

Factsheet *Zeugodacus cucurbitae* (Coquillett)

Original name: *Dacus cucurbitae* Coquillett, 1899: 129.

Vernacular name: Melon fruit fly; melon fly

Formal redescription (after White, 2006)

Wing length, 4.2-7.1 mm.

Head. Pedicel+first flagellomere not longer than ptilinal suture. Face, antennal furrow with a dark spot. Frons, frontal setae 2-3, orbital seta 1.

Thorax. Scutum predominantly red-brown; postpronotal lobe yellow; notopleural callus yellow; notopleural xanthine isolated from notopleural callus; lateral and medial postsutural vittae present. Scutellum without any dark patterning (except for basal dark margin). Anepisternum with a stripe from notopleural callus to (or almost to) katepisternum; extended onto katepisternum. Lateroterga with a single xanthine across both anatergite and katatergite. Thoracic setae. Anterior notopleural seta present; anterior supra-alar seta usually present (rarely absent); prescutellar acrostichal seta present (very rarely absent); basal scutellar seta absent (rarely present).

Wing. Basal cells bc and c without an almost complete covering of microtrichia; cell bm without microtrichia. Narrow subbasal raised section of cell br with extensive covering of microtrichia. Crossvein R-M beyond middle of cell dm. Costal band complete; fairly deep, extending below vein R₂₊₃ or to vein R₄₊₅, before wing apex; apically expanded into a spot which reaches about mid-depth of cell r₄₊₅. Anal streak present (colour extending beyond cell bcu). Cells bc and c hyaline. Crossbanding; crossband on DM-Cu and usually R-M.

Legs. Femora bicoloured (pale basally and red-brown apically).

Abdomen. Predominantly fulvous; shape and patterning, see image (CD-C). Tergites II-V separate.

Male. Tergite III with pecten, dense microtrichia adjacent end A₁+Cu₂, and hindtibia preapical "pad". Basal costal sections without specialised setae. Female. Aculeus pointed; no torsion; length, 1.7 mm.

Remark: Until recently, this species was being referred to as *Bactrocera (Zeugodacus) cucurbitae*. Phylogenetic studies have shown that the subgenus *Zeugodacus* is more closely related to *Dacus* than to *Bactrocera* and that it should have generic status (see Virgilio et al., 2015).

Encyclopedia of Life link: <http://eol.org/pages/727324/overview>

DNA barcoding

Multiple reference DNA barcodes from the species distribution (under *Bactrocera cucurbitae*) are available on the Barcode of Life Data Systems (BOLD) at:

http://www.boldsystems.org/index.php/Taxbrowser_Taxonpage?taxon=Bactrocera+cucurbitae&searchTax=

In BOLD (March 2017), *Z. cucurbitae* forms multispecific BINs most probably due to the misidentification of a few reference vouchers. Regardless of that, DNA barcoding might still be considered as a suitable tool for the molecular identification of this species.

Biology

Zeugodacus cucurbitae can complete its life cycle in 24 – 106 days at temperatures 32°C - 16°C respectively (Vargas et al., 1997). Adults can live up to 31 weeks (Vargas et al., 1997). Females start laying eggs in fruit between 6 – 30 days after adult emergence (Vargas et al., 1997) depending on prevailing temperatures. Eggs are laid under the fruit skin. Eggs are usually white to creamy yellow in colour. Eggs hatch into larvae which feed on the fruit pulp. Larvae are cream coloured. There are three larval instars. The larval duration of *Z. cucurbitae* varies between 27 and 47 days (Vargas et al., 1997). Fully fed larvae burrow into the soil where they pupate. The pupal stage lasts for 21 – 30 days at 24°C – 16° C (Vargas et al., 1997), after which an adult fly emerges and the cycle continues.

Host plant list

One of the main fruit fly pests found on wild and cultivated Cucurbitaceae. Also reported from a wide range of other plant families (see McQuate et al., 2017 for a recent review on the host records). Throughout its African range it is recorded from the hosts listed in the table below.

PlantFamily	PlantLatinName	PlantCommonNameEnglish
Anacardiaceae	Anacardium occidentale	cashew nut
Anacardiaceae	Mangifera indica	mango
Annonaceae	Annona senegalensis	wild custard apple
Canellaceae	Warburgia salutaris	pepper-bark tree
Cucurbitaceae	Citrullus colocynthis	bitter apple
Cucurbitaceae	Citrullus lanatus	watermelon
Cucurbitaceae	Coccinia grandis	
Cucurbitaceae	Cucumeropsis mannii	bitter cucumber
Cucurbitaceae	Cucumis anguria	
Cucurbitaceae	Cucumis dipsaceus	teasel gourd
Cucurbitaceae	Cucumis ficifolius	
Cucurbitaceae	Cucumis figarei	
Cucurbitaceae	Cucumis melo	melon
Cucurbitaceae	Cucumis sativus	cucumber
Cucurbitaceae	Cucumis sp.	
Cucurbitaceae	Cucurbita maxima	pumpkin, squash
Cucurbitaceae	Cucurbita moschata	
Cucurbitaceae	Cucurbita pepo	gourd, squash, zucchini
Cucurbitaceae	Cucurbita sp.	pumpkin, squash
Cucurbitaceae	Cylanthra pedata	
Cucurbitaceae	Diplocyclos palmatus	
Cucurbitaceae	Kedrostis leloja	

Cucurbitaceae	Lagenaria leucaritha	bottle gourd
Cucurbitaceae	Lagenaria siceraria	water-bottle
Cucurbitaceae	Lagenaria sphaerica	
Cucurbitaceae	Luffa acutangula	ridged gourd, sponge gourd
Cucurbitaceae	Luffa cylindrica	smooth luffa
Cucurbitaceae	Luffa sp.	
Cucurbitaceae	Momordica charantia	bitter melon, bitter gourd
Cucurbitaceae	Momordica foetida	
Cucurbitaceae	Momordica trifoliolata	
Cucurbitaceae	Sechium edule	chayote
Cucurbitaceae	Telfairia occidentalis	grooved pumpkin
Cucurbitaceae	Trichosanthes cucumerina	snakegourd
Oxalidaceae	Averrhoa carambola	carambola/starfruit
Rutaceae	Citrus reticulata	tangerine
Rutaceae	Citrus sinensis	sweet orange
Solanaceae	Capsicum frutescens	tabasco pepper
Solanaceae	Solanum aethiopicum	
Solanaceae	Solanum anguivi	
Solanaceae	Solanum scabrum	

Additional information on African host records and associated specimens can be found on : <http://projects.bebif.be/fruitfly/taxoninfo.html?id=175>

Information on host range worldwide can be found on the USDA Compendium of Fruit Fly Host Information (see Liquido et al., 2016). Also see McQuate et al. (2017).

Impact & management

A major pest of cucurbit species, with infestation rates reaching 100 pupae per kg of fruit (bitter melon) Vargas et al. (1997). Infestation rates in Africa can differ widely according to region, seasonality and interspecific competition with *Dacus* specie, but can be considerable for particular hosts (De Meyer et al., 2015).

Management for this species is, as for most fruit fly pests, most efficient using an IPM (Integrated Pest Management) program, including aspects such as orchard sanitation, bait sprays, mass trapping among others. General reviews on the current IPM components applied in Africa can be found in chapters 13 to 20 of Ekesi et al. (2016).

No SIT (Sterile Insect Technique) application specifically for this species has been developed in Africa.

SIT has been used in eradication and suppression programmes elsewhere (see Enkerlin, 2005 for a review).

Attractants & trapping

Both sexes can be attracted by protein bait products such as liquid protein baits (Buminal, Brewery waste, Torula yeast) and three component Biolure.

Male flies can be attracted by cuelure.

General information on trapping, types of traps, lures and required density of trapping stations can be found in IAEA (2013), Shelly et al. (2014), and Manrakhan (2016).

Distribution

Zeugodacus cucurbitae is mainly found in western Africa (from Senegal to Cameroon) and eastern Africa (from Ethiopia and Sudan, southwards till Malawi). Present on the Seychelles, La Réunion, Mauritius, and the Comoro archipelago (De Meyer et al., 2012).

Distribution map for Africa, based upon specimen records with georeferences is available at:

<http://projects.bebif.be/fruitfly/taxoninfo.html?id=175>

For worldwide distribution, see GBIF: <http://www.gbif.org/species/8070510>

Quarantine regulations

Zeugodacus cucurbitae is on the A1 quarantine pest list of the EPPO and is a quarantine pest for the USA, Jordan and New Zealand (<https://gd.eppo.int/taxon/DACUCU/categorization>).

Others

CABI Plantwise factsheet on *Z. cucurbitae* can be found at:

<http://www.plantwise.org/knowledgebank/datasheet.aspx?dsid=17683>

CABI invasive species compendium on *Z. cucurbitae* can be found at:

<http://www.cabi.org/isc/datasheet/17683>

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