Indian J. Hill Farmg. 14 (2) : 117 — 119 2001

FIELD EVALUATION OF INDIGENOUS GERMPLASM OF CITRUS AGAINST INSECT PESTS

K. Rajasekhara Rao and K.A. Pathak
Division of Entomoogy, ICAR Research Complex for NEH Region,
Umiam - 793 103, Meghalaya.

The North Eastern Hill (NEH) Region of India is one of the richest reservoirs of genetic resources of citrus. The hilly terrain alongwith with adjacent countries like Mynmar and China constitute the most important natural home of citrus. Among the diverse forms of citrus found here include papedas, pummelos and their hybrids, *Citrus indica* and several types of citrons, lemons and mandarins (Sheo Govind and Yadav, 2000). Ebeling (1959) listed as many as 875 species of insects and mites feeding on various species of citrus around the world. In India, 250 species of insects have been found feeding on citrus (Butani 1976; Pathak and Rajasekhara Rao, 2000). Hence, a field study was undertaken during 1999 to study the field occurrence of different insects infesting citrus germplasm maintained at ICAR Research complex farms, Umium, Meghalaya.

Monthly observations were recorded on the pest incidence. The methodology used was the number of leaves damaged/twig for leaf miner (for 10 twigs); number of psylla, aphids, mealy bugs and scales per leaf (for 10 leaves).

Citrus psylla (*Diaphorina citri* Kuw.)

The data on the incidence of Citrus psylla on 15 indigenous species of citrus indicated that maximum number of psylla adults was recorded in June. The species Adajamir and Khasi mandarin *(Citrus reticulata)* recorded very high population of the range of 11.08 and 10.58 adults per ventral side of leaf respectively (Table 1). Kagzi lime *(Citrus aurantifolia)* and Karna khatta (*C. karna*) recorded zero population throughout the period of study showing immunity to psylla attack. In all the species there was a continuous decline in psylla population, which was attributed to very heavy rainfall in the subsequent months of observations i.e. July to September at Umiam. The gradual reduction in psylla population was noticed from June to September with increase in the age of second flush and fall in night temperatures. The correlation between psylla incidence and some of the weather parameters showed that there was a positive relationship with minimum temperature (r=0.6862) and relative sunshine hours (r=0.8159). The correlation between psylla population and phenol content of citrus leaves was found zero.

Citrus leafminer *(Phyllocnistis citrella* St.)

Gradual decrease in leafminer incidence was noticed from June to September, 1999 on different species and the species *Carrizo citron* showed almost zero per cent incidence. The lower incidence was noticed in Karna khatta (11.66%), Pummelo (15.66%), East rough lemon (20.00%). Moderate incidence was observed in Soh

Nariange (24.15%), Rough lemon (29.58%), Karun Jamir (31.25%), *Citrus latipes* (33.74%) and Adajamir (34.16%) whereas Sweet lime, Soh Jora, Khasi mandarin, Gandharjaj citron recorded very high per cent of foliage damage (57.5-75.83%). Correlation between leafminer incidence and phenol content of citrus leaves indicated the existence of a non-significant positive relationship (r=0.2364).

Citrus aphid *(Toxoptera aurantii* Fon.)

T. aurantii incidence was not noticed on eight species viz. Adajamir, Karun Jamir, Pummelo. *Carrizo citron, Citrus latipes,* Sweet lime and Karna khatta. Lower number of aphids were noticed on East rough lemon, Gandharaj citron and Khasi mandarin (3.50-5.41 aphids/leaf). Moderate population was noticed on Sohjora (14.16 aphids per leaf) and the highest number of citrus black aphid was recorded on Rough lemon (20.83 aphids/leaf). Correlation between aphid population and relative humidity was significantly positive (r=0.9862) at 5% level and minimum temperature (r=0.7384. The correlation with phenol content of citrus leaves was also positive (r=0.2832) but it was non-significant.

Citrus red scale *(Aonidiella aurantii* Marshell)

High incidence of citrus red scale was observed on Soh Nariange and Adajamir (16.67 and 25.5 scales/leaf). Remaining all species were not infested by scales with significant damage. The correlation between citrus red scale infestation and minimum temperature was found significantly positive (r = 0.8483*). Though the correlation betwen scales and phenols of citrus leaves was postive but it was very low (r = 0.1113).

Citrus mealybug *(Planococcus citri* Risso)

Mealybug did not infest all species of citrus during the period of study except Rough lemon, Adajamir and Gandharaj citron, which recorded 2.25 to 3.83 mealy bugs per leaf. The relationship with sunshine hours was positive (r = 0. 7171) and with phenols (r = 0.2872) and both were non-significant.

ACKNOWLEDGEMENT

The authors are thankful the Dr. N.D. Verma, Director and Dr. A.K. Singh, Head, Plant pathology, ICAR Research complex for facilities provided to take the observations on germplasm of citrus.

REFERENCES

Butani, D.K. (1979). *Pesticides,* 13:15-21.

Ebeling, W. (1959). *Subtropical Fruit pests,* University of California Press, Los Angles, p. 436.

Pathak, K.A. and Rajasekhara Rao, K (2000). In *Hi-Tech Citrus Management. (Eds.Shyam Singh and S.P. Ghosh). Proceedings of International Symposium on Citriculture* (Nov 23-27, 1999), NRC Citrus, Nagpur, India. Pp. 803-809.

Sheo Govind and Yadav, D.S. (2000). *Ibid. Pp. 38-46.*

Table 1. Insect pest incidence on different citrus species*

Germplasm	Psylla No./leaf	Leaf miner %damage	Scales No./leaf	Aphids No./leaf	Mealybugs No./leaf
Rough lemon	4.16	29.58	0.0	20.83	2.25
Citrus jambhiri					
Adajamir	11.08	34.16	25.58	0.00	2.25
Citrus assamensis					
Gandharaj citron	0.91	75.83	6.00	5.33	3.83
East rough lemon	0.50	20.0	0.33	3.50	Nil
Karun Jamir	5.99	31.25	Nil	Nil	Nil
Citrus aurantium					
Pumello	1.99	15.66	Nil	Nil	Nil
Citrus grandis					
Citrus gal gal	No foliage	No foliage	No foliage	No foliage	No foliage
Citrus pseudolimon					
Carrizo citron	0.41	0.00	Nil	Nil	Nil
Khasi papeda	0.41	33.74	Nil	Nil	Nil
Citrus latipes					
Sweetlime	2.24	57.50	Nil	Nil	Nil
Citrus limmettoides					
Soh nariang	1.58	24.15	16.67	Nil	Nil
Citrus sinensis					
Kagzi lime	Nil	Nil	Nil	Nil	Nil
Citrus aurantifolia					
Karna khatta	0.00	11.66	Nil	Nil	Nil
Citrus karna					
Soh Jura	6.99	67.49	3.58	14.16	Nil
Khasi mandarin	10.58	71.67	Nil	5.41	Nil

*Average of four months (June-September)