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**Spatiotemporal evolution of plant infection by SCYLV in a disease free plot. Toward modeling virus spread in tropical conditions**

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A sugarcane trial (17 rows of 55m each) was established with 1,745 disease-free tissue culture propagated plants of cultivar SP71-6163. In Brazil, this cultivar is highly susceptible to yellow leaf caused by the *Sugarcane yellow leaf virus* (SCYLV). Two rows of SCYLV-infected plants of cultivar FR90714 were also planted next to one side of the SP71-6163 plot. The number of SCYLV-infected plants was monitored on weeks 6, 10 14 19 and 23 after transferring plants to the field, on all plants by tissue blot immunoassay (TBIA). Colonization of disease-free plants by aphids was monitored in plant cane crop and aphid population structure was estimated from 40 random identified plants. Alate aphids were observed 2 days after transferring plants in the field and increased during 8 weeks with a mean of 2 alate aphids per plant and then decrease to a mean of 0 to 0.3 alate aphids per plant on week 15 until end of observation on week 23. The first SCYLV-infected leaves were found on 6 plants, 6 weeks after planting. Number of infected plant then increase slowly up to 4% of the plants until week 14 with no aggregative contamination but distribution of infected plant within the field was heterogeneous. Then infected plants drop to 12.6% on week 19 and end at 18% of the plants on week 23. The two last samples showed short distance aggregation between infected plants with maximum signification within a specified distance of 2m between plants. Random infection was linked to high level of alate aphid population and was followed by neighbourhood infection due probably to movement of aphids from plant to plant when apterous aphid population increased and was observed on all plants. Results showed that primary infection of disease free plot due to alate aphids is low and happens during the first stage of growth (3 to 4 months). Main infection is due to disease expansion from primary infected plants.