

Spatiotemporal analysis of antimicrobial use in the Internet in Poland and neighboring countries with a case study of "pesticides in grains" (April 2023)

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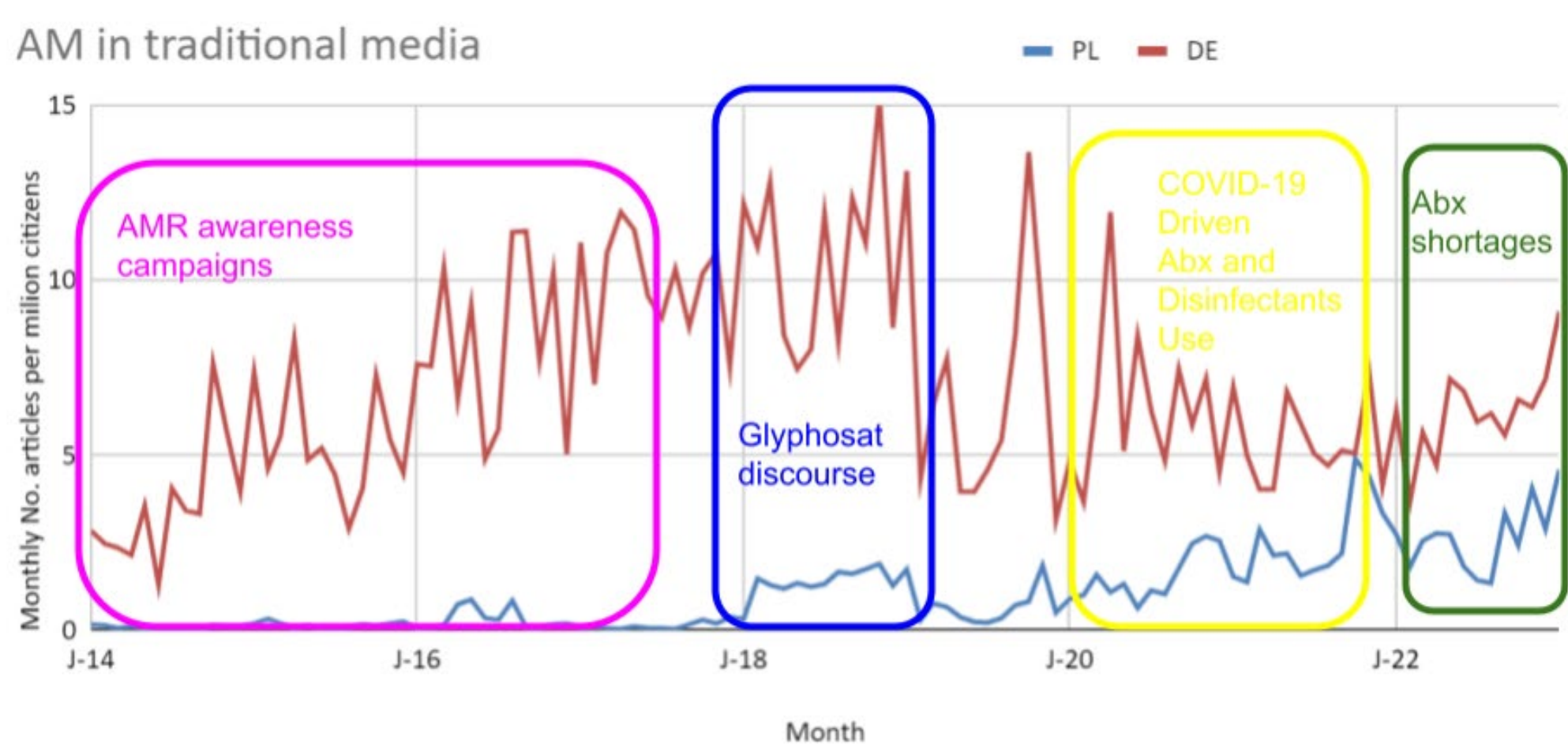
Problem: Public health researchers have been using the Internet for disease surveillance, the assessment of risk perception and behavior changes during epidemics for a long time. Antimicrobial (AM) use are challenging topics to explore on the Internet, and current approaches are limited to simple Google Trend and media narratives analysis, and information retrieval. To address these shortcomings, we propose a novel computational method of new media listening for monitoring AMU and AMR perception in One Health settings. Our project aims to collect data from Poland, and neighboring countries internet media to establish analysis frames for the topics of AMU using state-of-the-art machine learning methods. We plan to integrate and triangulate surveillance of AMU and interest in AMU in plants, as well as AM residues in food/feed, and the environment. This project will address four major research questions, including the:

- (i) presentation of AM in internet media,
- (ii) the characterization of content by key vocabulary, topics, and sentiment,
- (iii) the influences of attitudes towards AM in One Health paradigm (food safety, AMR, etc.), and
- (iv) the improvement of awareness communication and community empowerment on social media.

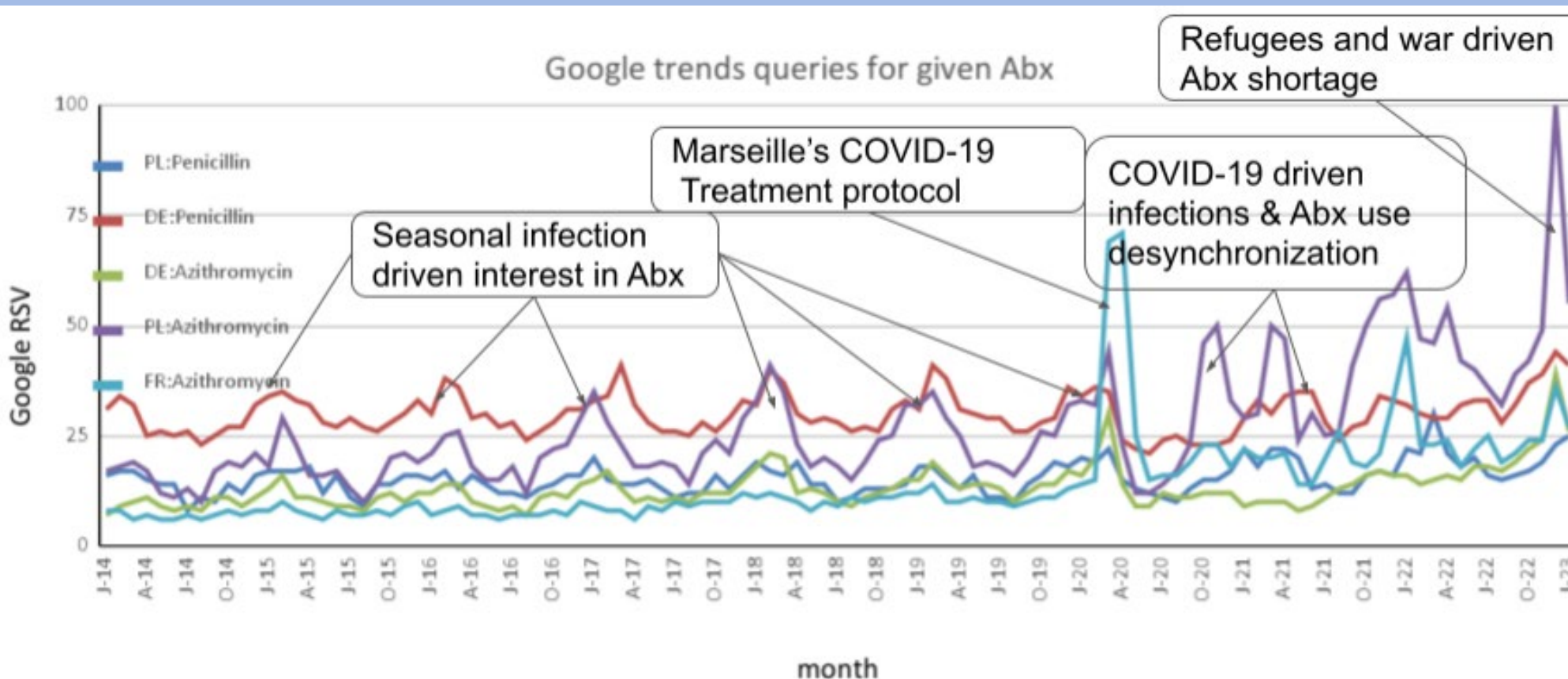
Since 2022 in agriculture stringent laws have been implemented in the EU for the non-treatment regime of AM use. The aim was to reduce metaphylaxis/control and to forbid prophylaxis/prevention. Moreover, Farmers in the EU are forced to reduce nitrogen-based biocides and Zinc intake, which is not fully acceptable everywhere. Thus, an intensive discussion among farmers in e.g. Poland about alternative sources of AM and similar products out of our officially registered circulation broke out. Internet (also Dark Web) markets increasingly intersect with offline AM markets. In some countries (i.e. Ukraine) farmers can easily obtain AM legally in small amounts (i.e. for self-medication or medication of companion animals) from e-prescription system and in larger amounts from the social networking sites or Darknet.

Historical Perspective:

Import of products (as cereals) or home grown production that do not meet EU standards for consumption is difficult, because laboratory and organoleptic tests are carried out at the level of cereal plants and processing plants. Therefore, on a massive scale, there is no possibility of introducing food that does not meet EU standards. Especially if significant irregularities are detected, a warning will be issued quickly in the RASFF system. However, some AM such as Glyphosate have got a huge interested in the media (mainly Western Europe and Americas).



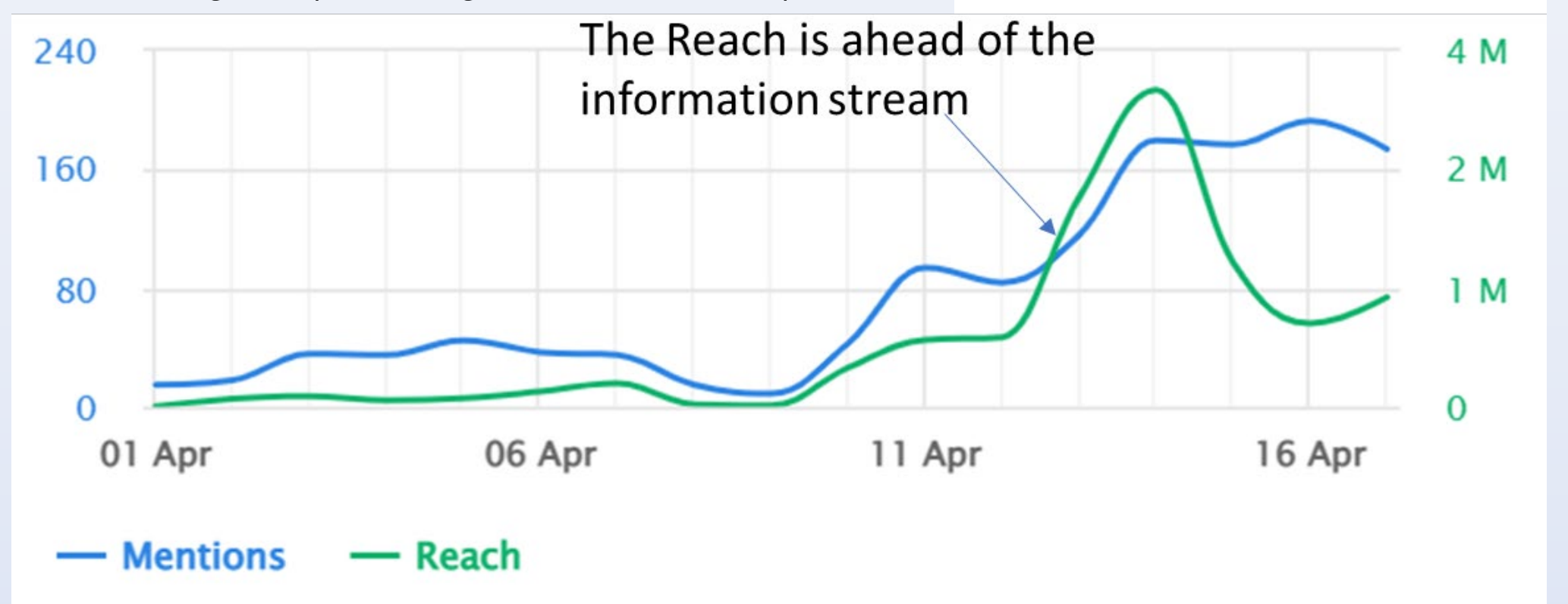
Comparison of intensity and topics dynamics between Poland and Germany in traditional media based on traditional media scraping. AMR is more often discussed in Germany than Poland. The peak of interest in 2018 in Germany is driven by the biocide-glyphosate topic).



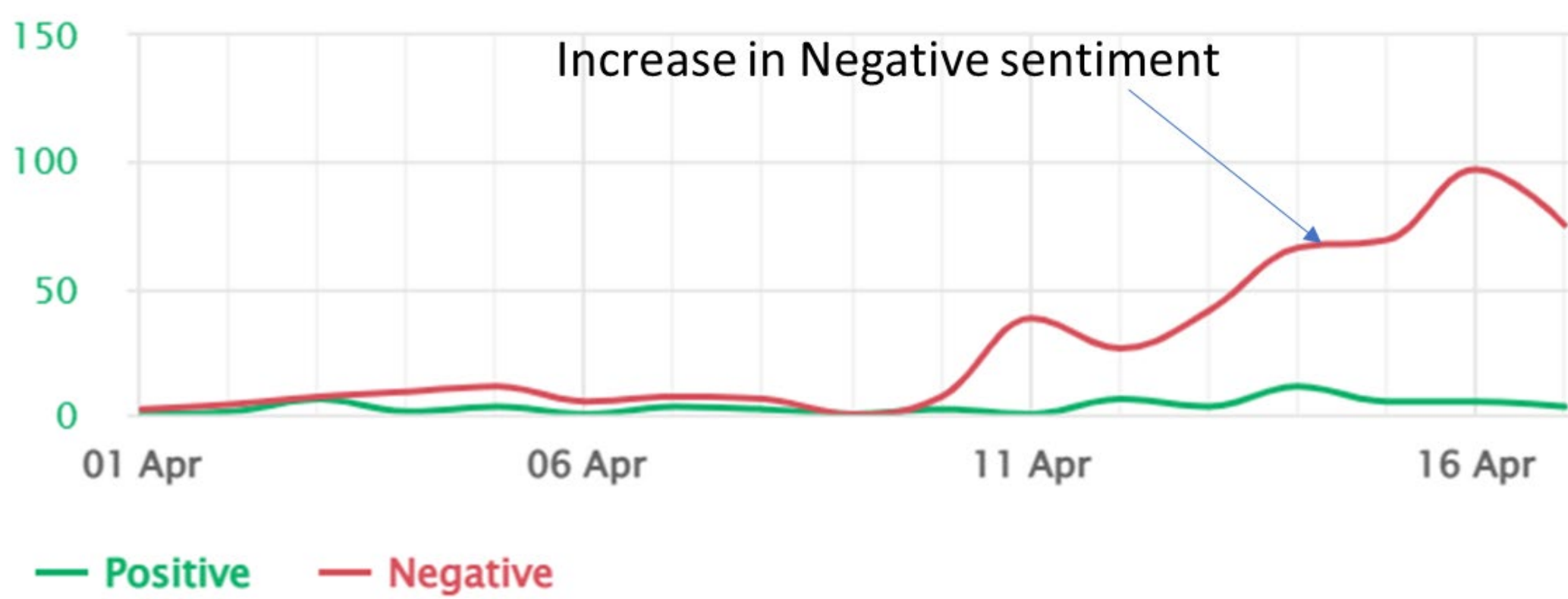
Google trends for various groups of ABX in different countries. Deseasonalization due to COVID-19 pandemic has been observed.

Preliminary Results - Real time monitoring:

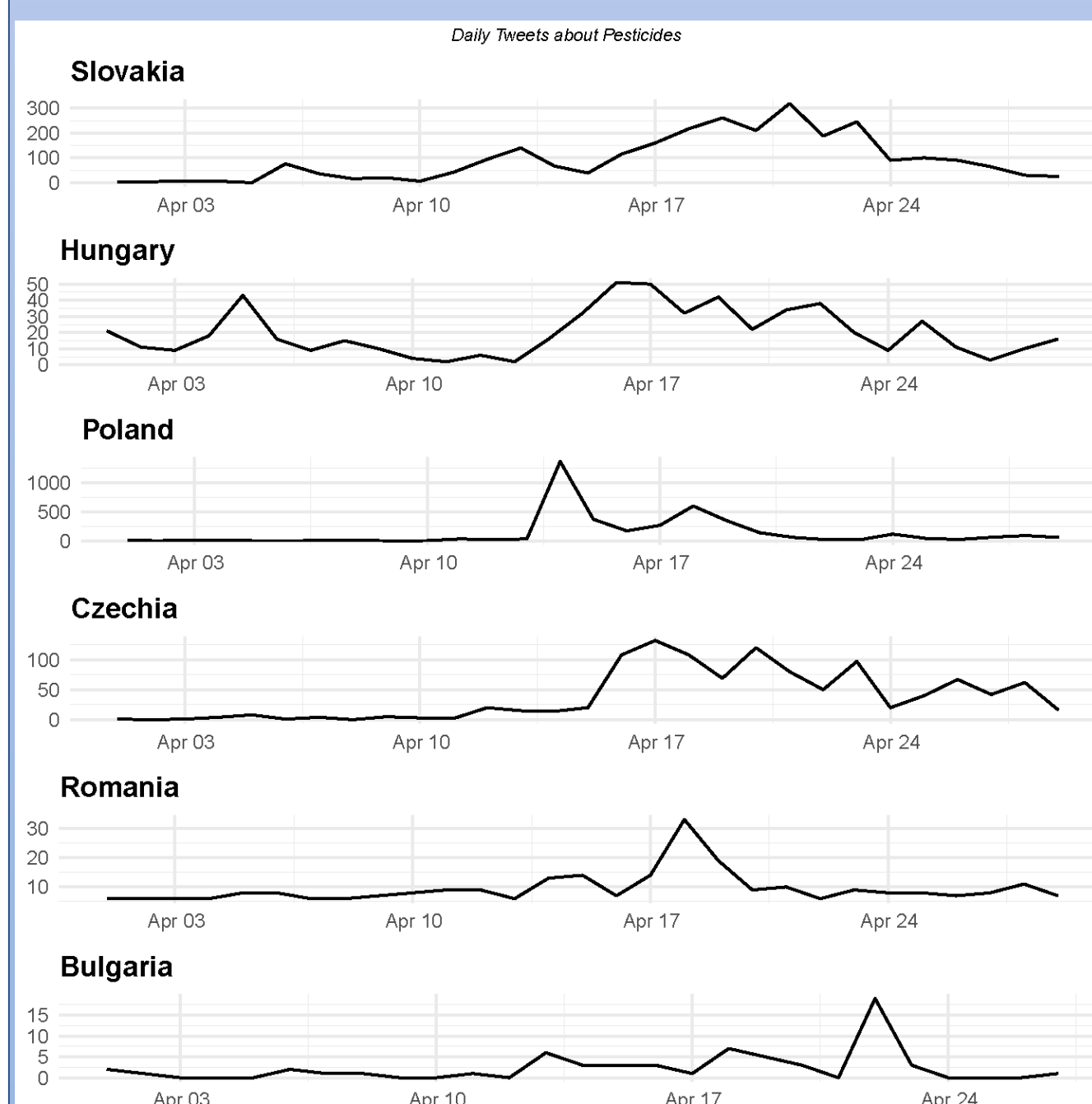
interest in the phrases "food security", "poisoned grain" or "pesticides" in the Internet in the context of food. It's necessary to separate the layer of the real problem of Polish farmers from polarizing information activities. We focus only on the media coverage in the context of food security. In addition, it should be emphasized that it was the period of Orthodox Easter (April 14-17), which on the one hand explained the slowdown of negotiations on the Ukrainian side, but also Russian propaganda relatively limited disinformation activities regarding Poland or Eastern Europe and focused on the issue of Ukrainian grain (including its health values).



Course of interest in cereal food security in social media. Reach peak unnaturally around 14.04. the situation evolved rapidly and the topic quickly gained very large reach around 14.04, which then returned to the starting level on 16.04. Therefore, the involvement of bots, troll farms and agents of influence and other resonance tools in promoting the threat can be suspected.



Emotions in social media. Strong share of emotions with accumulation on April 14-16. A particular concentration of negative emotions can be seen on April 14, i.e. before the express closure of borders for many food products from Ukraine to Poland, and again on April 16.



1. Right-wing phase
08-13.04 we have a problem on which the niche right wing is interested (so a lot of traffic but small reach). Also around 13.04 an attack by bots on Twitter (I have no evidence that it was from the Kremlin), but not on accounts involved in the discourse, but potentially calming the situation. Also a lot of traffic in the Slovak and Hungarian infosphere.

1. Peak phase (long ranges)
14.04 (and only on this day) the most popular media take up the topic (the biggest role of TVN24 - several reports on the same day and Money.pl - specifically one article about Slovakia), but celebrity accounts did not follow them either (large negative load and hundreds of likes on Twitter and Instagram). Negative ranges peaked already on April 13, but only on April 14 they peak for the whole sentiment (because the mainstream media report the situation rather without much emotion).

1. Mixed right-left phase (high traffic, small reach)
Later we have Orthodox holidays - and in Poland on April 15, with closing the border and goes to mass, but there are no more ranges. Naturally (usually) we should also have good ranges (because the social network always has larger ranges at the weekend), but they return to the level before 13.04 as if they couldn't do it without pumping up.

1. Commenting Phase
From 17.04 other traditional media are switched on.

1. Kremlin propaganda phase (for the internal market)
On April 18-19, the Kremlin's official disinformation kicks in, but without any real impact on the Polish infosphere. Entering the infosphere of Bulgaria and Romania

- Infoveillance - correlating spatio-temporal local media and social media releases with occurrence of AM residuals in grains;
- Infodemic - propagation of fake news (i.e. rumour about massive contamination of grains), narration comparison between Poland and neighboring countries (i.e. different pick times), communication needs

