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Taxonomic Associations: Host vs. Fruit Fly

Y. S. Rathore[1], S. N. Tiwari [2]

[1]MIG 110, Indira Nagar, Kanpur (U.P.), 208 026

[2]Deptt. Of Entomology, G.B. Pant University of Agri. & Tech., Pantnagar, Udhamsingh Nagar, (Uttarakhand)263 145

Abstract: ***Fruit flies (Diptera: Tephritidae) are invasive and detrimental for the production of fruits and vegetable crops round the globe. In the present study 163 species of fruit fly were randomly selected having maximum subgenera. Out of these, 159 belonged to tribe Dacini and 4 to tribe Trypetini. 53.37% fruit flies were feeding on plants of single family and rest on 2 or more than 2 families. Maximum number of fruit flies exploited plants from Cucurbitaceae (23) as a single host family followed by Asclepiadaceae (10) and Anacardiaceae (6). Highest number of fruit fly species was recorded on Cucurbitaceae (48) as host family and closely followed by Anacardiaceae (46), Myrtaceae (46) and Rutaceae (45). Plant taxonomic associations revealed that, in general, 84.52% families and 80.65% orders fall in dicotyledons, and 13.18% families & 16.13% orders in monocotyledons. Among dicotyledons, greater preference was observed for host families comprised of fundamentally woody plants (lignosae) than those are basically herbaceous in nature (herbaceae). In lignosae fruit flies invaded plants from 75.93% orders from very primitive (Annonales, Laurales, Dilleniales) to most advanced (Verbenales) orders, again indicating their preference to woody plants. Genus Bactrocera is a rich genus with several subgenera and groups and contains numerous host families. Preference of Dacus to host families was found towards Cucurbitaceae, Asclepiadaceae and Apocynaceae. Three species of Carpomya were exclusively associated with host family Rhamnaceae and one with Rosaceae. Phylogenetic study of Bactrocera (Bactrocera) tryoni revealed that host families follow the host orders on evolutionary lineage.***

Keywords: Fruit flies, dicotyledons, monocotyledons, lignosae, herbaceae, *Bactrocera, Dacus, Carpomya*

1. Introduction

Fruit flies (Diptera: Tephritidae) are invasive and detrimental for the production of fruit and vegetable crops. The family Tephritidae is distributed in all world regions except the Antarctica [16]. Among Tephritid fruit flies, Dacini is a large group with over 800 described species, chiefly in the genera *Bactrocera* and *Dacus* [10]. An another Tephritidae, *Carpomya* has limited species but some of them are very destructive pest of *Ziziphus* sp. in the area of host distribution [2].

Allwood *et al* (1999) and Hancock et al (2000) in their surveys from South East Asia and Australia, respectively concluded that high proportion of fruit flies confined to a single host family. Studies of Novotny et al (2005) on richness of fruit flies in rain forest revealed that they were mostly specialized to a single plant family (83% species) and within each family to a single genera (88% of species), while most were able to feed on >1 congeneric plant species. White and Elson-Harris (1992) described that besides family preference fruit flies had deeper associations on selection of flowers or fruits or both as their feeding sites. In the present study an attempt was made to find out preference of fruit fly species at confamilial and conorder levels. Co- evolutionary relationships was also investigated in one highly invasive and destructive fruit fly species.

2. Materials and Methods

Taxonomy of Tehritid fruit flies is very complicated and each genera has subgenera. To investigate the host-fruit fly relationships randomly a sample of commonly known fruit fly species was taken representing maximum sub-genera. It is beyond the scope of this paper to correctly list the host species along with genera, therefore, families are reported here. The main source of information were the publications of Anonymous (2011), Leblanc *et al* (2012, 2013) [9] [10]. The host families were aligned following the taxonomic classification of Hutchinson (1973). He divided phylum Angiosperms into subphylum dicotyledons and monocotyledons. Dicotyledons were divided in division lignosae (fundamentally woody plants) and division herbaceae (fundamentally herbaceous plants). Monocotyledons were partitioned into calyciferae (distinct calyx and corolla), corolliferae (calyx and corolla are similar) and glumiflorae (perianth was much reduced or represented by lodicules). The maximum number of host families was reported in fruit fly, *Bactrocera (Bactrocera) tryoni.* An attempt was, therefore, made to study the co-evolutionary pattern / phylogenetic relationships of this fruit fly species.

3. Results and Discussion

A general description of Tephritid fruit flies preference and confamilial and conorder affiliation is presented in Table 1 and host response of conspecies is presented in Table 2. Out of 163 fruit fly species, 159 belonged to tribe Dacini (Dacinae) and 4 to tribe Trypetini. Out of these fruit fly species, 87 (53.37%) were feeding on host plants of single family, 18 (11.04%) species invaded host plants from two families and rest i.e. 58 (35.58%) species infested plants from more than two families (Table 3). We could not find the high proportion of fruit fly association exclusively with a single family as reported by others. This could be due to particular niche or area surveyed by Allwood *et al* (1999) [1] and Hancock *et al* (2000) [6] may have limited plants of host families for set of fruit flies or the other plants which could have served as host did not have feeding structure present during survey period.

Maximum number of fruit fly species exploited plants from family Cucurbitaceae (23) as a single host family followed

by Asclepiadaceae (10), Anacardiaceae (6), Oleaceae, Rutaceae and Rhamnaceae each 4 (Table 1). Highest number of fruit fly species also harboured on Cucurbitaceae (48) as host family closely followed by Anacardiaceae (46), Myrtaceae (46), and Rutaceae (45) (Table 2).

Taxonomic classification described by Hutchinson (1973) [7] grouped 54 orders in division lignosae and 28 in herbaceae of dicotyledons. Monocotyledons consisted of 29 orders i.e. 12, 14 and 3 orders in calyciferae, corolliferae and glumiflorae, respectively. The data reported in Table 4 revealed that In general 84.52% families and 80.65% orders fall in dicotyledons and 13.18% families and 16.13% orders in monocotyledons. This shows that fruit flies prefer dicotyledonous host species over monocots. Among dicotyledons, greater preference was observed for host families in lignosae division than herbaceae. In monocots, calyciferae and corolliferae were preferred over glumiflorae. It is amazing that fruit flies viz., *B.(Bactrocera) mcgregori, B.(Bulladacus) bullata, B. (Bulladacus) gnetum, B.(Bulladacus) pacificae, B. (Bulladacus) penefeuva* feed on family Gnetaceae (order Gnetales) and *B.(Bactrocera) frauenfeldi* on family Araucariaceae of the order Pinales of gymnosperms. Supposedly, gymnosperms are progenitor of angiosperms and a foresaid species of fruit fly are feeding on such most primitive plants (Table 2).

In lignosae, fruit fly invaded plants from 41(75.93%) orders from very primitive (Annonales, Laurales,Dilleniales) to most advanced (Verbenales) orders, again indicating their preference to woody plants (Table 2). The host orders were supported by 7 families in Myrtales, 5 Celastrales and 3 each in Laurales, Tiliales and Solanales and less in others. The highest number of fruit fly species were recorded on Myrtales (112) followed by Sapindales (72), Rutales (53) and Ebenales (47). In herbaceae, order Solanales and Geraniales were invaded by 39 and 19 fruit fly species, respectively. In monocotyledons, Zingiberales were attacked by 23 and Palmales by 15 fruit fly species (Table 2).

A lot of controversy exists for the subgenera of *Bactrocera.* To differentiate diversity in this species rich genus, it has been taxonomically divided into 22 subgenera and 20 species complexes) [5]. Zhang *et al* (2015) [17] reported that subgenera *Bactrocera* (*Bactrocera*) and *Bactrocera* (*Zeugodacus*) are paraphyletic. Their molecular studies further revealed that subgenus *Austrodacus* and *Zeugodacus*, which attack cucurbit plants are closely related to the species of subgenus *Afrodacus, Bactrocera* and *Gymnodacus* which attack plants of numerous families. In addition, subgenus *Paratridacus*, is a sister group of subgenus *Tetradacus*, and 7 species of *B. (Bactrocera*) *dorsalis* complex. Subgenus *Daculus* is of independent lineage and not related to the *Bactrocera* group or *Zeugodacus* group.

Host-confamilial relationships presented here showed that among *Bactrocera,* subgenus *Bactrocera.* has large number of host families recording varied preference. However, other subgenera has limited and sometimes exclusive preference. Subgenus *Bulladacus* infested hosts from 5 families viz., Clusiaceae, Combretaceae, Gnetaceae, Meliaceae and Thymelaeaceae; *Daculus* and *Hemisurstylus* only on Clusiaceae; *Gymnodacus* on Clusiaceae and Anacardiaceae; *Hemigymnodacus* on 7 host families viz., Anacardiaceae, Brassicaceae, Cucurbitaceae, Musaceaes, Myristicaceae, Myrtaceae and Rutaceae; *Javadacus* and *Sinodacus* only on Cucurbitaceae; *Melanodacus* only infests Oleaceae; *Notadacus* feeds on plants of 28 host families; *Paradacus* on Cucurbitaceae and Solanaceae; *Paratridacus* on Cucurbitaceae, Meliaceae and Solanaceae; *Patridacus* on Clusiaceae and Cucurbitaceae, and *Zeugodacus* on several host families (Table 1,3)

In case of *Dacus*, preference to host families is varied but trend is clear i.e. towards Cucurbitaceae, Asclepiadaceae and Apocynaceae. Subgenus *Callantra* infests host plants in families Cucurbitaceae and Asclepiadaceae; *Dacus* in Caricaceae, Cucurbitaceae, Liliaceae, Malvaceae, Passifloraceae, Rubiaceae, Solanaceae but not Asclepiadaceae; *Didacus* on Asclepiadaceae, Cucurbitaceae, Malvaceae, Passifloraceae, Rutaceae; *Leptozyda* on Asclepiadaceae and Cucurbitaceae and *Neodacus* on Apocynaceae (Table 1). White and Elson-Harris (1992) [16] opined that major plant genus has a typical host pattern of host relationships. Most *Dacus* and *Bactrocera (Zeugodacus)* spp. show a strong preference for attacking species of a single plant family typically Asclepiadaceae or Cucurbitaceae. Aforesaid information largely shares their views. However, studies on African *Dacus* revealed that molecular data and plant associations do not corroborate morphology based classification and not compatible with the monophyly of the currently recognized subgenera. Rather, Apocynaceae feeders are monophyletic sister group of species feeding on both Cucurbitaceae and Passifloraceae (the latter being also monophyletic) (Virgilio *et al* 2009) [15].

Out of 4 *Carpomya* species in tribe Trypetini *C. incomplete, C. vesuviana* and *C. ziziphus* feed only on plants of family Rhamnaceae and *C. schineri* only on Rosaceae (Table 1 & 2).

Individual fruit fly response further indicated that some of the Dacini has large number of host families. For example *B.(Bactrocera) tryoni* is a serious pest and invades host plants in 50 families followed by *B.(Bactrocera) papayae* (49) *B.(Bactrocera) neohumeralis* (43) *B.(Bactrocera) dorsalis* (42), *B.(Bactrocera) frauenfeldi* (33) and *B.(Bactrocera) facialis* and *B.(Bactrocera) kraussi* each 30 host families and so on. *B. (Bactrocera) dorsalis* species complex contains over 100 taxa (Schutze *et al* 2014) [13] and the diversity and distribution makes phylogeny of this genus very complicated. Krosch *et al* (2013)[8] reported that *B. (Bactrocera) dorsalis* and *B.(Bactrocera) papayae* are the same species and similarly Schutze *et al* (2014) [13] concluded that *B.(Bactrocera) dorsalis* and *B.(Bactrocera) invadense* are the same species.

The morphological analysis based on colour differentiation by Clarke *et al* (2005) [4] revealed that *B. (Bactrocera) dorsalis, B. (Bactrocera) papayae, B. (Bactrocera) philippinensis and B. (Bactrocera) carambolae*, all are as *B.(Bactrocera) dorsalis (s.l.).* However, in the present list of host families (Table 1) showed that differences in number of host families for the above species.

On the basis of molecular studies Smith *et al* (2003) [14] reported that *B.(Bactrocera) dorsalis* complex was monophyletic in nature whereas, Nakahara and Muraji (2008)[11] found it to be paraphyletic.

As mentioned in aforesaid description and given in Table 1, out of 163 fruit fly species, *B.(Bactrocera) tryoni* reported to feed upon maximum number of host families. Therefore, a phylogenetic relationship of this species was discussed following the phylogenetic classification of angiosperms by Hutchinson (1973) [7]. *B.(Bactrocera) tryoni* feeds on three primitive plant families viz., Annonaceae (Annonales), Hernandiaceae and Lauraceae (Laurales) (evolved from most primitive plant species of order Magnoliales) and up to advanced families like Rubiaceae (Rubiales) and Verbenaceae (Verbenales) in the fundamentally woody group of plants (lignosae) (Table 1). However, none of the plant species from families of order Dilleniales were accepted (Fig. 1).

Order Rosales, Theales and Bixales co-evolved from order Dilleniales. Rosales is a natural group and 13 orders derived from this order; Theales gave rise to 2 orders Ericales and Ochnales. Similarly, Bixales group is comprised of 32 orders. On evolutionary scale Rosales group ranged from 6th to 19th, Theales 36^{th,} 37th and 38th and Bixales group from 20th onwards ending in Verbenales on 54th except those occupied by Theales. If we consider preference on order basis then 35.71, 33.35 and 71.88% were accepted within Rosales, Theales and Bixales groups, respectively. The following lineages were observed:

1) Bixales—Tiliales—Celastrales—Malpighiales—Euphorbiales—Rhamnales—Myrrsinales—Ebenales (10 families)
2) Bixales—Guttiferales—Myrtales (8 families)
3) Bixales—Passiflorales—Cucurbitales, Cactales (5 families)
4) Bixales—Tiliales—Celastrales—Olacales—Meliales (6 families)
5) Bixales—Tiliales—Olacales—Loganiales—Rubiales, Apocynales, Verbenales (9 families)
6) Rosales—Leguminales, Cunoniales (3 families)

This shows that 1st and 5th lineages were more prominent and families followed the orders on evolutionary lineage (Fig. 1). *B. (Bactrocera) tryoni* also invades plants/fruits in families of other orders in lignosae, herbaceae and monocots but they did not show any evolutionary pattern. It is remarkable that order Myrtales alone possessed 6 host families. Aforesaid description, therefore, revealed that *B. (Bactrocera) tryoni* follows phylogenetic pattern in host selection.

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Table 1: Affiliation between fruit fly species and host families

SI. No	Fruit fly species	Host families	No.
1	*Bactrocera (Afrodacus) biguttula*	Oleaceae	1
2	*Bactrocera (Afrodacus) jarvisi*	Anacardiaceae, Annonaceae, Arecaceae, Cactaceae, Caricaceae,Celastraceae,Clusiaceae,Combretaceae,Cucurbitaceae, Ebenaceae, Lauraceae, Lecythidaceae, Malpighiaceae, Meliaceae, Moraceae, Musaceae, Myrtaceae, Oleaceae, Oxalidaceae, Passifloraceae,Punicaceae, Rosaceae, Rubiaceae, Rutaceae, Sapindaceae, Sapotaceae, Solanaceae, Tiliaceae	28
3	*Bactrocera (Austrodacus) cucumis*	Anacardiaceae, Caricaceae, Combretaceae, Cucurbitaceae, Ebenaceae, Euphorbiaceae, Lauraceae, Myrtaceae, Oxalidaceae, Passifloraceae, Rosaceae, Rubiaceae, Rutaceae, Solanaceae, Vitaceae	15
4	*Bactrocera (Bactrocera) albistriga*	Anacardiaceae, Apocynaceae, Combretaceae, Moraceae, Myrtaceae, Verbenaceae	6
5	*Bactrocera (Bactrocera) alyxiae*	Apocynaceae	1
6	*Bactrocera (Bactrocera) anomala*	Sapotaceae	1
7	*Bactrocera (Bactrocera) aquilonis*	Anacardiaceae, Annonaceae, Arecaceae, Combretaceae, Cucurbitaceae, Ebenaceae, Euphorbiaceae, Flacourtiaceae, Lauraceae, Malpighiaceae, Meliaceae, Myrtaceae, Musaceae, Rhamnaceae, Rosaceae, Rubiaceae, Rutaceae, Sapindaceae, Sapotaceae, Santalaceae, Solanaceae, Tiliaceae	22
8	*Bactrocera (Bactrocera) arecae*	Annonaceae, Arecaceae	2
9	*Bactrocera (Bactrocera) atramentata*	Sapindceae	1
10	*Bactrocera (Bactrocera) bancroftii*	Euphorbiaceae	1
11	*Bactrocera (Bactrocera) barringtoniae*	Lecythidaceae	1
12	*Bactrocera (Bactrocera) breviaculeus*	Myrtaceae	1
13	*Bactrocera (Bactrocera) bryoniae*	Cucurbitaceae, Fabaceae, Loganiaceae, Musaceae, Passifloraceae, Solanaceae	6
14	*Bactrocera (Bactrocera) cacuminata*	Solanaceae	1
15	*Bactrocera (Bactrocera) caledoniensis*	Convolvulaceae, Gentianaceae, Rhiozophoraceae	3
16	*Bactrocera (Bactrocera) carambolae*	Alangiaceae, Anacardiaceae, Annonaceae, Apocynaceae, Arecaceae, Clusiaceae, Combretaceae, Euphorbiaceae, Lauraceae, Loganiaceae, Meliaceae, Moraceae, Myristicaceae, Myrtaceae, Oleaceae, Oxalidaceae, Polygalaceae, Punicaceae, Rhamnaceae, Rhizophoraceae, Rutaceae, Sapindaceae, Sapotaceae, Simaroubaceae, Solanaceae, Symplocaceae	26
17	*Bactrocera (Bactrocera) caryeae*	Anacardiaceae, Malpighiaceae, Moraceae, Myrtaceae, Musaceae, Rosaceae, Rubiaceae,Rutaceae,Sapotaceae	9
18	*Bactrocera(Bactrocera) cheessmanae*	Clusiaceae	1
19	*Bactrocera (Bactrocera) cilifer*	Cucurbitaceae, Rutaceae	2
20	*Bactrocera(Bactrocera) contermina*	Flacourtiaceae	1
21	*Bactrocera (Bactrocera) correcta*	Anacardiaceae, Annonaceae, Apocynaceae, Arecaceae, Cactaceae, Capparaceae, Caricaceae, Combretaceae, Cucurbitaceae, Dipterocarpaceae, Euphorbiaceae, Flacourtiaceae, Lecythidaceae, Malpighiaceae, Meliaceae, Moraceae, Musaceae, Myrtaceae, Rhamnaceae, Rosaceae, Rubiaceae, Rutaceae, Santalaceae, Sapindaceae, Sapotaceae, Simaroubaceae, Tiliaceae	27
22	*Bactrocera (Bactrocera) curvifera*	Moraceae	1
23	*Bactrocera(Bactrocera) curvipennis*	Anacardiaceae, Annonaceae, Apocynaceae, Clusiaceae, Caricaceae, Combretaceae, Convolvulaceae, Ebenaceae, Loganiaceae, Malpighiaceae, Moraceae, Musaceae, Myrtaceae, Olacaceae , Oalidaceae, Passifloraceae, Rhamnaceae, Rosaceae, Rubiaceae, Rutaceae, Solanaceae	21
24	*Bactrocera(Bactrocera) dapsiles*	Solanaceae	1
25	*Bactrocera(Bactrocera) decumana*	Sapotaceae	1
26	*Bactrocera(Bactrocera) diaphana*	Euphorbiaceae	1

27	*Bactrocera(Bactrocera) distincta*	Malvaceae, Moraceae, Myrtaceae, Rutaceae, Sapindaceae, Sapotaceae	6
28	*Bactrocera(Bactrocera) dorsalis*	Alangiaceae, Anacardiaceae, Annonaceae, Apocynaceae, Arecaceae, Bombacaceae,Burseraceae,Capparaceae,Caprifoliaceae, Caricaceae, Celastraceae,Clusiaceae,Combretaceae,Convolvulaceae,Cucurbitaceae,Ebenaceae, Euphorbiaceae, Fabaceae, Flacourtiaceae, Juglandaceae, Lauraceae, Lecythidaceae, Malpighiaceae, Meliaceae, Moraceae, Musaceae, Myrtaceae, Olacaceae, Oleaceae, Orchidaceae, Oxalidaceae, Passifloraceae,Polygalaceae,Rhamnaceae,Rosaceae,Rubiaceae,Rutaceae,Sapindaceae, Sapotaceae, Simaroubaceae, Solanaceae, Tiliaceae	42
29	*Bactrocera(Bactrocera) enochra*	Bactrocera (Bactrocera) enochra	1
30	*Bactrocera (Bactrocera) endiandrae*	Annonaceae, Clusiaceae	2
31	*Bactrocera (Bactrocera) facialis*	Anacardiaceae, Annonaceae, Apocynaceae, Asparagaceae, Boraginaceae, Bromeliaceae, Cardiopteridaceae, Caricaceae, Clusiceae, Combretaceae, Ebenaceae, Fabaceae, Hernandiaceae, Lauraceae, Lecythidaceae, Malvaceae, Meliaceae, Moraceae, Musaceae, Myristicaceae, Myrtaceae, Passifloraceae, Rosaceae, Rubiaceae, Rutaceae, Salicaceae, Sapindaceae, Sapotaceae, Solanaceae, Thymelaeaceae	30
32	*Bactrocera(Bactrocera) frauenfeldi*	Anacardiaceae, Annonaceae, Apocynaceae, Arecaceae, Auracariaceae, Caricaceae, Celastraceae, Clusiaceae, Combretaceae, Ebenaceae,Euphorbiaceae,Fabaceae,Goodeniaceae, Hernandiaceae, Lauraceae,Lecythidaceae,Loganiaceae,Malpighiaceae,Malvaceae,Melastomataceae, Meliaceae, Moraceae, Musaceae, Myrtaceae, Olacaceae, Oxalidaceae, Passifloraceae, Rubiaceae, Rutaceae, Sapindaceae, Sapotaceae, Solanaceae, Thymelaeaceae	33
33	*Bactrocera(Bactrocera) froggatt*	Anacardiaceae	1
34	*Bactrocera(Bactrocera) grandistylus*	Ebenaceae	1
35	*Bactrocera (Bactrocera) halfordiae*	Moraceae, Myrtaceae, Rosaceae, Rutaceae	4
36	*Bactrocera (Bactrocera) incisa*	Anacardiaceae, Moraceae, Myrtaceae	3
37	*Bactrocera(Bactrocera) jarvisi*	Anacardiaceae, Lecythidaceae, Oxalidaceae	3
38	*Bactrocera(Bactrocera) kandiensis*	Anacardiaceae, Annonaceae, Clusiaceae, Cucurbitaceae, Myrtaceae, Oxalidaceae, Rutaceae	7
39	*Bactrocera(Bactrocera) kirki*	Anacardiaceae, Annonaceae, Apocynaceae, Bromeliaceae, Caricaceae, Clusiaceae, Combretaceae, Elaeocarpaceae, Fabaceae, Lauraceae, Malvaceae, Meliaceae, Myrtaceae, Oxalidaceae, Passifloraceae, Rosaceae, Rubiaceae, Rutaceae, Sapindaceae, Sapotaceae,Solanaceae	21
40	*Bactrocera(Bactrocera) kraussi*	Agavaceae, Anacardiaceae, Annonaceae, Apocynaceae, Clusiaceae, Combretaceae, Cunoniaceae, Euphorbiaceae, Flacourtiaceae, Icacinaceae, Lauraceae, Lecythidaceae, Loganiaceae, Malpighiaceae, Meliaceae, Menispermaceae, Moraceae, Musaceae, Myrtaceae,Oleaceae,Oxalidaceae, Passifloraceae, Rosaceae, Rubiaceae, Rutaceae, Sapindaceae, Sapotaceae, Solanaceae, Thymeliaceae, Tiliaceae	30
41	*Bactrocera(Bactrocera) latifrons*	Anacardiaceae, Cucurbitaceae, Lythraceae, Musaceae, Myrtaceae, Oleaceae, Passifloraceae, Punicaceae, Rhamnaceae, Rosaceae, Rubiaceae, Rutaceae, Sapindaceae, Solanaceae, Verbenaceae	15
42	*Bactrocera(Bactrocera) limbifera*	Anacardiaceae	1
43	*Bactrocera (Bactrocera) lineata*	Apocynaceae, Moraceae, Sapindceae	3
44	*Bactrocera (Bactrocera) luteola*	Rubiaceae	1
45	*Bactrocera (Bactrocera) mayi*	Rosaceae	1
46	*Bactrocera (Bactrocera) mcgregori*	Gnetaceae	1
47	*Bactrocera(Bactrocera) melanotus*	Anacardiaceae, Annonaceae, Araliaceae, Caricaceae, Clusiaceae, Combretaceae, Fabaceae, Gentianaceae, Lauraceae, Melastomataceae, Moraceae, Myrtaceae, Oalidaceae, Rosaceae, Rubiaceae, Rutaceae, Sapindaceae, Sapotaceae, Solanaceae	19
48	*Bactrocero (Bactrocera) melas*	Arecaceae, Moraceae, Myrtaceae, Rosaceae, Rutaceae	5
49	*Bactrocero(Bactrocera) minax*	Rutaceae	1
50	*Bactrocera(Bactrocera) minuta*	Apocynaceae, Moraceae	2
51	*Bactrocera(Bactrocera) moluccensis*	Fabaceae	1
52	*Bactrocera (Bactrocera) muronis*	Annonaceae, Apocynaceae, Combretaceae,Euphorbiaceae, Myrtaceae	5
53	*Bactrocera (Bactrocera) murrayi*	Anacardiaceae	1
54	*Bactrocera (Bactrocera) musae*	Capparaceae, Caricaceae, Musaceae, Myrtaceae,Oleaceae, Passifloraceae, Rubiaceae,Rutaceae, Solanaceae	9
55	*Bactrocera (Bactrocera) mutabilis*	Rutaceae	1
56	*Bactrocera (Bactrocera) naucleae*	Rubiaceae	1

57	*Bactrocero(Bactrocer) neocheesmanae*	Clusiaceae, Rubiaceae	2
58	*Bactrocera(Bactrocera) neohumeralis*	Anacardiaceae, Annonaceae, Apocynaceae, Arecaceae, Baseliaceae, Cactaceae,Capparaceae,Caricaceae,Celastraceae,Clusiaceae,Combretaceae,Cunoniaceae,Ebenaceae,Euphorbiaceae,Flacourtiaceae,Hippocrateacee,Lauraceae,Liliaceae,Lecythidaceae,Malpighiaceae,Melastomataceae, Meliaceae, Moraceae, Musaceae, Myrtaceae, Olacaceae, Oleaceae, Oxalidaceae, Passifloraceae, Piperaceae, Rhamnaceae, Rhizophoraceae, Rosaceae, Rubiaceae, Rutaceae, Santalaceae,Sapindaceae, Sapotaceae, Similacaceae, Solanaceae, Tiliaceae, Verbenaceae, Vitaceae	43
59	*Bactrocera {Bactrocera} nigrotibialis*	Rubiaceae	1
60	*Bactrocera{Bactrocera) nigrovittata*	Lauraceae, Solanaceae	2
61	*Bactrocera {Bactrocera} oblique*	Celastraceae, Myrtaceae, Phylianthaceae	3
62	*Bactrocera (Bactrocera) occipitalis*	Anacardiaceae, Myrtaceae, Rutaceae	3
63	*Bactrocera (Bactrocera) ochrosiae*	Apocynaceae, Combretaceae, Malpighiaceae, Meliaceae, Myrtaceae, Olacaceae	6
64	*Bactrocera {Bactrocera} opiliae*	Anacardiaceae	1
65	*Bactrocera {Bactrocera} pallid*	Malvaceae, Rubiaceae	2
66	*Bactrocera(Bactrocera) papayae*	Amaryllidaceae, Anacardiaceae,Annonaceae,Apocynaceae, Arecaceae, Boraginaceae, Burseraceae, Cactaceae, Caricaceae, Clusiaceae, Combretaceae, Cucurbitaceae, Dilleniaceae, Ebenaceae, Euphorbiaceae, Fagaceae, Flacourtiaceae, Flagellariaceae, Lauraceae, Lecythidaceae, Fabaceae, Loganiaceae, Malpighiaceae, Meliaceae, Menispermaceae, Moraceae, Musaceae, Myristicaceae, Myrsinaceae, Myrtaceae, Oleaceae, Oxalidaceae, Passifloraceae, Punicaceae, Rhamnaceae, Rhizophoraceae, Rosaceae, Rubiaceae, Rutaceae, Sapindaceae, Sapotaceae, Simaroubaceae, Solanaceae, Sterculiaceae, Tiliaceae, Ulmaceae, Verbenaceae, Vitaceae, Zingiberaceae	49
67	*Bactrocera(Bactrocera) paramusae*	Anacardiaceae	1
68	*Bactrocera (Bactrocera) parvula*	Cucurbitaceae	1
69	*Bactrocera(Bactrocera) passiflorae*	Anacardiaceae, Annonaceae, Apocynaceae, Bignoniaceae, Caricaceae, Clusiaceae, Combretaceae, Elaeacarpaceae, Fabaceae, Lauraceae, Lecythidaceae, Loganiaceae, Lythraceae, Malvaceae, Meliaceae, Moraceae, Myrtaceae, Oxalidaceae, Passifloraceae, Rosaceae, Rubiaceae, Rutaceae, Santalaceae, Sapindaceae, Sapotaceae, Simabouraceae, Solanaceae,Sterculiaceae	28
70	*Bactrocera(Bactrocera) passiflorae (sp. nr.)*	Anacardiaceae, Annonaceae, Apocynaceae, Clusiaceae, Caricaceae, Combretaceae, Fabaceae, Hernandiaceae, Lauraceae, Malvaceae, Myrtaceae, Passifloraceae, Rubiaceae, Rutaceae, Sapindaceae,Solonaceae, Thymelaeaceaes	17
71	*Bactrocera (Bactrocera) perfusca*	Anacardiaceae, Combretaceae, Myrtaceae,Santalaceae	4
72	*Bactrocera (Bactrocera) phaea*	Zingiberaceae	1
73	*Bactrocera(Bactrocera) philippinensis*	Anacardiaceae, Caricaceae, Moraceae, Myrtaceae, Sapotaceae	5
74	*Bactrocera (Bactrocera) pisidii*	Anacardiaceae, Annonaceae, Apocvnaceae, Caricaceae, Combretaceae, Ebenaceae, Euphorbiaceae, Fabaceae, Lythraceae, Malpighiaceae, Moraceae, Musaceae, Myrtaceae, Oxalidaceae, Passifloraceae,Punicaceae, Rosaceae, Rutaceae, Sapindaceae, Vitaceae	20
75	*Bactrocera(Bactrocera) quadrisetosa*	Sapindaceae	1
76	*Bactrocera (Bactrocera) redunca*	Menispermaceae	1
77	*Bactrocera (Bactrocera) samoae*	Annonaceae, Apocynaceae, Araliaceae, Clusiaceae, Combretaceae, Ebenaceae, Gentianaceae, Rubiaceae, Rutaceae	9
78	*Bactrocera(Bactrocera) simulata*	Cucurbitaceae, Sapindaceae, Solanaceae	3
79	*Bactrocera(Bactrocera) sp. (Bhutan)*	Rosaceae	1
80	*Bactrocera (B.) sp. near B. dorsalis (A)*	Anacardiaceae, Arecaceae, Combretaceae, Malpighiaceae, Moraceae, Musaceae, Myrtaceae, Oxalidaceae, Rhamnaceae, Rutaceae, Sapotaceae, Solanaceae	12
81	*Bactrocera (B.) sp. near B. dorsalis (B)*	Anacardiaceae, Annonaceae, Arecaceae, Caricaceae, Cucurbitaceae, Ebenaceae, Meliaceae, Moraceae, Musaceae, Myrtaceae, Passifloraceae, Rhamnaceae, Rutaceae, Sapindaceae, Sapotaceae, Solanaceae	16
82	*Bactrocera (B.) sp. near B. dorsalis (C)*	Anacardiaceae, Moraceae, Myrtaceae	3
83	*Bactrocera (B.) sp. near B. dorsalis (D)*	Anacardiaceae, Rutaceae, Solanaceae	3
84	*Bactrocera(Bactrocera) terminaliae*	Combretaceae, Lauraceae	2
85	*Bactrocera(Bactrocera) tinomiscii*	Menispermaceae, Polygalaceae, Rubiaceae	3

86	*Bactrocera (Bactrocera) trilineola*	Anacardiaceae, Annonaceae, Apocynaceae, Caricaceae, Caesalpiniaceae, Combretaceae, Fabaceae, Lauraceae, Meliaceae, Moraceae, Musaceae, Myrtaceae,Oxalidaceae,Rubiaceae,Rutaceae,Santalaceae,Sapindaceae,Sapotaceae	18
87	*Bactrocera (Bactrocera) trivialis*	Anacardiaceae, Combretaceae, Euphorbiaceae, Lecythidaceae, Myrtaceae,Oalidaceae, Pandanaceae, Phylianthaceae, Rosaceae, Rutaceae, Santalaceae, Solanaceae	12
88	*Bactrocera (Bactrocera) tryoni*	Anacardiaceae, Annonaceae, Apocynaceae, Arecaceae, Burseraceae, Cactaceae, Capparaceae, Caricaceae, Celastraceae, Clusiaceae, Combretaceae, Cucurbitaceae, Cunoniaceae, Ebenaceae, Ericaceae, Euphorbiaceae, Fabaceae, Flacourtiaceae, Goodeniaceae, Hernandaceae, Hippocrateaceae, Juglandaceae, Lauraceae, Lecythidaceae, Loganiaceae, Lythraceae, Malpighiaceae, Melastomataceae, Meliaceae Moraceae, Musaceae, Myrtaceae, Olacaceae, Oleaceae, Oxalidaceae, Passifloraceae, Punicaceae, Rhamnaceae, Rosaceae, Rubiaceae, Rutaceae, Santalaceae, Sapindaceae, Sapotaceae, Similacaceae, Solanaceae, Thymelaeaceae, Tiliaceae, Verbenaceae, Vitaceae	50
89	*Bactrocera(Bactrocera) tuberculata*	Anacardiaceae, Rosaceae	2
90	*Bactrocera (Bactrocera) umbrosa*	Cucurbitaceae, Moraceae, Passifloraceae, Rutaceae	4
91	*Bactrocera (Bactrocera) uvariae*	Annonaceae	1
92	*Bactrocera (Bactrocera) versicolor*	Anacardiaceae, Myrtaceae, Sapotaceae	3
93	*Bactrocera (Bactrocera) zonata*	Anacardiaceae; Annonaceae, Arecaceae,Caricaceae,Combretaceae, Cucurbitaceae, Fabaceae, Lecythidaceae, Malpighiaceae, Malvaceae, Moraceae, Myrtaceae, Punicaceae, Rhamnaceae, Rosaceae, Rutaceae, Sapotaceae, Solanaceae, Tiliaceae	19
94	*Bactrocera (B.) sp. near B. zonata*	Annonaceae	1
95	*Bactrocera(Bulladacus) aenigmatica*	Meliaceae	1
96	*Bactrocera (Bulladacus) bullata*	Clusiaceae, Gnetaceae, Thymelaeaceae	3
97	*Bactrocera (Bulladacus) eximia*	Combretaceae	1
98	*Bactrocera (Bulladacus) gnetum*	Gnetaceae	1
99	*Bactrocera (Bulladacus) pacificae*	Gnetaceae	1
100	*Bactrocera (Bulladacus) penefurva*	Combretaceae, Gnetaceae	2
101	*Bactrocera (Oaculus) oleae*	Oleaceae	1
102	*Bactrocera (Gymnodacus) calophylli*	Clusiaceae	1
103	*Bactrocera (Gymnodacus) hastigerina*	Anacardiaceae	1
104	*Bactrocera (Hemigymnodacus) diversa*	Anacardiaceae, Brassicaceae, Cucurbitaceae, Musaceae, Myristicaceae, Myrtaceae, Rutaceae	7
105	*Bactrocera (Hemisurstylus) melanoscutata+*	Clusiaceae	1
106	*Bactrocera (Javadacus) trilineata*	Cucurbitaceae	1
107	*Bactrocera (Melonodacus) nigra*	Oleaceae	1
108	*Bactrocera (Notodacus) neoxanthodes*	Lecythidaceae, Passifloraceae	2
109	*Bactrocera (Notodacus) paraxanthodes*	Apocynaceae, Araliaceae	2
110	*Bactrocera (Notodacus) near xanthodes*	Araliaceae, Clusiaceae, Moraceae	3
111	*Bactrocera (Notodacus) xanthodes*	Anacardiaceae, Annonaceae, Apocynaceae, Bromeliaceae, Caricaceae, Clusiaceae, Combretaceae, Convolvulaceae, Cucurbitaceae, Ebenaceae, Euphorbiaceae, Fabaceae, Lauraceae, Lecythidaceae, Malvaceae, Moraceae, Myrtaceae, Passifloraceae, Rutaceae, Santalaceae,Sapindaceae, Sapotaceae, Solanaceae	23
112	*Boctrocera (Paradacus) decipiens*	Cucurbitaceae	1
113	*Bactrocera (Paradacus) depressa*	Cucurbitaceae, Solanaceae	2
114	*Bactrocera (Paratridacus) atrisetosa*	Cucurbitaceae, Meliaceae, Solanaceae	3
115	*Bactrocera (Patridacus) expandense*	Clusiaceae, Cucurbitaceae	2
116	*Bactrocera (Sinodacus) strigifinis*	Cucurbitaceae	1
117	*Bactrocera (Sinodacus) triangularis*	Cucurbitaceae	1
118	*Bactrocera (Tetradacus) minax*	Rutaceae	1
119	*Bactrocera (Tetradocus) tsuneonis*	Rutaceae	1
120	*Bactrocera (Zeugodacus) caudata*	Cucurbitaceae, Myrtaceae, Poaceae, Rosaceae, Rutaceae, Sapotaceae, Solanaceae	7
121	*Bactrocera (Zeugodacus) chorista*	Cucurbitaceae	1

122	*Bactrocera (Zeugodocus) cucurbitae*	Agavaceae, Anacardiaceae, Annonaceae, Arecaceae, Brassicaceae, Capparaceae, Caricaceae, Clusiaceae, Cucurbitaceae, Fabaceae, Juglandaceae, Lauraceae, Liliaceae, Loganiaceae, Malvaceae, Moraceae, Musaceae, Myrtaceae, Passifloraceae, Rhamnaceae, Rosaceae, Rutaceae, Sapindaceae, Sapotaceae, Solanaceae, Vitaceae	26
123	*Bactrocera (Zeugodacus) duplicata*	Rosaceae	1
124	*Bactrocera (Zeugodacus) fulvifacies*	Oleaceae	1
125	*Bactrocera (Zeugodacus) munda*	Cucurbitaceae	1
126	*Bactrocera (Zeugodacus) scutellaris*	Cucurbitaceae	2
127	*Bactrocera (Zeugodacus) sutellata*	Cucurbitaceae	1
128	*Bactrocera (Zeugodacus) tau*	Anacardiaceae, Cucurbitaceae, Fabaceae, Loganiaceae, Moraceae, Myrtaceae, Oleaceae, Rutaceae, Sapotaceae, Solanaceae, Tiliaceae, Vitaceae	12
129	*Bactrocera (Zeugodacus) trimaculata*	Cucurbitaceae	1
130	*Carpomya incompleta*	Rhamnaceae	1
131	*Carpomya schneri*	Rosaceae	1
132	*Carpomya vesuviana*	Rhamnaceae	1
133	*Carpomya ziziphae*	Rhamnaceae	1
134	*Dacus (Callantra) axanus*	Cucurbitaceae	1
135	*Dacus (Callantra) eumenoides*	Cucu rbitaceae	1
136	*Dacus (Callantra) petioliforma*	Cucu rbitaceae	1
137	*Dacus (Callantra) semieroides*	Cucurbitaceae	1
138	*Dacus (Callantra) solomonensis*	Cucurbitaceae	1
139	*Dacus (Callantra) sphaeroidalis*	Asclepiadaceae	1
140	*Dacus (Dacus) armatus*	Cucurbitaceae	1
141	*Dacus (Dacus) bivittatus*	Caricaceae, Cucurbitaceae, Passifloraceae, Rubiaceae, Solanaceae	5
142	*Dacus (Dacus) ciliatus*	Malvaceae	1
143	*Dacus (Dacus) demmerezi*	Cucurbitaceae	1
144	*Dacus (Dacus) disjunctus*	Cucurbitaceae	1
145	*Dacus (Dacus) momordicae*	Cucurbitaceae	1
146	*Dacus (Dacus) punctatifrons*	Cucurbitaceae, Liliaceae	2
147	*Dacus (Dacus) telfaireae*	Cucurbitaceae	1
148	*Dacus (Dacus) yangambinus*	Cucurbitaceae	1
149	*Dacus (Didacus) arcuatus*	Asclepiadaceae	1
150	*Dacus (Didacus) aspilus*	Asclepiadaceae	1
151	*Dacus (Didacus) ciliatus*	Malvaceae	1
152	*Dacus (Didacus) eminus*	Asclepiadaceae	1
153	*Dacus (Didacus) equalis*	Rutaceae	1
154	*Dacus (Didacus) frontalis*	Cucurbitaceae	1
155	*Dacus (Didacus) fuscatus*	Asclepiadaceae	1
156	*Dacus (Didacus) lounsburyii*	Cucurbitaceae	1
157	*Dacus (Didacus) vertebratus*	Cucurbitaceae, Passifloraceae	2
158	*Dacus (Leptoxyda) annulatus*	Asclepiadaceae	1
159	*Dacus (Leptoxyda) longistylus*	Asclepiadaceae, Cucurbitaceae	2
160	*Dacus (Leptoxyda) obesus*	Asclepiadaceae	1
161	*Dacus (Leptoxyda) persicus*	Asclepiadaceae	1
162	*Dacus (Neodacus) aneuvittatus*	Apocynaceae	1
163	*Dacus (Neodacus) taui*	Apocynaceae	1

Table 2: Host order and family associated with different fruit fly species

Order	Family	Fruit fly species	No. of species
Dicotyledons-lignosae			
Annonales (2)	Annonaceae	Bactrocera (Afrodacus) jarvisi, Bactrocera(Bactrocera) sp. near B. dorsalis (B), B.(B.) near zonota, B.(B.) aquilonis, B.(B.) arecae, B.(B.) carambolae, B.(B) correcta, B.(B.) curvipennis, B.(B.) dorsalis, B.(B.) endiandrae, B.(B.) facialis, B.(B.) frauenfeldi, B.(B.) kirki, B.(B.) kandiensis, B.(B.) kraussi, B.(B.) melanotus, B.(B.) mucrois, B.(B.) neohumeralis, B.(B.) papayae, B.(B.)passiflorae, B.(B.) passiflorae (sp. nr.), B.(B.) psidii, B.(B.) samoae, B.(B.) uvariae, B.(B.) trilineola,B. (B.) tryoni, B. (Notodacus) xanthodes, B.(B.) zonata, B. (Zeugodacus) cucurbitae	29
Laurales (3)	Hernandiaceae	B.(B.) facialis, B.(B.) frauenfeldi, B.(B.) passiflora (sp. nr.), B.(B.) tryoni	4

	Lauraceae	B. (Afrodacus) jarvisi, B. (Austrodacus) cucumis,B.(B.) aquitonis, B.(B.) carambolae, B.(B.) dorsalis, B.(B.) facialis, B.(B.) frauenfeldi, B.(B.) kirki, B(B.) kraussi, B.(B.) metanotus, B.(B.) neohumeralis, B.(B.) nigrovittata, B.(B.) papayae, B.(B.) possiflorae, B.(B.) passiflorae (sp. nr.), B.(B.) terminaliae, B.(B) trilineolo, B.(B.) tryoni, B.(Notodacus) xanthodes, B.(Zeugodacus) cucurbitae	20
	Myristicaceae	B.(B.) carambolae, B.(B.)facialis, B.(B.) papayae, B. (Hemigymnodacus) diversa	4
Dilleniales (4)	Dilleniaceae	B.(B.) papayae	1
Rosales (6)	Rosaceae	B.(Afrodacus) jarvisi, B.(Austrodacus) cucumis, B.(B.) aquilonis, B.(B.) caryeae, B.(B.) correcta, B.(B.) curvipennis, B.(B.) dorsalis, B.(B.) facialis, B.(B.) halfordiae, B.(B.) kirki, B.(B.) kraussi, B.(B.) loatifrons, B.(B.) mayi, B.(B.) melas, B.(B.) melonotus, B.(B.) neohumeralis, B.(B.) papayae, B.(B.) passiflorae, B.(B.) psidii, B.(B.) sp.[Bhutan],B.(B.)trivialis,B.(B.)tryoni,B.(.B)tuberculata,B.(B.)zonota,B.(Zeugodacus)caudata, B.(Zeugodacus) cucurbitae, B.(Zeugodacus) duplicata, Carpomya schneri	28
Leguminales (7)	Caesalpinaceae	B.(B.) trilineola	1
	Fabaceae	B.(B.) dorsalis, B.(B.) facialis, B.(B.) frauenfeldi, B.(B.) kirki, B.(B.) melanotus, B.(B.) moluccensis, B.(B.) papayae, B.(B.) psidii, B.(B.)passiflorae, B.(B.) passiflorae (sp. nr.), B.(B'.) trilineola, B.(B.) tryoni, B.(B.) zonata, B. (Notodacus) xanthodes, B. (Zeugodacus) cucrbitae, B.(Zeugodacus) tau	16
Cunoniales (8	Cunoniaceae	B.(B.) kraussi, B.(B.) neobumeralis, B.(B.) tryoni	3
Styracales (9)	Symplocaceae	B.(B.) carambolae	1
Araliales (10)	Alangiaceae	B.(B.) carambolae, B.(B.) dorsalis	2
	Araliaceae	B.(B.) metonotus, B.(B.) samoae, B.(Notodacus) paraxanthodes, B.(Notodacus) near xanthodes (sp. n no.l)	4
Salicales (12)	Caprifoliaceae	B.(B.) dorsalis	1
	Salicaceae	B. (B.) facialis	1
Fagales (16)	Fagaceae	B. (B.) papaya	1
Juglandales (17)	Juglandaceae	B.(B.) dorsalis, B.(B.) tryoni, B.(Zeugodacus) cucurbitae	3
Urticales (19)	Moraceae	B. (Afrodacus) jarvisi, B.(B.) sp. near B. dorsalis (A,B,C), B.(B.) albistrigata, B.(B.) carambolae, B.(B.) caryeae, B.(B.) correcta, B.(B.) curvifera, B.(B.) curvipennis, B.(B.) distincta, B.(B.) dorsalis, B.(B.) facialis, B.(B.) frauenfeldi, B.(B.) halfordiae, B.(B.) incisa, B.(B.) kraussi, B.(B.) lineata, B.(B.) melanotus, B.(B.) minuta, B.(B.) melas, B.(B.) neohumeralis, B.(B.) papayae, B.(B.) philippinensis, B.(B) psidii, B.(B.)passiflorae, B.(B.) trilineola, B.(B.) tryoni, B.(B.) umbrosa, B.(B.) zonata, B. (Notodacus) xanthodes, B. (Notodacus)near xanthodes (sp. no.1).B.(Zeugodacus) cucurbitae, .(Zeugodacus) tau	34
	Ulmaceae	B. (B.) papayae	1
Bixales (20	Flacourtiaceae	B.(B.) aquilonis, B.(B.) contermina, B.(B.) correcta, B.(B.) dorsalis, B.(B.) kraussi, B.(B) neohumeralis, B.(B.) papayae, B.(B.) tryoni	8
Thymelaeales (21)	Thymelaeaceae	B.(B.) dorsalis, B.(B.) frauenfeldi, B.(B.) kraussi, B.(B) passiflorae (sp. nr., B.(B.) tryoni, B. (Bulladacus) bullata	6
Capparales (24)	Capparaceae	B.(B.) correcta, .B.(B.) dorsalis, B.(B.) musae, B.(B.) neohumeralis ,B.(B.) tryoni, ,B. (Zeugodacus) cucurbitae	6
Polygalales (27)	Polygalaceae	B.(B.) carambolae, B.(B.) dorsalis, B.(B.) tinomiscii	3
Passiflorales (29)	Passifloraceae	B.(Afrodacus) jarvisi, B.(Austrodacus) cucumis, B.(B.) sp. near B. dorsalis (B), B.(B.) bryonioe, B.(B.) curvipennis, B.(B.) dorsalis, B.(B.) facialis, B.(B.) frauenfeldi, B.(B.) kirki, B.(B.) kraussi, B.(B.) latifrons, B.(B.) musae, B.(B.) neohumeralis, B.(B.) papayae, B.(B.) psidii, B.(B.) passiflorae, B.(B.) passiflorae (sp. nr.), B.(B.) tryoni, .(B.) umbrosa, B. (Notodacus) xanthodes, B.(Notodacus) neoxanthodes, B. (Zeugodacus) cucurbitae, Dacus (Dacus) bivittotus, Dacus (Didacus) vertebratus	24
Cucurbitales (30)	Caricaceae	B.(Afrodacus) jarvisi, B.(Austrodacus) cucumis, B.(B.) sp. near B. dorsalis (B),B.(B.) correcta, B.(B.) curvipennis, B.(B.) dorsalis, B.(B.) facialis, B.(B.) frauenfeldi, B.(B.) kirki, B.(B.) melanotus, B.(B.) musae, B.(B.) neohumeralis, B.(B.) papayae, B.(B.) passiflorae, B.(B.) passiflorae (sp. nr.) B.(B.) philippinensis, B.(B.) psidii, B.(B.) trilineola, ,B. (B.) tryoni, B.(B.) zonota, B.(Notodacus) xanthodes, B.(Zeugodacus) cucurbitae, Dacus (dacus) bivittatus	23
	Cucurbitaceae	B.(B.) so. near B. dorsalis (B), B.(B.) aquilonis, B.(B.) bryoniae, B.(B.) cilifer, B.(B.) correcta, B.(B.) dorsalis, B.(B.) kandiensis, B.(B.)latifrons, B.(B.) papayae, B.(B.) parvula, B.(B.) sirnulata, B.(B.) tryoni, B.(B.) umbrosa, B.(B.) zonata, B.(Hemigymnodacus) diversa, B. (Javadacus) trilineata, B.(Notodacus) xanthodes, B.(Paradacus)decipiens,B.(Paradacus) depressa, B.(Paratridacus) atrisetosa, B.(Patridacus) expandense, B.(Sinodacus) striqifinis, B.(Sinodacus) triangularis, B.(Zeugodacus) caudata, B. (Zeugodacus) chorista, B.(Zeugodacus) cucurbitae, B.(Zeugodacus) munda, B.(Zeugodacus) scutellaris, B.(Zeugodacus) scutella, B.(Zeugodacus) tau, B.(Zeugodacus) trimaculata, Dacus (Callantra) axanus, Dacus (Callantra) eumenoides, Dacus (Callantra) petioliforma, Dacus (Callantra) semieroides, Dacus (Callantra) solomonensis, Dacus (Dacus) armotus, Dacus (Dacus) bivittatus, Dacus (Dacus) demmerezi, Dacus (Dacus) disjunctus, Dacus (Dacus)	48

		momordicae, Dacus(Dacus) punctotifrons, Dacus (Dacus) telfaireae, Dacus (Dacus) yangambinus, Dacus (Didacus) frontalis, Dacus (Didacus) lounsburyii, Dacus (Didacus) vertebratus, Dacus (Leptoyzyda) longistylus.	
Cactales (31)	Cactaceae	B.(Afrodacus) jarvis, B.(B.) correcta, B.(B.) neohumeralis, B.(B.) papayae, B.(B.) tryoni	5
Tiliales (32)	Bombacaceae	B.(B.) dorsalis	1
	Tiliaceae	B.(Afrodacus) jarvisi, B.(B.) aquilonis, B.(B.) correcta, B.(B.) dorsalis, B.(B.) kirki, B.(B.)kraussi, B.(B.) neohumeralis , B.(B.) papayae, B.(B.) passiflorae, B.(B.) tryoni, B.(B.) zonata, B.(Zeugodacus) tau	12
	Sterculiaceae	B.(B.) papayae, B.(B.) passiflorae	2
	Malvaceae	B.(B.) distincta, B.(B.) facialis, B.(B.) frauenfeldi, B.(B.) kirki, B.(B.) pallida, B.(B.) passiflorae, B.(B.) passiflorae(sp. nr.), B.(B.) zonata, B.(Notodacus) xanthodes, B.(Zeugodacus) cucurbitae, Dacus (Dacus) ciliatus, Dacus (Didacus) ciliatus	12
Malpighiales (34)	Malpighiaceae	B.(Afrodacus) jarvisi, B.(B.) sp. near B. dorsalis (A), B.(B.) aquilonis, B.(B.) caryeae, B.(B.) correcta, B.(B.) curvipennis, B.(B.) dorsalis, B.(B.) frauenfeldi B.(B.) kraussi, B.(B.) neohumeralis, B.(B.) ochrosiae, B.(B.) papayae, B.(B.) psidii, B.(B.) tryoni, B.(B.) zonata	15
Euphorbiales (35)	Euphorbiaceae	B.(Austrodacus) cucumis, B.(B.) aquilonis, B.(B.) bancrofti, B.(B.) carambolae, B.(B.) correcta, B.(B.) diaphana, B.(B.) dorsalis, B.(B.) frauenfeldi, B.(B.) kraussi, B.(B.) mucronis, B.(B.) neohumeralis, B.(B.) obliqua, B.(B.) papayae, B.(B.) psidii, B.(B.) trivialis, B.(B.) tryoni, B.(Notodacus) xanthodes	17
Ochnales (37)	Dipterocarpiaceae	B.(B.) correcta	1
Ericales (38)	Ericaceae	B. (B.) tryoni	1
Guttiferales(39)	Clusiaceae	B. (Afrodacus) jarvisi, B. (B.) carambolae, B.(B.) cheesmanae, B.(B.) curvipennis, B.(B.) dorsalis, B.(B.) endiandrae, B.(B.)facialis, B. (B.) frauenfeldi, B. (B.) kandiensis, B. (B.) kirki, B.(B.) kraussi, B. melonotus, B.(B.) neocheesmanae, B. (B.) neohumeralis,B.(B.)papayae,B.(B.)passiflorae,B.(B.) passiflorae(sp. nr.], B.(B.) somoae, B. (B.) tryoni, B.(Bulladacus) bullata, B. (Gymnodacus)calophylli,B .(Hemisurstylus) melonoscutata, B.(Notodacus) xanthodes, B.(Notodacus) near xanthodes, B.(Patridacus) expandense, B. (Zeugodacus) cucurbitae	26
Myrtales(40)	Combretaceae	B. (Afrodacus) jarvisi, B. (Austrodacus) cucumis, B. (B.) sp. near B. dorsalis (A), B. (B.) albistrigata, B. (B.) aquilonis, B. (B.) carambolae, B. (B.) correcta, B. (B.) curvipennis, B.(B.) dorsalis, B. (B.)facialis, B. (B.) frauenfeldi B. (B.) kirki, B. (B.) kraussi, B. (B.) melanotus, B. (B.) mucronis, B. (B.) neohumeralis, B. (B.) ochrosioe, B. (B.) papayae, B.(B.) passiltorae, B.(B.) passiflorae (sp. nr.}, B.(B.) perfusca, B. (B.) psidii, B.(B.) samoae, B.(B.) terminaliae, B. (B.) trilineola, B. (B.) trivialis, B. (B.) tryoni,B.(B.) zonota, B.(Bulladacus) eximia, B.(Bulladacus) penefurva, B.(Notodacus) xanthodes	31
	Lecythidaceae	B. (Afrodacus) jarvisi, B.(B.) barringtoniae, B. (B.) correcta, B. (B.) dorsalis, B. (B.) facialis, B.(B.) frauenfeldi, B.(B.) jarvisi, B. (B.) kraussi, B. (B.) neohumeralis, B. (B.) papayae,B.(B.)passiflorae, B.(B.) trivialisB. (B.) tryoni, B. (B.) zonata, B. (Notodacus) neoxanthodes. B. (Notodacus) xanthodes	16
	Lythraceae	B. (B.)latifrons, B.(B.) passiflorae, B.(B.) psidii, B.(B.) tryoni	4
	Melastomataceae	B.(B.) frauenfeldi B.(B.) melanotus, B. (B.) neohumeralis, B. (B.) tryoni	4
	Myrtaceae	B. (Afrodacus) jarvisi, B. (Austrodacus) cucumis, B.(B.) sp. near B. dorsalis (A, B, C), B.(B.) albistriga, B.(B.) aquilonis, B.(B.) breviaculeus, B.(B.) carambolae, B.(B.) caryeae, B.(B.) correcta, B.(B.) curvipennis, B.(B.) distincta, B.(B.) dorsalis, B.(B.) facialis, B.(B.) frauenfeldi, B.(B.) halfordiae, B.(B.) incisa, B.(B.) kandiensis, B.(B.) kirk], B.(B.) kraussi, B.(B.) latifrons, B.(B.) melanotus, B.(B.) melas, B.(B.) mucronis, B.(B.) musae, B.(B.) neohumeralis, B.(B.) obliqua, B.(B.)occipitalis, B.(B.) ochrosiae, B.(B.) papayae, B.(B.) passiflorae, B.(B.) passiflorae(sp. nr.), B.(B.) perfusca, B.(B.) philippinensis, B.(B.) psidii, B.(B.) trilineola, B.(B.) trivialis, B.(B.) tryoni B.(B.)versicolor, B.(B.) zonata, B.(Hemigymnodacus) diverse,B.(Notodacus)xanthodes,B.(Zeugodacus)caudata,B.(Zeugodacus) cucurbitae, B.(Zeugodacus) tau	46
	Punicaceae	B.(Afrodacus) jarvisi, B.(B.) carambolae, B.(B.) latifrons, B.(B.) papayae, B.(B.) psidii, B.(B.) tryoni, B.(B.) zonata	7
	Rhizophoraceae	B.(B.) caledoniensis, B.(B.) carambolae, B.(B.) neohumeralis, B.(B.) papayae	4
Celastrales (41)	Cardiopteridace	B.(B.)facialis	1
	Celastraceae	B.(Afrodacus) jarvisi, B.(B.) dorsalis, B.(B.) frauenfeldi, B.(B.) neohumeralis, B.(B.) obliqua, B.(B.) tryoni	6
	Hippocrateaceae	B.(B.) neohumeralis, B.(B.) tryoni	2
	Icacinaceae	B.(B.) kraussi	1
	Pandaceae	B.(B.) trivialis	1
Olacales (42)	Olacaceae	B.(B.) curvipennis, B.(B.) dorsalis, B.(B.) frauenfeldi, B.(B.) neohumeralis, B.(B.) ochrosiae, B.(B.) tryoni	6
Santalales (43)	Santalaceae	B.(B.) aquilonis, B.(B.) correcta, B.(B.) facialis, B.(B.) neohumeralis, B.(B.) passifiora, B.(B.) perfusca, B.(B.)trilineola, B.(B.) trivialis, B.(B.) tryoni, B. (Notodacus) xanthodes	10

Rhamnales (44)	Rhamnaceae	B.(B.) sp. near B.dorsalis (A, B), B.(B.) aquilonis, B.(B.) carambolae, B.(B.) correcta, B.(B.) curvipennis, B.(B.) dorsalis, B.(B.) latifrons, B.(B.) neohumeralis, B.(B.) papayae, B.(B.) tryoni, B.(B.) zonata, B.(Zeugodacus) cucurbitae, Carpomyo incompleta, Carpomya vesuviana, Carpomya ziziphae	16
	Vitaceae	B.(Austrodacus) cucumis, B.(B.) neohumeralis, B.(B.) papayae, B.(B.) psidii, B.(B.) tryoni, B.(Zegodacus) cucurbitae, B.(Zeugodacus) tau	7
Myrsinales (45)	Myrsinaceae	B.(B.) papayae	1
Ebenales (46)	Ebenaceae	B.(Afrodacus) jarvisi, B.(Austrodacus) cucumis, B.(B.)sp. near B.dorsalis(B), B.(B.)aquilonis, B.(B.)curvipennis ,B.(B.) dorsalis, B.(B.)facialis, B.(B.)frauenfeldi, B.(B.) grandistylus, B.(B.) neohurneralis, B.(B.) papayae, B.(B.) psidii, B.(B.) samoae, B.(B.) tryoni, B.(Notodacus) xanthodes	15
	Sapotaceae	B.(Afrodacus) jarvisi, B.(B.) sp. near B.dorsalis (A, B), B.(B.) anomala, B.(B.) aquilonis, B.(B.) carambolae, B.(B.) caryeae, B.(B.) correcta, B.(B.) decumana, B.(B.) distincta, B.(B.) dorsalis, B.(B.)facialis, B.(B.) frauenfeldi, B.(B.) kirkl, B.(B.)kraussi, B.(B.) melanotus, B.(B.) neohumeralis, B.(B.) papayae, B.(B.) passiflorae, B.(B.) philippinensis, B.(B.) trillneola, B.(B.) tryoni, B.(B.) versicolor, B.(B.) zonota, B.(Notodacus) xanthodes, B. (Zeugodacus) caudata, B.(Zeugodacus) cucurbitae, B.(Zeugodacus) tau	28
Rutales (47)	Burseraceae	B.(B.) dorsalis, B.(B.) papaya, B.(B.) tryoni	3
	Rutaceae	B.(Afrodacus) jarvisi, B.(Austrodacus) cucumis, B.(B.) sp. near B.dorsalis (A, B, D), B.(B.) aquilonis, B.(B.) carambolae, B.(B.) caryeae, B.(B.) cilifer, B.(B.) correcta, B.(B.) curvipennis, B.(B.) distincta, B.(B.) dorsalis, B.(B.) facialis, B.(B.) frauenfeldi, B.(B.) halfordiae, B.(B.) kandiensis, B.(B.) kirki, B.(B.)kraussi, B.(B.) latifrons, B.(B.) melanoto, B.(B.) melas, B.(B.) minax, B.(B.) musoe, B.(B.) mutabilis, B.(B.) neohumeralis, B.(B.) occipitalis, B.(B.) papayae, B.(B.) passiflorae, B.(B.) passiflorae (sp. nr.), B.(B.)psidii, B.(B.) samoae, B.(B.) trilineola, B.(B.) trivialis, B.(B.) tryoni, B.(B.)umbrosa,B.(B.)zonota,B.(Hemigymnodacus)diversa,B.(Notodacus) xanthodes, B.(Tetradacus) minax, B.(Tetradacus) tsuneonis, B.(Zeugodacus) caudata,B.(Zeugodacus) cucurbitae, B.(Zeugodacus) tau, Dacus (Didacus) equalis	45
	Simaroubaceae	B.(B.) carambolae, B.(B.) correcta, B.(B.) dorsalis, B.(B.) papayae, B.(B.) passiflorae	5
Meliales (48)	Meliaceae	B.(Afrodacus) jarvisi, B.(B.)sp. near B.dorsalis (8), B.(B.)aquilonis, B.(B.)carambolae, B.(B.) correcta, B.(B.) dorsalis, B.(B.) facialis, B.(B.) frauenfeldi, B.(B.) kirki, B.(B.)kraussi, B.(B.) neohtneralis, B.(B.) ocbrosiae, B.(B.) papayae, B.(B.) passiflorae, B.(B.) trilineolo, B.(B.) tryoni, B.(Bulladacus) aenigmatica, B.(Paratridacus) atrisetosa	18
Sapindales (49)	Anacardiaceae	B.(Afrodacus) jarvts, B.(Austrodacus) cucumis, B.(B.) sp. near B.dorsalis (A, B, C, D), B.(B.) albistrigata, B.(B.) oquilonis, B.(B.) carambolae, B.(B.) caryeae, B.(B.) correcta, B.(B.) curvipennis, B.(B.) dorsalis, B.(B.) facialis, B.(B.) frauenfeldi B.(B.) froggatti, B.(B.) Incisa, B.(B.) jarvisi, B.(B.) kandiensis, B.(B.) kirki, B.(B.)kraussi, B.(B.) latifrons, B.(B.) limbifera, B.(B.) melanotus, B.(B.) murrayi, B.(B.) neohumeralis., B.(B.) occipitalis, B.(B.) opiliae, B.(B.) papayae, B.(B.) paramusae, B.(B.) passiflorae, B.(B.) passiflorae (sp. nr.), B.(B.) perfusca, B.(B.) philippinensis, B.(B.) psidii, B.(B.) trilineola, B.(B.) trivialis, B.(B.) tryoni, B.(B.) tuberculata, B.(B.) versicolor, B.(B.) zonota, B.(Gymnodacus) hastigerina , B.(Hemigymnodacus) diversa, B.(Notodacus) xonthodes, B.(Zeugodacus) cucurbitaa, B.(Zeugodacus) tau	46
	Sapindaceae	B.(Afrodacus) jarvisi, B.(B.) sp. near B.dorsalis (8), B.(B.) aquilonis, B.(B.) atramentata, B.(B.) carombolae, B.(B.) correcta, B.(B.) distincta, B.(B.) dorsalis, B,(B.)facialis, B.(B.) frauenfeldi, B.(B.) kirki, B.(B.) kraussi, B.(B.) latifrons, B.(B.) lineata, B.(B.) melanota, B.(B.) neohumeralis, B.(B.) papayae, B.(B.) passifiorae,B.(B.) passiflorae (sp. nr.], B.(B.) psidii, B.(B.) quadrisetosa, B.(B.) simulata,B.(B.) trilineola, B. (B.) tryoni,B. (Notodacus) xanthodes, B. (Zeugodacus) cucurbitae	26
Loganiales (50)	Loganiaceae	B.(B.) bryoniae, B.(B.) carambolae, B.(B.) curvipennis, B.(B.) frauenfeldi, B.(B.) kraussi, B.(B.) papayae, B.(B.) passiftorae, B.(B.) tryoni, B.(Zeugodacus) cucurbitae, B. (Zeugodacus) tau	10
	Oleaceae	B. (Afrodacus) biguttula ,B.. (Afrodacus) jarvisi, B.(B.) carambolae, B.(B.) dorsalis, B.(B.) kraussi, B.(B. latifrons, B.(B.) musae, B.(B.) neohumeralis, B.(B.) papayae, B.(B.) tryoni, B. (Daculus) oleae, B. (Melanodacus) nigro, B.(Zeugodacus) fulvifacies, B.(Zeugodacus) tau	14
Apocynales (51)	Apocynaceae	B.(B.) albistrigata, B.(B.) alyxiae, B.(B.) carambolae, B.(B.) correcta, B.(B.) curvipennis, B.(B.) dorsalis, B.(B.)facialis, B.(B.) frauenfeldi, B.(B.) kirki, B.(B.) kraussi, B.(B.) lineata, B.(B.) minuta, B.(B.)muronis, 8.(B.) neohumeralis, B.(B.) ochrosiae, B.(B.)papayae, B.(B.) passifiorae, 8.(B.) passiflorae (sp. nr.), B.(B.) psidii, B.(B.) samoae, B.(B.) trilineola, B.(B.) tryoni, B. (Notodacus) paraxanthodes, B. (Notodacus) Xanthodes, D.(Neodacus) aneuvittatus, D. (Neodacus) taui	26
	Asclepiadaceae	D. (Callantra) sphaeroidalis, D. (Didacus) arcuatus, D. (Didacus) aspilus, D. (Didacus)	9

		eminus, D. (Didacus) fuscatus, D. (Leptozyda) onnulatus, D.(Leptozyda) longistylus, D. (Leptozyda) obesus, D. (Leptozyda) persicus	
Rubiales(52)	Rubiaceae	B. (Afrodacus) jarvisi, B.(Austrodacus) cucumis, B.(B.) aquilonis, B.(B.) caryeae, B.(B.) correcta, B.(B.) curvipennis,B.(B.) dorsaliss, B.(B.) facialis, B.(B.) frauenfeldi B.(B.) kirki, B.(B.) kraussi, B.(B.) latifrons, B.(B.)luteola, B.(B.) melanotus. B.(B.) musae, B.(B.) naucleae, B.(B.) neocheesmanae, B.(B.) neohumeralis, B.(B.) nigrotibialis, B.(B.) pollida, B.(B.) papayae,B.(B.)passiflorae, B.(B.) passiflorae (sp. nr.], B.(B.) somoae, B.(B.) tinomiscii, B.(B.) trilineola, 8.(B.) tryoni, Dacus (Dacus) bivittatus	28
Bignoniales(53)	Bignoniaceae	B.(B.) passiflorae	1
Verbenales (54)	Verbenales (54)	B.(B.) albistrigata, B.(B.) latifrons, B.(B.) neohumeralis, B.(B.) papayae, B.(B.) tryoni	5
Dicotyledons-herbaceae			
Berberidales (56)	Menispermaceae	B.(B.)kraussi, B.(B.) papayae, B.(B.) redunca, B.(B.) tinomiscii	4
Piperales (58)	Piperaceae	B.(B.) neohumeralis	1
Brassicales (60)	Brassicaceae	B. (Hemigymnodocus) diversa, B. (Zeugodacus) cucurbitae	2
Chenopodiales(64)	Basellaceae	B.(B.) neohumeralis	1
Gentianales (66)	Gentianaceae	B.(B.) caledoniensis, B.(B.) metanotus, B.(B.) samoae	3
Goodeniales (75)	Goodeniaceae	B.(B.) frauenfeldi. B.(B.) tryoni	2
Solanales (77)	Convolvulaceae	B. (B.) caledoniensis, B. (B.)curvipennis, B. (B.)dorsalis, B. (Notodacus) xanthodes	4
	Solanaceae	B. (Afrodacus) jarvisi, B. (Austrodocus) cucumis, B.(B.)sp. near D. dorsalis (A, B, D), B.(B.) aquilonis, B.(B.) bryoniae, B.(B.) cacuminata, B.(B.) carambolae, B.(B.) curvipennis, B.(B.) dapselis, B.(B.) dorsalis, B.(B.) facialis, B.(B.) frauenfeldi, B.(B.) kirki, B.(B.) kraussi, B.(B.) latifrons, 8.(B.) melanotus, B.(B.)musae, B.(B.) neohumeralis, B.(B.) nigrovittata, B.(B.) papayae, B.(B.)passiflorae,B.(B.) passiflorae (sp. nr), B.(B.) simulata, B.(B.) trivialis, B.(B.) tryoni, B.(B.) zonata, B.(Notodacus) xanthodes, B. (Paradacus) depressa, B. (Paratridacus) atrisetosa, B.(Zeugodacus)caudata,B. Zeugodacus) cucurbitae, B. (Zeugodacus) tau, Dacus (Dacus) bivittatus	35
Geraniales (79)	Oxalidaceae	B.(Afrodacus) jarvisi, B.(Austrodacus) cucumis, B.(B.) sp. near B.dorsalis (A), B.(B.) carambolae, B.(B.) curvipennis, B.(B.) dorsalis, B.(B.) frauenfeldi, B.(B.) jarvisi, B.(B.) kandiensis, B.(B.) kirki, B.(B.)kraussi, B.(B.) melanotus, B.(B.) neohumeralis, B.(B.)papayae, B.(B.) passiflora, B.(B.) psidii, B.(B.) trilineola, B.(B.) trivialis, B.(B.) tryoni	19
Boraginales (81)	Boraginaceae	B.(B.) facialis, B.(B.)papaya, B.(B.)passiflorae	3
Monocotyledons			
Calyciferae			
Commelinales (90)	Flagellariaceae	B. (B.) papayae	1
Bromeliales (93)	*Bromeliaceae*	B.(B.)facialis, 8.(B.) kirki, B. (Notodacus) xanthodes	*3*
Zingiberales (94)	Musaceae	B.(Afrodacus) jarvis, B.(B.) sp. near B.dorsalis (A, B), B.(B.)aquilonis, B.(B.) bryoniae, B.(B.) caryeae, B.(B.) correcta, B.(B.) curvipennis, B.(B.) dorsalis, B.(B.) facialis, B.(B.) frauenfeldi, B.(B.)kraussi, B.(B.) latifrons, B.(B.) musae, B.(B.) neohumeralis, B.(B.) papayae, B.(B.) psidii, B.(B.) trilineola, B.(B.) tryoni, B.(Hemigymnodacus) diversa, B.(Zeugodacus) cucurbitae	21
	Zingiberaceae	B.(B.) papaya, B.(B.) phaea	2
Corolliferae			
Liliales (95)	Liliaceae	B.(B.)facialis, B.(B.) neohumeralis, B.(Zeugodacus) cucurbitae, Dacus (Dacus) punctatifrons	4
	Similacaceae	B.(B.) neohumeralis, B.(B.) tryoni	2
Amaryllidales (99)	Amaryllidaceae	B.(B.) papayae	1
Dioscoreales (101)	Roxburgiaceae	B.(B.) enochra	1
Agavales (102)	Agavaceae	B.(B.)kraussi, B. (Zeugodacus) cucurbitae	2
Palmales (103)	Arecaceae	B. (Afrodacus) jarvisi, B.(B.) sp. near B. dorsalis (A, B), B.(B.) aquilonis, B.(B.) arecae, B.(B.) cararmbolae, B.(B.) correcta, B.(B.) dorsalis, B.(B.) frauenfeldi, B.(B.) melas, B.(B.) neohumeralis, B.(B.) papayae, B.(B.) tryoni, B.(B.) zonata, B. (Zeugodacus) cucurbitae	15
Orchidales (108)	Orchidaceae	B.(B.) dorsalis	1
Glumiflorae			
Graminales (111)	Poaceae	B. (Zeugodacus) caudata	1
Gymosperms			
Gnetales	Gnetaceae	B.(B.) mcgregori, B. (Bulladacus) bullata, B.(Bulladacus) gnetum, B.(Bulladacus) pacificae, B. (Bulladacus) penefurva	5
Pinales	Araucariaceae	B.(B.) frauenfeldi	1
* Host orders are given on evolutionary scale (from primitive to advanced)			

Table 3: Host taxonomic relationship with fruitfly species

Host Family/Order	No. of plant families	No. of plant orders
Dicotyledons		
Lignosae	67 (73.63)*	41 (66.13)
Herbaceae	10 (10.99)	9 (14.52)
Monocotyledons		
Calyciferae	4 (4.39)	3 (4.84)
Corolliferae	7 (7.69)	6 (9.68)
Glumiflorae	1 (1.10)	1 (1.61)
Gymnosperms	2 (2.20)	2 (3.23)
Total	91	62

*Figure in parentheses are percent value

Table 4: Fruit fly species association with their host families

Fruit fly genera & sub-genera	*No. of*	*Associated with*	*Associated with 2*	*Associted with more than 2*
Bactrocera (Afrodacus)	2	1(50.00)	0(00.00)	1(50.00)
Bactrocera (Austrodacus)	1	0(00.00)	0(00.00)	1(100.00)
Bactrocera (Bactrocera)	91	35 (38.46)	9 (9.89)	47 (51.65)
Bactrocera (Bulladacus)	6	4 (66.67)	1 (16.67)	1 (16.67)
Bactrocera (Daculus)	1	1 (100.00)	0(00.00)	0(00.00)
Bactrocera (Gymnodacus)	2	2 (100.00)	0(00.00)	0(00.00)
Bactrocera (Hemigymnodacus)	1	0(00.00)	0(00.00)	1 (100.00)
Bactrocera (Hemisurstylus)	1	1 (100.00)	0(00.00)	0(00.00)
Bactrocera (Javadacus)	1	1 (100.00)	0(00.00)	0(00.00)
Bactrocera (Melanodacus)	1	1 (100.00)	0(00.00)	0(00.00)
Bactrocera (Notodacus)	4	0(00.00)	2 (50.00)	2 (50.00)
Bactrocera (Paradacus)	2	1 (50.00)	1 (50.00)	0(00.00)
Bactrocera (Paratridacus)	1	0(00.00)	0(00.00)	1 (100.00)
Bactrocera (Patridacus)	1	0(00.00)	1 (100.00)	0(00.00)
Bactrocera (Sinodacus)	2	2 (100.00)	0(00.00)	0(00.00)
Bactrocera (Tetradacus)	2	2 (100.00)	0(00.00)	0(00.00)
Bactrocera (Zeugodacus)	10	7 (70.00)	0(00.00)	3 (30.00)
Carpomya spp.	4	4 (100.00)	0(00.00)	0(00.00)
Dacus (Callantra)	6	6 (100.00)	0(00.00)	0(00.00)
Dacus (Dacus)	9	7 (77.78)	1 (11.11)	1 (11.11)
Dacus (Didacus)	9	8 (88.89)	1 (11.11)	0(00.00)
Dacus(Leptoxxyda)	4	3 (75.00)	1 (25.00)	0(00.000
Dacus (Neodacus)	2	2 (100.00)	0(00.00)	0(00.00)
Total	163	88 (53.99)	17 (10.43)	58 (35.58)