

Data Sheets on Quarantine Pests

*Dacus ciliatus***IDENTITY****Name:** *Dacus ciliatus* Loew**Synonyms:** *Dacus appoxanthus* var. *decolor* Bezzi
Dacus brevistylus Bezzi
Dacus insistens Curran
Dacus sigmoides Coquillett
Didacus ciliatus (Loew)
Leptoxyda ciliata (Loew)
Tridacus mallyi Munro**Taxonomic position:** Insecta: Diptera: Tephritidae**Common names:** Ethiopian fruit fly, lesser pumpkin fly, cucurbit fly (English)**Notes on taxonomy and nomenclature:** For phytosanitary purposes, non-European Tephritidae collectively have long been considered as quarantine pests for EPPO and the EU. This category included a large group of *Dacus* spp. According to a recent taxonomic revision, most of these *Dacus* spp. are now renamed *Bactrocera* and are covered in a separate data sheet (EPPO/CABI, 1996). *D. ciliatus* is the only important species which remains in *Dacus*.**Bayer computer code:** DACUCI**EPPO A1 list:** No. 238**EU Annex designation:** I/A1**HOSTS**

Larvae of *D. ciliatus* develop in the fruits of a wide range of cucurbit crops and wild Cucurbitaceae. In the EPPO region, cucumbers, melons and marrows would be the main potential hosts.

GEOGRAPHICAL DISTRIBUTION**EPPO region:** Egypt.**Asia:** Bangladesh, India (Delhi, Gujarat, Maharashtra, Punjab, Tamil Nadu, Uttar Pradesh), Iran, Myanmar, Pakistan, Saudi Arabia, Yemen.**Africa:** Angola, Benin, Botswana, Cameroon, Chad, Egypt, Eritrea, Ethiopia, Ghana, Guinea, Kenya, Lesotho, Madagascar, Malawi, Mauritius, Mozambique, Namibia, Nigeria, Réunion, Rwanda, Senegal, Sierra Leone, Somalia, South Africa, St. Helena (possibly interception only), Sudan, Tanzania, Togo, Uganda, Zaire, Zambia, Zimbabwe.**EU:** Absent.**Distribution map:** See IIE (1995, No. 323).**BIOLOGY**

Eggs are laid below the skin of the host fruit in groups of three to nine. These hatch within 1-2 days and during the summer the larvae feed for another 5-6 days. Pupariation is in the

soil under the host plant and adults emerge after 2-4 weeks. Adults occur throughout the year but are most numerous in summer (Annecke & Moran, 1982; Hancock, 1989).

DETECTION AND IDENTIFICATION

Symptoms

Attacked fruit will usually show signs of oviposition punctures.

Morphology

Larva

Described by Menon *et al.* (1968), Malan & Giliomee (1969) and Azab *et al.* (1971).

Adult

Colour: Face with a black spot in each antennal furrow; scutum orange, without lateral or medial vittae; postpronotal lobe, scutellum and katatergite yellow to orange; anatergite, and sometimes notopleuron, concolorous with scutum; legs predominantly yellow, slightly darkened to orange at apex of each femur, and on the tibia and tarsal segments 2-4; costal band not extending below vein R2+3; costal band extending from cell sc to beyond vein R4+5 and expanded into an apical spot; wing pattern confined to costal and cubital bands only; abdomen predominantly orange.

Head: Without ocellar and postocellar setae; first flagellomere at least three times as long as broad; combined length of pedicel and first flagellomere equal to, or less than, face height.

Thorax: Without dorsocentral and katepisternal setae; postpronotal lobes without any setae (sometimes with some small setulae or hairs); anterior supra-alar setae absent; scutum without prescutellar acrostichal setae; katatergite yellow and contrastingly paler than general body colour; anatergite concolorous with scutum (contrast with yellow katatergite). Scutellum with only two marginal setae (the apical pair).

Wing: Vein Sc abruptly bent forward at nearly 90°, weakened beyond this bend and ending at subcostal break; vein R1 with dorsal setulae; cell bc without microtrichia and cell c with microtrichia in apical areas; depth of cells r1 and r2+3 at r-m crossvein only about half length of r-m crossvein; cell cup very narrow, about half depth of cell bm; cup extension very long, equal or longer than length of vein A1+CuA2.

Abdomen: All tergites fused into a single plate, at most with smooth transverse lines marking the boundaries of each segment (view from side to check that no sclerites overlap the next); tergites 1+2 broader than long (although all the tergites are fused in this species, transverse shiny lines mark the area of each tergite); male with a row of setae (the pecten) on each side of tergite 3; tergite 5 with a pair of slightly depressed areas (ceromata).

Size: Wing length 4-6 mm.

Detection and inspection methods

Males are not attracted to cue lure or vert lure (no species of *Dacus* is known to be attracted to methyl eugenol, which is an important monitoring attractant for *Bactrocera* spp.; EPPO/CABI, 1996). Detection is therefore only possible by examination of fruit for oviposition punctures and then rearing the larvae through to the adult stage.

MEANS OF MOVEMENT AND DISPERSAL

Adult flight and the transport of infected fruit are the major means of movement and dispersal to previously uninfected areas. The flight capability of *D. ciliatus* has not been measured, but it is probably similar to that of many *Bactrocera* spp. which can fly 50-100 km (Fletcher, 1989).

PEST SIGNIFICANCE

Economic impact

A serious pest of cucurbit crops (Hancock, 1989).

Control

When detected, all infected fruit should be destroyed. Insecticidal protection is possible by using a full cover spray or a bait spray (Annecke & Moran, 1982). Malathion is the usual choice of insecticide for fruit fly control and this is usually combined with protein hydrolysate to form a bait spray (Roessler, 1989); practical details are given by Bateman (1982). Bait sprays work on the principle that both male and female tephritids are strongly attracted to a protein source from which ammonia emanates. Bait sprays have the advantage over cover sprays that they can be applied as a spot treatment so that the flies are attracted to the insecticide and there is minimal impact on natural enemies.

Phytosanitary risk

EPPO lists *D. ciliatus* as an A1 quarantine pest, within the category "non-European Trypetidae" (OEPP/EPPO, 1983); it is also of quarantine significance to CPPC. Its quarantine status for the EPPO region is practically the same as that of the *Bactrocera* spp., i.e. the direct risk of establishment in most of the EPPO region is minimal, though populations might enter and multiply during the summer months. In southern areas, some such populations might survive one or several winters, though in any case the direct losses from such introductions would probably not be high. The major risk for EPPO countries arises from the probable imposition of much stricter phytosanitary restrictions on exported fruits (particularly to America) if *Bactrocera* spp. or tropical *Dacus* spp. like *D. ciliatus* enter and multiply, even temporarily.

PHYTOSANITARY MEASURES

Consignments of fruits from countries where these pests occur should be inspected for symptoms of infestation and those suspected should be cut open in order to look for larvae. EPPO recommends (OEPP/EPPO, 1990) that such fruits should come from an area where *D. ciliatus* does not occur and where routine intensive control measures are applied. Fruits may also be treated in transit by cold treatment (e.g. 13 or 14 days at 0.0 or 0.6°C., respectively) or, for certain types of fruits, by vapour heat (e.g. keeping at 43-44°C for 6-9 h, according to commodity) (FAO, 1983) or hot water treatment. Ethylene dibromide was previously widely used as a fumigant but is now generally withdrawn because of its carcinogenicity; methyl bromide is less satisfactory, damaging many fruits and reducing their shelf life, although treatment schedules are available for specific cases (FAO, 1983; Armstrong & Couey, 1989). Treatment methods against fruit flies are currently under review within EPPO and as part of a common programme of the regional plant protection organizations.

Plants of host species transported with roots from countries where these pests occur should be free from soil, or the soil should be treated against puparia. The plants should not carry fruits. Importation of such plants may indeed be prohibited.

BIBLIOGRAPHY

- Annecke, D.P.; Moran, V.C. (1982) *Insects and mites of cultivated plants in South Africa*. Butterworths, Durban, South Africa.
- Armstrong, J.W.; Couey, H.M. (1989) Fruit disinfestation: fumigation, heat and cold. In: *World crop pests 3(B). Fruit flies; their biology, natural enemies and control* (Ed. by Robinson, A.S.; Hooper, G.), pp. 411-424. Elsevier, Amsterdam, Netherlands.

- Azab, A.K.; El-Nahal, A.K.M.; Swailem, S.M. (1971) The immature stages of the melon fruit fly, *Dacus ciliatus*. *Bulletin de la Société Entomologique d'Egypte* **54**, 243-247.
- Bateman, M.A. (1982) Chemical methods for suppression or eradication of fruit fly populations. In: *Economic fruit flies of the South Pacific Region* (Ed. by Drew, R.A.I.; Hooper, G.H.S.; Bateman, M.A.), pp. 115-128. 2nd edition. Brisbane, Australia.
- EPPO/CABI (1996) *Bactrocera cucumis*, *B. cucurbitae*, *B. dorsalis*, *B. minax*, *B. tryoni*, *B. tsuneonis*, *B. zonata*. In: *Quarantine pests for Europe*. 2nd edition (Ed. by Smith, I.M.; McNamara, D.G.; Scott, P.R.; Holderness, M.). CAB INTERNATIONAL, Wallingford, UK.
- FAO (1983) International plant quarantine treatment manual. *FAO Plant Production and Protection Paper* No. 50. FAO, Rome, Italy.
- Fletcher, B.S. (1989) Ecology; movements of tephritid fruit flies. In: *World crop pests 3(B). Fruit flies; their biology, natural enemies and control* (Ed. by Robinson, A.S.; Hooper, G.), pp. 209-219. Elsevier, Amsterdam, Netherlands.
- Hancock, D.L. (1989) Pest status; southern Africa. In: *World crop pests 3(A). Fruit flies; their biology, natural enemies and control* (Ed. by Robinson, A.S.; Hooper, G.), pp. 51-58. Elsevier, Amsterdam, Netherlands.
- IIE (1995) *Distribution Maps of Pests, Series A* No. 323 (1st revision). CAB International, Wallingford, UK.
- Malan, E.M.; Giliomee, J.H. (1969) Morphology and descriptions of the larvae of three species of Dacinae (Diptera: Trypetidae). *Journal of the Entomological Society of South Africa* **32**, 259-271.
- Menon, M.G.R.; Mahto, Y.; Kapoor, V.C.; Bhatia, S.K. (1968) Identities of the immature stages of three species of Indian fruit-flies *Dacus cucurbitae* Coquillett, *D. diversus* Coquillett, and *D. ciliatus* Loew (Diptera, Trypetidae). *Bulletin of Entomology, Entomological Society of India* **9**, 87-94.
- OEPP/EPPO (1983) Data sheets on quarantine organisms No. 41, Non-European Trypetidae. *Bulletin OEPP/EPPO Bulletin* **13** (1).
- OEPP/EPPO (1990) Specific quarantine requirements. *EPPO Technical Documents* No. 1008.
- Roessler, Y. (1989) Control; insecticides; insecticidal bait and cover sprays. In: *World crop pests 3(B). Fruit flies; their biology, natural enemies and control* (Ed. by Robinson, A.S.; Hooper, G.), pp. 329-336. Elsevier, Amsterdam, Netherlands.