



Effects of *Paracoccus marginatus* (Mealy bug) and *Myzus persicae* (Mite) Attack on forming of *Exacum ritigalensis* (Binara/Ginihiriya) Flower

Short Note

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ABSTRACT

Seeds of *Exacum ritigalensis* were taken in Pannala, Sri Lanka and potted in green house at the Department of Agriculture Biology, Faculty of Agriculture, University of Ruhuna, Sri Lanka. Four pots replicates were conducted on *E. ritigalensis* plants that were infested with *Paracoccus marginatus* and four pots replicates were conducted on *E. ritigalensis* plants that were infested with *Myzus persicae*. Two pots were used as controls. Potting medium was taken 1:1:1; sand, compost and topsoil and one *E. ritigalensis* plants were cared in each pot. At the flowering stage, two adults of *Paracoccus marginatus* which were taken from infected papaya plant (*Carica papaya*) and two aphids which were taken from infected tobacco plant (*Nicotiana tabacum* L.) introduced to the every branch of *E. ritigalensis* plants separately. Data were collected from maturity stage of the flower (after blooming 3days). Data regarding *E. ritigalensis* flowers diameter reduction were subjected to analysis mean average value and compared with the control. There were no significant difference of flowers which plant attacked by aphids and it was shown the reduction of number of flowers per bunch. Mealybugs and aphids severely damage to *E. ritigalensis* flower production. Researchers and farmers should have to use control measures to prevent mealybug and ants entering to the plantation.

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INTRODUCTION

Floriculture, which consists of the cultivation of ornamental plants used for cut flowers, flowering and non-flowering potted plants, and of the production of seeds, bulbs and large trees, is an important part while introducing aesthetic valuable wild plants varieties. The *Exacum*s are members of the family Gentianaceae which annual species are grown as flowering pot plants in the Western hemisphere for its beautiful and profuse blue or white flowers. There are eight *Exacum* species found from forests in Sri Lanka: *E. axillare*, *E. macranthum*, *E. pallidum*, *E. trinervium*, *E. walkerii*, *E. ritigalensis*, *E. petiolare* and *E. sessile* of which four are designated as threatened species (Perera and Dahanayake, 2016). The problems encounter from mealybug and aphids while they introduce to potted plant in home garden. Managing mealybug (Hemiptera: Pseudococcidae; *Paracoccus marginatus*) insects presents unique challenges. Mealybugs are polyphagous and multiply on different hosts. These have been recorded on many plant species including field crops, vegetables, ornamentals, weeds, bushes and trees in Sri Lanka. Important host plants include okra, holly hock, brinjal, potato, maize, sorghum, groundnut, pigeon pea, sunflower, beetroot, mulberry, Amaranthus spp, Marigold and cucurbits. The severity of problem may be estimated from the fact that this insect produces as many as 15 generations per year. The nymphs and adults suck plant sap from tender shoots, leaves

and even hard tissues including main stem and branches and cause damage (Anon, 2008) which cause direct plant injury by feeding on plant fluids or sap in the vascular tissues, primarily the phloem or mesophyll or both, with their piercing-sucking mouthparts. In addition, mealybugs excrete a clear sticky liquid called honeydew which serves as a growing medium for black sooty mold fungi that is secreted on to the leaves which interferes with photosynthesis (Lysandrou *et al.*, 2012; Jacobson *et al.*, 1978). As a result of mealy bug attack, plants become stunted and in severe cases may die. They may also inject a toxin. This may cause leaf yellowing, plant stunting, and wilting. Mealybugs are also capable of transmitting diseases, including viruses. Mealybugs tend to congregate in large numbers at leaf junctures where the petiole meets the stem, on leaf undersides, on stem tips, and under the leaf sheaths. Mealybug origin in Central America (Williams and Granara, 1992) has its spread at the Caribbean and Ecuador, Chile, Argentina, Brazil, Pakista, India, Nigeria, China, Australia and Sri Lanka (Prishanthini and Laxmi, 2009). Such a vast and fast distribution of mealy bug across the globe largely during the past few years and its economic damage to several crops make it necessary to characterize the ecological factors associated with the pest. Aphids (family Aphididae) are small, soft-bodied insects that suck plant juices. Several hundred species are occasional or frequent pests. The aphids stand out as important pests among the insects that feed on ornamental plants. They may cause damage to plants directly by sucking their sap, and indirectly by injecting toxic salivary

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secretions, transmitting pathogens, attracting ants and favoring the development of sooty-mold (Ana and Silva, 2002). Visually inspects plants for aphids at least once a week when aphids are expected to be present. Inspect the upper surface of foliage for whitish cast skins, shiny honeydew, and blackish sooty mold. To estimate infestation levels or to compare aphid densities before and after treatment, it may be helpful to use presence-absence sampling or indicator plants. Despite the increase of ornamental plant production, very few studies have been made on the insects associated with plants in gardens. In this study was conducted to determine the effects of *Paracoccus marginatus* (Mealybug) and Mite (*Myzus persicae*) attack on forming of *Exacum ritigalensis* flower.

Seeds of *Exacum ritigalensis* were taken in Pannala, Sri Lanka and potted in green house at the Department of Agriculture Biology, Faculty of Agriculture, University of Ruhuna, Mapalana, Kamburupitiya, Sri Lanka. Four pots replicates were conducted on *E. ritigalensis* plants that were infested with *Paracoccus marginatus* and four pots replicates were conducted on *E. ritigalensis* plants that were infested with *Myzus persicae*. Two pots were used as controls. Potting medium was taken 1:1:1; sand, compost and topsoil and one *E. ritigalensis* plants were cared in each pot. At the flowering stage, two adults of *Paracoccus marginatus* which were taken from infected papaya plant (*Carica papaya*) and aphids which

were taken from infected tobacco plant (*Nicotiana tabacum* L.) introduced to the every branch of *E. ritigalensis* plants separately. Data were collected from maturity stage of the flower (after blooming 3 days). Data regarding *E. ritigalensis* flowers diameter reduction were subjected to analysis mean average value and compared with the control. Statistical analysis was performed Least Significant Difference (LSD) using SAS software (version 9.1.3). Mean average *E. ritigalensis* flower diameter in control pots was 5.90 cm and average mean diameters of the infected plant's flowers were 4.05 cm. It showed significant reduction of flower formation which were attacked by mealy bug.

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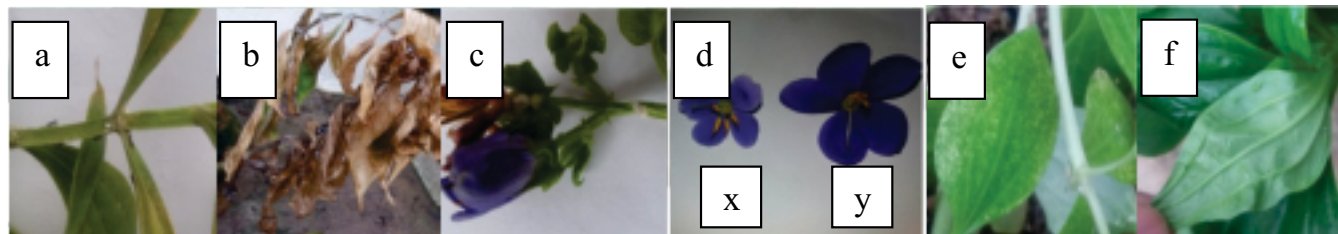


Fig. 1: Different stages of flowers and leaves infected by mealy bug and aphids (a, mealybug associated with ants; b, after heavy infection of mealybugs in *E. ritigalensis*; c, mealybug infected flower; d, *E. ritigalensis* flower (control, y) and flower infected with mealybug (x); e and f, leaves of *E. ritigalensis* infected by aphids)

The study was did not show significant affect on flowers of *E. ritigalensis* (Fig.1e and f). But, it was shown that flower bunches were reduced its number of flowers. In plants leaves were turned to yellow and curl. University of California statewide integrated pest management project in 2001 was observed that feeding by high aphid populations can slow plant growth or cause leaves to yellow and curl. Infested leaves or stems were distorted. Although many aphids look similar, most species feed only on closely related plant species and cannot spread to unrelated plants. The most important species infesting flower and nursery crops are melon (or cotton) aphid and green peach aphid. Concentrating scouting efforts and pesticide applications where the particular aphid is more abundant will improve control.

The present observations of the ants association with mealy bug (Fig. 1; a and c) were in close conformity with the report of earlier workers who reported the association of *S. geminate* with *Phenacoccus olenopsis* Tinsley association of *S. geminata* with homopterans (Gowda et al., 2014; Perera and Dahanayake, 2015). During the present study different ant species were found to transfer the mealybugs from one plant to another. This finding is in agreement with Genter (1925)

who found that the ant, *Camponotus lineo latta* (Say) transferring the grape mealybug, *Pseudococcus maritimus*. Saini et al. (2009) also noticed that ants were responsible for quick colonization of *P. solenopsis* to new areas. Smith (1928) reported that ants collected during the surveys comprised *Tapinoma sessile* Say, *Pheidole* sp., and *Technomyrmex* sp. (Hymenoptera: Formicidae).

Aphids cast skins may persist as unsightly white flecks on foliage long after aphids have left the plant (Jacobson et al., 1978; UoC, 2001). Aphids and mealybugs secrete honeydew, which attracts ants and results in growth of blackish sooty mold. In this experiment, it was observed blackish sooty molds in mealybug attacked plants while it was not observed in aphid attacked plants. Some aphids transmit certain viruses that cause diseases in some flower crops in generally but in particular time was not observed any 1 virus affected plants by aphids.

Mealybugs and aphids severely damage to *E. ritigalensis* flower production. Researchers and farmers should have to use control measures to prevent mealybug and ants entering to the plantation.

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