

POSTER SUMMARY

AN INVESTIGATION INTO THE POPULATION DYNAMICS OF THE YELLOW SUGARCANE APHID, WITH PARTICULAR EMPHASIS ON ITS MOVEMENT PATTERNS BETWEEN PLANTS

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Abstract

The Yellow Sugarcane Aphid (YSA), a confounding pest of sugarcane, has plagued the industry since it first arrived in South Africa in 2013. Damage is characterised by yellow-brown leaf lesions at the insect feeding-points, which translate to a reduced photosynthetic capacity and, eventually, to a reduction in the crop yield. The spatio-temporal dynamics of the YSA has not been well-understood or documented within the entomological arena. Field observations describe their infestation as often moving from a low to a high state, or vice versa, within a relatively short space of time, with no apparent agronomic or climatic change/correlation. Whilst many of these observations have been anecdotal, a similar trend appears to exist wherever the YSA is a problem on sugarcane. This study sought to enrich the knowledge-base that is currently available on the biology and behaviour of YSA, by intensively monitoring colonies for their movement between plants, changes in their feeding behaviour and the development of alates, under greenhouse conditions over time. After two years of study, the key findings can confirm that YSA move from plant-to-plant via the plant canopy and that they move between plants via a marching action on the ground. The movement of YSA between plants was most prolific in the late afternoon into the evening, which implies a level of photosensitivity. Temperature fluctuations did not affect their movement between plants. However, their movement did correlate with plant stress, where the greater the damage that was incurred on the leaves by the growing colonies, the greater the migration of 24- to 38-day-old aphids from infested plants to uninfested healthy plants. Less than 5% of each population during each round of the study produced winged alates. The YSA behaviour appeared to have been influenced by both biotic (mites, scale, hover fly) and abiotic (chemical residue) factors, as evidenced by a reduction in their movement and reproductive vigour upon exposure to these stimuli. Adult aphids also showed their ability to move from damaged plants towards uninfested, healthy plants at a maximum of 4 m at a time. A further observation was an abundance of ants, specifically the *Lepisiota* spp., in the immediate vicinity of YSA colonies. The ant/YSA interaction has been consistently observed on commercial cane in the field, not only on the *Lepisiota* spp, but also on the *Lineptherma* spp, *Tetramorium* spp. and *Lasius* spp. It is currently not clear whether a synergistic relationship exists between the two species, or if it might be a case of 'mistaken identity', where the ants expect the YSA to produce honeydew (a food-source for ants), which the YSA does not do. This presents an avenue for further research where the ant/YSA interactions could be intensively monitored over time, under controlled conditions. By understanding the movement patterns and ecological interactions of the YSAs, future research and pest control practices can be better tailored to mitigate their impact on sugarcane crops. A typical example could be to time the application of insecticides to the late afternoon, in order to catch the YSA as they begin moving between plants.

Keywords: Yellow sugarcane aphid, pest behaviour, pest management, population dynamics