ABSTRACT

Golden dewdrop (*Duranta*) is a common ornamental plant of the family Verbenaceae that is often grown as garden hedge and fruit juice is used against mosquitoes. *Duranta* is also known by the common names of gold mound, pigeon berry and sky flower. During survey of Dayalbagh the golden dewdrop plants were found to be naturally infected with symptoms, suggestive of its viral nature. There was reduction in the leaf lamina with mosaic slight puckering. Variations in symptoms expression along with host range studies; Cytopathological studies, effect on host physiology and isolation of virus from infected leaves of *D. plumeiri* and confirmation by Electron microscopy was done. For the preliminary studies, establishment of the viral nature of *D. plumeiri* was done by mechanical transmission method using sap of infected leaves of *D. plumeiri* 23 indicator plants of 11 families were selected. Out of 23 host plants only 19 host plants showed the positive response after five to twenty days of mechanical inoculations of crude sap obtained from infected leaves of *D. plumeiri*.

The indicator plants *Cucumis melo*, *Luffa cylindrica*, *Cucumis sativus* (Cucurbitaceae), *Nicotiana tobaccum*, *Nicotiana*, *repanda*, *Lycopersicon esculentum* (Solanaceae), *Ricinus communis*, *Euphorbia hirta* (Euphorbiaceae), *Vigna radiata*, *Vigna mungo* (Leguminoseae), *Ipomia nil* (convolvulaceae) *Mirabilis jalapa* (Nyctaginaceae), showed viral symptoms after mechanical transmission of the infected sap. Results revealed that these tested host-plants belonging to different family were systemically infected. Symptoms such as vein clearing, mosaic, chlorosis, reduction in leaf size, crinkling and puckering was observed in new leaves of the inoculated plants.

The host plants such as *Ricinus communis* (euphorbiceae) and *Achyranthus aspera* (Amaranthaceae) were locally infected after 5 to 10 days of mechanical inoculation of infected sap. In these plants local lesions were observed.

No visible symptoms whether local or systemic appeared on *Chenopodium album* (chenopodiaceae), *Amaranthus viridis* (amaranthaceae), *Crotalaria juncea* (leguminoseae), *Commelina benghalensis* (commelinaceae). From the results of host-range studies, the percentage of infection was found about 81.60%.

A wide variety of symptoms were observed on the indicator plants. These ranged from chlorotic spots, puckering, mottling, mosaic, vein clearing, deformities of leaves, reduction in leaf size, stunting in plant growth and complete yellowing of apical leaves.

The infectivity of the present virus was preserved at Dilution $10^{-4}$ and DEP lies between $10^{-4}$-$10^{-5}$. Results for TIP indicated that, the virus lost its infectivity after heating for 10 minutes in crude sap at 55 °C-60 °C.

The results show that the respiration of the diseased leaves (110 mg/m$^2$) per unit area is higher than the healthy leaves (50 mg/m$^2$), while the net production in healthy leaves (70 mg/m$^2$/hr) is much higher than the diseased leaves (-40mg/m$^2$/hr ). Consequently the gross
productivity in healthy leaves is higher (120 mg/m²/hr) than the diseased leaves (70 mg/m²/hr). It is also clear from the above findings that the capacity of photo synthesis of diseased leaves is much reduced than the healthy leaves and respiration is increased in diseased leaves than the healthy leaves.

Total chlorophyll, chlorophyll a, chlorophyll b and carotenoids in healthy leaves 11.333mg/l, 7.044mg/l, 4.289 and 2.842 was present while in symptomatic leaves only 7.652 mg/l, 5.413mg/l, 2.509mg/l and2.606mg/l was present. Percent loss in total chlorophyll, chlorophyll a, chlorophyll b and carotenoids was 32.48%, 26.98%, 41.5% and 8.3%. These above results show that there is a general loss of chlorophylls and carotenoids in the leaves of Duranta plumeiri due to virus infection.

Results show that reducing sugar content in diseased leaves was less than the healthy leaves. In healthy leaves reducing sugar was 22mg/g (dry weight) while in diseased leaves only 16 mg/g was present.

Also the non- reducing sugar content in diseased leaves was less than the healthy leaves. In healthy leaves non- reducing sugar was 28.5mg/g (dry weight) while in diseased leaves only 25mg/g was present.

Starch content in diseased leaves was also less than the healthy leaves. In healthy leaves reducing sugar amount to 23mg/g (dry weight) while in diseased leaves only 19.5mg/g was present.

The isolated virus preparation under study showed the presence of isometric virus particles, through electron microscopy.