IDENTIFICATION OF WHITEFLY SPECIES IN SELECTED FRUIT CROPS GROWN IN THE BATTICALOA DISTRICT

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ABSTRACT

Whitefly (Family: Aleyrodidae) is one of the major detrimental pests in the world, causing yield losses and economic injury to many crop species. It is a serious insect pest in the Battticaloa district of Sri Lanka which attacks numerous fruit crops, vegetables, ornamental, medicinal and wild crops. High infestation by whitefly ultimately causes death of the host plant.

It is believed that the chemical control against this pest is to be a serious one because of the development of resistance and destruction of the natural enemies. Several previous studies showed that there are many natural enemies found in the eco-system to maintain the population of this pest below the economic threshold level. Therefore biological control of whitefly on fruit crops becomes important to manage this pest.

In addition, fruits are being consumed freshly and the toxicity adheres with the fruits lead for bio-magnification of insecticide in human. The increasing demand for insecticide free products and self defense of consumers for toxicity of insecticides force the cultivators to take bio-control strategy to minimize the whitefly outbreaks by using parasitoids. Parasitoids are species specific and the effective control of whiteflies is only attained by the correct identification of whitefly species.

Banana and guava fruit crops were included as the host-plant of whitefly in the study period. Whitefly infested leaves were collected from which non-parasitized pupae and pupal exuviae were separated to identify the whiteflies species. Morphological characteristics were recorded to identify the whitefly species. Spiraling whitefly (Aleurodicus dispersus) species were identified as the pest of banana and guava.

Key words : Aleurodicus Disperses, Parasitoid, Pupae, Whitefly

1.INTRODUCTION

Fruits are the important source of vitamins, minerals, plant proteins and fat in human diets throughout the world. Fruit crop cultivation is one of the most dynamic and major branches of agriculture and from the point of view of economic value of the produce it is one of the most important crops. Fruit crops are rapidly becoming important source of income for the rural population. A large variety of fruits are grown in Sri Lanka of which banana, guava, mango, citrus, grape, pineapple and avocado are the major ones. In Sri Lanka, currently nearly 50,000 ha of land is engaged under banana cultivation and the annual banana production is around 450,000 metric tones. Guava is the most widely grown fruit crop in Sri Lanka. The area under guava cultivation is about 0.15 million ha which producing 1.80 MT yield annually.

The quality and yield of fruit production are commonly reduced by insect pest damages. Whitefly is one of the major pests in fruit crops. The Whitefly attack of fruit crop cultivation is commonly higher in summer (March-June) and lower in winter (October - January) in Sri Lanka (Wijesekera and Kudagamage, 1990). Whiteflies cause damage to plants by feeding on phloem. It causes three types of damages, direct damage, indirect damage and virus transmission to their host plants. With high whitefly population plants may die, very few whiteflies are enough to transmit viruses (Berlinger, 1986). Many biological characteristics of whiteflies including multivoltinism and a propensity to develop resistance to wide classes of insecticides have contributed to the difficulty of developing robust and sustainable management systems (Naranjo, 2001). Even the cultural, physical, host-plant resistance, biological and chemical control have been adapted by medicinal plant growers to control whiteflies. The biological control of whitefly is considered as cost effective and environmentally friendly method (Hoddle, 2003). Parasitoids are used as biocontrol agents. Parasitoids are species specific and to attain the effective control of whitefly by using parasitoids is only achieved by the correct identification of whitefly species.

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2. MATERIALSANDMETHODS

After thorough observation of fruit crops banana and Guava were found to be the only fruit crop infested by whiteflies during the study period. Ten whitefly infested leaves from each infested crop were collected in the appropriately labeled polyethylene bags and brought to laboratory for whitefly identification. Specimens were collected on weekly interval for a period of one month.

Identification of Whitefly

The taxonomic identification of the Aleyrodidae is entirely based on the puparial stage (Martin, 1987). Therefore, the collected leaf samples were observed under microscope and parasitized and non-parasitized pupae were separated based on colouration. Parasitized pupa were black and non-parasitized ones were pale (Figure 1).Non-parasitized pupae and pupal exuviae were taken for whitefly species identification. Hundred specimens were examined under microscope after mounting, to identify their species. Slide-mounted pupariа were individually examined under light microscope (×100) and the morphological characters were recorded. Whiteflies were identified up to species level based on the guidelines described by Mound *et al.*, (1978) and Martin, 1987.

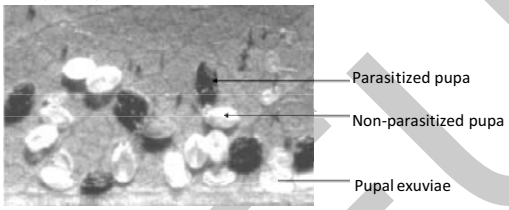

Figure 1 : Parasitized and non-parasitized pupae of whitefly

3. RESULTS AND DISCUSSION

Identification of Whitefly Species

A number of three hundred and fifty slide-mounted pupal specimens were observed under the microscope. From this observation it was confirmed that there was whitefly species associated with fruit crops.

Whitefly 1

Psidium guajava and *Musa* fruit crops were infested by this pest. Pupal case of whitefly consisted of five pairs of wax producing compound pores on dorsum. A pair of compound pore was on cephalo-thoracic region and other four were on abdominal region.

Vasiform orifice was subcodate and it was wider than long, Lingula large, tongue in shape and extended beyond posterior margin of vasiform orifice. It had four setae and usually all were conspicuous. The four pairs of compound pores found in abdomen of the pupal case were large, round and similar in shape, and the dorsal disk had single conical central pores; these were round in shape and conspicuous.

Based on these characteristics this species of whitefly was identified as *Aleurodicus dispersus* belonging to the sub family *Aleyrodicinae* and the order hemiptera (Russell, 1965).

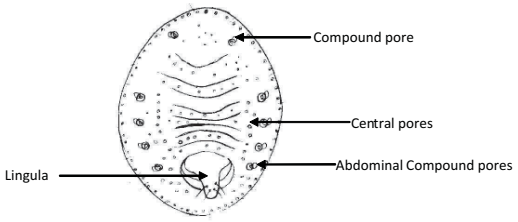

Figure 2: Schematic diagram of Pupal case of *Aleurodicus dispersus* (×100)

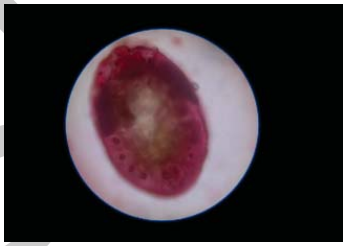

Figure 3: Stained pupal case of A*leurodicus dispersus* (×100)

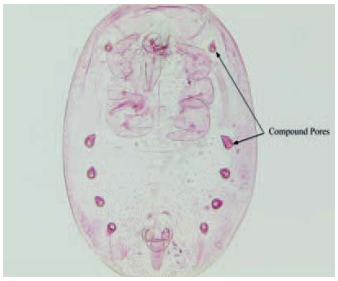

Figure 4: Compound pores in pupal case of *Aleurodicus dispersus*

Scientific classification of *Aleurodicus dispersus* is as follows:

Kingdom	:	Animalia
Phylum	:	Arthropoda
Subphylum	:	Hexapoda
Class	:	Insecta
Subclass	:	Pterygota
Order	:	Hemiptera
Super family	:	Aleyrodoidea
Sub family	:	Aleurodicinae
Family	:	Aleyrodidae
Genus	:	*Aleurodicus*
Species	:	*Aleurodicus dispersus* (Russell, 1965)

4. CONCLUSION

This study showed that *Aleurodicus dispersus was* the whitefly infested the host-fruit crops, banana and Guava found in the Batticaloa district of Sri Lanka, during the study period.

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