

BIONOMICS OF OLIVE PSYLLID, *EUPHYLLURA OLIVINA* COSTA

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Abstract. *Euphyllura olivina* Costa, a serious pest of *Olea europea*, has 8 overlapping generations in a year. Nymphs and adults of the last generation overwinter during December-January. Activity returns at the beginning of February and egg-laying of the 1st generation commences in 1st half of February which depends upon weather condition. Subsequently all stages of the pest are met with from February to November. The peak population of the pest was observed in April and again in September/October when the atmospheric maximum normal temperature and average relative humidity ranged between 30°C to 35°C and 70 to 75% respectively.

In the laboratory larvae of *Chrysopa* sp. consumed on an average 317 nymphs of the pest during 8 days of larval life. The details of the various biological aspects of the pest have been studied and discussed.

Introduction. *Euphyllura olivina* Costa (Hemiptera: Psyllidae) is infesting *Olea europea*, being grown at the Pakistan Forest Institute Peshawar for initial propagation trials. Its occurrence on *Olea* spp. was first reported by Alam et al (1959-69) from Bahrain, Balakot, Kahuta, Murree, Peshawar and Rawalpindi in Pakistan. Browne (1968) reported it from Cyprus occurring on *Olea europea* and *Ceratonia siliqua*.

In Greece and many other countries *Euphyllura olivina* Costa is considered of minor importance. However Arambourg (1964) reported it infesting inflorescence of olives damaging 50 to 60% of the crop in Sfax area of Tunisia. Rolli (1974) considered it alongwith other factors and insect pests responsible for reducing yield of olives in Tunisia. In Iran it caused occasional economic damage to olives (Farahbakhch and Moini, 1975). Cosella (1974) reported that *Euphyllura olivina* Costa infested olive plants in the ground but the same in pots were not attacked.

Its general life history and habits were described by Berlese (1924) further enlightened by Silvestri (1934) and Arambourg (1964).

The present investigations on biology of *Euphyllura olivina* Costa were initiated in August, 1977 in order to find out its life and seasonal histories leading to effective control measures.

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Material and Method. Biology was studied in the field in natural conditions because nymphs could not be reared in the laboratory. Infested olive shoots were covered over with 15 x 30 cm. muslin cloth sleeves. Newly emerged adults were removed and released in other cloth sleeves on uninfested shoots for mating and egg-laying. After oviposition ten adults were transferred to other uninfested shoots covered with cloth sleeves for recording their longevity. Ten newly hatched nymphs were established on separate shoots under the sleeves for study of nymphal instars. The same method was adopted for all generations. Observations were taken daily with the help of a magnifier lens. Data on temperature and relative humidity was collected from Quaterly "Weather and Crop Report".

Results and discussion. Life history.

Table 1

Average durations of life stages of Euphyllura olivina Costa

Life stages	GENERATIONS							
	1	2	3	4	5	6	7	8
Egg (days)	12.7	7.0	7.0	6.0	6.8	7.8	10.4	13.4
Nymph (days)	35.6	22.8	21.7	17.7	21.4	21.9	25.0	71.5
Adult (days)	60	94	78	65	36	32	63	50

Eggs, 0.32 to 0.36 mm long, oblong in shape, creamy white when laid turning red before hatching, are laid in rows attaching firmly at the broad end to inner surface of newly sprouting leaves, shoots and buds only detachable by scraping with a sharp pointed blad. Aveage incubation period of 8 generations ranges from 6 to 13.4 days. Prophetou and Tzanakakis (1977) reported that eggs are laid in spring on tender leaves at the time of new growth on axillary buds of previous season and on developing inflorescence.

Newly hatched nymphs, red in colour, can only be seen with the help of magnifier. Within two days nymphs cover themselves with minute white cotton like wax secreted by their bodies which become bulky after a few days by their collective secretion and can be seen visually. During peak of nymphal population all shoots and small branches are covered with white waxy coating and can be seen from a distance. Nymphs of all ages, living in groups under these coatings, suck cell sap of the plants. Mature nymphs, convex in shap, come out of waxy coating and shed their last nymphal skin on the lower surface of leaves and become adults. A nymph passes through 4 nymphal instars before reaching adult stage. Average nymphal period ranges from 17.7 to 71.5 days. Prophetou and Tzanakakis (1977) described that nymphs live in colonies and develop on the

FIG. 1
SEASONAL HISTORY OF
EUPHYLLURA OLIVINA COSTA

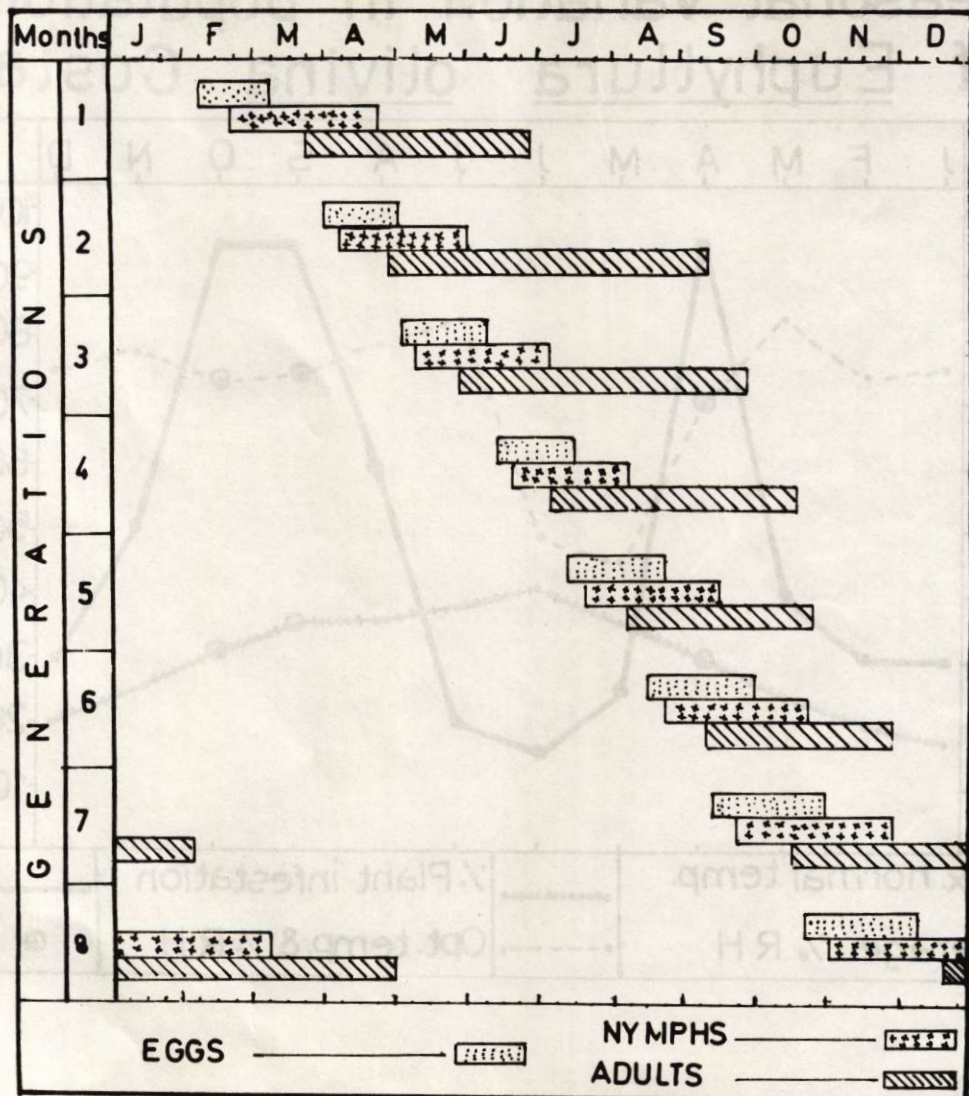
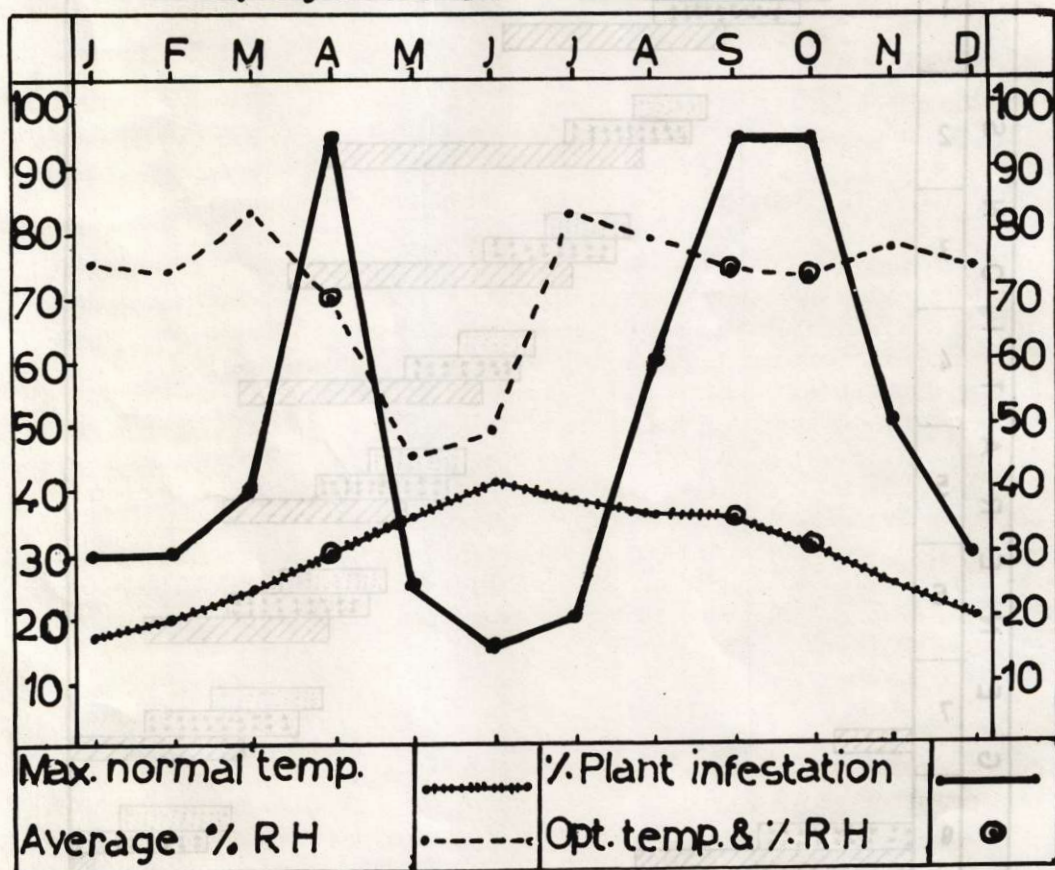


FIG. 2

Seasonal variation in population of Euphyllura olivina Costa.



inflorescence of new shoots producing a white waxy secretion and honey-dew droplets.

Adults are 1.72 to 2.44 mm long, average being 1.06 mm. Newly emerged adults are green in colour turning grey later on. Males are smaller than females. During mating both sit side by side on a tender twig or shoot and unite their abdomens at an angle of 45° . Mating lasts for a few hours. Egg-laying occurs after a day or so. Females lay 7-32 eggs with an average of 18.5 eggs. Adults live from 1 to 3 months during which they also desap the plants.

Seasonal history. The insect passes through 8 over-lapping generations in a year. Individuals of the last generation over-winter as active nymphs under waxy coating and adults on the lower surface of small branches and leaves. Prophetou and Tzanakakis (1977) reported it hibernating on olive trees as adults. At the beginning of February adults become active and nymphs transform to adults which mate and eggs of 1st generation appear in first half of February depending upon weather condition. Mass egg-laying occurs at the end of February and early March. Subsequently all stages of the pest are met with from February to November with a short gap in egg-laying between 1st and 2nd generations (Figure 1).

Nymphal population remained very low in December, January and February with a maximum normal temperature of $17-20^\circ\text{C}$ and average R.H. 73-76% in the field. This population increased in March and reached its peak in April when maximum normal temperature reached 30°C and average R.H. was 70%. Nymphal population became scarce during May/June when maximum normal temperature and average relative humidity were $36-41^\circ\text{C}$ and 45-49%. Eggs, nymphs and adults were found only under dense shade. During rainy season (July/August) population increased again when maximum normal temperature fell down from 41°C . Highest nymphal population with heavy infestation occurred again in September and October during which maximum normal temperature remained $31-35^\circ\text{C}$ and average R.H. 73-75%. Thus $30-35^\circ\text{C}$ and 70-75% relative humidity were the most favourable atmospheric conditions for mass development of *Euphyllura olivina* Costa (Figure 2).

Control. Six granular insecticides—Temik, Terracur, Disyston, Diphonate, Lorsban and Thiordan were tried in the field in doses of 20, 25 and 30 g per plant on three plant height groups of 60, 150 and 240 cm. Temik, Terracur and Disyston proved effective against the pest. Out of these Temik was the best in all doses in each height group of plants which showed activities within 24 hours after treatment and caused 100% mortality of nymphs and adults within 3 to 7 days. (Rahman, W and M.I. Chaudhry 1979).

Natural enemies. Small hymenopterous parasites, larvae of *Chrysopa* sp., larvae and adults of different species of lady bird beetles and adult hornets were recorded feeding on psyllid nymphs. Feeding potential of larvae of *Chrysopa* sp., was worked out in the laboratory.

Table 2

Feeding potential of larvae of Chrysopa sp. fed on psyllid nymphs.

Larvae	No. of nymphs consumed in instar				Total
	1	2	3	4	
1	50	81	89	99	319
2	61	73	82	90	306
3	56	78	94	98	326
Total	167	232	265	287	951
Average	56	77	88	96	317

A larva consumed on an average 317 nymphs during its 4 larval instars, each instar being of 2 days. Daily feeding of larvae ranged from 20 to 51 nymphs of the host.

References

1. ALAM, M.M., M.N. BEG, R. A. SYED, I.A. HAFIZ and S. SHAH. (1959-69). "Survey of parasites of insect pests of cultivated and useful plants and survey of insects destroying weeds and their parasites". Commonwealth Institute of biological control Pakistan station Rawalpindi, Pakistan. pp. 42.
2. ARAMBOURG, Y. (1964). Caracteristiques du peuplement entomologique de l'olivier dans le Sahel de Sfax. Ann. Inst. Nat. Rech. Agron. Tunisie. 37: 1-140.
3. BERLESE, A. (1924). Entomologia Agraria (2nd ed). Firenze. 503 pp.
4. BROWNE, F.G. (1968). Pests and diseases of forest plantation trees. pp.286.
5. COSELLA, D. (1934). Grafting of olive on *S. vulgaris*. Ann. R. Staz. Sperim. Frutticolt. e Agrumicolt. Acireale N.S.I. 211-214.
6. FARAHBAKHCH, G and M. MOINI. (1975). Olive pest in Iran. Plant Pests and Diseases Research Institute, National Agricultural Research Organisation, Ministry of Agriculture and Natural resources Iran. pe. 1 - 73: en 1 - 14.

7. PROPHETOU, D.A. and M.E. TZANAKAKIS. (1977). Seasonal development and number of generations of *Euphyllura olivina* in Halkidiki (N. Greece). Ann. Ent. Soc. Amer. 70(5): 707 - 710.
8. RAHMAN W. and M.I. CHAUDHRY. (1979). Granular insecticides for the control of olive psyllid, *Euphyllura olivina* Costa. Pakistan. J. For. 29(2): 81 - 85.
9. ROLLI, K. (1974). Plant protection in Tunisian olive groves. Z. Pflkrankh. 81(12): 705 - 710.
10. SILVESTRI, F. (1934). Compendio di Entomologia Applicata. Parte speciale. Vol. 1. Portici. 448 pp.