BIOLOGY OF *AMPHITETRANYCHUS VIENNENSIS* (ZACHER) (ACARI: TETRANYCHIDAE) IN BARAGHAN REGION OF KARAJ, IRAN

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SUMMARY: The biology of *Amphitetranychus viennensis* (Zacher) (Acari: Tetranychidae) was studied on black cherry (*Prunus serotina* Ehrh.) trees in an orchard of Baraghan in 2002 and also under laboratory conditions at 23 ± 1° C, 75 ± 5% RH and a 16L:8D photoperiod. Females of the mite began their activities near the end of May and produced 3 generations per year. In the laboratory, the mean time for development from egg to egg took 16.18 and 11.93 days for females and males respectively. The average preoviposition, oviposition and postoviposition periods were 2.25, 4.91 and 1.12 days respectively.

RÉSUMÉ : La biologie de *Amphitetranychus viennensis* est étudiée sur un verger de *Prunus serotina* de Bereghan (2002) et au laboratoire en condition standard (23° C, 75% HR, 16hJ-8hN). Les femelles sont actives à partir de début Mai et trois générations par an sont comptées. Le temps moyen d'une génération (d'œuf à œuf) est de 16,18 j et 11,93 j pour les femelles et les mâles respectivement. Les durées moyennes de préoviposition, oviposition et post oviposition sont respectivement de 2,25, 4,91 et 1,12 jours.

The hawthorn spider mite, *Amphitetranychus viennensis*, is an important species of the family Tetranychidae which was first described by Zacher in 1921 from Austria (Vienna), Germany (Berlin, Dahlem) and UK (Sabsbury). This species is an important pest of different rosaceous plants such as hawthorn (*Crataegus* sp.), quince (*Cydona* sp.), apple (*Malus* sp.), pear (*Pyrus* sp.), flowering quince (*Chaenomeles* sp.), blackthorn, cherry, peach, plum, apricot (*Prunus* spp.) (PUCAT & GARLAND, 1996).

It has also been reported from Azerbaijan, Caucasus, Georgia, Russia, Turkey, Kirgizia, Pakistan, China, Korea, Japan, Hungary, The Netherlands, Poland, Romania, Slovakia, Spain, Sweden, Switzerland, Ukrain and Black Sea Coast (EHARA & SHINKAJI, 1975; JEPPSON *et al.,* 1975; SEPASGOSARIAN & SCHRUFT, 1975; SKORUPSKA & BOCZEK, 1984; Gotoh, 1986).

MATERIALS AND METHOD

Field observations: Because of high populations of this mite in the mountainous rural district of Karaj named Baraghan, studies on the biology was started

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by selecting five infested black cherry trees (*Prunus serotina* Ehrh.) in four different directions in an orchard in this region. Trees were marked and samplings were made once a week taking ten damaged leaves from each tree to the laboratory. In the laboratory, each leaf was studied carefully and the number of different stages of *A. viennensis* was recorded. Field samplings were continued from 23 May to 2 September 2002.

Laboratory rearing and studies on life histories: The adult females were collected and transferred to the laboratory at 23 ± 1° C, 75 ± 5% RH and a 16L:8D photoperiod. Cadogan & Laing's (1977) rearing method with some modifications was carried out. Rearing was performed in transparent plastic containers (24 × 18 × 6 cm) with a reticulated basket in it. The distance between the basket and the bottom of the container was 1.5 cm which was filled by saturated NaCl solution. Six Petri dishes (6 cm diameter and 1.5 cm height) were placed on the basket and each Petri dish contained a cubic sponge (2 × 2 × 2 cm) with a small napkin (2 × 2 cm) on it. A fresh leaf was placed on the napkin so that the back side of the leaf was up. The sponge was saturated with distilled water. After the container lid was closed, the relative humidity increased to 75%. The saturated NaCl solution increased the stability of the leaf and under this conditions the leaf would be usable at least for 15 days. The leaf was substituted when the first symptoms of declining were seen. A female and a male were introduced on each leaf disc and after oviposition and egg hatching, each larva was transferred to another leaf to study its development. The observations were made every 2 hours from 7a.m-9 p.m.

Results and Discussion

Seasonal history in the field According to the field observations, *A. viennensis* has 3 generations per year in Baraghan, Karaj. We found the hibernating mites among the fallen leaves in the surface layer of the soil. Our observations confirm the findings of Rambier (1954), Beglarov (1959) and Sepasgozarian and Shruft (1975) whereas Müller (1957) and Skorupska & Boczek (1984) found overwintering mites in upper part of tree branches and Livšič (1960) found hibernating females in insect exuviae, in moss and in crevices of trunks and branches and in bands of corrugated paper. Females appeared near the end of May at 16° C, 60% RH and 11.5 hours daylight. First generation began near the end of May, second generation about mid June and third one at the end of July. The female population reached its peak in early July, in the second generation at 21° C, 48% RH and 13 hours daylight. Number of generations differs from previous report on the life cycle of the same species by Skorupska & Boczek (1984). They reported 4 and 5 generations per year in Poland. These differences might result from climatologically different conditions of the two geographic areas and of different host plants. In early September females began to hibernate at 22° C, 29 RH and 11.5 hours daylight. In Baraghan the main host for *A. viennensis* was black cherry; the mite was very rarely seen on plum. This mite was not detected on cherry in any of the samples.

Stage	*n*	Mean ± SE (hours)	Range (hours)
Larva	32	29.01 ± 1.33	17.5-46
Protochrysalis	35	27.37 ± 1.24	13-41.5
Protonymph	32	27.01 ± 1.22	17.3-44
Deutochrysalis	32	26.96 ± 0.95	12-38
Deutonymph	28	28.79 ± 1.30	18.8-44
Teliochrysalis	29	31.62 ± 1.004	23-42.5

Table 1. — Developmental period of *A. viennensis* at 23 ± 1° C, 75 ± 5% RH and 16L:8D

Period	*n*	Mean ± SE (days)	Range (days)
Preoviposition	10	2.40 ± 0.22	1-4
Oviposition	12	4.41 ± 0.29	4-7
Postoviposition	15	1.12 ± 0.08	0.79-1.5
Embryonic P. (male)	16	4.56 ± 0.12	4-5
Embryonic P. (female)	28	5.17 ± 0.10	4-6

Table 2. — Durations of various periods of *A. viennensis* at 23 ± 1° C, 75 ± 5% RH and 16L:8D

Generation	*n*	Mean ± SE (days)	Range (days)
Male	14	11.78 ± 0.31	10-14
Female	16	16.18 ± 0.35	15-18

Table 3. — Duration of a generation for male (from egg to adult) and female (from egg to egg) at 23 ± 1° C, 75 ± 5% RH and 16L:8D

Factor	This study	Gotoh (1986)
Host plant	Black cherry (*Prunus serotina*)	Deciduous oak (*Quercus mongolica* var. *grosseserrata* (Blume))
Temperature	23 ± 1° C	25 ± 1° C
Humidity	75 ± 5% RH	—
Photoperiod	16L:8D	15L:9D
Preoviposition Period	2.40 ± 0.22 (days)	1.82 ± 0.07 (days)
Oviposition Period	4.41 ± 0.29 (days)	15.9 ± 1.13 (days)
Postoviposition Period	1.12 ± 0.08 (days)	0.68 ± 0.13 (days)
Number of eggs per female	24.82	43 ± 2.60
Duration of a generation (female)	16.18 ± 0.35 (days)	12.06 ± 0.08 (days)
Duration of a generation (male)	11.78 ± 0.31 (days)	11.93 ± 0.17 (days)

Table 4. — Comparison of this laboratory study with that of Gotoh (1986)

Life cycle in the laboratory Under laboratory conditions (23 ± 1° C, 75 ± 5% RH and a 16L:8D photoperiod) the mean time required for the development of each stage was 28.18, 26.19 and 31.12 hours for larva, protonymph and deutonymph respectively (Table 1). The mean time for embryonic development of males and female were 4.5 and 4.17 days respectively (Table 2). The mean time for completion of a generation from egg to egg was 16.18 days (Table 3). As expected, our laboratory results differ from those in Gotoh (1986) because of difference in laboratory conditions and especially host plant (Table 4).

The difference between number of eggs per female in this study & Gotoh's study (1986) might be caused by difference in alimentary ingredients of hosts (blackcherry & oak). Probably rich ingredients such as proteins and other necessary elements in oak leaves might avail more suitable nourishing conditions in comparison with blackcherry leaves that could have been resulted to a notable increase in number of eggs per female.

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