



Grower Summary

PE 016

Sweet peppers: Preliminary evaluation of IPM compatible monitoring and control measures for *Nezara viridula*

Final 2014

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Before using all pesticides check the approval status and conditions of use.

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Further information

If you would like a copy of this report, please email the HDC office (hdc@hdc.ahdb.org.uk), quoting your HDC number, alternatively contact the HDC at the address below.

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HDC is a division of the Agriculture and Horticulture Development Board.

Project Number: PE 016

Project Title: Sweet peppers: Preliminary evaluation of IPM compatible monitoring and control measures for *Nezara viridula*

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GROWER SUMMARY

Headline

A pheromone has been shown to be attractive to the parasitic tachinid, *Trichopoda pennipes*, which attacks *Nezara viridula*. If *T. pennipes* were present in the local ecosystem, then the pheromone could be used to draw it into crops infested by *N. viridula*.

Background

Nezara viridula (southern green shieldbug) is believed to be native to Ethiopia but is now widely distributed across tropical and subtropical regions of the world. It feeds on a wide range of plants and is a serious pest of many important food crops. It has been imported into the UK on fruit and vegetable products for many years but was not found in the wild until 2003. *Nezara viridula* has now found a favourable niche in heated glasshouses in the north London area and it seems highly likely that it will eventually be transported to other parts of the country on produce and packing materials. It also seems likely that the pest would survive year round anywhere in the UK if it were within a glasshouse with frost protection between crops.

Sexually mature males of *N. viridula* have been shown to release a pheromone which is said to be attractive in the field to females, males, and late-stage larvae of the same species. Formulated pheromone was obtained by Russell IPM from a source in Japan, where it was reported to be a highly effective attractant of *N. viridula*. Practical evaluation of pheromone baited traps began in this project in 2013, in and around glasshouses in the north London area, and later at infested sites near the Instituto Superior de Agronomia, Lisbon.

Summary

The pheromone lures were placed within plastic cages which were then placed in Delta traps. The inner floor of the Delta trap was covered with a removable sticky plate. In a preliminary study, the 'glue' used on the sticky plate had been shown to be capable of retaining both adult and nymphal stages of healthy *N. viridula*. The traps were always placed in pairs 5-10m apart and similarly orientated. One trap of each pair would contain a

pheromone lure while the other would be a control without an attractant. Pheromone lures were replaced at 5-6 week intervals.

The traps were first tested between weeks 33 and 39 in 2013 within a vegetable 'allotment' immediately outside a commercial glasshouse which had suffered a serious infestation of *N. viridula* during the previous growing season. The allotment contained the usual range of vegetable crops that are grown in UK gardens including several types of podding legumes. There was also a fig tree within the allotment which is known to be a favoured host of *N. viridula* in Mediterranean countries. No *N. viridula* were caught in any of the traps. Extensive surveys, which involved beating foliage of numerous species of shrubs and herbaceous plants in the immediate vicinity, also failed to detect any *N. viridula* during 2013.

Due to the lack of *N. viridula* at the UK site in 2013, work was transferred to parkland at the Instituto Superior de Agronomia, Lisbon which was known to be infested with the pest. Traps were placed in early September 2013 which was much later in the year than would have been the case had it been the intention to work at that site from the outset. No *N. viridula* were caught in any of the pheromone-baited or unbaited traps but it was impossible to say whether this was because the pheromone was ineffective, or because the insects' behaviour had changed towards the end of the season; *i.e.* they were no longer seeking a mate. There was, however, an unexpected development in that a significant number of large tachinid flies were captured in each baited trap while none were present in the unbaited traps. The tachinids were subsequently identified by a specialist taxonomist as *Trichopoda pennipes*; a parasitoid that attacks true bugs and specifically members of the Pentatomidae and Coreidae. The fly is sometimes referred to as the "feather-legged fly" because of the prominent fringe of feather-like bristles on its legs.

Nezara viridula was not reported at any UK sites until the end of the 2014 growing season which was too late to continue any monitoring or control studies. However, more comprehensive trapping exercises were carried out at two infested sites in Portugal between June and October 2014. The results were comparable to 2013. No *N. viridula* were found in any pheromone-baited traps nor in any unbaited traps. However, an average of 7.3 *T. pennipes* was caught per pheromone-baited trap.

Russell IPM has been assured that the pheromone has been extremely attractive to *N. viridula* in Japan. It is therefore possible that the European populations are of a different genotype to those found in Japan and respond to a different combination / ratio of chemical components in the pheromone. The fact that the parasite does respond to the pheromone indicates that the differences are only marginal.

Trichopoda pennipes is not specific to *N. viridula* and this would probably eliminate it as a released biocontrol agent unless it is already in the UK. It has not yet been recorded as indigenous to the UK but this may be because no one has specifically looked for it or stumbled across it by chance. We know it is present in Europe and information from North America indicates that it is capable of surviving at least as far north as Ontario and Massachusetts where winter conditions are far more severe than in southern England. The pheromone tested in this project could provide an opportunity to accelerate a search for *T. pennipes* in the UK.

Financial Benefits

Current control measures against *N. viridula* in the UK are based on broad spectrum insecticides which are extremely disruptive to IPM. This can lead to secondary problems with other pests which must also be controlled with chemical insecticides. The disruption and termination of the IPM programme would result in UK growers losing an important marketing advantage over their overseas competitors. Initial observations suggest that losses due to direct damage, secondary pest problems and the loss of goodwill with retail customers could be substantial. While this project has not yet found a solution to this problem, the results do indicate a way forward for further research.

Action Points

A formulated pheromone has been shown to be attractive to the parasitic tachinid, *T. pennipes*. If *T. pennipes* were present in the local ecosystem, then the pheromone could be used to draw that parasitoid into crops infested by *N. viridula*.

Trichopoda pennipes has not yet been recorded in the UK. The pheromone could be a useful tool in surveying a range of habitats in the UK for its presence. The possibility of its use as a biocontrol agent would be greatly increased if it were found in the wild.

Other monitoring and IPM compatible control systems for *N. viridula* could not be tested in this project due to the lack of populations of the pest in UK commercial crops until the very end of the 2014 season. There are still several options for both monitoring and control of *N. viridula* which have realistic potential and should be tested in crops as soon as the opportunity arises.