

***ALEUROCANTHUS SPINIFERUS* (QUAINTANCE) (HEMIPTERA
ALEYRODIDAE) IS SPREADING THROUGHOUT THE ITALIAN REGION
APULIA**

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Abstract

The recent introduction of orange spiny whitefly (OSW), *Aleurocanthus spiniferus* (Quaintance) (Hemiptera Aleyrodidae), in Italy is a new challenge for whoever is involved in citrus producing chain activity. *A. spiniferus* is a polyphagous insect, reported to infest 90 plant species of 38 plant families and it is considered as one of the most destructive Citrus whiteflies worldwide. It causes a general weakening of the infested trees due to sap loss and sooty mould blackening. In Italy, *A. spiniferus* diffusion from its primary detection sites has been monitored, with a special focus on population density and eventual new host plant species. Up to the end of 2012, the pest was found in Lecce district only; but more recently (till April 2014) it has been collected in both Taranto and Bari districts. These findings are isolated from the original infested areas in Italy and far northern from them. Moreover, these recent collections demonstrate the OSW ability to overwinter in the new northern territories. It is suggested that the whitefly was passively dispersed on traded plants and/or leaves-decorated marketed fruits. These findings alert about a possible further northern spread of *A. spiniferus*.

Key words: *Orange spiny whitefly, Quarantine pest outbreak, Citrus.*

Introduction

Given the damage that *Aleurocanthus spiniferus* (Quaintance) 1903 may cause to citrus and other agricultural crops, the Apulia Region - Plant Protection Centre, in collaboration with Consortia of Defence of the provinces of Lecce and Brindisi, published, in the official regional journal 146 of 7th November 2013, the measure 348/2013 of the Agriculture services containing phytosanitary requirements to control the spread of *A. spiniferus* in the regional, national and EU territory. *A. spiniferus*, originated in tropical Asia but has been spread to different geographic regions (Africa, Japan, India, Central America, South America and Australia) (Kanmiya et al., 2011; Cioffi et al., 2013). *A. spiniferus* is listed as a quarantine threat to Europe and is included in the EU Annex II/A1 and in the EPPO A2 list. In Europe, it was reported for the first time in Italy, in 2008 (Porcelli, 2008, Nutricato, 2009). In May 2012, *A. spiniferus* was first found in Croatia, on ornamental potted orange seedlings (*Citrus aurantium* L.) in a nursery garden in Split (Mladen&Tatjana, 2013). OSW is a polyphagous insect, here reported to infest 90 plant species of 38 plant families (Cioffi et al., 2013). It is considered as one of the most destructive citrus whitefly in tropical Asia and the seventh most important citrus pest in Japan. *A. spiniferus* is a common and sometimes serious pest of *Citrus* and other plants in the Indo-Malayan region (Clausen et al., 1978). It is also

considered a pest of tea in the Guangdong province of China (Xie, 1993) and recorded as a serious pest of roses in India (David and Subramaniam, 1976). It causes a general weakening of the infested trees due to sap loss and development of sooty mold. The leaves, fruit and branches of infested trees are usually covered with sooty mold. Orange spiny whitefly is spread from one place to another through movement of nursery stocks and infested fruits.

As other whitefly species, OSW has six developmental stages: egg, crawler (1st instar), two sessile nymphal instars (2nd and 3rd instars), puparium (4th instar) and adult (APHIS, 1975). All stages are found on the leaves (USDA, 1974; EPPO/CABI, 1997). Depending on conditions, the life cycle of *A. spiniferus* generally takes 2-4 months, but there can be three to six overlapping generations per year. The development is most favoured by temperatures of 20-34°C (optimum 25.6°C) and relative humidity of 70-80%. The species does not survive at temperatures below freezing and is not found in areas with temperatures of 43°C or over (EPPO/CABI, 1997). In general, chemical control has not proved to be effective against OSW (Gyeltshen et al., 2010). The pest appears to be well controlled by natural enemies in its native countries. Biological control, using hymenopteran parasitoids, has proved to be effective in several regions of the world (Smith, 1945; Quezada, 1974; Clausen et al., 1978). This work aims to assess the *A. spiniferus* status in Apulia.

Materials and Methods

During the period 2009-2012, from April to September, monitoring was regularly carried out in all municipalities of the Lecce district on potential host plants to assess the presence and the spread of the whitefly *A. spiniferus*. Suitable host plants were checked in orchards, private and urban gardens, ornamentals, tree-lined streets, park areas and natural reserves. Moreover, in 2012-2014 similar inspections have been realised on the boundaries among Lecce and others Apulian municipalities, through the main transport routes. Inspections started in the city centre; they were then extended to boundaries and orchards, along the main routes, looking for infested host plant species. Yellow sticky traps have been also used, to check the presence of adults in the early stages of infestation. Leaves samples with preimaginal stages of the whitefly were collected, dry stored, and brought to lab in aerated and hermetically sealed boxes, until insect preparation. Once in the laboratory, puparia were slide-mounted for taxonomic identification, either by quick-mounts method (Martin et al., 2000) or in Canada Balsam, following the suggestions by Pizza and Porcelli (1993) and Martin (1999). All mounted specimens were identified to the species level according to relevant morphological keys (Silvestri, 1928; Bink-Moenen, 1983; Martin, 1987, 1999; Kanmiya et al., 2011). All laboratory observations were taken by stereomicroscope, light compound microscope equipped for bright field and phase contrast, and Hitachi TM3000 low pressure Scanning Electron Microscope (SEM).

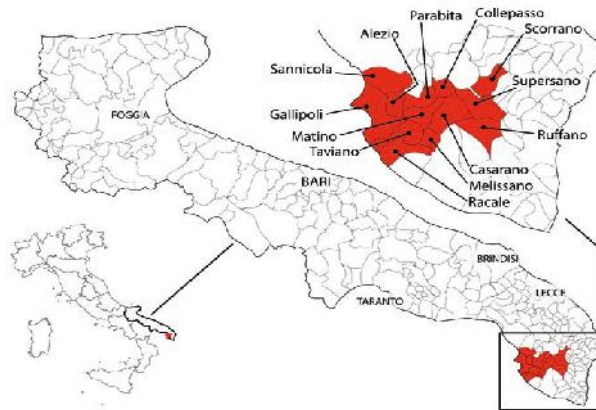
Results and Discussion

The first detection of *A. spiniferus* was in Lecce District in April 2008 (Porcelli, 2008) in a Citrus orchard (figure1), by the end of 2008 *A. spiniferus* spread around, monitoring area showed that 13 municipalities in Lecce District were invaded by *A. spiniferus* (Nutricato et al., 2009): Alezio, Casarano, Collepasso, Gallipoli, Matino, Melissano, Parabita, Racale, Ruffano, Sannicola, Scorrano, Supersano and Taviano. At the end of 2009, the pest was found to infest 68 of the 97 municipalities of the Lecce district, with various degree in infestation intensity. One year later, *A. spiniferus* infested 88 municipalities but was still absent in Diso, Guagnano, Melendugno, Novoli, Salice Salentino, Squinzano, Trepuzzi, Uggiano la Chiesa and Veglie. These nine non-infested municipalities are located along the Brindisi-Taranto districts border, on the Adriatic coast, at the north edge of the infested area. During 2011, the pest spread into the villages alongside the Adriatic coast; only Diso and

Melendugno remained apparently pest-free. Inspections in April 2011 revealed the presence of the whitefly on a lemon tree in a private garden in San Pancrazio Salentino (Brindisi district): that was the first OSW outbreak outside the Lecce district. In 2013-2014 new foci in

Figure 1 : The first detection of *A. spiniferus* was in Lecce District

Bari (both city centre and province) and Taranto have been detected. In 2014 previous results



on new foci were confirmed; we noticed also that OSW populations were completely acclimatized and in continuous expansion.

Two maps report the spreading of the pest in Puglia Region (figure 2) and different infestation intensity (figure 3) by municipalities, both based on inspection results carried out to the end of 2011. The colour is re-lated to the first pest presence in the area. In general, the older the infestation the higher the population; thus, the infestation level increases over time. Consequently, the most dense pest populations were found in the early infestation sites and at sea level. So, uninfested areas are green, low and moderately infested areas are yellow and orange, severely infested are red.

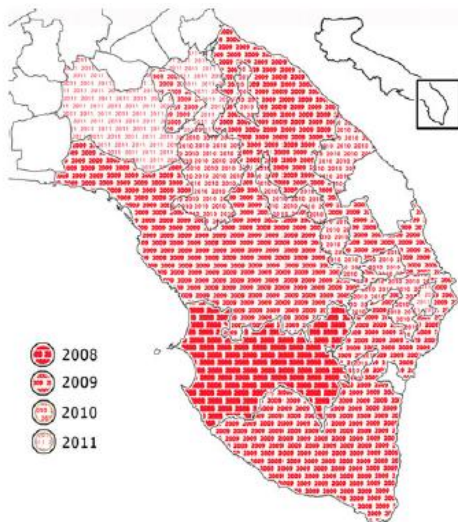


Figure 2 : Spreading and distribution map of *A. Spiniferus* up to 2011.

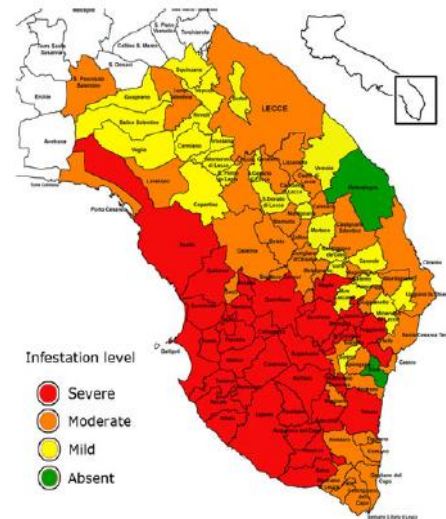


Figure 3: Infestation level of *A. spiniferus* in 2011.

Conclusion

Our study show that OSW is now acclimatized not only in the Lecce district but apparently in the whole monitored Apulia, except for northern districts, and its eradication is almost impossible. This is an additional validation of the high spreading capacity and harmfulness of the pest. In spite of the described critical situation and even more critical expectations, official control strategies are still absent in Italy.

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