

## CORONASTEP Airport Report 03 (2023 - Weeks 02 to 13) SARS-CoV-2 Airport Sewage Surveillance in Luxembourg

### Summary

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The latest EU recommendations ([https://health.ec.europa.eu/latest-updates/opinion-health-security-committee-common-eu-approach-response-covid-19-situation-china-2023-01-05\\_en](https://health.ec.europa.eu/latest-updates/opinion-health-security-committee-common-eu-approach-response-covid-19-situation-china-2023-01-05_en)) state that EU/EEA countries should consider introducing or strengthening wastewater monitoring, especially in waters originating from airports with international flights and/or aircraft after long-haul flights, with a particular focus on passenger flights from China. However, the variants currently circulating in China are already circulating within the EU/EEA and no new variants have been detected so far.

Following these recommendations and at the request of the Health Directorate, LIST added an additional wastewater sampling point in the airport area.

In order to maximise the geographical coverage and the number of people captured, we have, in collaboration with SIDEST, defined a collection point in the sewage system of the airport area. This point captures both the wastewater from the aircrafts and that from the airport itself (option 3 in the EU guidelines<sup>1</sup>).

In a similar way to what is done for the wastewater treatment plant monitoring network, sampling is carried out once a week over a 24-hour period, before being reported to LIST for analysis.

As requested in the EU guidelines<sup>1</sup>, the following analyses are performed:

- Generic detection of SARS-CoV-2 by RT-qPCR (E gene)
- Search for specific mutations by RT-ddPCR
- High throughput sequencing to determine circulating variants and mutations. Sequencing is performed at LNS and bioinformatic analysis at LIST

***Overall, the results confirm that so far, no new variants (or mutations) of SARS-CoV-2 have been detected, but that all currently circulating variants have been identified. It is interesting to note that the XBB lineage was detected in the airport wastewater sample from mid-March.***

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<sup>1</sup> European Commission. Adhoc guidance: Wastewater sampling of aircrafts and airports for SARS-CoV-2 surveillance. 10 January 2023. European Commission Brussels 2023.

Table 1: SARS-CoV-2 concentration (RT-qPCR) in the airport sewage samples.

| Sample ID | Sampling date    | SARS-CoV-2 concentration                |
|-----------|------------------|---|
| FIN 144   | 08 January 2023  | 3.7 x 10 <sup>4</sup> genome copies / L |
| FIN 145   | 19 January 2023  | 1.1 x 10 <sup>4</sup> genome copies / L |
| FIN 146   | 25 January 2023  | 2.0 x 10 <sup>4</sup> genome copies / L |
| FIN 147   | 31 January 2023  | 4.3 x 10 <sup>4</sup> genome copies / L |
| FIN 148   | 06 February 2023 | 6.0 x 10 <sup>3</sup> genome copies / L |
| FIN 149   | 12 February 2023 | 7.6 x 10 <sup>3</sup> genome copies / L |
| FIN 150   | 23 February 2023 | 6.0 x 10 <sup>4</sup> genome copies / L |
| FIN 151   | 01 March 2023    | 8.3 x 10 <sup>4</sup> genome copies / L |
| FIN 152   | 07 March 2023    | 5.7 x 10 <sup>4</sup> genome copies / L |
| FIN 153   | 13 March 2023    | 1.5 x 10 <sup>5</sup> genome copies / L |
| FIN 154   | 19 March 2023    | 2.6 x 10 <sup>4</sup> genome copies / L |
| FIN 155   | 30 March 2023    | 3.9 x 10 <sup>4</sup> genome copies / L |

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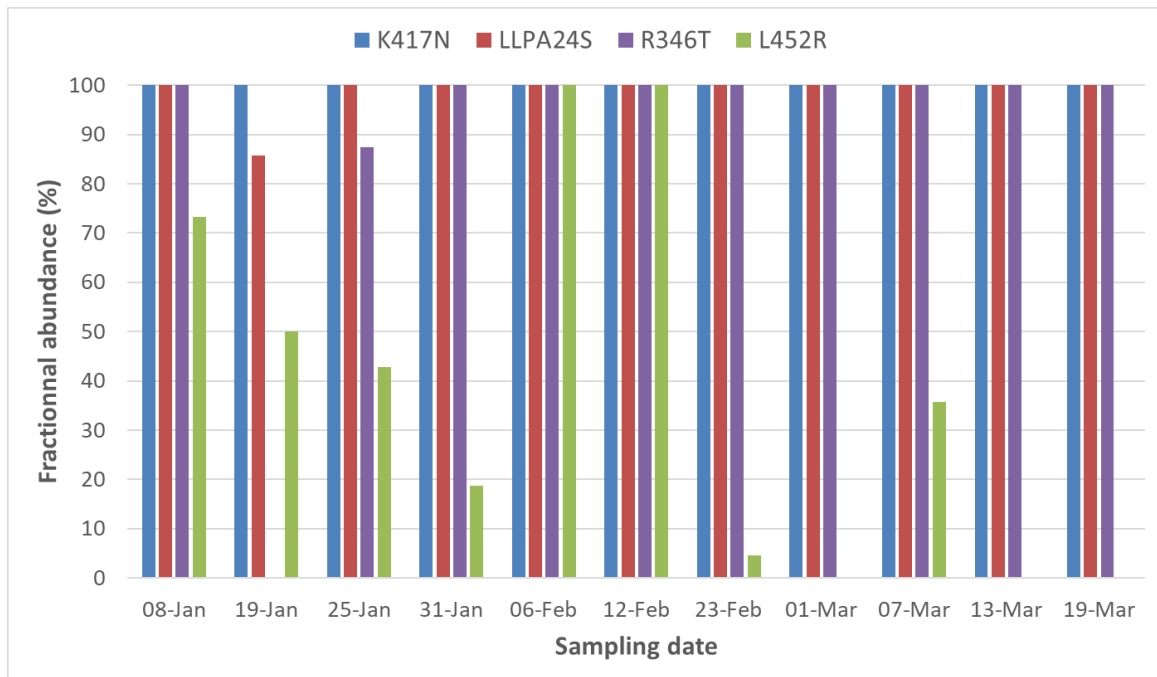
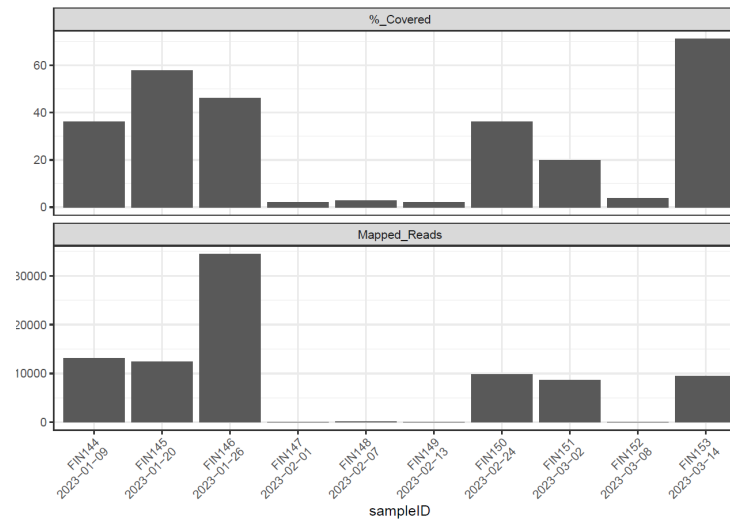


Figure 1: SARS-CoV-2 mutations detected (RT-ddPCR) in the airport sewage samples. L452R: Omicron BA.4, BA.5, BQ.1; LLPA24S: Omicron BA.2, BA.4, BA.5, BA.2.12.1, BA.2.75, BQ.1, XBB; K417N: Omicron BA.1, BA.2, BA.4, BA.5, BA.2.12.1, BA.2.75, BQ.1, XBB; R346T: Omicron XBB, BQ.1

(A)



(B)

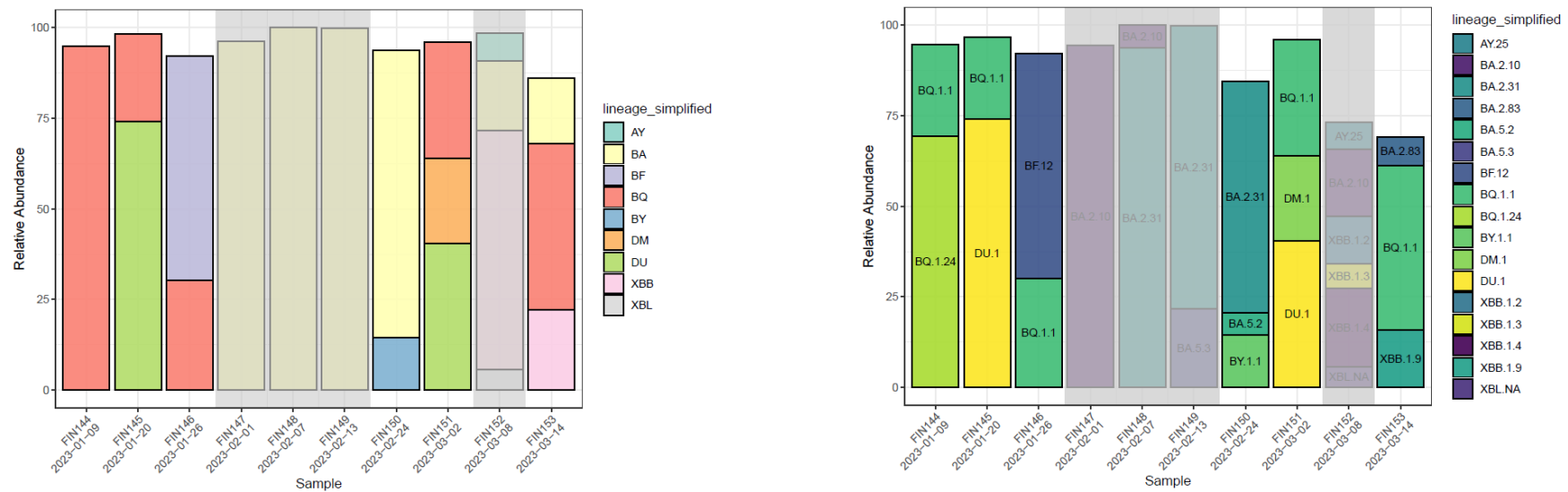


Figure 1: High throughput sequencing data of the airport sewage samples. (A) Mean coverage and number of mapped read per sample. (B) Identification of main lineages. The grey areas correspond to samples where the sequencing was of poor quality (not deep enough), which can lead to a lot of variance and uncertainty in the results presented.