

SPIRALLING WHITEFLY, *ALEURODICUS DISPERSUS*, A RECENT INVADER AND NEW CASSAVA PEST

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ABSTRACT

The spiralling whitefly, *Aleurodicus dispersus* Russell (Hom., Aleyrodidae), a native of Central America, was found in continental Africa for the first time early in 1992, and has since spread to five West and Central African countries. It is a polyphagous pest which causes substantial damage also on cassava. In mid-1993, two parasitoids, *Encarsia* sp. near *haitiensis* Dozier and *E. guadeloupa* Viggiani (Hym., Aphelinidae) were recovered from *A. dispersus* in Benin. They probably had arrived serendipitously. Wherever the whitefly spreads, initially damaging populations were observed. In coastal Benin, population levels declined sharply in 1994. The necessity of introducing another biological control agent, the predator *Nephaspis oculatus* Blatchley (= *amnicola* Wingo) (Col., Coccinellidae), remains therefore unclear.

Key Words: Biological control, *Encarsia* spp., *Nephaspis oculatus*, whitefly

RÉSUMÉ

La mouche blanche, *Aleurodicus dispersus* Russell (Hom., Aleyrodidae) d'origine Centre-américaine a été recensée en Afrique continentale pour la première fois en 1991 et s'est dispersée depuis sur cinq pays. C'est un ravageur polyphage, qui produit des dégâts importants sur manioc. En 1992 deux parasitoides, *Encarsia* sp. proche *haitiensis* Dozier and *E. guadeloupa* Viggiani (Hym., Aphelinidae), furent découverts sur *A. dispersus* au Bénin. Ils ont été probablement introduits accidentellement. Partout où la mouche blanche se répandait, elle causait des dégâts. Au moins dans la zone côtière du Bénin, un déclin marqué était observé en 1994. La nécessité d'introduire un autre agent de lutte biologique, le prédateur *Nephaspis oculatus* Blatchley (= *amnicola* Wingo) (Col., Coccinellidae) reste donc controversée.

Mots Clés: Lutte biologique, *Encarsia* spp., *Nephaspis oculatus*, mouche blanche

SPREAD OF *ALEURODICUS* *DISPERSUS* AND PEST STATUS

The spiralling whitefly, *Aleurodicus dispersus* Russell (Hom., Aleyrodidae), was described in 1965 and distinguished from similar species accumulated in the U.S. Department of Agriculture collection over 60 years. Its distribution covered southern Florida, portions of Central and South

America, the West Indies, and also the Canary Islands (Russell, 1965). It was known from a wide range of host plants (38 genera from 27 families, but not from cassava) and not considered a pest. In southern Florida, the species seems to reach the northern limit of its distribution due to cold winter temperatures (Cherry, 1979).

Aleurodicus dispersus was first noticed as a pest insect in Hawaii in 1978, from where it

spread across the Pacific (Laufofo and Iwamoto, 1982; Martin and Lucas, 1984) to Sri Lanka (Wijesekera and Kudagamage, 1990), and the Maldives Islands (Martin, 1990). It was, however, not noted as a cassava pest.

In continental Africa, *A. dispersus* was observed for the first time in the area of Ibadan and Lagos, Nigeria as a serious pest of cassava early in 1992, though unverifiable reports suggest that the insect might have been present since 1990. In limited surveys, it was also found in other south-western states of Nigeria. Important hosts, other than cassava, included soybean, pigeon pea, fruit crops like *Citrus* spp., papaya (*Carica papaya*), as well as numerous ornamentals and shade trees (Akinlosotu *et al.*, 1993). The dense populations of *A. dispersus* producing ample honeydew and sooty mould, led to abandonment of some cassava fields and the removal of some ornamental trees.

Aleurodicus dispersus was also observed in Cotonou, Benin, and Lomé, Togo early in 1993. It spread rapidly, but irregularly, mainly along the roads, and by the end of the year was observed in many localities up to about 100 km inland in Benin (d'Almeida, 1994; J. A. Lys, pers. comm.) and Togo (D. Agouké, pers. comm.), and in two localities in Ghana. It was also reported from Congo (A. Kiyindou, pers. comm.). By early 1995, it occupied almost the whole coastal region between Lagos and Accra, Ghana, up to 150 km inland, and had spread locally to some large cities in the north, like Parakou, Benin, and Lama Kara, Togo (O. Ajuonu and Y. d'Almeida, unpubl. results). The number of host plants recorded surpassed 100.

BIOLOGICAL CONTROL

In Hawaii, *A. dispersus* was considered an economic pest of major significance and a search for natural enemies was initiated in the Caribbean. Three species of coccinellid predators and two species of aphelinid parasitoids, namely *Encarsia* sp. near *haitiensis* Dozier and *Encarsia* sp. were introduced, studied for their host specificity, and liberated. By 1981, the whitefly populations were judged to be under control, which was credited to the exotic parasitoids and the coccinellid *Nephaspis oculatus* Blatchley (= *amicola* Wingo)

(Kumashiro *et al.*, 1983). Similar success was achieved in other Pacific countries, either by *E. ?haitiensis* and one or the other coccinellid or by *E. ?haitiensis* alone, as in Palau and Pohnpei (Waterhouse and Norris, 1989). In the Maldives Islands, *E. ?haitiensis* was introduced as the only exotic agent and achieved control (C. Klein-Koch, G. Schulten, pers. comm.).

In view of the conspicuous damage, particularly on cassava, by *A. dispersus* in West Africa, the national plant protection services of Togo, Benin, Ghana, and Nigeria contacted Food and Agricultural Organisation of the United Nations (FAO), the C.A.B. International Institute of Biological Control, and International Institute of Tropical Agricultural (IITA) for assistance in developing a biological control project. Before the planned introduction of *E. ?haitiensis* could be implemented, this parasitoid together with *Encarsia guadeloupa* Viggiani (as identified by G. Viggiani and A. Polaszek) were discovered in southern Benin and Togo, in two localities in Ghana, and in Ibadan (J.A. Lys, P. Neuenschwander, Y. d'Almeida, unpubl. results) in the second half of 1993. By 1995, *E. ?haitiensis* had spread throughout the infested area in the south, but its distribution in the north remained patchy. In southern Benin, surveys indicated fluctuating, but clearly lower whitefly populations than had been noticed before the advent of *E. ?haitiensis* (d'Almeida, 1994; O. Ajuonu and Y. d'Almeida, unpubl. results). By early 1995 it remains uncertain whether *E. ?haitiensis* can permanently control *A. dispersus* on all host plants in West Africa.

A similar serendipitous introduction of parasitoids of *A. dispersus* had been noted in Guam for *Encarsia* sp. (Waterhouse and Norris, 1989), where *E. ?haitiensis* had been released and established, and in Florida for *Euderomphale vittata* Dozier (Hym., Eulophidae) where *E. ?haitiensis* had not become established (Bennett and Noyes, 1989).

An eventually desired introduction of *N. oculatus* has to await the results of extended host specificity trials, as requested by the soon-to-be ratified FAO convention concerning the introduction of beneficial organisms. The life history of *N. oculatus* has in fact been studied in

some detail (Yoshida and Mau, 1985). Adults fed on three whitefly species other than *A. dispersus*, and, to a limited extent, on red spider mite, but not on an aphid and a coccid (Yoshida and Mau, 1985).

At a planning meeting in Lomé in February 1995, attended by the plant protection services of Togo, the Inter-African Phytosanitary Council of Yaounde, Cameroon, IIBC and IITA, it was therefore decided to go ahead with testing *N. oculatus* for an eventual introduction into Africa and to continue monitoring the spread and impact of *E. ?haitiensis*.

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