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Research Article

# Biology of mite *Schizotetranychus baltazari* Rimando on acid lime Cv. Kagzi lime.

**Praveen Kottalagi, Jagginavar S.B, Veerendra A.C*, Nandini R***

Department of Agricultural Entomology, College of Agriculture, Bijapur, UAS Dharwad

*Senior Research fellow's (Agricultural Entomology), UAHS, Shimoga, Karnataka

**Abstract**

Studies on biology of *Schizotetranychus baltazari* Rimando on acid lime Cv. Kagzi lime indicated that the duration of different developmental stages of *Schizotetranychus baltazari* were 4.07 days for eggs, 2.32 days for larvae, 0.77 days for I quiescent, 2.37 days for protonymph, 0.71 for II quiescent, 2.23 days for deutonymph and 0.84 days for III quiescent stages, respectively. The fecundity was 66.53 eggs/female, while pre-oviposition, oviposition and post-oviposition periods lasted for 1.99 days, 10.54 days and 2.57 days, respectively. The total developmental period from egg to adult was recorded as 13.31 days and longevity of male was 8.58 days and that of female was 15.25 days.

**Key word**: *Schizotetranychus baltazari,* biology, Kagzi lime.

## INTRODUCTION

Citrus is a general term, which refers to a large number of species of fruit trees in the family Rutaceae. It includes grapefruit, lime, lemon, malta, orange and pomelo. Acid lime, *Citrus aurantifolia* (Swingle) is locally grown species for in routine life. Citrus fruits are rich in vitamin C as well as mineral salts and are consumed as dessert, squashes, marmalades, pickles and jellies. They are also used in the preparation of a large number of concentrated products like citric acid and pectin etc.

Citrus ranks third (next to mango and banana) in acreage among the fruits grown in India ranks sixth among the citrus growing countries of the world (Shivankar and Singh, 2005). In India, citrus orchards occupy an area of 9, 87,000 hectares with an annual production of 96, 38,000 million tones of fruits with an average productivity of 9.8 tones/ha (www://nhb.gov.in/area-pro/database-2011). Among the 12 districts of Northern Karnataka, Bijapur and Gulbarga districts have the maximum area under acid lime cultivation i.e. 6,211 and 1,453 ha with the production of 1, 55,275 and 33,522 tonnes, respectively. More than 30% of citrus production in the country is lost every year as a result of damage caused by insect and mite pests (Butani, 1979a and 1979b).

Citrus is attacked by number of insect pests throughout its growth period starting from nursery to maturity of fruits. More than 250 species insects have been reported on various citrus species in India (Shivankar and Shyam Singh, 1999). Among them Mites *(*Acarina*:* Arachnida*)* are one of the important pests of citrus causing severe damage in recent years. Karbhanthanal *et al.* (2011) reported that mite infestation on acid lime was 10-12 per cent in 2008-09 and which was increased up to 14-18 per cent Bijapur 2009-2010 in Bijapur district. Hence, the present study was under taken to know the mite, *Schizotetranychus baltazari* Rimando infestation in acid lime at Bijapur.

## MATERIALS AND METHOD

Present investigation life history of mites was studied under laboratory conditions. The leaf discs were brushed and cleaned thoroughly to ensure that initially no eggs or other developmental stages of

mite were present on it. Adult females of mite from infested leaf/fruits were transferred individually to each on leaf disc and were allowed to lay eggs. After egg laying, females were removed from the discs. Observations were recorded at 4 h intervals to know the duration of development of different life stages. Water was added periodically so as to keep the cotton wad wet and to maintain the leaf discs in a turgid condition. Whenever the leaf discs showed drying symptoms, they were replaced by fresh ones. Various parameters relating to development stages such as egg, larva, protonymph, deutonymph, quiescent stages (I, II and III), pre- oviposition, oviposition and post-oviposition periods and adult longevity were recorded.

**RESULTS AND DISCUSSION**

Freshly laid eggs were smooth, spherical in shape, translucent white and appeared like a tiny drop of water. As time progressed, it gradually turned more whitish and then to creamy pinkish prior to hatching. At this stage, red eye spots corresponding to simple eyes of larvae were clearly visible. The eggs measured on an average 0.1mm in diameter. The incubation period ranged from 3.89 - 4.30 days with an average of 4.07 ± 0.17 days. The newly emerged hexapod larva was almost spherical or slightly oval in shape and larva was creamy white in colour and turned green upon initiation of feeding and finally to dark green. The larva, quiescent stage I, protonymph, quiescent stage II, deutonymph and quiescent stage III period have reported 1.89 - 2.75, 0.65 - 0.95, 1.80 - 2.75, 0.65 - 0.85, 2.73 – 1.75 and 0.70 – 0.95 days respectively. Irrespective of the season, the total life cycle from egg to till death of mite varied in different temperature. It was observed that the males completed life cycle early (8.58 ± 0.28 days) compared to females (15.25 ± 0.56 days) mites complete life cycle faster during summer as compare to other seasons. These results have been in concurrence with earlier findings. Childers *et al.* (2001) on citrus mite eggs hatch in about 3 days at 81°F. After about 2 days at 81°F, moulting occurs. The next (nymphal) stage requires 2 days to moult to an adult at the above temperature. Males and females have an average life span of 6 and 14 days, respectively at 81°F. In the field, females can live for nearly 30 days in winter. The length of life cycle from egg to adult is 6 days at $81^{O}$F. Similar findings were also observed; Manjunatha (1982) studied on brinjal mite, *T. neocaledonicus*, where egg, larval, protonymphal, deutonymphal and adult stage lasted for 2.59, 1.89, 1.43, 2.33 and 14.13 days, respectively. Fecundity was 60 eggs with 3.37 eggs per day. On an average mated female took 1.98, 17.0 and 1.40 days for the pre oviposition, oviposition and post oviposition period, respectively.

Thus, the citrus appears to be better host for *Schizotetranychus baltazari*. The biological variation for different host is a known phenomenon though each host supports the survival and perpetuation to considerable extent.

Many reports from different authors like Sadana and Joshi (1986) they studied that the development of Citrus silver mite (*Brevipalpus californicus)* during different months, under laboratory conditions and observed faster development of mite in May while it was minimum during March. Fecundity per female ranged from 8.2 to 12.0 and a female laid on an average of 0.96 to 1.83 eggs per day. Mite developed rapidly during summer months. Griffiths and Thompson (1957) in their study on effect of temperature and humidity on the biology of the rust mite in Florida concluded that, heavy infestations appeared during any month of the year, there was tendency for infestation to increase during summer and with lowest infestations generally occurring during late fall and winter months. So these results were confined to our present study output in terms of incidence of mites that they were severe and also shown their tendency of increasing in population on citrus host is quite evident.

As like other different citrus mite species, *Schizotetranychus baltazari* one of the species also appears to be polyphagus infesting many crops. Since there were no much published reports available pertaining to this aspect in a closed manner to the respected study, its quite difficulty to compare and confined the results with others work in this pest. So it seems to be first attempt made in this regard on citrus host. There is yet to more work has to be done in this particular pest over citrus and also other alternate hosts. Hence citrus appears to be a good host for *Schizotetranychus baltazari* mite in study surmounted areas in north Karnataka.

**Table 1. Biology of *Schizotetranychus baltazari* Rimando on acid lime Cv. Kagzi lime.**

| Sl No. | Developmental stages | Duration in Days | |
|---|---|---|---|
| | | Range | Mean ± S.D |
| 1 | Egg | 3.89 – 4.30 | 4.07 ± 0.17 |
| 2 | Larval | 1.89 – 2.75 | 2.32 ± 0.38 |
| 3 | Quiescent- I | 0.65 – 0.95 | 0.77 ± 0.13 |
| 4 | Protonymph | 1.80 – 2.75 | 2.37 ± 0.42 |
| 5 | Quiescent- II | 0.65 – 0.85 | 0.71 ± 0.11 |
| 6 | Deutonymph | 1.75– 2.73 | 2.23 ± 0.44 |
| 7 | Quiescent- III | 0.70 - 0.95 | 0.84 ± 0.12 |
| 8 | **Total development** | 11.8-13.2 | 13.31 ± 1.19 |
| 9 | Pre-ovipositon period | 1.72 – 2.25 | 2.00 ± 0.26 |
| 10 | Ovipositon period | 11.00 - 12.00 | 11.48 ± 0.44 |
| 11 | Post-ovipositon period | 2.23 – 2.85 | 2.49 ± 0.26 |
| 12 | **Female longevity** | 14.5-15.8 | 15.25 ± 0.56 |
| 13 | **Male longevity** | 8.25-9.1 | 8.58 ± 0.28 |
| 14 | **Fecundity (Number)** | 48 -71 | 55.75 ± 10.37/Female |

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