

## QUEENSLAND DEPARTMENT OF PRIMARY INDUSTRIES

## MISCELLANEOUS BULLETIN NO. 1

## HOST RECORDS OF FRUIT FLIES (FAMILY TEPHRITIDAE) IN THE NORTHERN TERRITORY

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### SUMMARY

Complete host and locality records of fruit flies (Tephritidae) in the Northern Territory were compiled from authentic older records and the results of an intensive survey conducted from 1975 till 1979. The survey involved 741 samples of cultivated and wild fruits representing 183 plant species from 66 plant families.

The species of Dacinae listed are *Dacus* (*Afrodacus*) *jarvisi* (Tryon), *D. (Bactrocera) aquilonis* (May), *D. (B.) bryoniae* (Tryon), *D. (B.) species A*, *D. (B.) exspoliatus* (Hering), *D. (B.) mendosus* (May), *D. (B.) pallidus* (Perk. & May), *D. (B.) tenuifascia* (May), *D. (Daculus) decurtans* (May), *D. (Dacus) sp. n. (species B)*, and *D. (Diplodacus) signatifer* Tryon. In addition, two species of Trypetinae are recorded—*Adrama biseta* Malloch and *Callistomyia horni* Hendel.

### I. INTRODUCTION

Fruit flies (family Tephritidae) are major pests of horticultural crops. To date these crops have been of minor importance in the Northern Territory but the occurrence of fruit fly species in that area has considerable quarantine implications for horticultural industries throughout Australia.

The Northern Territory is an important point of entry to Australia for overseas travellers and is adjacent to South-East Asian countries with their fauna of important pest species. The risks are exemplified by the entry of the Asian melon fly, *Dacus* (*Zeugodacus*) *cucurbitae* Coquillet, which was bred from cucurbits in the Botanical Gardens in Darwin but was eradicated before it became further established (Hill 1915).

More recently, *Dacus* (*Bactrocera*) species A was recorded at various localities in the Northern Territory. This species belongs to the *dorsalis* complex and is morphologically indistinguishable from *D. (B.) dorsalis* (Hendel). However, genetic studies (Ohta, personal communication) and ecological studies (Fitt and Bateman, personal communication) indicate that it is significantly different from *D. dorsalis*. The current work consolidates older records and reports information on hosts of tephritids during an intensive survey carried out from December 1975 to the present.

TABLE 1—continued

RECORDED CULTIVATED AND WILD HOSTS FOR THE TEPHRITIDAE IN THE NORTHERN TERRITORY (JANUARY, 1979)—continued

| Fruit Fly Species                                     | Common Name of Host | Scientific Name of Host  | Plant Family           | Locality and Date of Collection   |
|---|---------------------|--|------------------------|---|
| <i>Dacus (Afrodacus) jarvisi</i><br>(Tryon)—continued | Cockatto apple      | <i>Planchonia careya</i><br>(F. Muell.) Kunth.   | Barringtoniaceae       | Croker Island 16 Nov. 76, 14 Dec. 78<br>Jabiru 19 Jan. 77, 8 Nov. 77<br>Acacia Creek 7 Nov. 77<br>South Alligator River, Arnhem<br>Highway 8 Nov. 77<br>Garden Point, Melville Island<br>9 Nov. 77, 24 Nov. 76<br>Snake Bay, Melville Island 9 Nov. 77<br>Manton River 10 Nov. 77<br>Humpty Doo 10 Nov. 77<br>Holmes Jungle 29 Dec. 78<br>Howard Springs 11 Nov. 77<br>Mataranka Homestead 21 Nov. 77 |
|   | Wild apple          | <i>Syzygium rubiginosum</i><br>Merr. and Perry<br><i>Syzygium suborbiculare</i><br>(Benth.) Hartly and Perry | Myrtaceae<br>Myrtaceae | Creek E. of Paru Village, Melville<br>Island 17 Dec. 76<br>Katherine Gorge 11 Nov. 76<br>Gunn Point 10 Nov. 76, 4 Nov. 77,<br>4 Dec. 78, 11 Jan. 79, 17 Jan. 79<br>South Alligator River, Arnhem<br>Highway 2 Feb. 77, 8 Nov. 77,<br>1 Dec. 77<br>Casuarina Beach 5 Dec. 77<br>Croker Island 14 Dec. 78   |
| <i>Dacus (Bactrocera) aquilonis</i><br>(May)          | Grapefruit          | CULTIVATED HOST<br><i>Citrus paradisi</i> Macf.<br><i>Citrus</i> sp.   | Rutaceae<br>Rutaceae   | Daly River 14 Apr. 78<br>Mt. Tolmer 26 Nov. 53  |
|   | Peach<br>Guava      | <i>Prunus persica</i> Stokes<br><i>Psidium guajava</i> L.  | Rosaceae<br>Myrtaceae  | Mallapunyah Springs 14 Dec. 76<br>Gunn Point 10 Oct. 76<br>Wild Boar Station 16 Sep. 76,<br>3 Dec. 76<br>Angurugu, Groote Eylandt 14 Dec. 77  |

## II. SURVEYS PRIOR TO 1975

Surveys for tephritids and their hosts commenced in the Alice Springs area in 1952. Mertin (1952) reported that no Dacine flies occurred in that area. This view was supported by limited host surveys and trapping carried out by Brown (1954). The use of more effective synthetic attractants by Austwick (1961) showed that *Dacus* (*Bactrocera*) *newmani* (Perkins) existed in Alice Springs but, having no recorded hosts, was not of economic importance. Similar host surveys were conducted in the Darwin, Howard Springs, and Humpty Doo areas by Brown (1954).

Commencing in 1961, cultivated and wild fruits were sampled in the area from Darwin to Katherine. This was accompanied by limited trapping, using synthetic attractants. Mangoes, *Mangifera indica* L., were reported to be infested with maggots identified as those of *Dacus* (*Afrodacus*) *jarvisi* (Tryon) (Austwick 1961). Similarly, "wild apples", fruits of *Syzygium suborbiculare* (Benth.) Hartly & Perry were heavily infested by the same species. Mounted Dacine specimens and records within the Department of Industrial Development showed that limited collections of host fruits were made by Chaffey and Li (1964), Li (1965), and Allwood (1969).

## III. MATERIALS AND METHODS

Fruits from both cultivated and wild hosts were collected from localities north of Tennant Creek during the wet and dry seasons since 1975. To obtain fruits of differing maturity, wild fruits were collected at random from plants and the ground. Collections of cultivated hosts were generally restricted to fruits with sting marks but guava, *Psidium guajava* L., mango, *M. indica*, and lime, *Citrus aurantifolia* (Christm.) Swing. were sampled randomly.

A total of 741 samples of fruit was collected from December 1975 to January 1979. These consisted of 183 plant species from 66 plant families. Of these, 22 species belonging to 11 families were of some economic importance.

Collected fruits were placed in gauze-covered clear plastic boxes containing sieved sawdust to a depth of 25 to 30 mm. The sawdust was moistened at intervals, the frequency depending on the amount of moisture provided by the fruit. Less fleshy fruits required the sawdust to be moistened every 2 days. Rearing was carried out at 26 to 28°C. When flies emerged, they were fed on a sugar solution for 3 days to allow development of colour, and then killed, mounted, and identified.

Details of the methods used to sample fruit and breed flies prior to 1975 were not well documented. Collection of potential hosts was probably on a random basis resulting usually from requests by growers to identify insects causing problems in fruit or vegetable crops. Available records indicated that the method of rearing was similar to that described by May (1953).

## IV. RESULTS

Data on the positive records of the host fruits of the Tephritidae are summarized in table 1.

**TABLE 1**  
 RECORDED CULTIVATED AND WILD HOSTS FOR THE TEPHRITIDAE IN THE NORTHERN TERRITORY (JANUARY, 1979)

| Fruit Fly Species                           | Common Name of Host        | Scientific Name of Host   | Plant Family                      | Locality and Date of Collection  |
|---|----------------------------|---|-----------------------------------|--|
| <i>Adrama biseta</i> Malloch ..             | Freshwater Mangrove        | WILD HOST<br><i>Barringtonia acutangula</i><br>(L.) Gaertn.   | Barringtoniaceae                  | Flying Fox Creek, Arnhem Highway<br>3 Feb. 77<br>Howard Springs 11 Jan. 79   |
| <i>Callistomyia horni</i> Hendel ..         | Freshwater Mangrove        | WILD HOST<br><i>Barringtonia acutangula</i><br>(L.) Gaertn.<br><i>Glycosmis pentaphylla</i><br>Benth. | Barringtoniaceae<br>Rutaceae      | South Alligator River, Arnhem<br>Highway 2 Feb. 77<br>20 km W. South Alligator River<br>28 May 76  |
| <i>Dacus (Afrodacus) jarvisi</i><br>(Tryon) | Mango                      | CULTIVATED HOST<br><i>Mangifera indica</i> L.   | Anacardiaceae                     | Darwin 17 Nov. 53, 4 Dec. 61,<br>20 Oct. 70, 13 Nov. 72, 18 Dec. 73,<br>16 Oct. 74, 28 Oct. 77, 12 Nov. 78,<br>13 Nov. 78<br>Berrimah Experiment Farm 30 Oct. 78<br>Nightcliff 12 Nov. 78, 16 Nov. 78,<br>17 Sep. 78 |
|   | Guava                      | <i>Psidium guajava</i> L.   | Myrtaceae                         | Katherine 28 Feb. 77<br>Darwin 24 Oct. 77<br>Gunn Point 9 Jan. 78<br>Elcho Island 12 Dec. 78<br>Katherine 24 Feb. 54<br>Darwin 13 Nov. 78  |
|   | Pomergranate<br>Java apple | <i>Punica grantum</i> L.<br><i>Syzygium</i> sp. aff. <i>malaccensis</i><br>(L.) Merr. & Perry         | Punicaceae<br>Myrtaceae           |  |
|   | -----                      | WILD HOST<br><i>Eugenia armstrongii</i><br>Benth.<br><br><i>Parinari corymbosum</i><br>(Bl.) Miq.     | Myrtaceae<br><br>Chrysobalanaceae | Garden Point, Melville Island<br>23 Nov. 76<br>Snake Bay, Melville Island 23 Nov. 76<br>Garden Point, Melville Island<br>8 Nov. 77   |

TABLE 1—continued

RECORDED CULTIVATED AND WILD HOSTS FOR THE TEPHRITIDAE IN THE NORTHERN TERRITORY (JANUARY, 1979)—continued

| Fruit Fly Species                                      | Common Name of Host | Scientific Name of Host                               | Plant Family     | Locality and Date of Collection  |
|--|---------------------|---|------------------|--|
| <i>Dacus (Bactrocera) aquilonis</i><br>(May)—continued |                     | WILD HOST   |                  |  |
|  |                     | <i>Acmena hemilampra</i> (F. Muell.) Merr. & Perry    | Myrtaceae        | Pickertaramoor, Melville Island<br>18 Feb. 76  |
|  |                     | <i>Cleistocalyx operculatus</i> (Roxb.) Merr. & Perry |                  | Fogg Dam, Humpty Doo 9 Jan. 78,<br>20 Mar. 78  |
|  |                     | <i>Glycosmis pentaphylla</i> Benth.                   | Rutaceae         | South Alligator River, Arnhem<br>Highway 2 Feb. 77   |
|  |                     | <i>Glycosmis trifoliata</i> Spreng.                   | Rutaceae         | Wildman River, Arnhem Highway<br>28 May 76   |
|  |                     | <i>Livistona humilis</i> R. Br.                       | Palmae           | 7 km N-E of Garden Point, Melville<br>Island 19 May 76   |
|  |                     | <i>Micromelem minutum</i> (Forst. f.) Wight           | Rutaceae         | East Point 27 Nov. 78  |
|  |                     | <i>Parinari corymbosum</i> (Bl.) Miq.                 | Chrysobalanaceae | Pullempulli, Melville Island 24 Nov. 76<br>Manapi Road, Melville Island<br>2 Dec. 76   |
|  |                     | <i>Pouteria sericea</i> (Ait.) Baecni                 | Sapotaceae       | Garden Point, Melville Island<br>8 Nov. 77   |
|  |                     | <i>Syzygium claviflorum</i> (Roxb.) Cowan and Cowan   | Myrtaceae        | 30 km N of Mataranka 5 Apr. 77<br>Creek E. of Paru Village, Melville<br>Island 9 Nov. 77   |
|  |                     | <i>Syzygium suborbiculare</i> (Benth.) Hartly & Perry | Myrtaceae        | Taracumbi Falls, Melville Island<br>12 Oct. 78<br>South Alligator River, Arnhem<br>Highway 2 Feb. 77, 1 Dec. 77<br>Gunn Point 10 Nov. 77, 4 Dec. 78,<br>11 Jan. 79, 17 Jan. 79 |
|  |                     | <i>Terminalia erythrocarpa</i> F. Muell               | Combretaceae     | Croker Island 14 Dec. 78<br>Near Alligator Billabong 8 Jun. 77   |
|  |                     | Wild apple  |                  |  |

**TABLE 1—continued**  
**RECORDED CULTIVATED AND WILD HOSTS FOR THE TEPHRITIDAE IN THE NORTHERN TERRITORY (JANUARY, 1979)—continued**

| Fruit Fly Species  | Common Name of Host | Scientific Name of Host   | Plant Family | Locality and Date of Collection  |
|--|---------------------|---|--------------|--|
| <i>Dacus (Bactrocera) aquilonis</i><br>(May)— <i>continued</i> | Billy-goat plum     | <i>Terminalia ferdinandiana</i><br>Exell.                                     | Combretaceae | Airstrip, Snake Bay 18 Feb. 76<br>90 km along Arnhem Highway<br>31 Mar. 76<br>90 km from Darwin on Mandorah<br>Road 3 Apr. 76<br>60 km N-E Pine Creek 7 Apr. 76,<br>19 Apr. 77, 19 May 77<br>Wild Boar Station Turnoff, Arnhem<br>Highway 12 Apr. 77<br>Murganella 20 Apr. 77<br>Snake Bay 22 Apr. 77<br>Wildman River (West Branch)<br>Arnhem Highway 14 May 77<br>Nourlangie Rock 27 May 77<br>Katherine Gorge 5 Feb. 77 |
|  |                     | <i>Terminalia grandiflora</i> Benth.  | Combretaceae |  |
| <i>Dacus (Bactrocera) bryoniae</i><br>(Tryon)                  | Strychnine Berry    | WILD HOST<br><i>Strychnos lucida</i> R. Br.                                   | Strychnaceae | Fogg Dam, Humpty Doo 20 Jan. 78  |
| <i>Dacus (Bactrocera) expoliatus</i><br>(Hering)               |                     | WILD HOST<br><i>Diospyros maritima</i> (Bl.)                                  | Ebenaceae    | Smith Point, Cobourg Peninsula<br>24 Aug. 78   |
| <i>Dacus (Bactrocera) mendosus</i><br>(May)                    |                     | WILD HOST<br><i>Pouteria sericea</i> (Ait.) Baehni                            | Sapotaceae   | 30 km N. of Mataranka 26 May, 76   |
| <i>Dacus (Bactrocera) pallidus</i><br>(Perk. & May)            | Leichhardt pine     | WILD HOST<br><i>Sarcocephalus coadunatus</i><br>(Roxb. ex Sin.) Druce         | Naucleaceae  | Darwin 26 Apr. 76<br>Katherine 10 Jan. 77, 20 Jan. 77,<br>15 Jan. 77, 25 Feb. 77   |
| <i>Dacus (Bactrocera) tenuifascia</i><br>(May)                 |                     | WILD HOST<br><i>Planchonella pohlmanniana</i><br>(F. Muell.) Pierre ex Dubard | Sapotaceae   | Creek E. of Paru Village, Melville<br>Island 24 Jul. 77<br>Gunn Point 1 Sep. 77<br>30 km E. of Daly River 8 Sep. 77<br>100 km W. of Jabiru 11 Oct. 77,<br>8 Nov. 77  |

TABLE 1—continued

RECORDED CULTIVATED AND WILD HOSTS FOR THE TEPHRITIDAE IN THE NORTHERN TERRITORY (JANUARY, 1979)—continued

| Fruit Fly Species   | Common Name of Host                                   | Scientific Name of Host                                 | Plant Family   | Locality and Date of Collection   |
|---|---|---|----------------|---|
| <i>Dacus</i> ( <i>Bactrocera</i> ) species A                  | Mango (14 specimens have been reared from this fruit) | CULTIVATED HOST<br><i>Mangifera indica</i> L.           | Anacardiaceae  | Nightcliff, Darwin 13 Dec. 69,<br>19 Dec. 69  |
|   | Opilia (Major host)                                   | WILD HOST<br><i>Opilia amentacea</i> Roxb.              | Opiliaceae     | Pullempulli, Melville Island<br>16 Dec. 75, 17 Feb. 76, 3 Jan. 77,<br>11 Jan. 78<br>Creek E. of Paru Village, Melville<br>Island 23 Nov. 76, 1 Dec. 76,<br>9 Dec. 77<br>Paru Village, Melville Island<br>1 Dec. 76<br>Pickertaramoor, Melville Island<br>13 Jan. 77, 9 Dec. 77, 11 Jan. 78<br>Taracumbi Falls, Melville Island<br>11 Jan. 78<br>Gunn Point 20 Dec. 77, 4 Dec. 78,<br>18 Dec. 78 |
| <i>Dacus</i> ( <i>Daculus</i> ) <i>decurtans</i><br>(May)     |   | WILD HOST<br><i>Carallia brachiata</i> (Lour.)<br>Merr. | Rhizophoraceae | Taracumbi Falls 17 Jul. 78, 12 Oct. 78<br>Creek E. of Paru Village, Melville<br>Island 19 Oct. 78   |
| <i>Dacus</i> ( <i>Dacus</i> ) sp. n. (species B)              |   | WILD HOST<br><i>Secamone elliptica</i> R. Br.           | Asclepiadaceae | 20 km S. of Dunmarra 5 May 76   |
| <i>Dacus</i> ( <i>Diplodacus</i> ) <i>signatifer</i><br>Tryon |   | WILD HOST<br><i>Capparis</i> sp.                        | Capparidaceae  | East Point, Darwin 1 Nov. 78  |

Thirteen species of fruit flies were bred from host fruits. *Dacus* (*Bactrocera*) *aquilonis* (May) showed the greatest diversity in host range, being bred from 4 cultivated hosts from 3 plant families and 13 wild hosts from 6 plant families. *D. jarvisi* was bred from 4 cultivated hosts from 3 plant families and 5 wild hosts from 3 plant families. *D. species A* was bred from one cultivated and one wild host. *Callistomyia horni* Hendel was recorded from two wild hosts. The other species of fruit flies were bred from single hosts.

On several occasions, two species of tephritids emerged from the one sample of fruit. On five occasions, *D. aquilonis* and *D. jarvisi* were bred from fruit of *Syzygium suborbiculare*. The same species of flies also emerged from one sample of fruit of *Parinari corymbosum*. Similarly, *Callistomyia horni* and *D. aquilonis* emerged from one sample *Glycosmis pentaphylla*.

## V. DISCUSSION

Within the fruit fly fauna of the Northern Territory some well known economic species are absent e.g. *D. cucurbitae* and *D. tryoni* (Froggatt). Damage to cultivated hosts by the species which do occur was not common in comparison with that caused by *D. tryoni* in Eastern Australia.

Of the species present, *D. jarvisi*, *D. aquilonis*, and *D. species A* were recorded from cultivated hosts. *D. jarvisi* was responsible for most of the damage to guavas and mangoes. The mango cultivar Bowen Special attracted higher numbers of flies and had higher levels of infestation than other cultivars.

*D. aquilonis* had not previously been recorded from hosts of economic importance. In the Northern Territory, this species has been recorded from peaches, guava, grapefruit, and an undetermined species of *Citrus*.

Despite the intensive survey, *D. species A* was recorded only from mango and *Opilia amentacea* Roxb. with *O. amentacea* being the major host. Fourteen specimens of *D. species A* were bred from mango in 1969. No further infestations of mangoes have been recorded during the current programme.

Adults of this species have been trapped as far south as 19° south latitude whilst the known distribution of *O. amentacea* includes the region to 15° south latitude. Migration over this distance seems unlikely and the possibility exists that other unrecognized hosts are present in this area. In addition, on Melville Island and in some northern areas of the mainland, the fruiting period of *O. amentacea* does not coincide with initial increases in numbers of *D. species A* caught in traps. The fruiting period of *O. amentacea* extends from late November to January whilst numbers of *D. species A* commence to increase in the August–September period.

Both the limited host range and the low intensity of damage to cultivated hosts exhibited by *D. species A* are significantly different from that of the closely related *D. dorsalis* in Hawaii where 173 hosts have been recorded (Drew 1978). Intensive studies on the taxonomic status of *D. species A* are to be carried out elsewhere in Australia. Similarly, a species name for *Dacus* (*Dacus*) sp. n. (species B) is to be erected (Drew, personal communication). The sub-genus, *Dacus*, is of African origin and this constitutes a new and interesting record for the Northern Territory.

The record of *D. (B.) exspoliatus* (Hering) represents a new record in Australia. This species occurs in Papua New Guinea (Drew 1974).



## VI. ACKNOWLEDGEMENTS

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