

A checklist of the dacine fruit flies (Diptera, Tephritidae, Dacinae) of Mozambique

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Here we present a checklist of all records of dacine fruit flies (Diptera: Tephritidae: Dacinae) from Mozambique, based on verified specimen records in natural history collections and literature records. In total, 57 Dacinae species are recorded from Mozambique, of which only one is considered endemic. This relatively low species diversity compared to other African countries appears to be related to incomplete sampling. For each species the localities from which it was recorded are given (including geocoordinates), or a general distribution is provided. The checklist is discussed briefly in terms of species richness, endemism and geographic distribution.

INTRODUCTION

Fruit flies (Diptera, Tephritidae) are a very diverse group of Diptera, comprising more than 5 000 species worldwide (EFSA 2020), and approximately 1 000 species known from the Afrotropical region (Norrbom et al. 1999). The family is characterised by a diverse larval developmental biology mainly infesting the seed-bearing organs of a wide variety of host plants. This can take place either in the flower heads or in the fruits (the fleshy part or the actual seeds) (Drew and Yuval 1999). Because of this diversity in host range they can be used as indicator species for biodiversity (e.g. Copeland et al. 2005). A number of frugivorous species are, however, also of major economic significance because of the damage they cause on cultivated fruits including several that are categorised as vegetables (mainly Cucurbitaceae and Solanaceae such as cucumber, pumpkin, tomato, eggplant, etc.). Dacine fruit flies (Tephritidae: Dacinae) mainly belong to the frugivorous group, and thus comprise a number of pest species. Representatives of the tribe Gastrozonini who are grass infesters (in Asia in particular of bamboo. African records are from the subfamily Panicoideae, see Hancock 1999) are an exception among the Dacinae.

Losses for particular crops can run up to 40–50% and into the millions (see Ekesi et al. 2016 for examples) and the total loss across the entire African continent is estimated at USD 2 billion annually (Korir et al. 2015). Because of this economic importance of frugivorous species, the group has received a lot of scientific interest in Africa. However, for Mozambique this interest has been relatively limited prior to 2000. The oldest dated specimen known from Mozambique is a female of *Ceratitis capitata* (in the United States National Museum, Washington DC, U.S.A.) collected in Maputo in 1903. But von Röder (1885) and Karsch (1887) described a number of species based on specimens collected in ‘Delagoa Bay’ (i.e. Baía de Maputo), hence must have been collected prior to 1885. Further records are rare with the exception of a number of collecting efforts in 1928 (mainly at Umbeluzi River and Marracuene) reported by Munro (1984). Further material was collected by Skinner and McGough in 1949 within the framework of United States Department of Agriculture (USDA) funded surveys in Africa in search of natural enemies of *C. capitata*, and by Usher and Stuckenberg in 1957 in the area of Luabo and Mt Gorongosa. The presence of *Bactrocera dorsalis* (under the junior synonym *Bactrocera invadens*) in Mozambique in 2007 (Correia et al. 2008) triggered several surveying activities in the country funded by USDA/APHIS (Animal and Plant Health Inspection Service)-Pretoria office and conducted by mixed teams of USDA, EMU and RMCA. This yielded extensive collections from different provinces within the country not just for *Bactrocera dorsalis* but also for a number of other fruit fly species. The intensive sampling and subsequent data have been presented by Cugala et al. (2016), including information on their relative abundance. More recently, the invasion and spread of *Zeugodacus cucurbitae* has caused further concern and support has been given through several projects funded by the World Trade Organization’s Standards and Trade Development Facility and the Belgian Development Cooperation (see <https://fruitflies.africamuseum.be/activities/projects>).

Published lists for Mozambique are nevertheless incomplete. For example the catalogue of the Afrotropical region (Cogan and Munro 1980) only lists nine species specifically occurring in Mozambique (and an additional 5 listed as ‘widespread’ in Africa). Garcia and Bandeira (2011) provide a general list of known Tephritidae from Mozambique, predominantly based on literature references. They report 59 species for the family, of which 35 belong to the Dacinae. In addition, prior to 2000, several species were known from a single or very limited number of localities and their distribution in the country poorly known. It was, therefore, considered important to

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DATES

Received: 07 February 2023

Accepted: 02 May 2023

KEYWORDS

distribution

diversity

surveys

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have an up-to-date checklist of dacine fruit flies with their known distribution listed, so that it can be used as a reference publication for future research.

MATERIAL and METHODS

The checklist is based upon a specimen database (in Microsoft Access©) for Afrotropical dacine (Tephritidae, Dacinae) fruit flies, maintained by the RMCA. This database includes information for all specimens housed in the main natural history collections worldwide and of which the identification could be confirmed by re-examination. It also includes literature records that are deemed reliable. In total, it comprises 600 block records (i.e. a record for one or several specimens with identical data regarding locality, date of capture and collector) from Mozambique, representing more than 14 000 specimens. Records originate from all parts and provinces of Mozambique except for Tete province which has been poorly sampled (Figure 1). Mozambique has several ecological regions (Burgess et al. 2004) but a large part of the country is dominated by miombo woodlands and the majority of the localities where material has been collected correspond with this vegetation type. In addition, material has also been collected to some extent in the coastal forest mosaics. Other ecological regions like flooded grasslands or savannas, mangroves and montane grasslands are under sampled (Figure 2). Extensive references and list of collections that were examined, can be consulted at a dedicated website (True fruit flies (Diptera, Tephritidae) of the afrotropical regions – <http://projects.bebif.be/fruitfly/index.html>). Identifications are based on the respective papers listed below under the short treatment per genus, as well as the multi-entry lucid key developed by Virgilio et al. (2014) (which is also available online, see <https://fruitflykeys.africamuseum.be>).

For each taxon, the known list of localities in Mozambique is given. All these localities are included in Appendix 1 with

their geo-coordinates where applicable and annotations for doubtful or unknown locations. If more than 30 localities within Mozambique are known for a particular taxon, it is indicated as ‘widespread’. Additional information is given between parentheses “()” for a particular location if deemed relevant. If the actual location could not be traced but only a related larger or a nearby geographical entity, the latter is given with the former between square brackets “[]”. In addition to the distribution in Mozambique, the wider geographic distribution in Africa is also listed. If a particular taxon is known from more than 10 countries, a general description (like ‘widespread’ or ‘widespread in eastern and southern Africa’) is given. Furthermore we indicate for each species whether it is, based on the currently known host range as entered in the above mentioned database, either a non-pest, minor economic pest or major economic pest species. The listing is ordered by genus, and for each genus is preceded by a short description on the general biology and the availability of taxonomic revision and/or identification key. These are replicates of descriptions recently presented in an annotated checklist for the dacines of Tanzania (De Meyer et al. 2023). Comments are added under particular taxa when additional information on the record or identity is relevant.

In Appendix 1, all localities are listed with indication of the province (if this could be retrieved) and georeferences. The source of the georeferences varies and is either taken from ad verbatim indication on the collecting event or publication, or a posteriori sourced from various geographical reference sources and gazetteers.

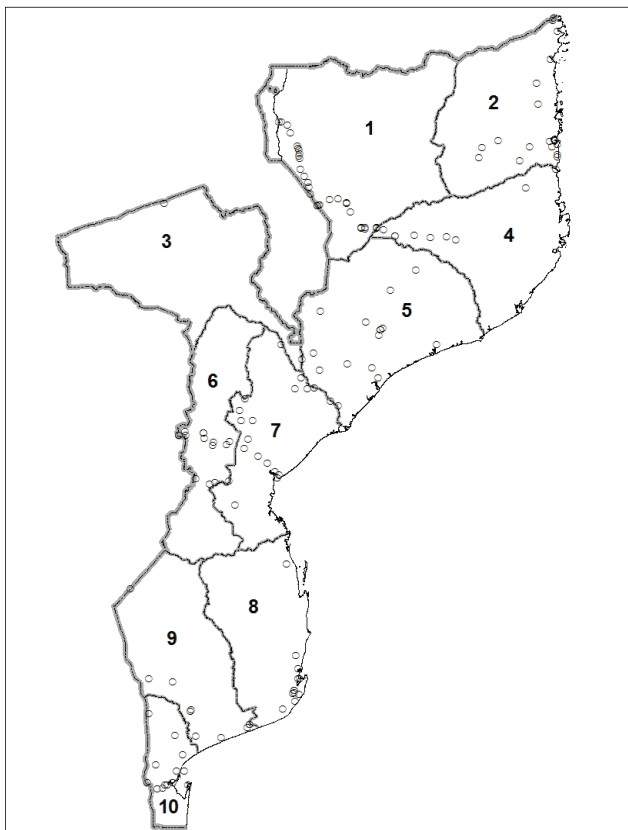


Figure 1. Map of Mozambique with provinces and sampling localities indicated. 1: Niassa, 2: Cabo Delgado, 3: Tete, 4: Nampula, 5: Zambezia, 6: Manica, 7: Sofala, 8: Inhambane, 9: Gaza, 10: Maputo

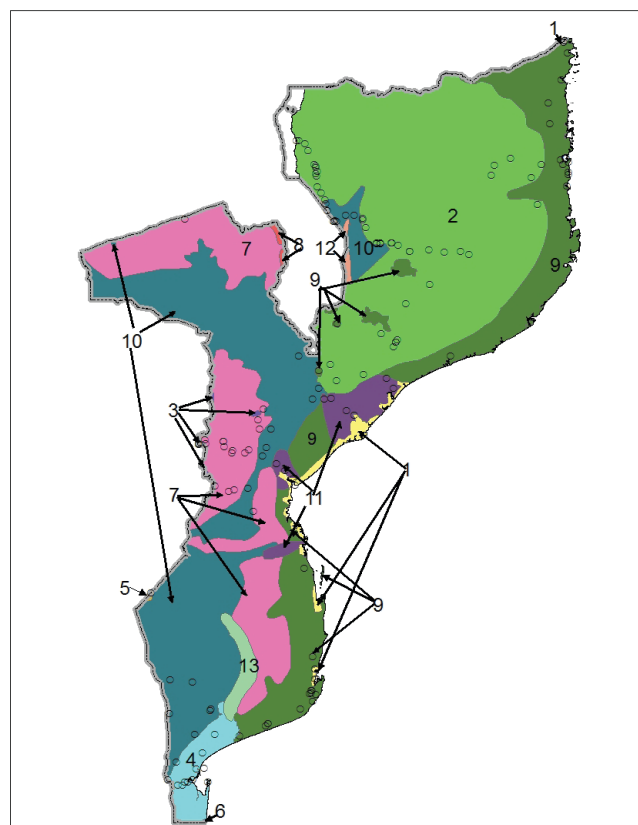


Figure 2. Map of Mozambique with ecological regions and sampling localities indicated. 1: East African mangroves, 2: Eastern Miombo woodlands, 3: Eastern Zimbabwe montane forest-grassland mosaic, 4: Maputoland coastal forest mosaic, 5: Southern Africa bushveld, 6: Southern Africa mangroves, 7: Southern Miombo woodlands, 8: Southern Rift montane forest-grassland mosaic, 9: Southern Zanzibar-Inhambane coastal forest mosaic, 10: Zambeian and Mopane woodlands, 11: Zambeian coastal flooded savanna, 12: Zambeian flooded grasslands, 13: Zambeian halophytics

LIST OF SPECIES

CERATITIDINI

Capparimyia **Bezzi, 1920**

The genus *Capparimyia* is a predominantly Afrotropical group, comprising eight species. All known and confirmed host records belong to the caper family (Capparaceae). Its biology is unusual in that larvae are reported both from flower buds and from fruits. A taxonomic revision and identification key are presented by De Meyer & Freidberg (2005).

Capparimyia aristata **De Meyer & Freidberg**

Mozambique: Mphingwe

Also recorded from Malawi.

Status: non-pest (host unknown)

Carpophthoromyia **Austen, 1910**

The genus *Carpophthoromyia* comprises 17 species, all restricted to the Afrotropical Region. Known host plants belong to the genus *Drypetes* (Euphorbiaceae). An identification key and taxonomic revision are presented by De Meyer (2006).

Carpophthoromyia dimidiata **Bezzi, 1924**

Mozambique: Baia de Maputo, West of Beira [Siluwe Hills], Mphingwe, Pungwe River Valley [Guéngère], Tembe-Tembe, and Vanduzi

Widespread in southern and eastern Africa (Kenya, Malawi, South Africa, Tanzania, and Zimbabwe).

Status: non-pest

Comment: The record for Mozambique of *C. vittata* (Fabricius, 1794) in Norrbom et al. (1999) (and taken over in Garcia and Bandeira 2011) is probably based on a misidentification as all material studied by De Meyer (2006) from Mozambique belongs to *C. dimidiata*, and both species show a disjunct distribution. For an extensive discussion on taxonomic confusion between *C. amoena* Enderlein, 1920, *C. dimidiata* and *C. vittata* and their respective geographic ranges, see De Meyer (2006).

Ceratitis **MacLeay, 1829**

The genus *Ceratitis* is a very speciose (about 100 described species) Afrotropical genus. One species, *C. capitata* has been introduced into other parts of the world and is considered one of the economically most important pest species. Host range within the genus is variable with some species being restricted to a particular plant host genus while others are very polyphagous. De Meyer et al. (2002) presented a host plant list for all described species. A comprehensive multi-entry key for the genus is presented by Virgilio et al. (2014) and available online. See <https://fruitflykeys.africamuseum.be>

Ceratitis capitata **(Wiedemann, 1824)**

Mozambique: widespread

Widespread in Africa; introduced in other continents.

Status: major economic pest

Ceratitis cosyra **(Walker, 1849)**

Mozambique: widespread

Widespread in Africa.

Status: major economic pest

Ceratitis discussa **Munro, 1935**

Mozambique: Buzi River pontoon (near Chimanimani Mountains)

Also recorded from Benin, Kenya, Malawi, South Africa, Tanzania, and Zimbabwe.

Status: non-pest (identification unconfirmed for single record from *Citrus* (De Meyer et al., 2002)).

Ceratitis ditissima **(Munro, 1938)**

Mozambique: Luabo, and Rotanda (Mussapa River Forest)

Widespread in Africa.

Status: minor economic pest (mainly of *Citrus*)

Ceratitis edwardsi **(Munro, 1957)**

Mozambique: Rotanda (Mussapa River Forest)

Widespread in Africa.

Status: non-pest

Ceratitis marriotti **Munro, 1933**

Mozambique: Gorongosa Mountain

Also recorded from Democratic Republic of Congo (Kivu region), Kenya, South Africa, and Uganda.

Status: non-pest

Ceratitis millicentae **De Meyer & Copeland 2005**

Mozambique: Boane, Chokwe, Jangamo, Lua-Lua, Maputo, Mecufi, Metuge, Mitucue, Mphingwe, Muchara, Ngoma, Vanduzi, and Zandamela

Also recorded from Eswatini, Kenya, and South Africa.

Status: non-pest

Ceratitis pedestris **(Bezzi, 1924)**

Mozambique: Maputo, Mitucue, and Mphingwe

Widespread in Africa.

Status: minor economic pest (few records from tomato, main host *Strychnos* spp.)

Ceratitis punctata **(Wiedemann, 1824)**

Mozambique: unknown locality (one male specimen in Hendel Collection at Naturhistorisches Museum Wien, Austria). Garcia and Bandeira (2011) report this species from Umbeluzi.

Widespread in Africa.

Status: minor economic pest

Comment: Because of possible confusion with *C. millicentae* (see De Meyer & Copeland 2005), the presence of this species in Mozambique needs reconfirmation.

Ceratitis quilicii **De Meyer, Mwatawala & Virgilio, 2016**

Mozambique: Maputo, Namaacha, and Quinta das Abelhas

Also recorded from Botswana, Eswatini, Kenya, Malawi, Mauritius, Réunion, South Africa, Tanzania, and Zimbabwe.

Status: major economic pest

Comment: Prior to 2016, representatives of this species were listed under *C. rosa*. Re-examination of all available material shows that *C. quilicii* is limited to the southernmost part of the country.

Ceratitis quinaria **(Bezzi, 1918)**

Mozambique: Nanhupo, and Vanduzi

Widespread in Africa.

Status: minor economic pest (most records from mango, guava, and peach).

Ceratitis rosa **Karsch, 1887**

Mozambique: widespread

Also recorded from Kenya, Malawi, South Africa, and Tanzania.

Status: major economic pest

Ceratitis rubivora **Coquillett, 1901**

Mozambique: Malica, and Vanduzi

Also recorded from Burundi, Cameroon, Kenya, Malawi, South Africa, Tanzania, Uganda, and Zimbabwe.

Status: minor economic pest (of *Rubus* spp.).

***Perilampus Bezzi*, 1920**

Perilampus comprises 17 species occurring solely in different parts of the Afrotropical region. All known hosts belong to Loranthaceae and the fruit fly larvae are known to attack the seeds. A taxonomic revision and identification key are provided by De Meyer (2009).

***Perilampus curta* Munro, 1938**

Mozambique: Boane, Maputo, and Masiena
Also recorded from Botswana, Eswatini, Kenya, South Africa, and Tanzania.

Comment: An earlier record by De Meyer (2009) of material from Maputo and identified as *Perilampus miratrix* Munro, 1939 was considered erroneous after molecular identification and belongs to *P. curta*. The presence of *P. miratrix* in Mozambique by Garcia & Bandeira (2011) (misspelled as *miratrix*), is thus not substantiated.

Status: non-pest

***Trirhithrum Bezzi*, 1918**

The genus *Trirhithrum* is endemic to the Afrotropical region and includes about 40 described species. Host range is variable with some species considered pest species of coffee. An identification key is provided by White et al. (2003).

***Trirhithrum albomaculatum* (von Röder, 1885)**

Mozambique: Baia de Maputo
Also recorded from Kenya, South Africa, Tanzania, Uganda, and Zimbabwe.

Status: non-pest

***Trirhithrum bimaculatum* (von Röder, 1885)**

Mozambique: Baia de Maputo
Also recorded from Equatorial Guinea.

Status: non-pest (host unknown)

***Trirhithrum nigerrimum* (Bezzi, 1913)**

Mozambique: Mphingwe
Widespread in Africa.
Status: minor economic pest (of coffee)

***Trirhithrum nitidum* (von Röder, 1885)**

Mozambique: Baia de Maputo, and Maxixe
Also recorded from South Africa.
Status: non-pest

DACINI

Genus *Bactrocera* Macquart, 1835

A very speciose genus (> 500 species) mainly found in the Oriental and Oceanian regions (Doorenweerd et al. 2018). Several of the representatives are considered agricultural pests and of major economic significance (White and Elson-Harris 1994). The African diversity is contrastingly rather limited with 13 species known from the Afrotropical region including three invasive species introduced from Asia: *Bactrocera dorsalis*, *B. latifrons* (Hendel, 1915) and *B. zonata* (Saunders, 1842). A key for the Afrotropical species is provided by White (2006) but not including *B. latifrons*.

***Bactrocera biguttula* (Bezzi, 1922)**

Mozambique: Catuane, and Maputo
Also recorded from Kenya, and South Africa.
Status: non-pest (recorded from olive but needs confirmation (White, 2006)).

***Bactrocera dorsalis* (Hendel, 1912)**

Mozambique: widespread
Widespread in Africa.
Status: major economic pest

***Dacus Fabricius*, 1805**

The genus *Dacus* is an Old World genus comprising about 270 species worldwide with a predominance in the Afrotropical region (Doorenweerd et al. 2018). The host range is confined to three families: Apocynaceae, Cucurbitaceae, and Passifloraceae. The vast majority appear to be oligophagous attacking plants of one particular host family and host specificity is to some extent corroborated by monophyletic groupings within the genus (Virgilio et al. 2009; Starkie et al. 2022). However, the current subgeneric classification does not reflect this and is in need of revision. An identification key for the Afrotropical species is provided by White (2006) while some additional species were described afterwards by White and Goodger (2009) and De Meyer et al. (2013).

***Dacus africanus* Adams, 1905**

Mozambique: Chupanga, Cuamba, Goonda, Gorongosa (town), Gorongosa Mountain, Mitucue, Morrumbala, Mphingwe, Nharuchonga, and Zero

Also recorded from South Africa, Zambia, and Zimbabwe.

Status: non-pest (host unknown)

***Dacus amphoratus* (Munro, 1984)**

Mozambique: Marracuene, and Umbeluzi River
Also recorded from Kenya, and Zimbabwe.

Status: non-pest (pest unknown)

***Dacus binotatus* Loew, 1862**

Mozambique: Umbeluzi River
Also recorded from Democratic Republic of Congo, Kenya, Lesotho, Namibia, Nigeria, South Africa, and Zimbabwe.

Status: non-pest

***Dacus bivittatus* (Bigot, 1858)**

Mozambique: widespread
Widespread in Africa.
Status: major economic pest

***Dacus brevis* Coquillett, 1901**

Mozambique: Umbeluzi River
Also recorded from Angola, Kenya, Lesotho, South Africa, Tanzania, Uganda, and Zimbabwe.

Status: non-pest

***Dacus brevistriga* Walker, 1861**

Mozambique: Maputo
Also recorded from South Africa, and Tanzania.
Status: non-pest

***Dacus ceropegiae* (Munro, 1984)**

Mozambique: Bandede
Also recorded from Ethiopia, Kenya, Nigeria, Tanzania, and Uganda.

Status: non-pest

***Dacus chapini* Curran, 1927**

Mozambique: Maputo
Also recorded from Cameroon, Democratic Republic of Congo, Kenya, Nigeria, Rwanda, Tanzania, and Uganda.

Status: non-pest (host unknown)

***Dacus chiwira* Hancock, 1985**

Mozambique: Alua, Bive, Caia-Chupanga road (crossing), Cuamba, Goonda, Metuge, Mize, Mitucue, Mphingwe, and Napaha

Also recorded from Ethiopia, Malawi, Tanzania, and Zimbabwe.

Status: non-pest

***Dacus ciliatus* (Loew, 1892)**

Mozambique: Boane, Chande, near Chemba [Nova Choupanga], Cuamba, Fevia, Inhaca Island, Lichinga (Agricultural Research Station), Luabo, Magene, Magude, Maputo, Marracuene, Marromeu, Mugene, Namaacha, and Nharuchonga

Widespread in Africa.

Status: major economic pest

***Dacus durbanensis* Munro, 1935**

Mozambique: Caia-Chupanga road (crossing), Gorongosa (town), Mitucue, and Mphingwe

Also recorded from Kenya, Malawi, South Africa, Tanzania, and Zimbabwe.

Status: non-pest

***Dacus eclipsis* (Bezzi, 1924)**

Mozambique: Boane, and Inhambane

Also recorded from South Africa, and Zimbabwe.

Status: non-pest

***Dacus eminus* Munro, 1939**

Mozambique: Boane, Dombe, and Mphingwe

Also recorded from Angola, Namibia, South Africa, Zambia, and Zimbabwe.

Status: non-pest

***Dacus famona* Hancock, 1985**

Mozambique: Bive, Cuamba, Mandimba (border post office), Manhiça, Mitucue, Mutuale, and Nanhupo

Also recorded from Botswana, Malawi, South Africa, Tanzania, Zambia, and Zimbabwe.

Status: non-pest (host unknown)

***Dacus ficicola* Bezzi, 1915**

Mozambique: Umbeluzi River

Also recorded from Angola, Democratic Republic of Congo, Kenya, Lesotho, Rwanda, Somalia, South Africa, Zambia, and Zimbabwe.

Status: non-pest

***Dacus frontalis* Becker, 1922**

Mozambique: Boane, and Namaacha

Widespread in Africa.

Status: minor economic pest

***Dacus fuscatus* Wiedemann, 1819**

Mozambique: unknown locality (type material of junior synonym *Dacus bistrigatus* Loew, 1852. Syntype in Zoological Museum of Berlin but only thorax and midlegs remaining; whereabouts of other syntype material unknown. (See White 2006)

Also recorded from Angola, Botswana, Lesotho, South Africa, Tanzania, and Zimbabwe.

Comments: this species is listed as *Dacus bistrigatus* by Garcia and Bandeira (2011).

Status: non-pest

***Dacus fuscineris* (Malloch, 1932)**

Mozambique: Maputo

Also recorded from Kenya, South Africa, and Tanzania.

Status: non-pest (host unknown)

***Dacus hamatus* Bezzi, 1917**

Mozambique: Chimoio, and Maputo

Widespread in Africa.

Status: non-pest

***Dacus humeralis* (Bezzi, 1915)**

Mozambique: Mphingwe, and Namaacha

Widespread in Africa.

Status: non-pest

***Dacus kariba* Hancock, 1985**

Mozambique: Gorongosa Mountain

Also recorded from South Africa, Zambia, and Zimbabwe.

Status: non-pest (host unknown)

***Dacus mulgens* Munro, 1932**

Mozambique: Baia de Maputo

Also recorded from Lesotho, and South Africa.

Status: non-pest

***Dacus ostiofaciens* Munro, 1932**

Mozambique: Maputo

Also recorded from Kenya, and South Africa.

Status: non-pest

***Dacus pallidilatus* Munro, 1948**

Mozambique: Alua, Chiure, Cuamba, Dombe, and Mphingwe

Also recorded from Tanzania, and Zimbabwe.

Status: non-pest

***Dacus pamela* (Munro, 1984)**

Mozambique: Luabo

Only known from Mozambique.

Status: non-pest (host unknown)

***Dacus pergulariae* Munro, 1938**

Mozambique: unknown locality (one male specimen in collection Naturhistorisches Museum Wien without further details)

Also recorded from Ethiopia, Kenya, South Africa, and Tanzania.

Status: non-pest.

***Dacus plagiatus* Collart, 1935**

Mozambique: Maputo, and Umbeluzi River

Also recorded from Democratic Republic of Congo, Kenya, Nigeria, South Africa, Tanzania, and Zimbabwe.

Status: non-pest (host unknown)

***Dacus punctatifrons* Karsch, 1887**

Mozambique: Boane, Chiure, Chokwe, Cuamba, Dombe, Gorongosa (town), Lichinga (6 km S), Macomia, Mandimba, Manhiça, Maputo, Mecufi, Metuge, Mize, Mitucue, Mocimboa da Praia, Mocuba, Mphingwe, Mutuale, Muxungue, Napaha, Naucheche, Pemba, and Vanduzi

Widespread in Africa.

Status: major economic pest

***Dacus purpurifrons* Bezzi, 1924**

Mozambique: Umbeluzi River

Also recorded from Democratic Republic of Congo, South Africa, and Zimbabwe.

Status: non-pest (host unknown).

***Dacus siliqualactis* Munro, 1939**

Mozambique: Covane Community Lodge (Canhane, Massingir)

Widespread in Africa.

Status: non-pest

Dacus umbeluzinus Munro, 1984

Mozambique: Umbeluzi River

Also recorded from Benin, Burkina Faso, Kenya, Tanzania, and Zimbabwe.

Status: non-pest

Dacus vertebratus Bezzi, 1908

Mozambique: Boane, near Chemba [Nova Choupanga], Maputo, Pungwe River Valley [Guéngère], and Rikatla

Widespread in Africa.

Status: major economic pest

Genus *Zeugodacus* Hendel, 1927

A speciose genus comprising close to 200 species, all restricted to the Oriental and Oceanian regions (Doorenweerd et al. 2018). One species, the melon fly *Zeugodacus cucurbitae*, has been introduced to other parts of the world including the African continent as well as some to the islands group in the western Indian Ocean (White 2006).

Zeugodacus cucurbitae (Coquillett, 1899)

Mozambique: Present in northern and central parts of the country: Cabo Delgado, Nampula, Niassa, Zambezia, Tete, Manica and Sofala provinces. (cf. discussion below)

Widespread in Africa.

Status: major economic pest

GASTROZONINI

Bistrispinaria Speiser, 1913

The genus *Bistrispinaria* comprises four endemic species. Known host records belong to Poaceae (Copeland 2007). An identification key was provided by Hancock (1999).

Bistrispinaria magniceps (Bezzi, 1918)

Mozambique: Amatongas

Also recorded from Burundi, Democratic Republic of Congo, Kenya, Malawi, Sudan, Tanzania, and Uganda.

Status: non-pest

Clinotaenia Bezzi, 1920

The genus *Clinotaenia* comprises six endemic species. There are no known host records but it is assumed that they attack Poaceae as is the case with other gastrozonines. Hancock (1999) provides an identification key for five species (*C. angusticeps* (Bezzi, 1923) was later transferred to this genus by De Meyer (2006)).

Clinotaenia superba (Bezzi, 1918)

Mozambique: Serra Chiperone (east of), and near Vanduzi [Belasse]

Also recorded from Malawi, and Tanzania.

Status: non-pest

DISCUSSION

In total, 57 Dacinae species are recorded from Mozambique. This is about 14% of all dacine species recorded from the Afrotropical region. Compared to some of the neighbouring countries like Tanzania (117 species known) or South Africa (104 species), this is a relatively low number. It does not appear to be due to less varied ecosystems being presented in Mozambique but rather to incomplete sampling throughout all regions of the country. Compared to other neighbouring countries where there has been limited sampling in recent decades as well, such as Malawi (59 species), Zimbabwe (68 species) or Zambia (27 species), the number is comparable.

Of all species known from Mozambique, only one appears to be endemic: *Dacus pamela* described from Luabo at the lower

Zambezi River and collected there by P and B Stuckenberg in 1957. The species has not been reported since. Regarding distribution patterns within the country, the information is also patchy because of the limited distribution data for several species and thus any conclusions or patterns are preliminary. Many species' distribution fits in a more general pattern from southern to eastern Africa. This is, for example, reflected in *Carpophthoromyia dimidiata*, *Ceratitidis millicentae*, *C. quiliicii*, *C. rosa*, *Perilampus curta*, and several *Dacus* species. For some the presence in Mozambique is the northernmost distribution record and is even restricted to the southern provinces, like observed in *Trirhithrum nitidum*, and *Dacus mulgens*.

One species, *Dacus longistylus* Wiedemann, 1830 is reported to occur in Mozambique according to Norrbom et al. (1999) (reference repeated in Garcia & Bandeira 2011). However, no material belonging to this species could be studied by the authors. It is also not listed as occurring in Mozambique in the revision by White (2006). *Dacus longistylus* has a wide distribution in Africa but largely from the West (Senegal) eastwards to the Arabian Peninsula. The southernmost record is from central Tanzania (see De Meyer et al. 2023). However, as the host for this species is *Calotropis procera* (Apocynaceae) and this plant occurs in parts of Mozambique, the presence of the fruit fly is not unlikely. We prefer, however, to await the actual confirmation based on examined material from the country before including it in the species list. The presence of *Perilampus miratrix* is based on a misidentification by De Meyer (2009) and actually refers to *P. curta* while the presence of *Ceratitidis punctata* requires confirmation because of possible confusion with *C. millicentae* (cf. above under comments in species list).

Two species found in Mozambique are invasives from Asia: *Bactrocera dorsalis* and *Zeugodacus cucurbitae*. The former was first recorded from the Kenyan coast in 2003 by Lux et al. 2003 (as member of the *Bactrocera dorsalis* group; later described as *Bactrocera invadens* by Drew et al. 2005, but this is generally considered as junior synonym of *B. dorsalis*). The first occurrence for Mozambique was reported by Correia et al. (2008) from Cuamba in Niassa Province. Its rapid spread through Mozambique has been well documented by Cugala et al. (2016) with the species spreading southwards throughout the whole country over five years (2007–2012). It is now found throughout the whole of Sub-Saharan Africa with the exception of the more southern provinces in South Africa (Manrakhan et al. 2015). *Zeugodacus cucurbitae* was already present in eastern Africa (Kenya and Tanzania) since the 1930s. For a long time its distribution appeared to be restricted to some areas in eastern Africa but since 2000 it has been reported from several other countries throughout the African continent and it is now widely distributed from Senegal eastwards to Kenya and southwards to Malawi and Mozambique (De Meyer et al. 2015). In Mozambique it was first reported in 2013 from the northernmost districts Mocimboa da Praia and Palma of Cabo Delgado Province (Cugala et al. 2014). In 2016 the species was considered to be still restricted to this area although in higher abundance (Cugala et al. 2016). Recent surveys, however, have indicated that the species is now spreading southwards as well, having been detected in several sampling sites in the northern (Cabo Delgado, Nampula and Niassa provinces) and Central (Tete, Manica, Sofala and Zambezia provinces) regions, where it was not reported previously. There has been no detection of *Z. cucurbitae* at the trapping sites in the southern provinces of Inhambane, Gaza and Maputo.

Of all species reported, 39 were already known to occur in Mozambique before 2000. However of these 29 were known from a single location in Mozambique only. Several of these records were restricted to a few sampling sites, in particular the capital Maputo (or Delagoa Bay/Baia de Maputo as a larger area),

and the adjacent Umbeluzi River area, both in the southernmost part of the country. Since 2000, 18 additional species were found and the geographic spread for a number of species is now better documented. However, in general the main distribution and range of the majority of the species remains poorly known and more intensive surveys are required in order to get a more complete image of the dacine fruit fly diversity and occurrence in the country.

ACKNOWLEDGEMENTS

The authors acknowledge the support and funding of the following institutions and organisations: the Belgian Development Cooperation through consecutive framework agreements with the Royal Museum for Central Africa (projects NSS fruit flies, AGROVEG, DISPEST), the Standards and Trade Development Facility (STDF) of the World Trade Organisation (project FFF), and the USDA-APHIS Pretoria office for support of initial surveys for *Bactrocera dorsalis* occurrence in Mozambique. We would like to thank the reviewers for their valuable input.

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Appendix 1: List of localities in Mozambique with indication of province and geo-references

Locality	Province	Latitude	Longitude	Locality	Province	Latitude	Longitude
Alua	Nampula	-13.9339	39.92361	Manhiça	Maputo	-25.4022	32.80722
Amatongas	Manica	-19.1833	33.75	Maputo	Maputo/Maputo City	-25.9653	32.58917
Baia de Maputo ¹	Maputo	-25.9653	32.58917	Marracuene	Maputo	-25.7369	32.67639
Bandeze	Niassa	-12.9061	35.05056	Marromeu	Sofala	-18.2908	35.94528
Bive	Zambezia	-16.8011	37.02278	Masiema [unknown locality] ³			
Boane	Maputo	-26.0808	32.36	Maxixe	Inhambane	-23.8597	35.34722
Buzi River Pontoon (nr Chimanimani Mountains)	Manica	-19.8667	33.1	Mecufi	Cabo Delgado	-13.2961	40.55417
Caia-Chupanga road (crossing)	Sofala	-18.0467	35.45917	Metangula	Niassa	-12.6972	34.80778
Catuane	Maputo	-24.5839	32.05944	Metuge	Cabo Delgado	-12.9917	40.38611
Chande	Niassa	-13.6422	35.2575	Mieze	Cabo Delgado	-13.0953	40.44111
Chemba [unknown locality: Nova Choupanga] ²	Sofala	-17.1644	34.89389	Mitucue	Niassa	-14.8167	36.61667
Chimoio	Manica	-19.1333	33.48333	Mocimboa da Praia	Cabo Delgado	-11.3469	40.36
Chiure	Cabo Delgado	-13.3839	39.78583	Mocuba	Zambezia	-16.8425	36.98139
Chokwe	Gaza	-24.5333	32.98333	Morrumbala	Zambezia	-17.3283	35.58222
Chupanga	Sofala	-18.0297	35.6125	Mphingwe	Sofala	-18.0472	35.20222
Covane Community Lodge (Massingir, Canhane)	Gaza	-23.8839	32.07972	Muchara	Cabo Delgado	-13.0411	40.53944
Cuamba	Niassa	-14.8164	36.53528	Muesse	Nampula	-14.7989	36.86056
Dombe	Manica	-19.9761	33.39528	Mugene [unknown locality] ⁴			
Fevia [unknown locality]				Mutuale	Nampula	-14.8392	37
Goonda	Sofala	-19.9142	33.81333	Muxungue	Sofala	-20.3897	33.93833
Gorongosa (town)	Sofala	-18.6894	34.07	Namaacha	Maputo	-25.9703	32.02556
Gorongosa Mountain	Sofala	-18.6903	34.31361	Nanhupo	Cabo Delgado	-12.9942	39.32694
Inhaca Island	Maputo	-26.0194	32.93	Napaha	Cabo Delgado	-13.3561	38.93833
Inhambane	Inhambane	-23.865	35.38333	Naucheche	Niassa	-14.3556	35.67639
Jangamo	Inhambane	-24.1406	35.27111	Ngoma	Cabo Delgado	-13.245	40.54583
Lichinga (6 km S)	Niassa	-13.3769	35.23278	Nharchonga	Sofala	-19.2506	34.14139
Lichinga (Agricultural Research Station)	Niassa	-13.3319	35.25083	Palma	Cabo Delgado	-10.7831	40.47528
Luabo	Zambezia	-18.3833	36.11667	Pemba	Cabo Delgado	-12.9583	40.48333
Lua-lua	Zambezia	-17.5297	36.29583	Pungwe River [unknown locality: Guéngère] ⁵	Sofala	-19.0692	34.22056
Lurio (river bridge, province border)	Niassa	-14.795	36.85389	Quinta das Abelhas	Maputo	-26.005	32.41639
Macomia	Cabo Delgado	-12.2589	40.13361	Rikatla	Maputo	-25.7333	32.85
Macoropa	Niassa	-14.4861	36.30472	Rotanda (Mussapa River forest)		-18.2667	34.15
Magene	Zambezia	-17.1069	38.16528	Serra Chiperone (east of)	Zambezia	-16.4819	35.79083
Magude	Maputo	-25.0231	32.64806	Siluwe Hills [unknown locality: Situated West of Beira] ⁶	Sofala		
Malema	Nampula	-14.9556	37.24083	Umbeluzi River	Maputo	-26.0086	32.47139
Malica	Niassa	-13.1842	35.19611	Vanduzi (n.s.)	Manica	-18.9511	33.26861
Mandimba (border post office)	Niassa	-14.3694	35.61861	Vanduzi [Belasse unknown locality] ⁷	Manica	-18.9511	33.26861
				Vila Bocage	Tete	-17.4608	35.33306
				Zandamela	Inhambane	-24.7953	34.30444
				Zero	Zambezia	-17.6725	35.71611

Notes

¹Baia de Maputo: a number of specimens are recorded from 'Delagoa Bay' (i.e. 'Baia de Maputo'). We have differentiated between this reference to a general region and Maputo which may be referring to the more restricted area of Maputo town, although in most cases it is not clear where exactly the material was collected. Records from 'Delagoa Bay' refer to specimens either without specific data regarding collecting date and collector, or refer to collector Monteiro or R. Monteiro. This most likely refers to Rose Monteiro, an insect collector, who was living in Maputo in the late 19th Century (Monteiro 1891).

²The locality Nova Choupanga cannot be found. The original labels indicate that the locality is close to Chemba which is a village in Sofala province near the Zambezi River. It concerns material collected by P. Lesne and deposited in the Muséum National d'Histoire Naturelle in Paris, France.

³The locality Masiema cannot be found. However, there is a location called Maciene in Gaza Province. The name 'Masiema' may be a misspelling of the latter.

⁴The locality Mugene cannot be found. It concerns material collected by C. Fuller who also collected material at the locality Magene. We assume 'Mugene' may be a misspelling of the locality name 'Magene'.

⁵The locality Guéngère (or Guengéré) cannot be found. The original label refers to the 'Vallée du Pungoué' (= Pungwe River Valley) which is a river crossing Sofala and Manica Provinces. The material was collected by G. Vasse who was a hunter active in the early 20th Century and who conducted a number of expeditions from Guengéré (see Vasse 1909).

⁶The locality Siluwe Hills cannot be found. It refers to material collected by DM Cookson who was mainly active in the eastern Highlands in Zimbabwe (in particular Vumba) but also collected in Vanduzi. The label indicates 'West of Beira'. There is a location currently known as Siluvo Hill or Xiluvo Hill, West of Beira and along the main road from Beira to Chimoio. Possible this is the location referred to as Siluwe.

⁷The locality Belasse cannot be found. Material under this locality originate from a trapping network set up by Vanduzi Company and the locality is considered to be in the proximity of Vanduzi.