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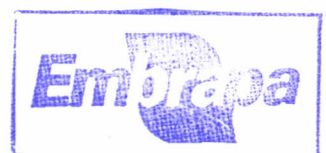
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SPATIAL PATTERNS OF MANGO MALFORMATION
IN IRRIGATED AREAS OF THE BRAZILIAN SEMI-ARID

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Background and objectives
There are over 18.000 ha of irrigated mango in the São Francisco River Valley, and 90% of the fruit produced in this semi-arid region is exported to the european and american markets. With the expansion of the mango areas in the last decade, the intensity of malformation has been increasing, and there are many unresolved questions on the dynamics of the disease in the region, such as the role of the mango bud mite (*Aceria mangiferae*) or mechanical transmission in the dissemination of the disease. This study aimed to characterize the spatial patterns of mango malformation in commercial orchards, of the brazilian semi-arid.

Materials and methods
Seventeen plots – Haden, Kent or Tommy Atkins cultivars, ranging from 6 to 21 years old and from 64 to 720 plants- were evaluated when blossoming. Each tree was visually evaluated and the percentage of symptomatic inflorescences was recorded, as well as tree position in a XY map. Ordinary runs test was performed for within-row and across-row directions and, additionally, spatial correlation was performed using LCOR2 software. After quadratization - 2x2 and 3x3 plants (Quadratizer Excel Macro), binomial dispersion index (Vobs/Vbin) was calculated for each plot as well as binary power law for the entire data set. Original XY maps were also employed to produce isopath maps using Statistica software.

Results and discussion
Plot average percentages of affected inflorescences ranged from 0.45% to 57.9%, median of 2.88%. Ordinary runs test pointed at a significant departure from randomness for 55.6% and 31.2% of the plots, within and across rows, respectively. The aggregation within the row may indicate mechanical transmission of the disease and/or of the mite vector. Spatial correlation reinforced runs results but, in general, the strength of aggregation could not be considered high. Also, only half of the plots presented a core cluster size with more than 1 significant lag, but significant spatial correlation was not limited to the core cluster. Nevertheless, the spatial correlation revealed an edge effect only for three plots. For 2x2 quadrat size, the dispersion index ranged from 0.82 to 1.97, median of 1.39; 9 out of 16 dispersion indices were significantly greater than 1. For 3x3 quadrat size, the indices ranged from 1.27 to 2.50, median of 1.92; 9 out of 11 indices were significantly greater than 1. The parameter b of binary power law was not significantly different from 1, and parameter A was not significantly different from 0 (t test) for both quadrat sizes. Isopath mapping showed that although conspicuous isolated foci could be seen, at least 12 of 16 plots had important high incidence sub-regions associated to the orchard borders, what may imply a role for a wind-borne inoculum introducing the disease to an area. Results did not pointed out clear, kindred patterns for all plots, which probably reflects the plot differences of age, cultivars and cultural practices. Some of them presented Z statistic (runs test) as low as –5.35, while others had an indication of regularity (Z= 1.88). The same variation was observed for binary dispersion indices and lack of aggregation brought up by binary power law analysis is a proof of this fact. The last but not the least, this variation and isopath mapping findings need to be carefully examined, based on multi-year assessments and a broader range of orchard´s history.