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Bactrocera (Bactrocera) Tuberculata (Bezzi) Reported as A Pest Attacking Fruit of Tummy-Wood, (*Careya Sphaerica*) in Thailand

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Bactrocera (Bactrocera) tuberculata (Bezzi), is a member of the *Bactrocera zonata* complex which larvae feed in the fruite of Tummy-wood (*Careya sphaerica*: Lecythidaceae). It is not economically important fruit fly species. The *B. zonata* complex, differ from those of the *B. dorsalis* complex in incomplete costal band and the weak anal streak (along cell cup and vein A_1+CuA_2). Morphological characters of adult *B. tuberculata* is as follows: large facial spots on face; scutum(mesonotum) predominantly black with yellow stripes, with anterior supra-alar setae, prescutellar setae; 2 scutellar setae; wing with a small dark brown spot at wing apex (apex of cell r_{4+5}); legs entirely yellow, male hind tibia with a prominent anterodorsal ridge before apex. The 5^{th} sternum of male is shallow concavity on posterior margin and posteroior lobe of surstyluslobe. The fruit of tummy-wood are found as a larval host of *B. tuberculata* and *B. albistrigata*.

Keywords: *Bactrocera (Bactrocera) tuberculata (Bezzi)*, Larval host, Tummy-wood,

Introduction

The fruit fly, *Bactrocera (Bactrocera) tuberculata* (Bezzi) (Diptera: Tephritidae) is considered to be the most destructive and invasive fruit fly species infesting over 300 species of fruits and vegetables (Chueca *et al*., 2007; Liquido *et al*., 1990). Fruit fly (*Bactrocera tuberculata* (Bezzi)) is in a subgenus Bactrocera, and listed under synonyms *Chaetodacus tuberculata* (Bezzi) and *Dacus tuberculata* (Bezzi). Several species of fruit flies from this genus are pests to economically important fruits in the agricultural industry (Drew and Hancock, 2000). The Bactrocera species complex comprises of at least 52 described species in the Asia-Pacific region (Shearman *et al*., 2006).

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One of the most significant groups of fruit flies to the agricultural industry is the Dacinae fruit flies. They are key pest groups of Asia and the Pacific (Waterhouse, 1993; Waterhouse, 1997). In Malaysia, these fruit flies are considered serious quarantine pests as they inflict irrefutable losses in field productions of fruits and vegetables, and they also cause difficulties in fresh horticultural exports due to infestations. An unchecked fruit may be completely damaged by fruit flies (Vijaysegaran, 1983).

Objectives

This research is to investigate distribution of *Bactrocera zonata* complex and their larval host plant.

Materials and Methods

Sample collection

Fruit of tummy-wood were collected from Trang, Nakhon Ratchasima, Chumphon, Ranong, Satun, Saraburi, Surat Thani, Chiang Mai, Sakon Nakhon provinces. Pupa and larvae of the fruit fly *Bactrocera (Bactrocera) tuberculata* (Bezzi) were isolated from samples and placed in plastic boxes sized 19×28.5×10 cm. The date and places of collection was recorded.

Insect rearing in the laboratory

The larvae and pupa were transferred and reared in plastic boxes sized 30×40×30 cm under room temperature condition (27-35℃) in the entomological laboratory, King Mongkut's Institute of Technology Ladkrabang. After those fruit flies developed into adults, a piece of cotton soaked with the mixture of yeast hydrolysate and honey solution or sugar at the ratio of 3:1 was provided as the feeding resource in the cage. Developmental and morphological characteristics of eggs, larva, pupa and adult of the fruit fly were recorded, measured and photographed (n=25).

Results

Morphology of Tummy-wood, (Careya sphaerica)

Tummy-wood, (*Careya sphaerica*) (Ericales: Lecythidaceae) is a deciduous tree about 8-20 m. Leaves are simple, glabrous and broadly obovate;

grown in clusters at the ends of branches. Flowers are white; thick, hard terminal spikes and in bloom during April – May. Fruitsare large, green, and fleshy. The fruits are ripen in the month of June-July. Seeds are embedded in the fleshy the fruit pulps. Natural reproduction reproduces through seeds. Seeds dispersal takes place with the commencement of the rain (Bhat *et al*, 2004). Bark is fissured and dark grey color. The wood is coarse-textured, hard and heavy. The sapwood is white while heartwood is reddish.

Description

Body length 6.93mm; Wing 5.93 mm long and 2.19 mm wide (Fig.1).

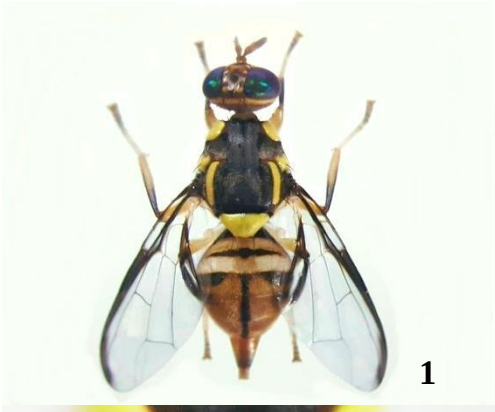
Head. Frons (Fig. 2) yellow to fulvous, with indistinct middle blackish mark and black spots at bases of setae; ocellar triangle. Face (Fig. 3) yellow to fulvous with two blackish round spots in antennae grooves, the distance between the two spots is distinctly shorter than their diameter. Antennae have 3 segments.

Thorax. Scutum (Fig. 4) black with two narrow lateral postsutural yellow vittae extends well before at intra-alar setae, and one long narrow median postsutural yellow vitta that extend well before prescutellar acrostichal setae and as long as lateral postsutural vittae. Scutellum with two lateral yellow marks, narrow black basal band and a black medial mark extending from base to apex. Wing hyaline(Fig. 5) in ground color; costal dark brown band confluent with vein R_{2+3}, an isolated apical dark brown spot; anal streak dark brown and broad, extending to posterior margin; cells bc and colourless. Legs yellow to brown; fore femur for about apical 3/4 brow; fore and hind tibiae yellow to dark brown.

Abdomen (Fig. 6) It is oval in outline, generally yellowcolor. Two tergites are blackwith a very narrow vague yellow to fulvous band on posterior marginOviscape is black and 3.63 mm in length. The first segment is 1.18 mm long. and aculeus length 1.17 mm. Aculeus have anternnas 4 pairs.

Biology: In general, the life cycle follows a pattern of adults mating, usually in the foliage of plants surrounding or near their host but not necessarily on the host (Raghu, 2002); followed by eggs being deposited within the flesh of the favored host fruit for the species. In a short period of time, usually a few days, larvae hatch and begin to consume the fruit in which they find themselves. After ranging between 4 and 12 days, the larvae drop from the fruit and become pupae in the soil. Adults emerge 7-10 days later and feed for about a week before sexually maturing and mating. (Pena *et al*., 2002; Drew and Hancock, 2000).

Distribution: The fruit flies of Tummy-wood, (*Careya sphaerica*) **occurred** in the central part of Thailand: Mueang Saraburi, Saraburi province, It is distributed in the Southern areas such as Khuan Lek District, Khao Phai District, Nong Bua District, Trang province; Tha Sae District, Tha Tako District, Chumphon province; Laot District, Mueang District, Ranong province; Khuan Don District, Muang District, Satun, Tha Mai District, Satun province; Chaiya District, Surat Thani. It was found in the North: Mae Rim District, Chiang Mai provinceand the Northeast: Akat Amnuai District, Sakon Nakhon province.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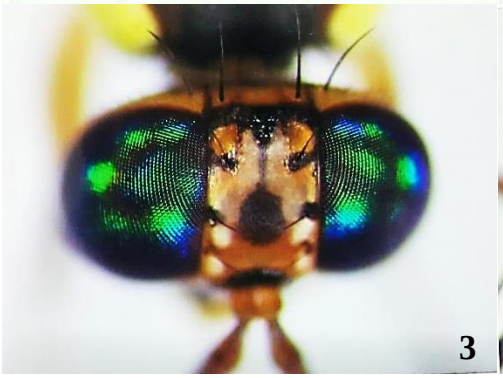
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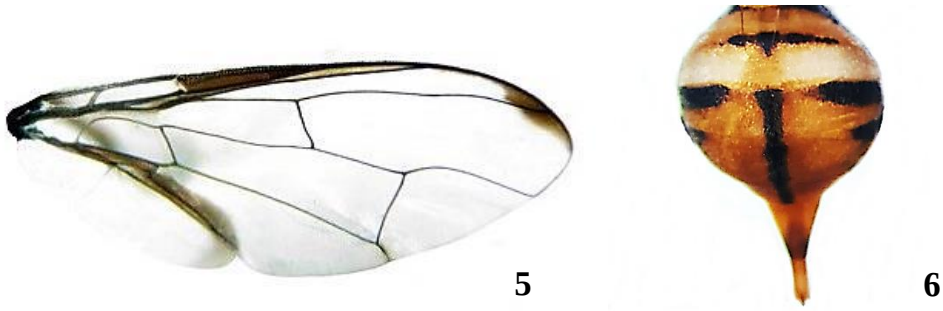

Figure 1-6. *Bactrocera* (Bactrocera) *tuberculata* (Bezzi) 1. Body 2. Head, front view; 3. Face; 4. Scutum, dorsal view; 5. Wing; 6. Abdomen, dorsal view

Table 1. Survey of fruit flies of Tummy-wood, (*Careya sphaerica*) of Thailand.

Collecting location	Date collected	No. of fruits	No. of pupa	Fruit fly species			
				BA	BC	BD	BT
Trang							
-Khuan Lek District	15/3/2012	10	1,021	-	-	-	842
-Khao Phai District	18/3/2012	28	390	-	-	-	378
- Nong Bua District	17/3/2012	13	512	-	-	-	498
Nakhon Ratchasima							
- Chulabhorn District	20/3/2012	23	66	-	-	-	64
Chumphon							
-Tha Sae District	23/4/2011	4	48	-	-	-	26
- Tha Tako District	8/5/2011	30	166	-	-	-	121
Ranong							
- Laot District	24/4/2011	20	93	-	-	-	77
- Mueang District, Ranong	11/5/2011	24	92	-	-	-	9
Satun							
- Khuan Don District	7/5/2011	16	84	6	-	-	73
- Muang District, Satun	9/5/2011	13	127	-	-	-	115
-Tha Mai District	9/5/2011	3	17	-	-	-	17
Saraburi							
-Mueang Saraburi	25/3/2011	2	115	-	-	-	74
Surat Thani							
- Chaiya District	31/5/2011	9	146	-	-	-	124
Chiang Mai							
-Mae Rim District	23/6/2011	5	40	-	-	-	37
Sakon Nakhon							
- Akat Amnuai District	7/6/2011	50	750	-	-	-	730

* BA = *Bactrocera albistrigata*
BD = *Bactrocera dorsalis*
BC = *Bactrocera correcta*
BT = *Bactrocera tuberculata*

Conclusion

The survey of fruit fly of Tummy-wood, (*Careya sphaerica*) found 4 species of fruit flies: *Bactrocera albistrigata, B. dorsalis, B. correcta and B. tuberculata* at Chiang Mai, Sakon Nakhon, Surat Thani, Saraburi, Satun, Ranong and Chumphon province. The fruit flies from fruits of Tummy-wood are mostly *B. tuberculata*, *B. albistrigata* was found only in the Khuan Don District and none of *B. dorsalis* and *B. correcta* was observed in collected samples.

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