

APHID PARASITIDS IN THE CAPE VERDE ISLANDS (HYMENOPTERA, APHELINIDAE, APHIDIIDAE)

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Aphid parasitoids in the Cape Verde Islands (Hymenoptera, Aphelinidae, Aphidiidae).— The rearing of various aphid species on various plants yielded three primary parasitoids: *Aphelinus* sp., *Aphidius colemani* Vier. and *Diaeretiella rapae* (M'Intosh). Both aphidiid species are broadly oligophagous. Faunal relationships show Afro-tropical features. The parasitoid spectrum was found specifically poor in relation to 29 aphid species known to occur in Cape Verde Islands. Several parasitoids species are recommended to be introduced in a biocontrol programme.

Key words: *Aphidius colemani*, *Diaeretiella rapae*, Fauna, Biological control.

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INTRODUCTION

Research on the islands fauna of aphid parasitoids provides valuable data on the species composition, distribution, host range, peculiarities as well as faunal richness all over the world. Moreover, the results are of key importance as a back-ground for biological control within the framework of Integrated Pest Management.

The aphid fauna of the Cape Verde Islands has been relatively well-known in contrast to that of the aphid antagonists.

This paper contains information on the hymenopterous primary parasitoids of aphids.

MATERIAL AND METHODS

The research on aphid parasitoids was undertaken within an overall research on the aphid fauna of Cape Verde Islands (VAN HARTEN, 1982, in press).

Aphid parasitoids were reared from field-collected aphid colonies in the laboratory. Aphid colonies of various species were collected in various environments in Cape Verde Islands in the course of 1982-1983 and partially also in 1984-1985.

In total, 248 parasitoid specimens were examined: 143 *Diaeretiella rapae* and 105 *Aphidius colemani*.

RESULTS

Review of parasitoids

Aphelinus sp. (Aphelinidae)

Rhopalosiphum maidis (Fitch): São Jorge, 82, on *Zea mays*, 5 specimens.

Aphidius colemani Viereck (Aphidiidae)

Aphis craccivora Koch: São Jorge, 30 X 82, on *Achyranthes asper*, 52 specimens.

Aphis gossypii Glover: São Jorge, 22 X 82, *Bidens pilosa*, 17 specimens; Serra de Malaqueta, 12 XI 82, on beans, 1 specimen.

Aphis nerii Boyer de Fonscolombe: São Jorge, 5 X 82, on *Nerium oleander*, 4 specimens.

Hyadaphis coriandri (Das): São Jorge, 10 XI 82, on Umbelliferae, 1 specimen.

Hysteroneura setariae (Thomas): São Jorge, 10 XI 82, on grasses, 1 specimen.

Rhopalosiphum maidis (Fitch): São Jorge, 13 X 82, on *Zea mays*, 29 specimens.

Aphidencyrthus sp. was found as a hyperparasitoids.

Taxonomical notes: morphology of the anterolateral area of tergite 1 of the abdomen manifested an unusually great reduction of the longitudinal carinae.

Diaeretiella rapae (M'Intosh) (Aphidiidae)

Brevicoryne brassicae (Linnaeus): Cha das Cadeiras, Island of Fogo, 1 XI 82, on *Brassica*, 26 specimens; Monte Genebra, Island of Fogo, 1 XI 82, on *Brassica*, 17 specimens. (coll. G. Scheibelreiter); São Jorge, 10 XI 82, on *Brassica*, 63 specimens, 20 I 83, on *Brassica*, 33 specimens.

Myzus persicae (Sulzer): São Jorge, 6 X 82, on *Brassica*, 4 specimens.

Alloxysta brassicae (Kief.) was found as a hyperparasitoid.

Host range

Both the parasitoid species determined are oligophagous. *D. rapae* is mainly associated with *Brevicoryne brassicae*, to a lesser degree with *Myzus persicae*. *A. colemani* is a much broader oligophage.

Seasonal history

D. rapae was present throughout the year on (irrigated) cabbage. On the contrary, *A. colemani* was found in the course of the short rainy period (October-January).

Spectrum

The parasitoid spectrum per aphid species was found to be rather poor, being represented by a single parasitoid species.

A comparison of the host range patterns of parasitoids in the Cape Verde Islands indicated that both parasitoids species did not interfere with each other in action. The only case might be *Myzus persicae*.

DISCUSSION

Faunistics

D. rapae is a cosmopolitan species of Palearctic origin, and *A. colemani* is a pantropical species apparently of Afro-tropical origin (STARÝ, 1975), which is also a common and widely distributed parasitoid in Africa, in the northern Mediterranean area (STARÝ, 1976) as well as in areas south of the Sahara desert (STARÝ et al., 1985). However, its host range is much broader in the tropical belt (STARÝ, 1975).

A. colemani indicates faunal connections of the Cape Verde Islands with the tropical West Africa.

In comparison with other islands, the Cape Verde Islands manifest Afro-tropical patterns, as both the Canary Islands (MACKAUER, 1962) and Madeira (STARÝ et al., in press) involve different and clearly palearctic-Mediterranean species.

A significant reduction of the species number and correspondingly fewer species represented in the parasitoid spectrum per aphid species are the most typical features of island faunas (STARÝ, 1970). This phenomenon is emphasized in the subtropical and especially in the tropical belt. For example, in Madeira (STARÝ et al., in press), Canary Islands (MACKAUER, 1962), Corse (STARÝ et al., 1975), Cuba (STARÝ, 1981), Guadeloupe (STARÝ et al., 1987) and Trinidad (BENNETT, 1985).

Usually, one species—mostly a broad oligophage—becomes the dominant one which covers the whole parasitoid spectrum of the particular aphid species present. In the Cape Verde Islands this is the case of *A. colemani*.

Biological control

The situation of aphids as well as that of their antagonists (parasitoids) seems to be very useful for implementing biocontrol of aphids in crop protection system in the Cape Verde Islands. The island character, the climate and the composition and crop production, are apparently positive factors in the same way as in the biocontrol of a number of other pests (VAN HARTEN et al., 1990).

The history of research on the aphid fauna of the Cape Verde Islands has been summarized in two papers by VAN HARTEN (1982, in press). The relatively final status of aphids known includes 29 species.

Aphids are reported not to belong to pests of primary importance as agricultural pests and virus vectors in the Cape Verde Islands. *Brevicoryne brassicae* on cabbage and

Dysaphis foeniculus on carrots are treated with pesticides. *Myzus persicae* sometimes causes problems on paprika. However, aphids in rainfed crops may cause more serious problems as in such crops insecticide treatments are impracticable. *Rhopalosiphum maidis* on maize, and *Aphis craccivora* cause considerable losses in some years, but normally they are controlled by their natural enemies.

Many beneficial insects were imported to the Cape Verde Islands for the biocontrol of a number of pests (VAN HARTEN et al., 1990).

Activities were undertaken for introduction of *Lysiphlebus testaceipes* (Cresson) to the Cape Verde Islands. Material of *L. testaceipes* was obtained from Hawaii but the final number of surviving imported specimens was negligible and no releases were made (VAN HARTEN et al., 1990).

Proposals for introduction of *Lysiphlebus fabarum* (Marshall) and *L. testaceipes* have been examined (VAN HARTEN, in press).

Introduction activities should be supported. Successful introduction of selected specimens presumably cover populations of most aphid species in most environments. Furthermore, it can be reliably predicted whether or not a parasitoid species (host range) might represent a biotic danger to the endemic aphid fauna; however, aphid species of that type have not been found in Cape Verde Islands (VAN HARTEN, 1982, in press). Finally, the presence of more aphid parasitoid species largely prevents population outbreaks of new pest immigrants, i.e., such parasitoids are preventive biological control agents.

Activities should be supported to introduce at least *L. testaceipes* and *L. fabarum*-group species in the Cape Verde Islands. Both species exert a heavy pressure on aphid populations in the Mediterranean as

well as in other areas. Both were successfully introduced into Burundi (AUTRIQUE et al., 1989). A special goal might be *L. testaceipes* because of spectacular introduction results obtained in the Mediterranean (STARÝ et al., 1988a, 1988b; for references also STARÝ, et al., in press). After its introduction to the French Riviera in 1973-1974 and a subsequent rather fast spread over most of the west Mediterranean *L. testaceipes* occurs nowadays prevalently in the coastal areas from the north of Spain to Portugal, the Mediterranean coast of Spain and France and throughout Italy up to Sicily (STARÝ et al., in press). It was also capable of crossing the sea (apparently by air streams) and reached accidentally some islands. It was found in Capri (STARÝ et al., in press), in the Canary Islands (Michelena, in prep.) and also in Madeira (STARÝ et al., in press).

REFERENCES

- AUTRIQUE, A., STARÝ P. & NTAHIMPERA, L., 1989. Biological control of pest aphids by hymenopterous parasitoids in Burundi. *FAO Plant Prot. Bull.*, 37: 71-74.
- BENNETT, F. D., 1985. First records of hymenopterous parasites of aphids from Trinidad, West Indies. *Florida Entomol.*, 68: 227-228.
- MACKAUER, M., 1962. Aphid parasites from the Canary Islands (Hym. Aphidiidae). *EOS*, 38: 435-443.
- STARÝ, P., 1970. Biology of aphid parasites (Hymenoptera: Aphidiidae) with respect to integrated control. *Series entomologica*, 6:1-643.
- 1975, *Aphidius colemani* Viereck: Its taxonomy, distribution and host range (Hymenoptera, Aphidiidae). *Acta Entomol. Bohemoslov.*, 72: 156-163.
- 1976. Aphid parasites (Hymenoptera, Aphidiidae) of the Mediterranean area. *Trans. Czechosl. Acad. Sci., Ser. Math. & Nat. Sci.*, 86(2): 1-96.
- 1981. Aphid parasitoids (Hymenoptera, Aphidiidae) of Cuba. *Acta Entomol. Bohemoslov.*, 78: 33-42.
- STARÝ, P., CECÍLIO, A. & FRANQUINHO AGUIAR, A. M., (in press). *Lysiphlebus testaceipes* (Cr.), an exotic parasitoid biocontrol agent of aphids in Madeira Island (Hymenoptera, Aphidiidae). *Bol. Mus. Mun. Funchal*.
- STARÝ, P., LECLANT, F. & LYON, J. P., 1975. Aphidiidae (Hym) et aphides (Hom.) de Corse. I. Les Aphidiides. *Ann. Soc. ent. Fr., N.S.*, 11: 745-762.
- STARÝ, P., LYON, J. P. & LECLANT, F., 1988a. Biocontrol of aphids by the introduced *Lysiphlebus testaceipes* (Cress) (Hym., Aphidiidae) in mediterranean France. *Z. angew. Ent.*, 105: 74-87.
- 1988b. Post-colonisation host range of *Lysiphlebus testaceipes* (Cresson) in the mediterranean area (Hymenoptera, Aphidiidae). *Acta Entomol. Bohemoslov.*, 85: 1-11.
- STARÝ, P., REMAUDIÈRE, G. & AUTRIQUE, A., 1985. Les aphidiides parasites de pucerons en région éthiopienne. In: *Contribution à l'écologie des aphides africains. Étude FAO, Production Végétale et Production des Plantes*, 64: 95-102 (G. Remaudière & A. Autrique, Eds.). FAO, Rome.
- STARÝ P., REMAUDIÈRE, G. & ETIENNE, J., 1987. Aphid parasitoids (Hymenoptera, Aphidiidae) from Guadeloupe, West Indies. *Florida Entomol.*, 70: 178-180.
- VAN HARTEN, A., 1982. Lista anotada dos afídeos (Homoptera: Aphidoidea) conhecidos das Ilhas de Cabo Verde. *Agronomia Lusit.*, 41: 313-321.
- (in press). The aphids (Homoptera, Aphidoidea) of Cape Verde Islands. *Courier Forschungs-Institut Senckenberg*.
- VAN HARTEN, A., NEVES, A. M. & BRITO, J. M., 1990. Importation, propagation, release and recovery of parasites of agricultural pests on the Cape Verde Islands, April 1983-December 1987. *Inv. Agr., S. Jorde dos Organos*, 3(2): 39-49.