MORPHOLOGY AND BIOLOGY OF *TYPHLODROMUS AFRICANUS* N. SP. (ACARINA : MESOSTIGMATA : PHYTOSEIIDAE)

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LIFE CYCLE
PREDATION

SUMMARY : Different stages of *Typhlodromus africanus* n. sp., were described. At 25°C, the total period of female immature stages averaged 5.2 days, when the predator was fed on immature stages of *Tetranychus arabicus* Attiah. The male emerged earlier.

CYCLE DE VIE
PRÉDATION

RÉSUMÉ : *Typhlodromus africanus* n. sp. est décrit à toutes ses stases. La durée moyenne du développement postembryonnaire du mâle et de la femelle est donnée ainsi que la durée de ponte de la femelle, le nombre d'œufs pondus, la durée moyenne de vie des adultes.

Des indications sont également données sur le nombre de proies attaquées (immatures de *Tetranychus arabicus* Attiah). La femelle est plus efficace que le mâle.

INTRODUCTION

Different species of the genus *Typhlodromus* Scheuten, were described by ELBADRY (1967, 1968), ZAHER and SHEHATA (1969, 1970). The biology of *T. pyri* Scheuten was investigated by ZAHER and SHEHATA (1971).

The present work comprised a description of a new species and its immature stages. The duration, efficiency of the predator immature stages and adults, together with its fecundity, were also studied.

MATERIALS AND METHODS

Rearing *Typhlodromus africanus* n. sp., leaf discs of grapevine of about 3 cm in diameter each, were placed on pieces of cotton wool, and put in petri-dishes. Suitable moisture was maintained by adding few drops of water.

Hatching larvae, were reared singly during their life span. A surplus of known numbers of immatures of *Tetranychus arabicus* Attiah were introduced. The killed prey individuals were counted daily and replaced by another alive. The experiment was carried out in an incubator at 25°C, and inspected twice daily.

Ten individuals of each of the predator different stages were mounted in Hoyer's medium and drawn to study their morphology.

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Results and Discussion

Morphological studies :

Typhlodromus africanus n. sp.

Diagnosis : This species is closely allied to *T. Zaheri* Elbadry (1967), but differs in having five pores on the dorsal shield ; setae M_2 and L_{10} serrate, the former slightly shorter than the latter ; setae M_2 longer than L_9. Chelicera of female with four subapical teeth on the fixed digit, three subapical ones on the movable digit.

Female : Dorsal shield (Fig. 1-G) heavily covered by a network reticulation, being larger on the post-scutum ; with five pores, of which three on the proscutum ; bearing 18 pairs of setae, of which ten in the lateral row. Setae M_2 finely feathered and longer than L_9 ; setae L_{10}, finely feathered and appearing to be the longest.

Sternal plate oblong, with convexed anterior, concaved lateral and posterior edges, heavily covered by a network reticulation, bearing setae St_1, St_2 and St_3 in addition to two pairs of lyrifissures (Fig. 1-I). Metasternals occurring on a pair of oval platelets, and appearing to be shorter than the genitals. Ventrianal plate nearly pentagonal ; preanal area heavily covered by a transverse striae forming a wide network pattern ; with three pairs of preanal setae and a pair of minute crescent-shape pores between the third preanals. Ventrolateral setae subequal, but shorter than the caudals. Spermathecal duct slender and tappered anteriorly, nearly as long as the pyriform vesicle (Fig. 1-J). Chelicera with four subapical fine teeth and a pilus denticulus on the inner margin of the fixed digit, movable digit bearing three subapical teeth (Fig. 1-H). Leg IV with one macroseta (Fig. 1-K). Idiosoma measuring 406.42 μ long, and 266.14 μ wide.

Male : Differs from the female in having a small body (Fig. 1-L). Ventrianal plate triangular nearly occupying the opisthosomal venter and covered by a wide network reticulation (Fig. 1-N). Chelicera with two terminal teeth and a pilus denticulus on the inner margin of the fixed digit ; movable digit with two subapical teeth (Fig. 1-M). Spermatodactyl elongate, ending in a blunt inner and pointed outer edges (Fig. 1-M). Idiosoma measuring 289.45 μ long and 168.0 μ wide.

Description of Immature Stages

Larva : Dorsal shield smooth, divided into a large pyriform anterior and a small trapezoidal posterior one (Fig. 1-A). The anterior shield bears setae V, L_1-L_4, D_1-D_3 and M_1. Setae L_4 subequal to D_3 and each of them longer than the others. The posterior shield having setae L_5, L_6 and a considerably long and whiplike setae L_{10}.

Ventral plates lacking, sternal setae present (Fig. 1-B). Anus ill-defined, two pairs of preanals, setae VL_3 and CS present, the latter the shortest. The paraanals long while the postanal short. Idiosoma measuring 176.96 μ long and 135.94 μ wide.

Protonymph : Dorsal shield complete, smooth, bearing the dorsal setal complement (Fig. 1-C). Setae L_8 subequal to M_2, and each appearing to be shorther than L_{10} but slightly longer than the others. Setae S_1, S_2, stigmata and peritremes appear.

Ventral chaetotaxy, differs from that of the larva, in having short paraanals and long caudals (Fig. 1-D). Idiosoma measuring 197.68 μ long and 138.25 μ wide.

Deutonymph : Dorsal shield bearing five pairs of minute pores, of which three on the proscutum (Fig. 1-E). Setae M_2 subequal to L_{10}, and each finely serrate.

Ventrally, two pairs of lyrifissures appear behind setae St_1 and anterior to setae St_3 (Fig. 1-F). The metasternals, genitals, setae VL_1 and the second preanals appear. A pair of minute crescent-shape pores observed between the third preanals. Anus surrounded by a triangular and ill-defined plate. Peritremes and peritremal plates developed. Two pairs of short anterior and long posterior metapodal platelets present. Idiosoma measuring 261.66 μ long and 150.23 μ wide.

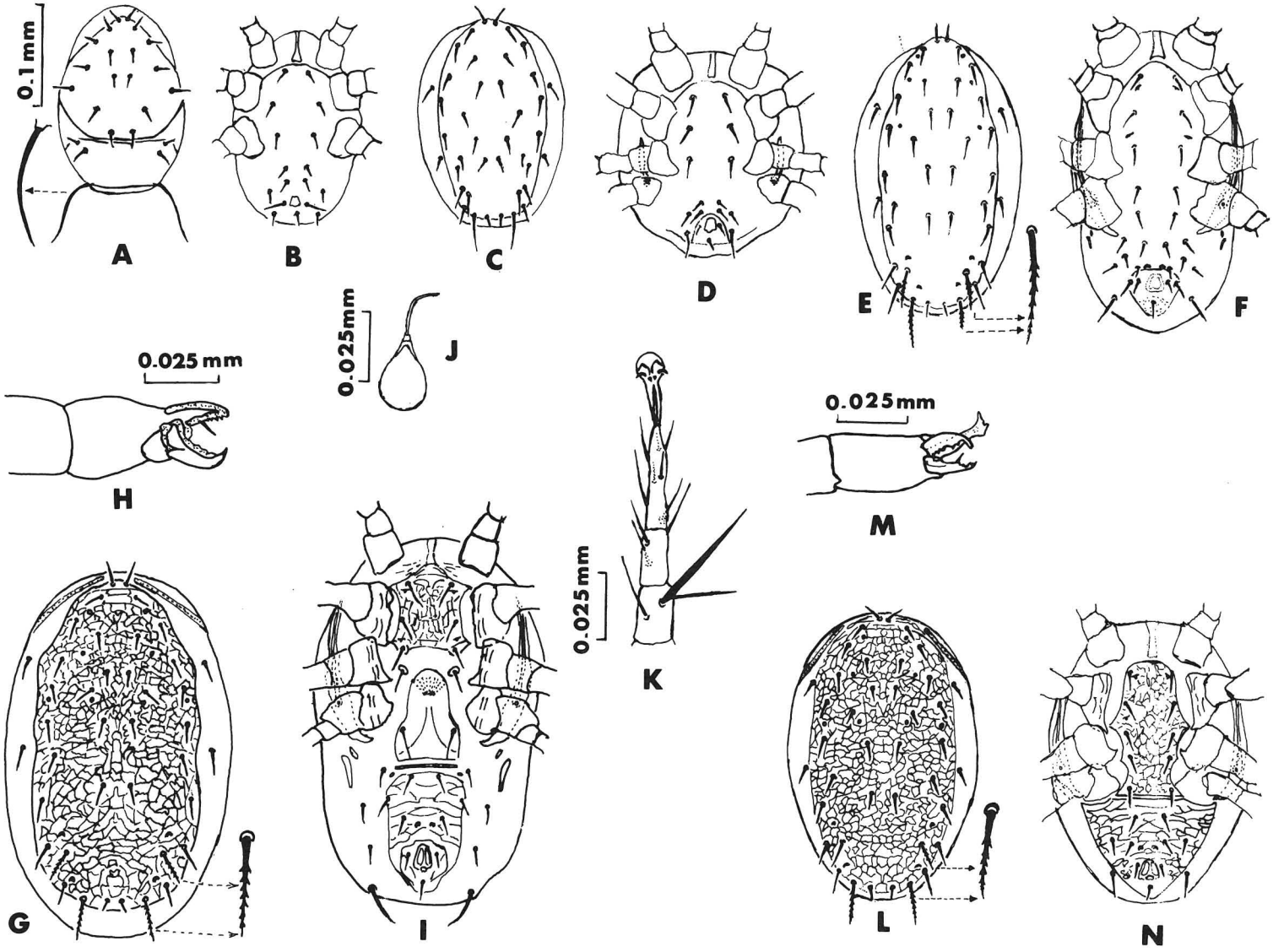

FIG. 1 : **Typhlodromus africanus** n. sp. — A) Dorsal view of larva. ; B) Ventral view of larva ; C) Dorsal view of protonymph ; D) Ventral view of protonymph ; E) Dorsal view of deutonymph ; F) Ventral view of deutonymph ; G) Dorsal view of female ; H) Female chelicera ; I) Ventral view of female ; J) Spermatheca ; K) Leg IV of female ; L) Dorsal view of male ; M) Male chelicera ; N) Ventral view of male.

Biology of **Typhlodromus africanus** n. sp.

The tested predator passed through a larval and two nymphal stages before being adults. The female active larva, protonymph and deutonymph lasted for 0.9, 1.2 and 8.0 days (Table I).

TABLE I : Duration of immature stages of *Typhlodromus africanus* n. sp. when fed on immatures of *T. arabicus* Attiah, at 25°C.

Sex	Average Period (in days)							
	Larva		Protonymph		Deutonymph		Immature stages	
	A	Q	A	Q	A	Q	Active total	
Female	0.9	0.8	1.2	0.8	0.8	0.7	2.9	5.2
Male	0.8	0.6	1.1	0.7	0.8	0.6	2.7	4.6

A = Active. Q = Quiescent.

The quiescent stages was about 0.7 day. The total period of female immature stages averaged 5.2 days. The male emerged earlier than the female for a period of 0.6 days. ZAHER and SHEHATA (1971), noticed that the male of *T. pyri* Scheuten emerged earlier than the female for 2.4 days.

The pre-oviposition period was 1.5 days and the oviposition period lasted for 19.1 days. The female and male longevity averaged 45.4 and 36.2 days, respectively. Similarly HERBERT (1956) reported that females of *T. tiliae* Oudemans, lived considerably longer than males, when fed on eggs of *T. bimaculatus* Harvey at 70°F (21.22°C).

The predator feeding capacity was increasing as the mite grow up. The female larva, protonymph and deutonymph attacked 2.8, 11.8 and 17.6 immatures of *T. arabicus*, respectively (Tabl II).

The predator female immature stages consumed a total average and a daily rate of 32.2 and 11.1 prey immatures. The female immature stages killed about twice as much as that devoured by the male (Table II).

TABLE II : Efficiency of *Typhlodromus africanus* n. sp. in attacking immatures of *T. arabicus*, at 25°C.

Sex	Average number of preys consumed during the predator								
	Larva	Proto-nymph	Deuto-nymph	Immature stages		Longevity		Life span	
				T	D	T	D	T	D
Female	2.8	11.8	17.6	32.2	11.1	916.0	20.13	948.2	18.70
Male	2.0	4.4	8.6	15.0	5.55	366.0	10.11	381.0	9.34

T = Total average. D = Daily rate.

During the life span, the predator female fed on 948.2 prey immatures, where 96.5 % of them were attacked by the adult (916.0 prey individuals), (Table II). Similar results were obtained by ZAHER and SHEHATA (1971), concerning *T. pyri*.

The female deposited a total average of 43.1 eggs, with a daily rate of 2.24 eggs. Similar daily rate of oviposition was obtained by BALLARD (1954) concerning *T. fallacis* (Garman) when fed on males of *T. telarius* (L.) at 78°F (25.55°C).

REFERENCES

BALLARD (R. C.), 1954. — The biology of the predacious mite *Typhlodromus fallacis* (Garman) at 78°F. — Ohio. J. Sci., **54** : 175-79.

ELBADRY (E. A.), 1967. — Five new phytoseiid mites from U.A.R. with collection notes on three other species (Acarina : Phytoseiidae). — Indian J. Ent., **29** : 177-84.

ELBADRY (E. A.), 1968. — Some predatory mites of the genera *Typhlodromus* and *Amblyseius* from the United Arab Republic (Acarina : Phytoseiidae). — Entomologist, **101** : 139-44.

HERBERT (H. J.), 1956. — Laboratory studies on some factors in the life history of the predacious mite *Typhlodromus tiliae* Oudemans. — Can. Entomol., **88** : 701-4.

ZAHER (M. A.) and SHEHATA (K. K.), 1969. — Two new species of genus *Typhlodromus* (Acarina : Phytoseiidae). — Indian Bull. Ent., **II** (1) : 54-59.

ZAHER (M. A.) and SHEHATA (K. K.), 1970. — A new typhlodromid mite ; *Typhlodromus tetramedius* n. sp. (Acarina : Phytoseiidae). — Bull. Ent. Soc. Egypt., **LIV** : 117-21.

ZAHER (M. A.) and SHEHATA (K. K.), 1971. — Biological studies on the predatory mite *Typhlodromus* pyri Scheuten, with the effect of prey and non prey substance (Acarina : Phytoseiidae). — Z. Ang. Ent., **67** : 389-99.