

EFFECT OF SEASON AND GRAPEVINE VARIETY
ON THE BIOLOGY OF *TENUIPALPUS GRANATI* SAYED,
WITH DESCRIPTION OF ITS IMMATURE STAGES
(ACARI : PROSTIGMATA : TENUIPALPIDAE)

BY

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INTRODUCTION

In 1946 SAYED described his *Tenuipalpus granati* from vineyards and pomegranate in Lower and Upper Egypt. Since the end of the last decade, it has been evident that the mite usually infested grapevines in different localities of Egypt (Wafa et al., 1969 ; YOUSEF, 1970 ; RASMY et al., 1970).

The present work aimed to investigate the effect of season and plant variety on the development and fecundity of *T. granati*. The morphology of its immature stages, were also studied.

MATERIALS AND METHODS

The life span of *T. granati* Sayed, was measured once every season under laboratory conditions. Mite individuals were reared singly on leaf discs of about one square inch of the grapevine variety Romey red. These leaf discs were put in pairs on wet layers of cotton wool in petri-dishes of 9 cm. diameter. Thirty five mite individuals, were inspected twice daily, during development and necessary records were noted. The same technique was adopted for studying the mite development and fecundity, on both varieties Romey red and Elgharibi.

Field and taxonomic discriminations were made for the egg, larva, protonymph and deutonymph.

RESULTS AND DISCUSSION

A. — DESCRIPTION OF EGG AND IMMATURE STAGES :

Egg : Reddish, elongate, measuring 110.6 μ long and 79.6 μ wide. The egg-shell usually glimmering, bearing longitudinal grooves.

Larva : Body oval, smooth, with large and wide podosoma measuring 138.8 μ long including rostrum and 96.3 μ wide, with orange reddish colour (Fig. 1-A). Third propodosomal setae lanceolate, finely serrate, and significantly longer than either the first or the second ones.

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Hysterosoma bearing the first dorsocentrals short, each of the dorsosublaterals, second and third dorsocentrals minute ; the humerals long, lanceolate and finely serrate, five pairs of dorso-laterals, of which four lanceolate, finely serrate, and the penultimate one long and whiplike.

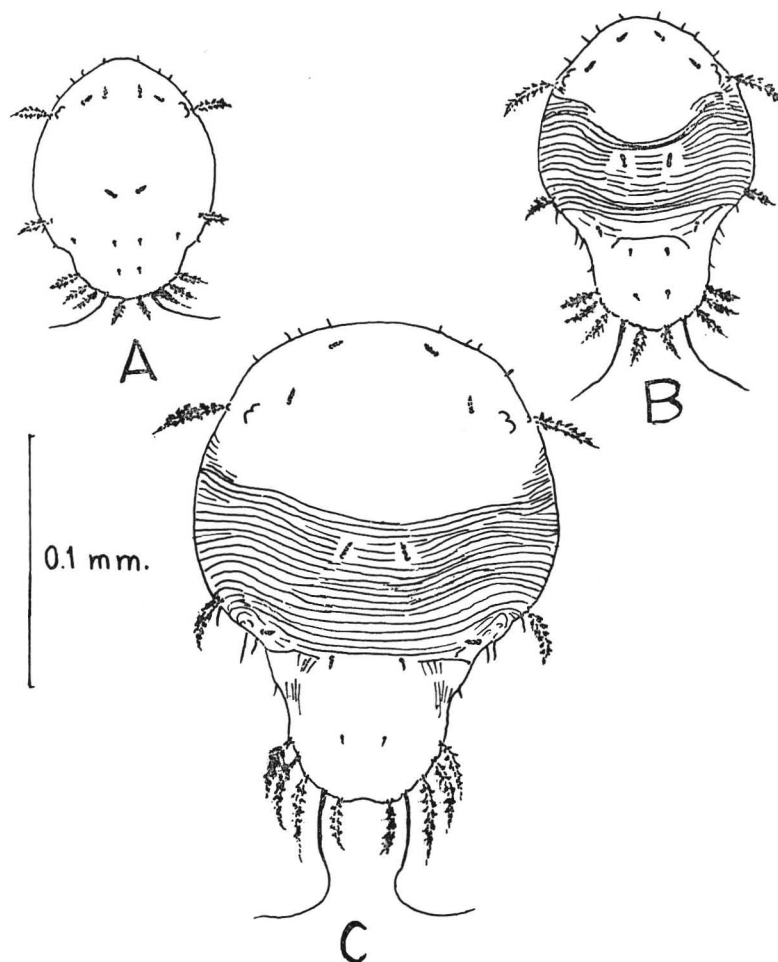


FIG. 1. — *Tenuipalpus granati* Sayed : A) Larva ; B) Protonymph ; C) Deutonymph.

Protonymph : Body pear-shaped, measuring 211.9μ long, including rostrum, and 138.5μ wide, with yellowish colour (Fig. 1-B). It differs from the larva in having four pairs of legs and a transversely striated metapodosoma.

Deutonymph : Differs from the protonymph in having larger body, measuring 263.0μ long including rostrum, and 168.3μ wide (Fig. 1-C). Dorsal setation obviously larger than that of the protonymph.

B. — BIOLOGICAL STUDIES :

Biological studies showed that this mite seemed to be thelytokous, as males were not captured either in the laboratory or in the field. ZAHER and YOUSEF (1972) noticed that males of *T. punicae* P. and B., were very rare and females reproduced parthenogenetically.

TABLE I. — Seasonal variation of the Life cycle of *T. granati*, reared on Romey red variety.

		Average duration (in days)								
Season		Incubation	Larva		Protonymph		Deutonymph		Total	Life cycle
		period	A	Q	A	Q	A	Q	Immatures	
Spring	Period	8.5±0.6	3.3±0.4	2.6±0.4	3.3±0.6	3.7±0.5	3.9±0.2	3.6±0.6	20.6±1.1	29.1±4.4
	Temp. °C.	22.2	25.1	24.4	24.9	25.1	25.2	26.1	24.7	23.6
	R.H. %	63.4	58.6	54.8	47.7	54.8	51.5	54.2	54.4	55.4
Summer	Period	4.3±0.3	2.2±0.3	1.9±0.2	2.0±0.3	2.1±0.6	2.6±0.4	2.5±0.4	13.3±1.6	17.6±3.0
	Temp. °C.	29.9	29.8	30.0	29.9	29.8	29.9	30.7	30.1	30.0
	R.H. %	62.1	62.1	61.6	61.6	63.6	65.9	67.5	62.7	63.5
Autumn	Period	5.4±0.8	3.6±0.1	3.5±0.6	4.8±1.0	4.8±1.0	4.8±1.1	5.1±0.4	26.6±1.5	32.0±5.8
	Temp. °C.	28.9	28.6	28.3	25.9	27.9	27.3	25.8	27.3	27.8
	R.H. %	59	57	56	64	78	60	62	62	62

As most of the tenuipalpid mites, *T. granati*, passed through two nymphal stages, in addition to the larva, before reaching adult. Field observations indicated that females deposited their eggs on young developed leaves and twigs, preferring invaginations and around midribs. It was noticed that autumn females did not lay any eggs during autumn and winter. These females overwintered under the bark, and in early spring they began to deposit their eggs. Similar results were obtained by ZAHER and YOUSEF (1972), who noticed that autumn females of *T. punicae* hibernated during winter and began to lay eggs after a period of 122.5 days.

EFFECT OF SEASON ON THE DEVELOPMENT AND FECUNDITY OF *T. granati* :

The incubation period changed from 8.5 days in spring (22.2°C) to 4.3 days in summer (29.9°C) (Table I). Relative humidity averaged about 63 % during the two periods.

During spring (about 25°C) and summer (about 30°C) the active larval, protonymphal and deutonymphal stages varied from 3.3 to 2.2, 3.3 to 2.0 and 3.9 to 2.6 days, respectively (Table I). The total period of immature stages averaged 20.6, 13.3, and 26.6 days in spring, summer and autumn, when the temperature, averaged 24.7°C, 30.1°C and 27.3°C, respectively. The life cycle required 29.1, 17.6, and 32.0 days, during the previous mentioned seasons.

A negative relationship existed between temperature and the duration of life cycle. This statement clearly appeared in spring and summer, but in autumn, the case was different. In spite of the higher average temperature in autumn than that in spring, yet the duration of the life cycle was longer in the former. This prolongation of the period of immature stages in autumn could be due to certain factors, such as high relative humidity, photoperiod, leaf conditioning or the mite behaviour, as adult females tended to hibernate during late autumn and winter. ZAHER and YOUSEF (1972) stated that temperature highly affected the development of *T. punicae*, yet relative humidity did not show any significant effect.

The pre-oviposition period was nearly similar in spring and summer, as it averaged 3.4 days for the former, and 3.5 days for the latter. In autumn, females migrated from leaves to hibernate in protected places including cracks, and under bark till early spring (in late March), as they began to deposit their eggs. This period which was considered as pre-oviposition, reached an average of 149.4 days.

The generation period ranged from 21.1 days in summer to 32.5 days in spring. The autumn generation lasted for 181.4 days. Adult females lived for an average of 9.7 days in summer, and 17.5 days in spring.

During summer, the female deposited a number of eggs slightly higher than that recorded in spring, yet the former season exhibited a significantly higher daily rate (Table II).

TABLE II : Effect of season on the fecundity of *T. granati*, when reared on Romey red variety.

Season	oviposition period (in days)	Average no. of deposited eggs		Temp. °C.	H.R. 90
		Total average	daily rate		
Spring	11.8 ± 2.4	16.7 ± 3.1	1.4	27.8	53.2
Summer	4.9 ± 1.1	18.2 ± 4.8	3.7	32.2	67.2

The development and fecundity of *T. granati* were measured when reared on the susceptible variety, Romey red and a non-susceptible one, Elgharibi. The mite individuals could not develop on Elgharibi variety, as larvae died after one day and adult females survived for 1.5 days and deposited very few eggs averaging 1.4 eggs/female ; at 27.8°C and 53.3 % R.H. On the opposite

immatures developed when fed on Romey red variety as it required 20.6 days at 25.6°C and 54.6 % R.H. Adult females lived for 17.5 days and deposited an average of 16.7 eggs during 11.8 days, at 27.8°C and 53.2 % R.H.

SUMMARY

Biological studies showed the following :

1. — *Tenuipalpus granati* proved to be thelytokous. Females passed through a larval and two nymphal stages before being adults.
2. — The incubation period lasted for 8.5, 4.3 and 5.4 days, and the period of immature stages required 20.6, 13.3 and 26.6 days, during spring, summer and autumn, respectively. The female life cycle lasted for 29.1 days at 23.6°C and 55.4 % R.H., 17.6 days at 30.0°C and 63.5 % R.H., 32.0 days at 27.8°C and 62 % R.H., during the previous mentioned seasons, respectively. Autumn females, hibernated till early spring (about 149.4 days) where they began to deposit their eggs.

The adult female lived for 9.7 days and laid 18.2 eggs in summer, and survived for 17.5 days and deposited 16.7 eggs in spring.

Elgharibi variety did not suit the mite development and fecundity, while Romey red was highly favourable.

RÉSUMÉ

Tenuipalpus granati est une espèce thelytoque. Une larve et deux nymphes précèdent la stase adulte. Des données sont apportées concernant la durée de l'incubation, des stases immatures et la durée de vie des femelles. Celles-ci hivernent et déposent leurs œufs au printemps et l'été suivant.

REFERENCES

- RASMY (A. H.), ZAHER (M. A.) and ABOU-AWAD (B. A.), 1972. — Mites associated with deciduous fruit trees in U.A.R. — *Z. ang. Ent.*, **70** : 179-83.
- SAYED (M. Taher.), 1946. — Description of *Tenuipalpus granati* nov. spec. and *Brevipalpus pyri* nov. spec. (Acarina : Trichadenidae). — *Bull. ent. Soc. Égypte*, **30** : 99-104.
- Wafa (A. K.), ZAHER (M. A.), and YOUSEF (A. A.), 1969. — Survey of the tenuipalpid mites in U.A.R. (Acarina : Tenuipalpidae). — *Bull. Zool. Soc. Egypt*, **22** : 52-59.
- YOUSEF (A. A.), 1970. — Mites associated with vine trees in the U.A.R. (Acarina). — *Z. ang. Ent.*, **67** : 1-6.
- ZAHER (M. A.), and YOUSEF (A. A.), 1972. — Biology of the false spider mite *Tenuipalpus punicae* Pritchard and Baker in U.A.R. (Acarina : Tenuipalpidae). — *Z. ang. Ent.*, **70** : 23-29.

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