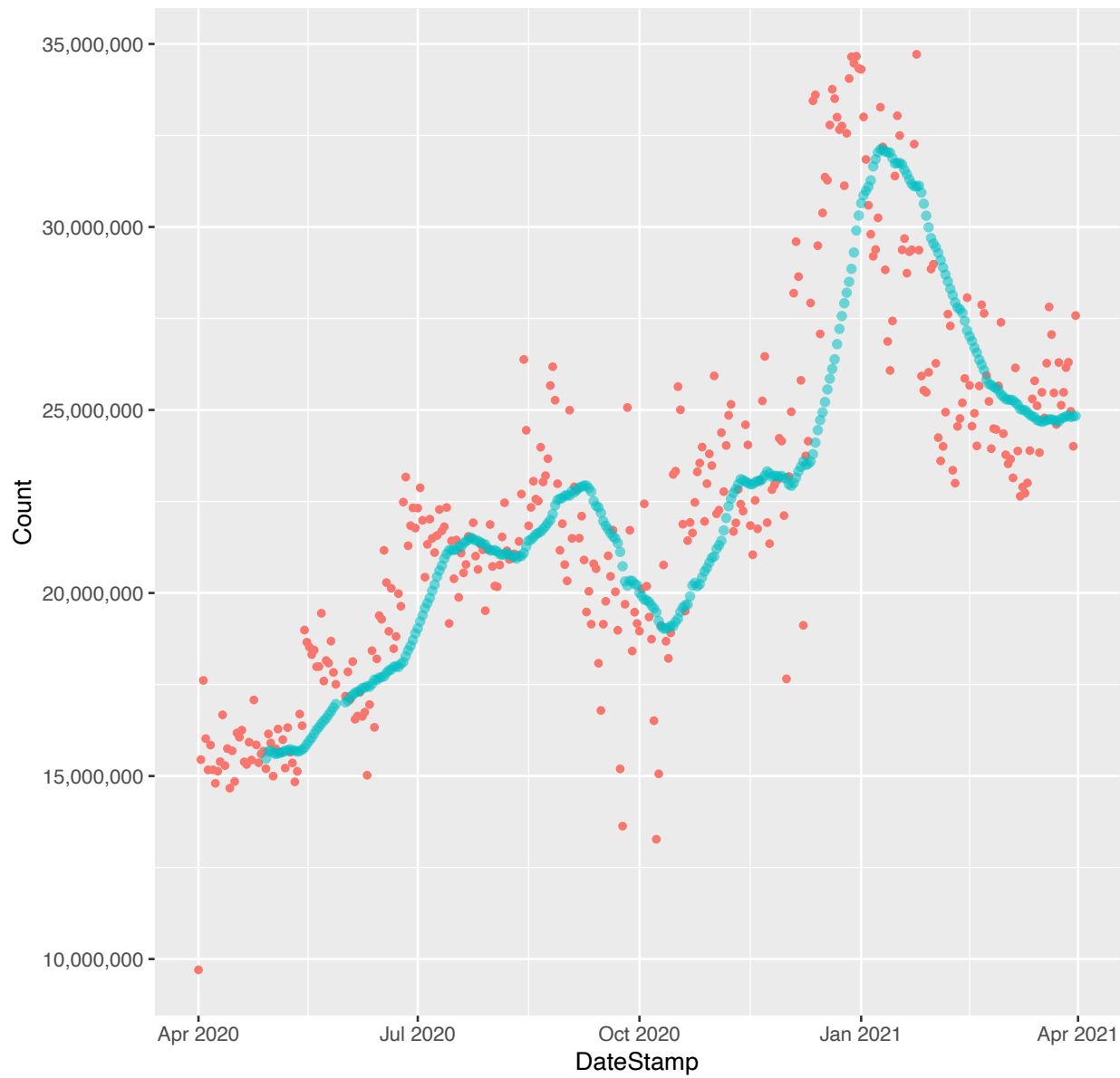


*. ea.com (monthly boxplots (outliers trimmed))

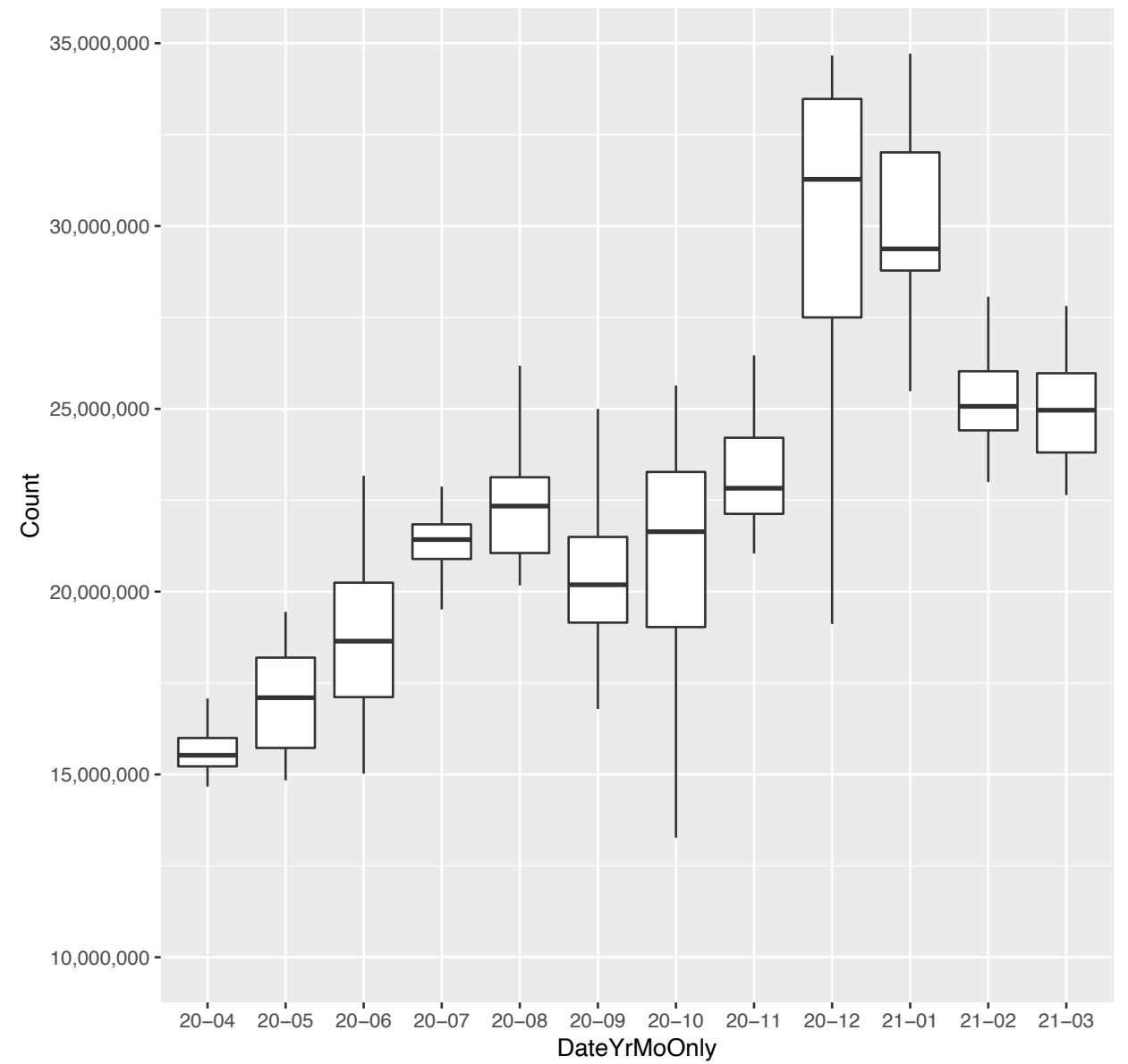


5. epicgames.com: [↗](#)

*. epicgames.com (day-by-day counts and 28 day moving average)

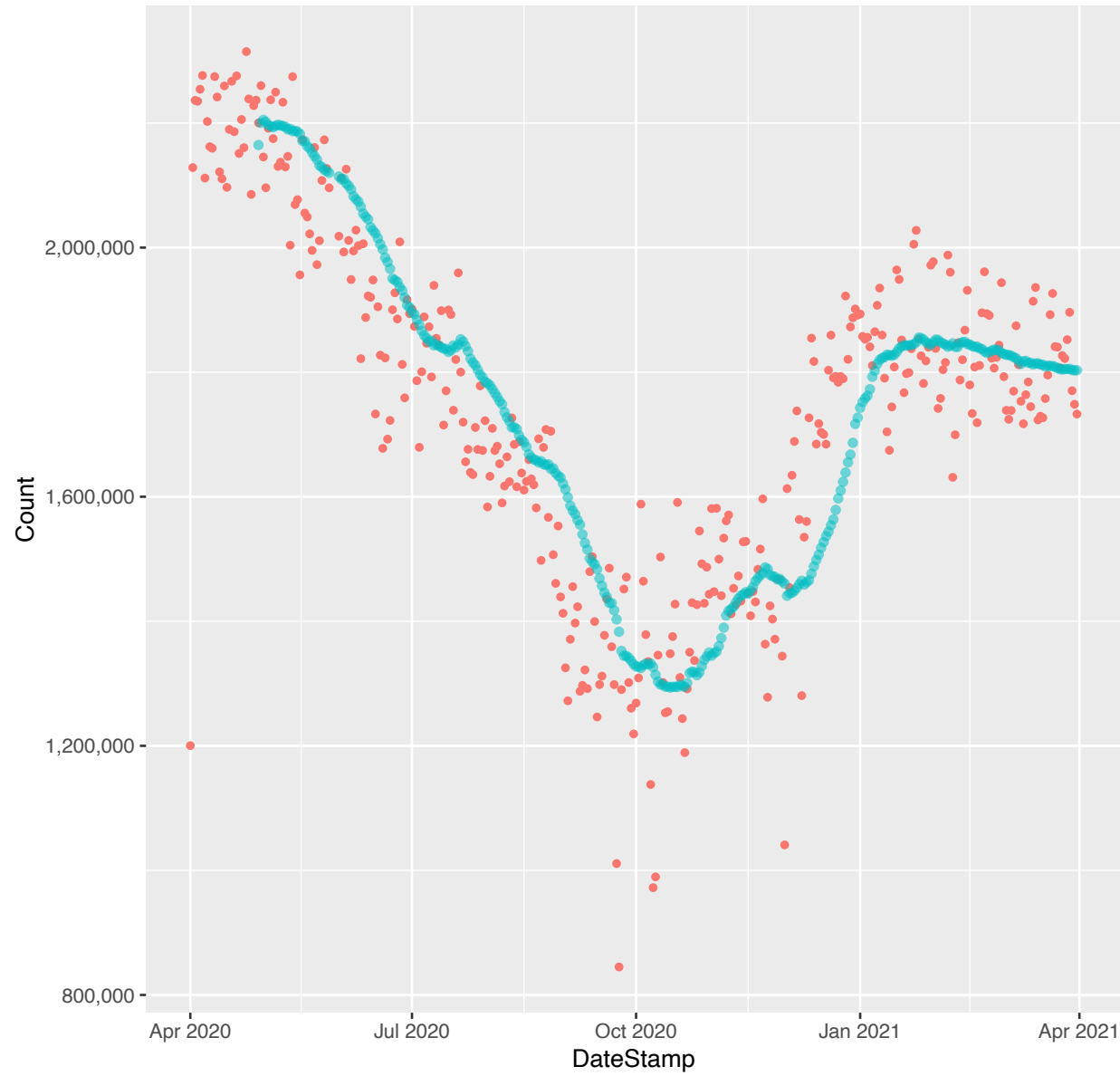


*. epicgames.com (monthly boxplots (outliers trimmed))

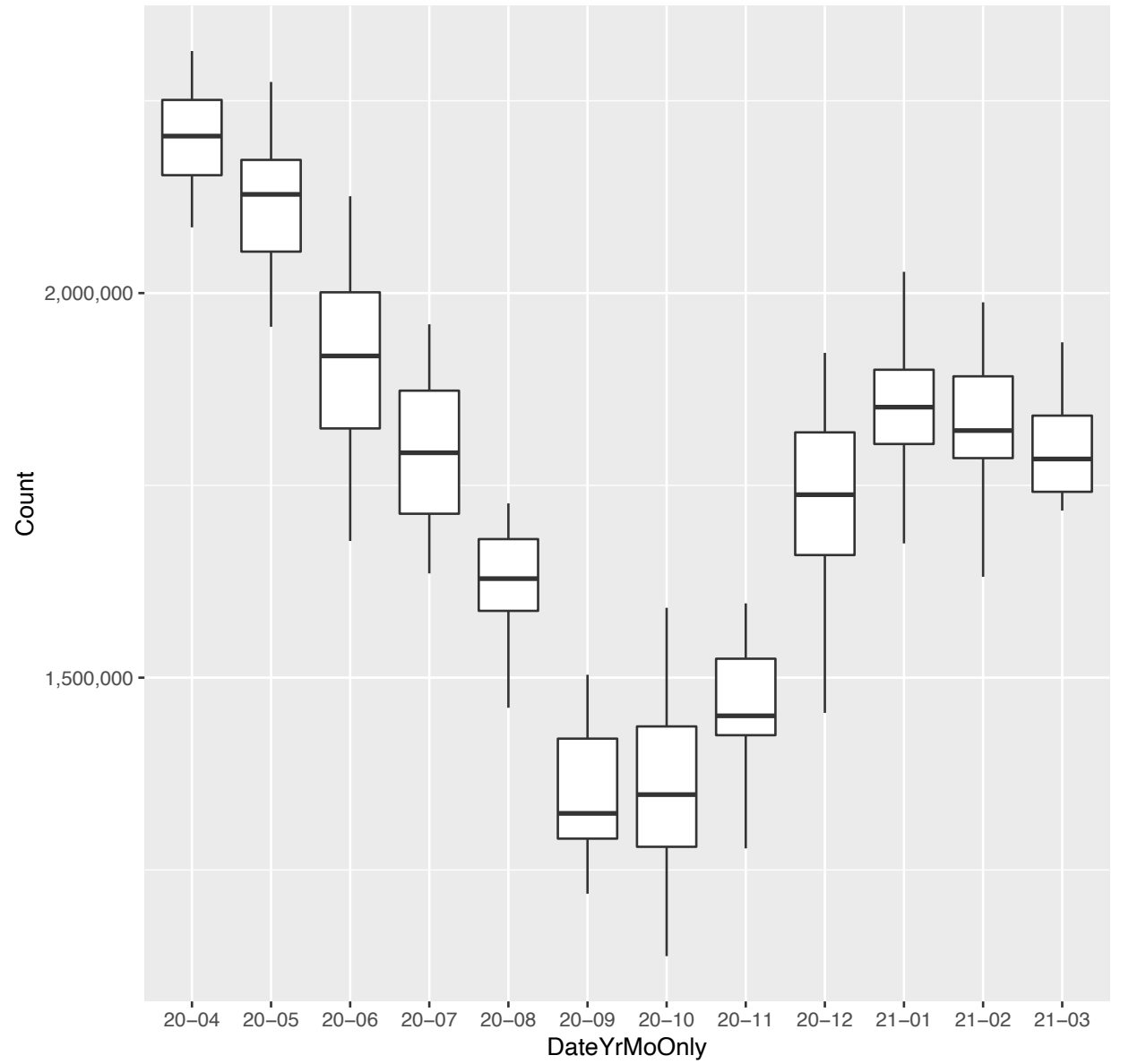


6. minecraft.net: U shaped (ending lower)

*. minecraft.net (day-by-day counts and 28 day moving average)



*. minecraft.net (monthly boxplots (outliers trimmed))

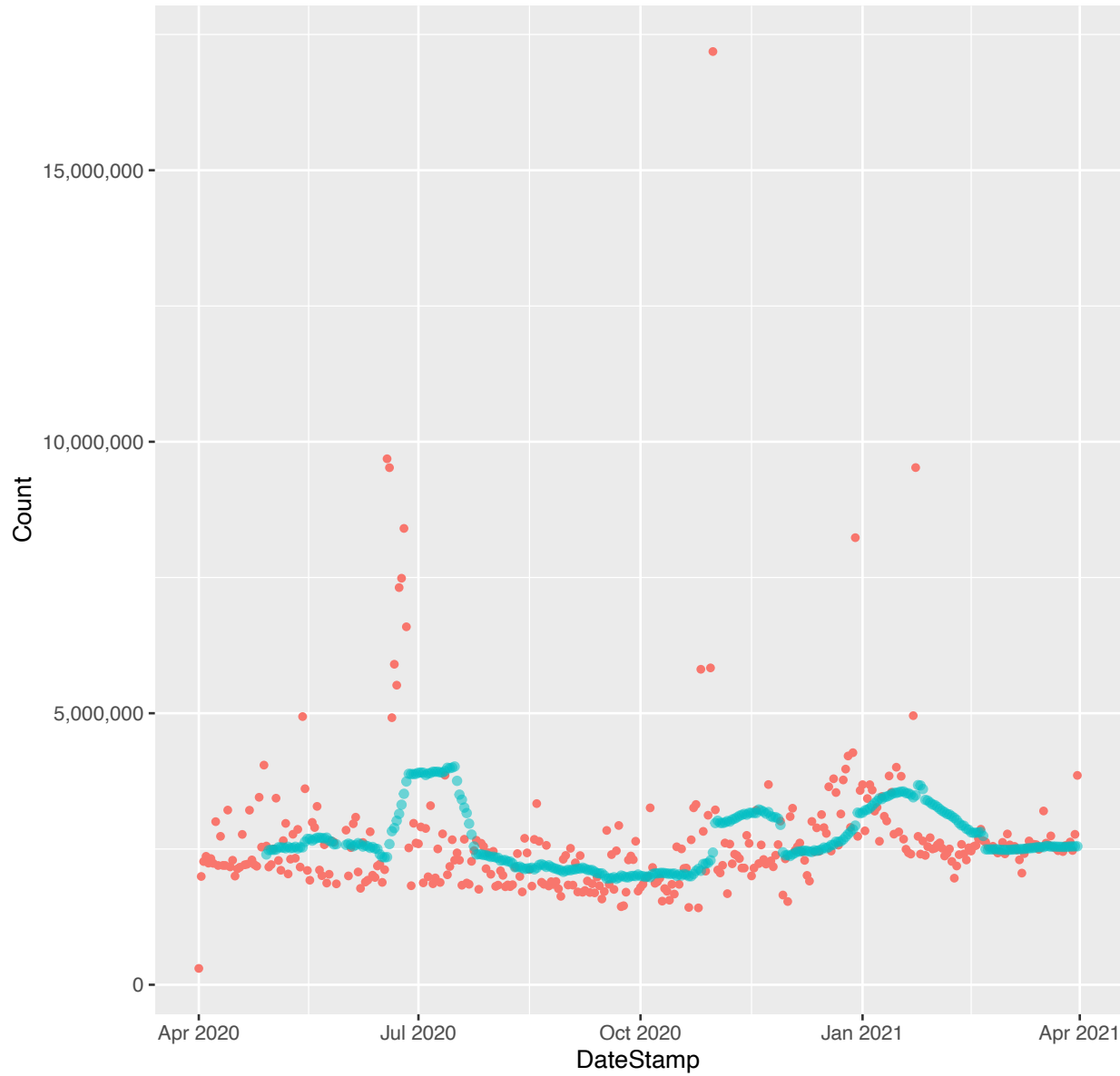


7. nintendo.com:

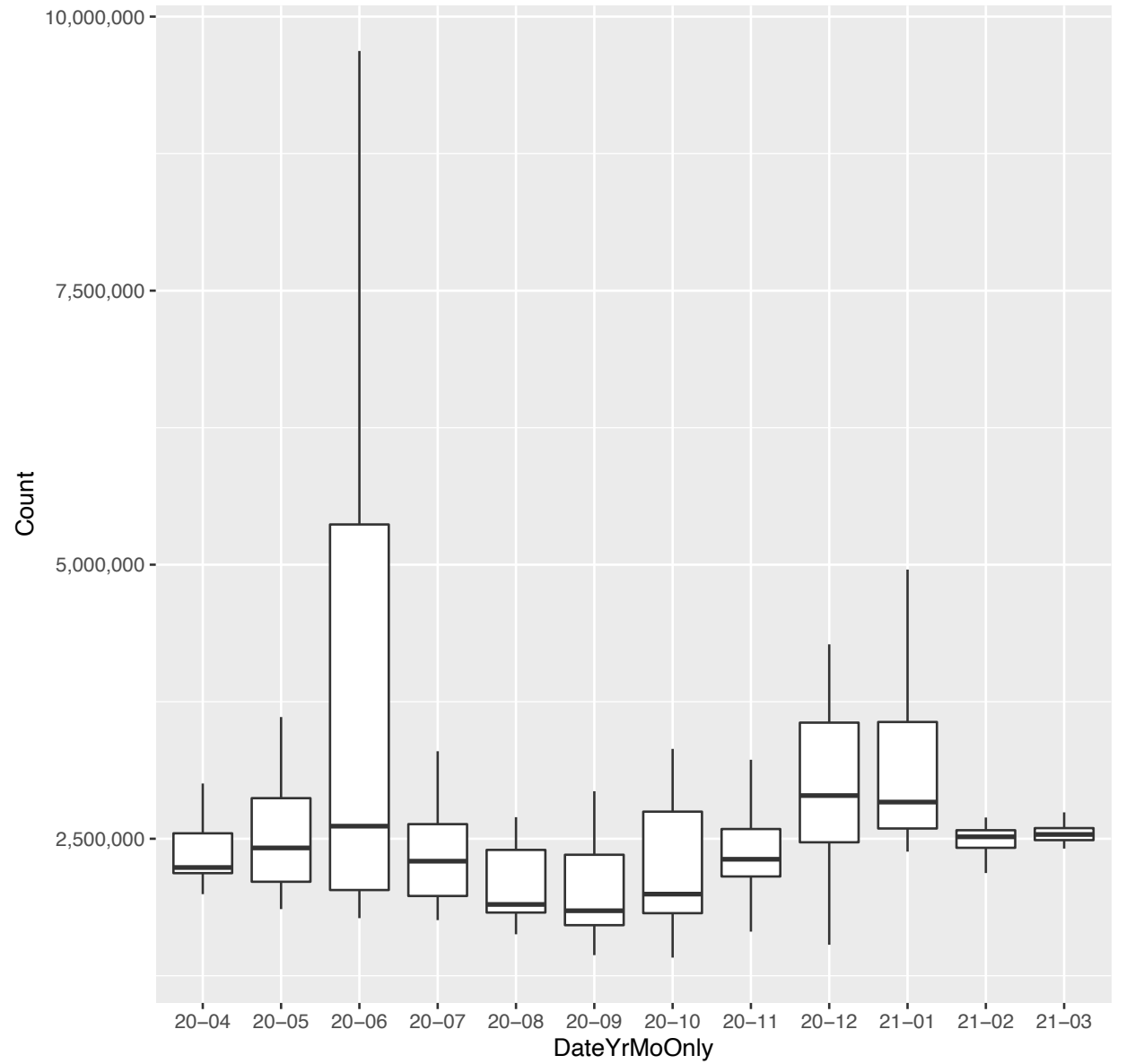


M

*. nintendo.com (day-by-day counts and 28 day moving average)



*. nintendo.com (monthly boxplots (outliers trimmed))

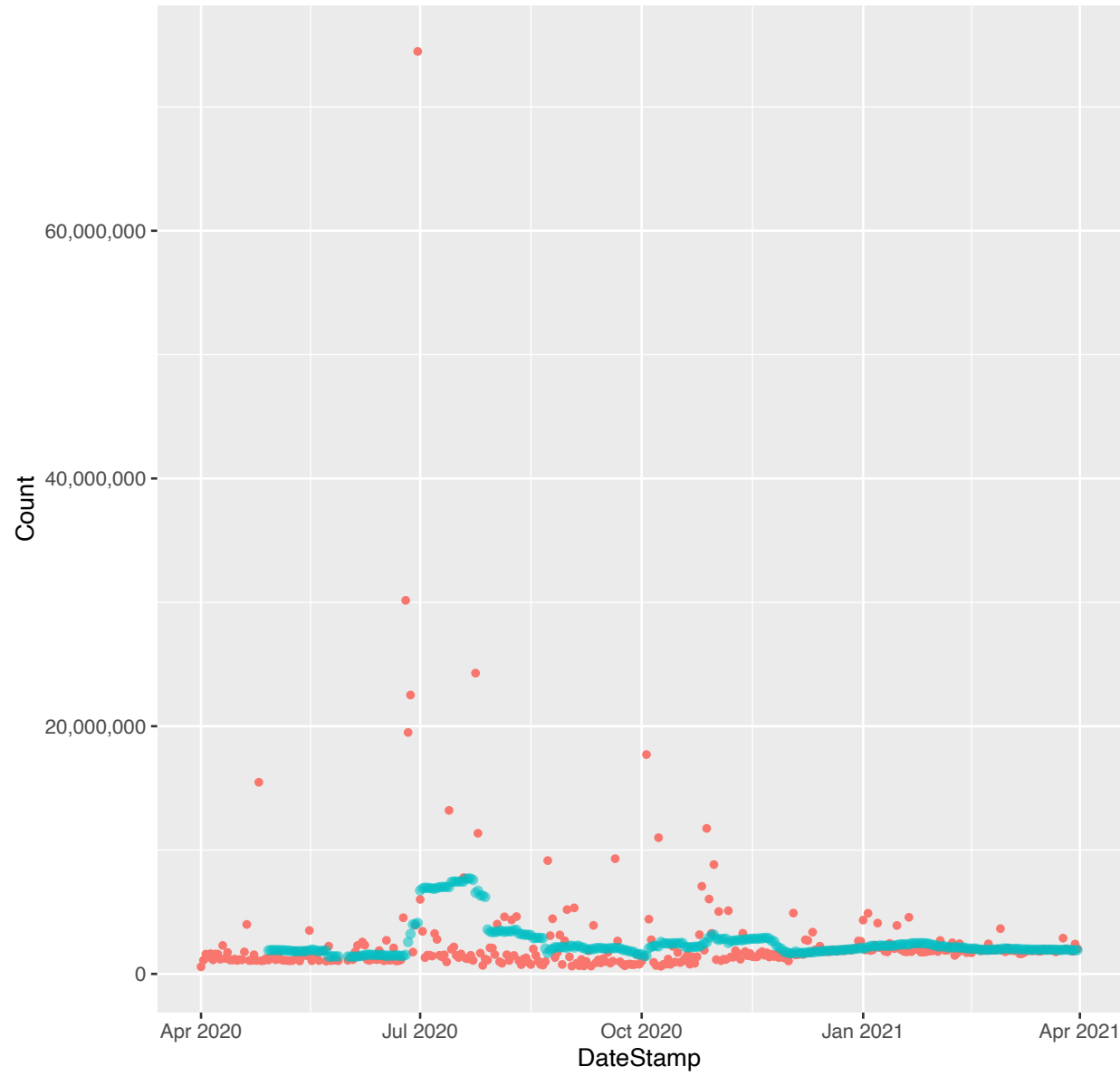


8. playstation.com:

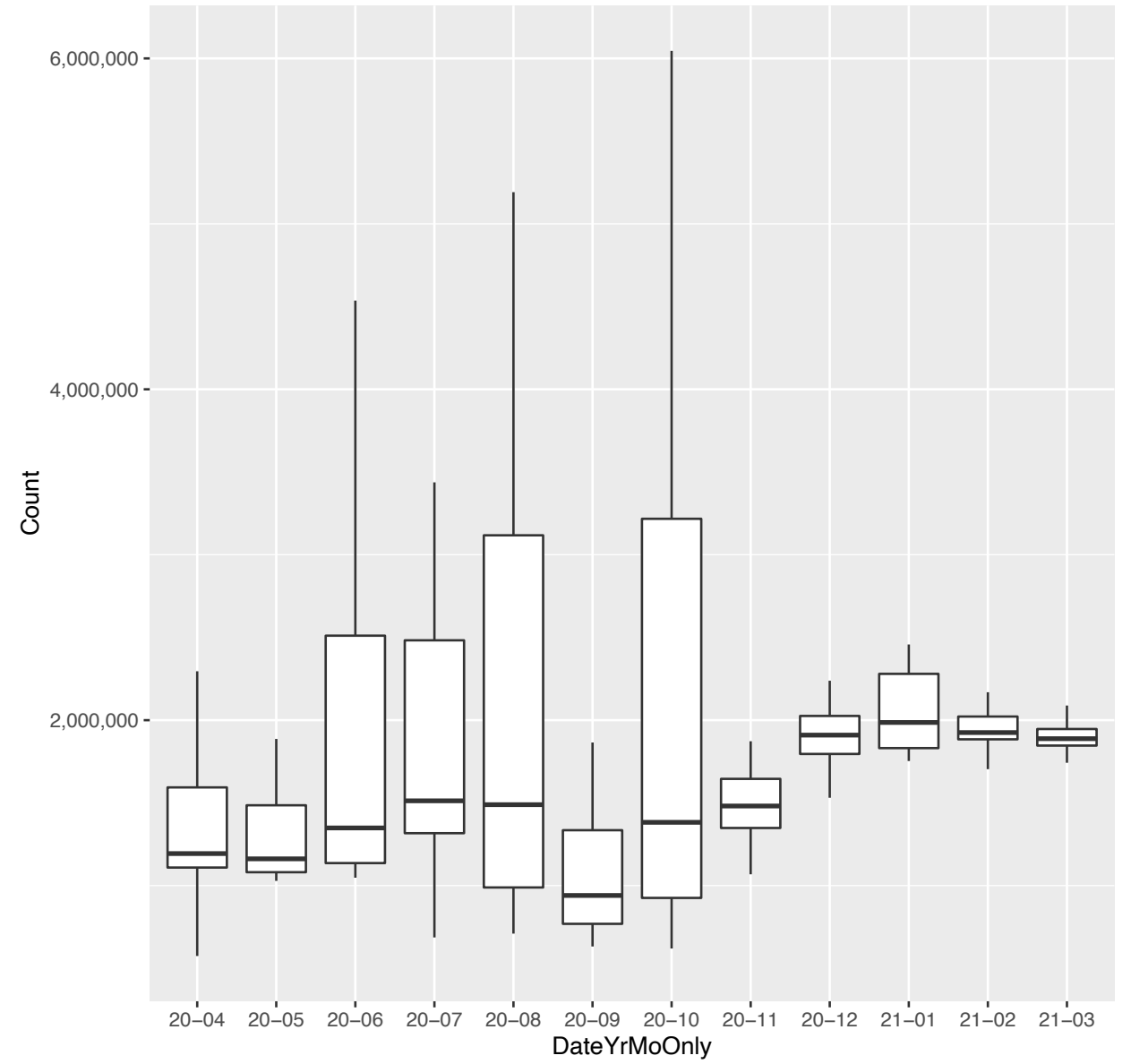


M

*. playstation.com (day-by-day counts and 28 day moving average)



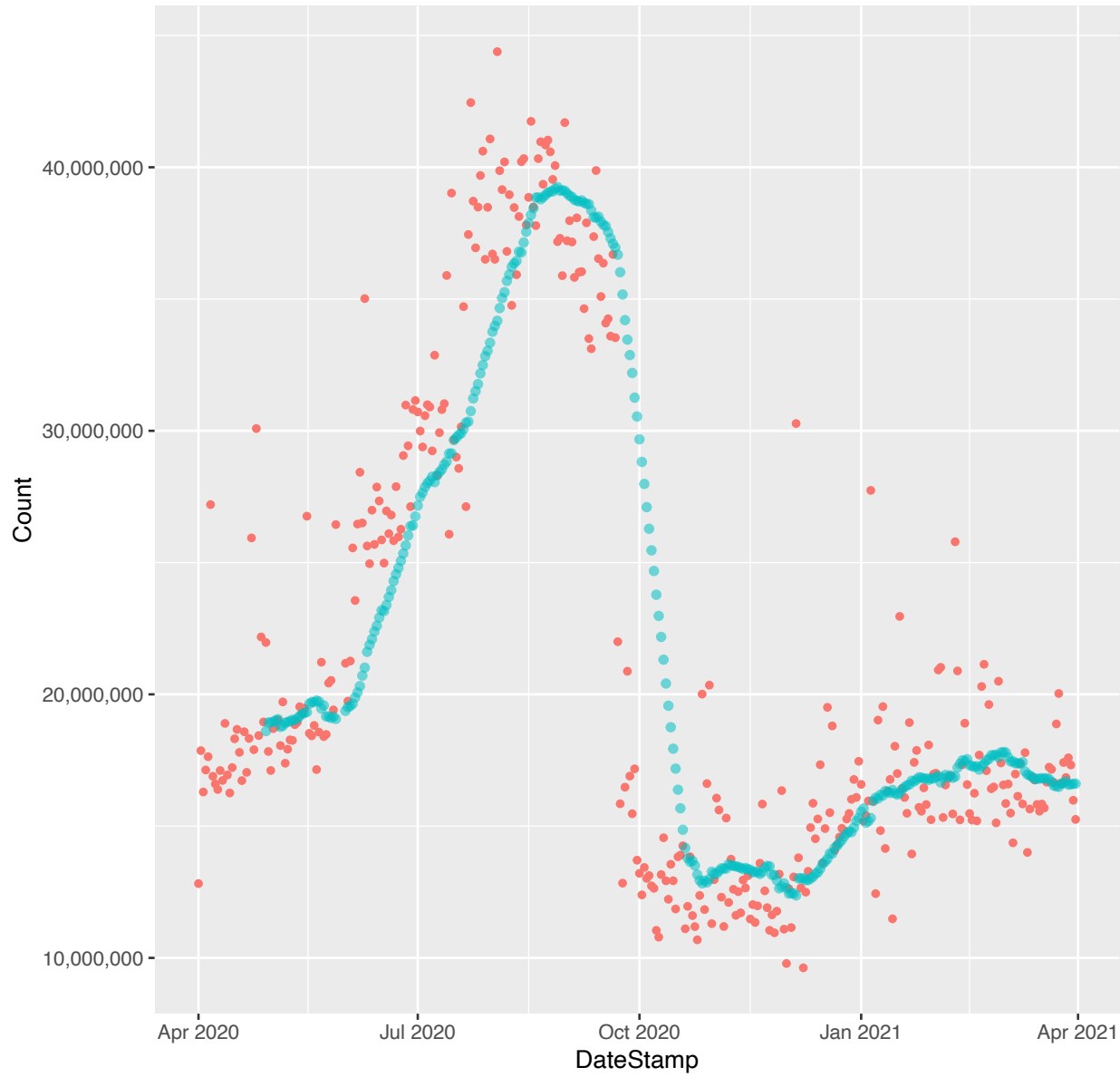
*. playstation.com (monthly boxplots (outliers trimmed))



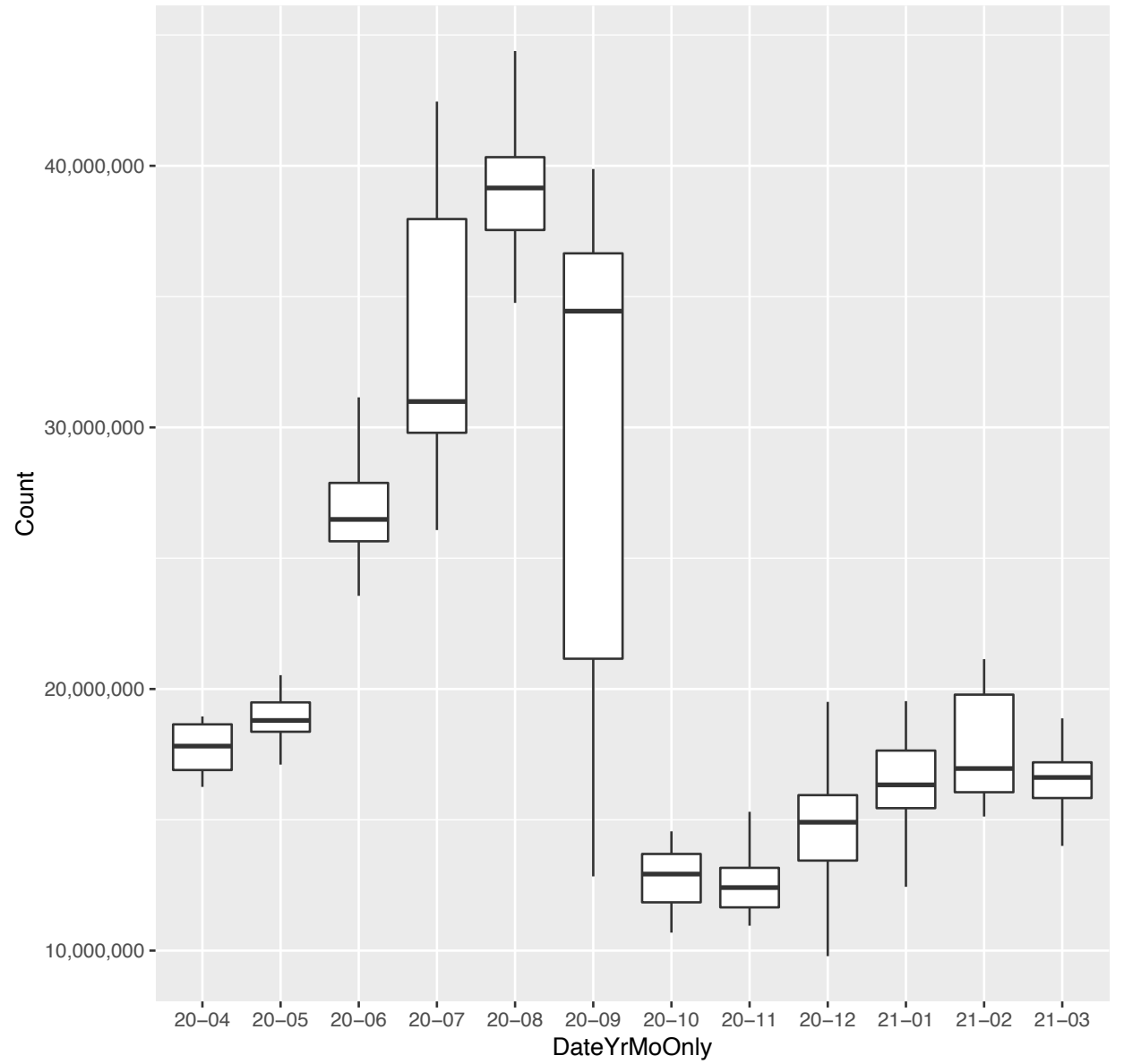
9. roblox.com:



*. roblox.com (day-by-day counts and 28 day moving average)



*. roblox.com (monthly boxplots (outliers trimmed))

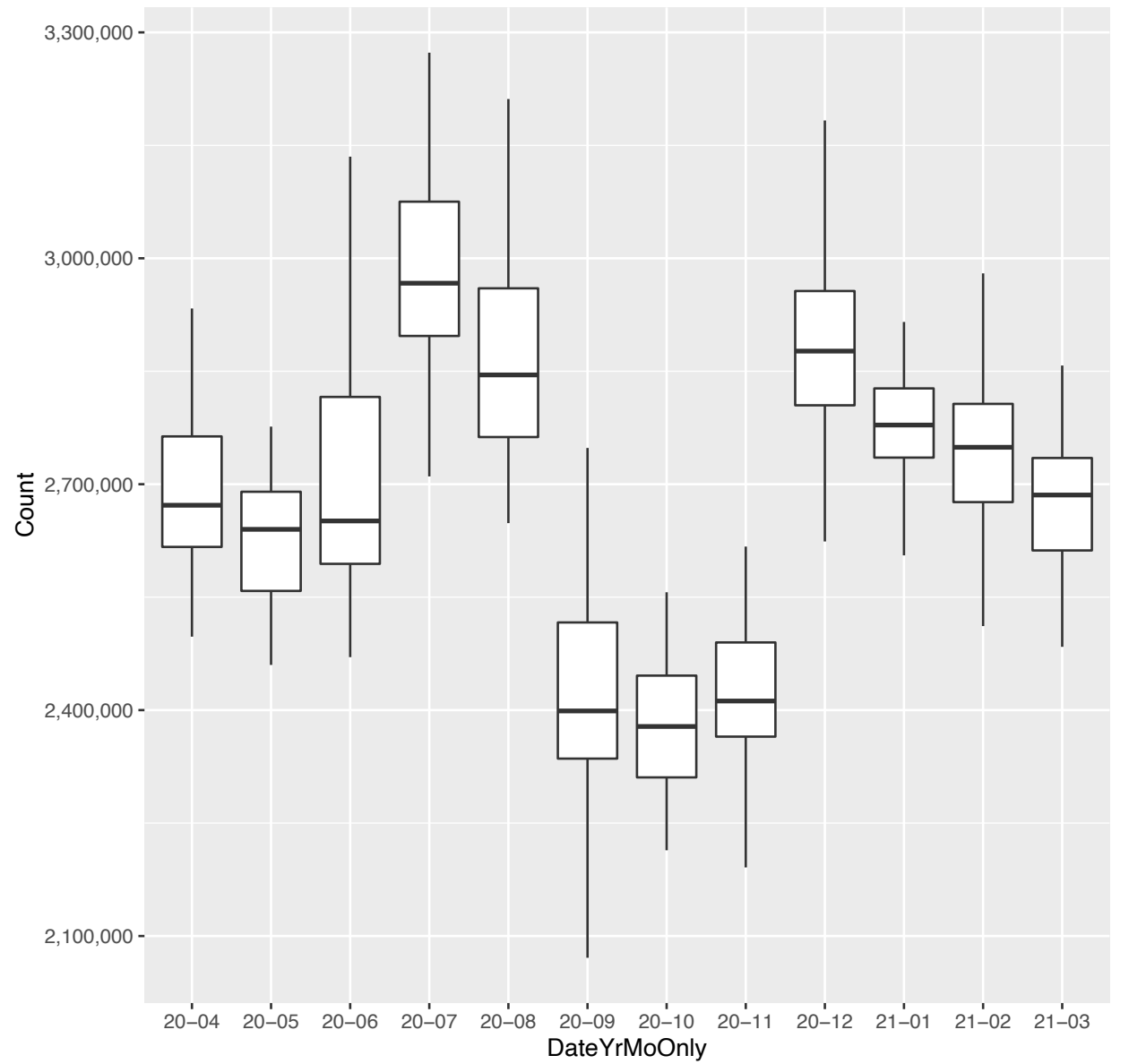


10. steampowered.com: ~

*. steampowered.com (day-by-day counts and 28 day moving average)



*. steampowered.com (monthly boxplots (outliers trimmed))

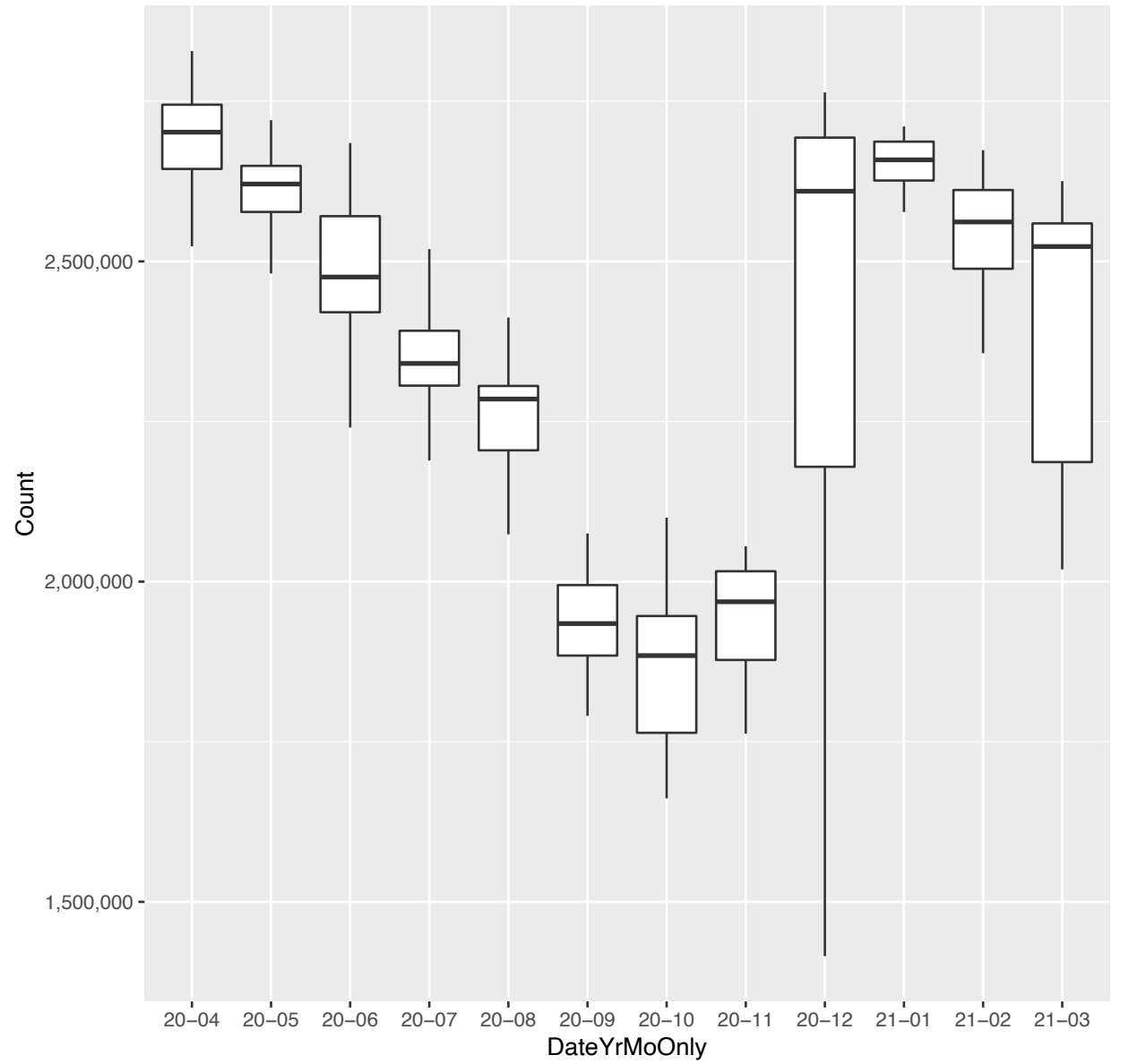


11. xboxlive.com: * U shaped

*. xboxlive.com (day-by-day counts and 28 day moving average)



*. xboxlive.com (monthly boxplots (outliers trimmed))



XVII. Conclusion

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You've now seen how the volume of cache miss traffic for 341 domains changed over the last year. Some highlights from the report:

- This report provides a unique view of how passive DNS data changed over the pandemic of the past year. It is based on a special internal-only/research database, and as such is quite a unique data product. (We built it for you because you don't have access to the data you'd need to build it for yourself).
- A surprisingly large number of different categories of sites were impacted by Covid. We couldn't cover all of them in this report, but we at least found room to squeeze in a few new areas, and we also took the opportunity to give you at least "a peek" at some of the other areas we didn't fully study.
- The cache miss traffic we studied is not ideal from a traffic analytic perspective: a single cache miss may represent hundreds, thousands or even millions of end user queries. Cache miss traffic volume is also potentially profoundly impacted by the domain owner's TTL choice.
- Some of the sites that we'd initially hoped would provide a stable baseline turned out to be less stable than we'd expected, with some of those sites experiencing substantive staffing and leadership changes (as well as other challenges) that may have impacted user interest in/interaction with those domains.
- Two of the highest volume sites during the study were *.webex.com and *.netflix.com -- we apparently responded to the pandemic by working hard online (and/or studying hard online), and then chilling out by binge-watching streaming videos from our couches.
- We'd expected that most pandemic-impacted sites would follow a consistent pattern, either steadily growing or steadily declining, depending on whether the pandemic helped or hurt them. That was naive, and not what we always saw in the data. Yes, we did see some steadily growing sites and some steadily declining sites, but also sites with a variety of other patterns, too. It would be nice if we could definitively explain WHY each of the sites responded as they did, but volumetric traffic data provides nil explanatory context. (Maybe some of you would be interested in annotating these timelines with information about substantive events relevant for each of the studied sites?)
- Competition continued during the pandemic. Merely being part of a popular category was no guarantee of success. For example, *.fedex.com appeared to suffer a substantial decline in the package delivery subcategory of travel/transport, while *.dhl.com, a competitor, trended strongly in a positive direction.
- We continued to see sites plagued by randomized subdomain attacks, typically leveraging wildcarded domain records. That abuse can be a problem for domain owners, and obviously a problem for the targets of those attacks, too.
- We welcome your feedback on this report, and any questions you may have. You may send that feedback or those questions to [<INSERT EMAIL HERE>](#).
- Thanks for taking the time to check out this whitepaper!

Appendix I -- Building The Graphs In This Report

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"I'm a DNSDB API Customer -- Can I Produce My Own Graphs For Arbitrary Domains That I May Be Interested In?" Unfortunately no. Normally DNSDB API reports statistics "rolled up over time" for each unique RRset (each unique combination of RRname, RRtype, Rdata value, Bailiwick, and sensor vs. zone data source). For example, looking at DNSDB API results for Whitman college (run with dnsdbq, <https://github.com/dnsdb/dnsdbq>):

```
$ dnsdbq -r www.whitman.edu -s -k first
;; record times: 2010-06-24 13:49:41 .. 2014-03-27 16:40:25 (~3y ~277d)
;; count: 940920; bailiwick: whitman.edu.
www.whitman.edu. A 199.89.174.13

;; record times: 2014-03-26 21:27:00 .. 2021-04-08 18:43:31 (~7y ~14d)
;; count: 1413688; bailiwick: whitman.edu.
www.whitman.edu. A 199.89.174.11
```

We don't know if the 940,920 counts associated with the first RRset happened "uniformly" over the nearly four years we saw that RRset, or if it "oscillated cyclically", or "trended up" (or "trended down"). Similarly, we don't know and can't say how the 1,413,688 counts associated with the second RRset were distributed over time. Building the graphs in this report required extracting PER DAY domain counts from an internal/research-only archive of non-rolled-up daily MTBL files. Without access to that data archive (and the proprietary tool we used to extract the counts), it will unfortunately be impossible for customers to fully replicate the graphs reported in this document. (That's one of the reasons why we wanted to create this report FOR you!)

DNSDB API users can get some sense of how counts are distributed over time using DNSDB's "gravel" feature, but note that results will (a) be per fully-qualified-domain (FQDN), and (b) gravel results may be for a variety of different time periods -- older data may be for a year-long period, while more recent data may be monthly, daily, or even hourly. For example:

```
$ dnsdbq -r www.whitman.edu -g
;; record times: 2014-03-26 21:27:00 .. 2014-12-31 20:45:09 (~279d 23h 18m)
;; count: 168322; bailiwick: whitman.edu.
www.whitman.edu. A 199.89.174.11

;; record times: 2014-12-31 08:51:10 .. 2015-12-31 23:54:43 (~1y)
;; count: 253016; bailiwick: whitman.edu.
www.whitman.edu. A 199.89.174.11

;; record times: 2015-12-31 21:37:47 .. 2016-12-31 19:25:28 (~1y)
;; count: 211820; bailiwick: whitman.edu.
www.whitman.edu. A 199.89.174.11

;; record times: 2016-12-31 08:31:19 .. 2017-12-31 20:19:35 (~1y)
;; count: 171055; bailiwick: whitman.edu.
www.whitman.edu. A 199.89.174.11
```

```
;; record times: 2017-12-31 16:21:50 .. 2018-12-31 22:12:27 (~1y)
;; count: 171121; bailiwick: whitman.edu.
www.whitman.edu. A 199.89.174.11
```

```
;; record times: 2018-12-31 17:56:06 .. 2019-12-31 21:24:03 (~1y)
;; count: 161565; bailiwick: whitman.edu.
www.whitman.edu. A 199.89.174.11
```

```
;; record times: 2019-12-31 15:23:01 .. 2020-12-31 15:48:31 (~1y ~1d)
;; count: 207967; bailiwick: whitman.edu.
www.whitman.edu. A 199.89.174.11
```

```
;; record times: 2020-12-31 08:35:44 .. 2021-01-31 21:07:53 (~31d 12h 32m)
;; count: 18683; bailiwick: whitman.edu.
www.whitman.edu. A 199.89.174.11
```

```
;; record times: 2021-01-31 13:31:44 .. 2021-02-28 18:14:38 (~28d 4h 42m)
;; count: 20766; bailiwick: whitman.edu.
www.whitman.edu. A 199.89.174.11
```

```
;; record times: 2021-02-28 09:21:42 .. 2021-03-31 22:30:29 (~31d 13h 8m)
;; count: 24199; bailiwick: whitman.edu.
www.whitman.edu. A 199.89.174.11
```

```
;; record times: 2021-03-31 13:52:46 .. 2021-04-01 10:32:07 (20h 39m 22s)
;; count: 366; bailiwick: whitman.edu.
www.whitman.edu. A 199.89.174.11
```

```
;; record times: 2021-04-01 05:39:41 .. 2021-04-02 11:57:05 (~1d 6h 17m)
;; count: 752; bailiwick: whitman.edu.
www.whitman.edu. A 199.89.174.11
```

```
;; record times: 2021-04-02 07:54:13 .. 2021-04-03 15:32:24 (~1d 7h 38m)
;; count: 559; bailiwick: whitman.edu.
www.whitman.edu. A 199.89.174.11
[etc]
```

Nonetheless, we wanted to document how we built these graphs for the record.

It involved two phases:

Phase I: Extract the required data...

Build the raw input files. sites-to-check consists of a list of domain wildcards of interest, while all-dailies.txt consists of a list of YYYYMMDD dates to pull from the daily files. (We started at 20200101 through 20210331, and then set a more-restrictive starting date in our R code.)

```
$ cat sites-to-check.txt
\*.ansi.org
[...]
\*.w3.org
```

```
$ cat all-dailies.txt
20200101
[...]
20210331
```

mtbl-lookup (as used below) is a Farsight-proprietary golang program.

```
$ cat run-dailies.bash
#!/bin/bash

while read twold
do
  while read dailyfile
  do
    echo -n $dailyfile
    echo -n " "
    mtbl-lookup -dns joe:$twold pathtomtblfiles/dns.${dailyfile}.D.mtbl
  done < "all-dailies.txt"
done < "sites-to-check.txt"
```

```
$ bash run-dailies.bash > baseline.output
```

The output needs to be post processed with an editor to (a) replace two tabs with just one, (b) one space with one tab, and (c) to delete all commas.

Phase II: Build the graphs with R...

```
$ cat make-baseline-graphs-2.R
library(ggplot2)
library(tidyverse)
library(lubridate)
library(ggstatsplot)
library(pals)
library(scales)

myrawdata <- read.csv("baseline-output.txt", sep = "\t", row.names=NULL,
  col.names=c("Date","Domain","RRsets", "FQDNs","TwoLDs","Count"))

myrawdata$Date2 <- as.Date( as.character(myrawdata$Date), "%Y%m%d")
mydata <- subset(myrawdata, Date2 > as.Date("2020-03-31"))

mydata$lag1count <- ifelse((lag(mydata$Domain, n=1) == mydata$Domain),
  lag(mydata$Count, default=NA, n=1), NA)
mydata$lag2count <- ifelse((lag(mydata$Domain, n=2) == mydata$Domain),
  lag(mydata$Count, default=NA, n=2), NA)
mydata$lag3count <- ifelse((lag(mydata$Domain, n=3) == mydata$Domain),
```

```

lag(mydata$Count, default=NA, n=3), NA)
mydata$lag4count <- ifelse((lag(mydata$Domain, n=4) == mydata$Domain),
  lag(mydata$Count, default=NA, n=4), NA)
mydata$lag5count <- ifelse((lag(mydata$Domain, n=5) == mydata$Domain),
  lag(mydata$Count, default=NA, n=5), NA)
mydata$lag6count <- ifelse((lag(mydata$Domain, n=6) == mydata$Domain),
  lag(mydata$Count, default=NA, n=6), NA)
mydata$lag7count <- ifelse((lag(mydata$Domain, n=7) == mydata$Domain),
  lag(mydata$Count, default=NA, n=7), NA)
mydata$lag8count <- ifelse((lag(mydata$Domain, n=8) == mydata$Domain),
  lag(mydata$Count, default=NA, n=8), NA)
mydata$lag9count <- ifelse((lag(mydata$Domain, n=9) == mydata$Domain),
  lag(mydata$Count, default=NA, n=9), NA)
mydata$lag10count <- ifelse((lag(mydata$Domain, n=10) == mydata$Domain),
  lag(mydata$Count, default=NA, n=10), NA)
mydata$lag11count <- ifelse((lag(mydata$Domain, n=11) == mydata$Domain),
  lag(mydata$Count, default=NA, n=11), NA)
mydata$lag12count <- ifelse((lag(mydata$Domain, n=12) == mydata$Domain),
  lag(mydata$Count, default=NA, n=12), NA)
mydata$lag13count <- ifelse((lag(mydata$Domain, n=13) == mydata$Domain),
  lag(mydata$Count, default=NA, n=13), NA)
mydata$lag14count <- ifelse((lag(mydata$Domain, n=14) == mydata$Domain),
  lag(mydata$Count, default=NA, n=14), NA)
mydata$lag15count <- ifelse((lag(mydata$Domain, n=15) == mydata$Domain),
  lag(mydata$Count, default=NA, n=15), NA)
mydata$lag16count <- ifelse((lag(mydata$Domain, n=16) == mydata$Domain),
  lag(mydata$Count, default=NA, n=16), NA)
mydata$lag17count <- ifelse((lag(mydata$Domain, n=17) == mydata$Domain),
  lag(mydata$Count, default=NA, n=17), NA)
mydata$lag18count <- ifelse((lag(mydata$Domain, n=18) == mydata$Domain),
  lag(mydata$Count, default=NA, n=18), NA)
mydata$lag19count <- ifelse((lag(mydata$Domain, n=19) == mydata$Domain),
  lag(mydata$Count, default=NA, n=19), NA)
mydata$lag20count <- ifelse((lag(mydata$Domain, n=20) == mydata$Domain),
  lag(mydata$Count, default=NA, n=20), NA)
mydata$lag21count <- ifelse((lag(mydata$Domain, n=21) == mydata$Domain),
  lag(mydata$Count, default=NA, n=21), NA)
mydata$lag22count <- ifelse((lag(mydata$Domain, n=22) == mydata$Domain),
  lag(mydata$Count, default=NA, n=22), NA)
mydata$lag23count <- ifelse((lag(mydata$Domain, n=23) == mydata$Domain),
  lag(mydata$Count, default=NA, n=23), NA)

```



```

mydata$lag24count <- ifelse((lag(mydata$Domain, n=24) == mydata$Domain),
  lag(mydata$Count, default=NA, n=24), NA)
mydata$lag25count <- ifelse((lag(mydata$Domain, n=25) == mydata$Domain),
  lag(mydata$Count, default=NA, n=25), NA)
mydata$lag26count <- ifelse((lag(mydata$Domain, n=26) == mydata$Domain),
  lag(mydata$Count, default=NA, n=26), NA)
mydata$lag27count <- ifelse((lag(mydata$Domain, n=27) == mydata$Domain),
  lag(mydata$Count, default=NA, n=27), NA)
mydata$lag28count <- ifelse((lag(mydata$Domain, n=28) == mydata$Domain),
  lag(mydata$Count, default=NA, n=28), NA)

mydata$MA28count = (mydata$lag1count+mydata$lag2count+mydata$lag3count+
  mydata$lag4count+mydata$lag5count+mydata$lag6count+mydata$lag7count+
  mydata$lag8count+mydata$lag9count+mydata$lag10count+mydata$lag11count+
  mydata$lag12count+mydata$lag13count+mydata$lag14count+
  mydata$lag15count+mydata$lag16count+mydata$lag17count+
  mydata$lag18count+mydata$lag19count+mydata$lag20count+mydata$lag21count+
  mydata$lag22count+mydata$lag23count+mydata$lag24count+mydata$lag25count+
  mydata$lag26count+mydata$lag27count+mydata$lag28count)/28

mydata$DateStamp <- ymd(mydata$Date)
mydata$DateYrMoOnly <- as.factor(substr(lubridate::ym(as.character(
  mydata$DateStamp, format="%Y%m")), 3, 7))
mydata$DateYrMoOnly2 <- ordered(mydata$DateYrMoOnly, levels=c("20-01",
  "20-02", "20-03", "20-04", "20-05", "20-06", "20-07", "20-08",
  "20-09", "20-10", "20-11", "20-12", "21-01", "21-02", "21-03"))
mydata$DomainFactor <- as.factor(mydata$Domain)

## loop over the domains
for (var in unique(mydata$DomainFactor)) {
  pdf(paste(var, '-dotplot', '.pdf', sep=""))
  print( ggplot(mydata[mydata$DomainFactor ==var,], ) +
    geom_point(aes(x = DateStamp, y = Count, color="navy",
      shape = ".")) +
    geom_point(aes(x = DateStamp, y = MA28count, color="springgreen",
      alpha=0.03, na.rm = TRUE)) +
    ggtitle(paste("*. ",var," (day-by-day counts and 28 day moving average)")) +
    scale_y_continuous(labels=comma) +
    theme(legend.position = "none")
  )
dev.off()

```

```

pdf(paste(var, '-boxplot', '.pdf', sep=""))
myminy=10000000
mymaxy=0
for (var2 in unique(mydata$DateYrMoOnly)) {
  mydatasubset <- mydata[ which((mydata$DomainFactor==var) &
                               (mydata$DateYrMoOnly==var2)), ]
  # stats is "a vector of length 5, containing the extreme of the lower
  # whisker, the lower 'hinge', the median, the upper 'hinge' and the
  # extreme of the upper whisker."
  ylim1 = boxplot.stats(mydatasubset$Count)$stats[c(1,5)]
  # we took just the lower whisker and the upper whisker; use those now...
  myminy=min(myminy, ylim1[1])
  mymaxy=max(mymaxy, ylim1[2])
}

myboxplot = ggplot(mydata[mydata$DomainFactor ==var,],
  aes(x = DateYrMoOnly, y = Count)) +
  geom_boxplot(outlier.shape = NA) +
  coord_cartesian(ylim=c(myminy,mymaxy)) +
  scale_y_continuous(labels=comma) +
  ggtitle(paste("*. ",var," (monthly boxplots (outliers trimmed))"))
print(myboxplot)
dev.off()
}

$ R < make-baseline-graphs-2.R

```

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