

The subspecies of *Hyles tithymali* with a description of a new subspecies (Lepidoptera: Sphingidae)

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Abstract: *Hyles tithymali himyarensis* subsp. nov. is described from the highlands of the Yemen Arabic Republic. The discriminating characters and the distribution of the subspecies of *H. tithymali* (Boisduval, 1834) are discussed. The geographic variation of this species and of *H. euphorbiae* (Linnaeus, 1758) in the southern Mediterranean region is in need of detailed revision.

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Introduction

In July 1985 ten caterpillars of a *Hyles* sp. were collected by the author in the highlands around Dhamar, Yemen Arabic Republic (North Yemen). Close examination of caterpillars and later the adults showed them to belong to *H. tithymali* (Boisduval, 1834). However, they are clearly distinct from the three subspecies known hitherto of this species and therefore described as new in the present paper. The caterpillar from the Asir mountains, due north of North Yemen, (Saudi Arabia) described by Pittaway in Wiltshire (1982) as *H. euphorbiae* (Linnaeus, 1758) ssp. also belongs to the new subspecies. (In a later publication of Wiltshire (1986) however, a picture is presented to supplement the 1982 description. This picture however portrays a caterpillar of true *H. euphorbiae*.) According to Mr. A. R. Pittaway (pers. comm.), who has studied much material from the Asir-area, the new *H. tithymali* subspecies described here, occurs in the Asir-mountains sympatrically with a form of *H. euphorbiae*. Because within the entire genus hybrids are easily obtained the occurrence of hybridization cannot be excluded.

Mr. Pittaway furthermore reported caterpillars from Ibb (North Yemen) that fit the description given below. A picture of an adult moth from the same region taken by Mr. C. M. Naumann, that Mr. Pittaway kindly presented

to me, clearly portrays a specimen of the new subspecies.

Hyles tithymali himyarensis subsp. nov. (fig. 1, 2)

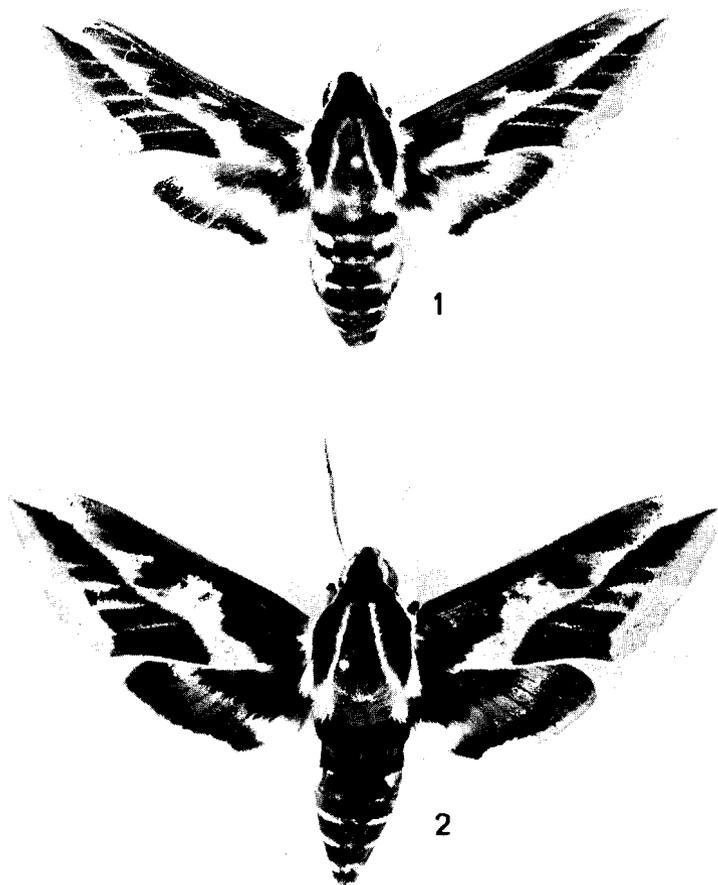
Holotype ♂: "North Yemen; (province of Dhāmār); Dhufār, 2500 m; (10 km SE of Yarīm); Larva 18.vii.1985; Emerged viii.1985; Leg. J. C. Meerman". (in coll. Zoologisch Museum, Amsterdam). Paratype: ♂, "North Yemen, province of Dhamār, Dawrān, 2500 m, 30 km NW of Dhamār. From larva collected 7.vii.1985 (Emerged viii-1985). Leg. J. C. Meerman" (in coll. Meerman).

Description

Body length 27-30 mm, forewing length 25-27 mm.

Head: above dark olive-brown. First segment of palpus laterally with white line which continues above eye and above wing implantation. Palpus near tongue white. Area anterior and posterior to eye olive-brown. Eyes dark brown. Antenna pectinate, club-shaped with hooked tip, dorsally white, ventrally brown.

Thorax: dorsally dark olive-brown. Tegulae prominently bordered white. Ventrally light camel-brown to slightly pinkish. Femur light camel-brown to pinkish, tibia and tarsus white anteriorly and light camel-brown posteriorly.



Figs. 1-2. *Hyles tithymali himyarensis* subsp. nov., c.l. from the Yemen Arabic Republic. 1, ♂ holotype, Dufār; 2, ♂ paratype, Dawrān. (Photographs J. Huisenga.)

Abdomen: dorsally dark olive-brown, ventrally camel-brown with a pinkish sheen. Segments distally bordered white, incompletely, however, on dorsum. Segments 2 and 3 laterally with short black band in white field. In paratype black band extends onto dorsum and even onto 4th segment. Ventrally, camel-brown with a pinkish sheen. Segments distally bordered white.

Forewing upperside: Costal shade broad dark olive-brown, incorporating the nearly black basal blotch, discal spot and costal spot C_3 . Small black stigma basally from discal spot. Median stripe grey-white. Subterminal fascia dark olive-brown, wide dorsally, tapering towards apex. Veins running through subterminal

fascia silvery white, veins 3 (Cu_1) and 4 (M_3) being especially clear. Terminal shade grey. Grey-white median stripe highly contrasting with dark parts of forewing.

Hindwing upperside: basal area and postmedian fascia black, rather narrow to very broad, nearly merging in the pink to wine-red internal part. Veins of internal part sometimes black.

Forewing underside: slightly pinkish-grey to clearly pinkish, basally changing to grey. Oval stigma distinctly black.

Hindwing underside: slightly pinkish-grey to clearly pinkish but with terminal black spot in anal angle. Otherwise uniform or with very narrow "y"-shaped black, post-median fascia.

Male genitalia: distal half of uncus slightly bent

upwards as in fig. 8; upper edge of uncus straight in the specimens examined of the other *H. tithymali* subspecies (see figs. 5-7). Gnathos well developed. Saccus rounded. Plain valves with setose inner surface. Sacculus prominent, somewhat square, bearing a single, curved distal thorn. Aedeagus nearly straight, relatively short in comparison with the specimens examined of the other *H. tithymali* subspecies. Distal keel of aedeagus laterally with row of seven thorns (figs. 14, 15), which are larger than in any of the other *H. tithymali* subspecies examined (figs. 11-13).

Larvae: General appearance black. Head, dorsal line, legs, prolegs and horn red. Tip of horn black. Black dorsal and lateral band covered with a profusion of nearly white, minute specks. Dorso-lateral band orange. Border of dorsal and dorso-lateral bands with single row of black ringed, nearly pure-white, circular ocelli (fig. 16).

Derivation of name: Himyar: Pre-islamic kingdom (115 BC-525 AD), at times covering large parts of S. W. Arabia. The original capital is Dhufar, the type locality of the new subspecies.

Habitat: Larvae found on *Euphorbia pepplus* Linnaeus growing along tracks in or very near the villages. *E. pepplus* was also found growing as a weed on irrigated fields, but no caterpillars were found on these plants.

Phenology: Unknown, but as the winter period in the collecting area is very dry and occasionally brings severe night frosts, the species is unlikely to breed continuously.

Distribution: The S.W. Arabian Highlands: North Yemen, Asir mountains (Saudi Arabia).

Diagnosis

H. tithymali himyarensis subsp. nov. resembles *H. tithymali deserticola* (Bartel, 1899) in size and markings but is readily distinguishable by the dark olive-brown parts of the body and the upperside of the forewings which contrast

highly with the grey-white median stripe. The dark parts in *deserticola* are pale camel-brown in colour. The undersides of the wings are pinkish to pinkish-grey in *himyarensis* and yellow in *deserticola*.

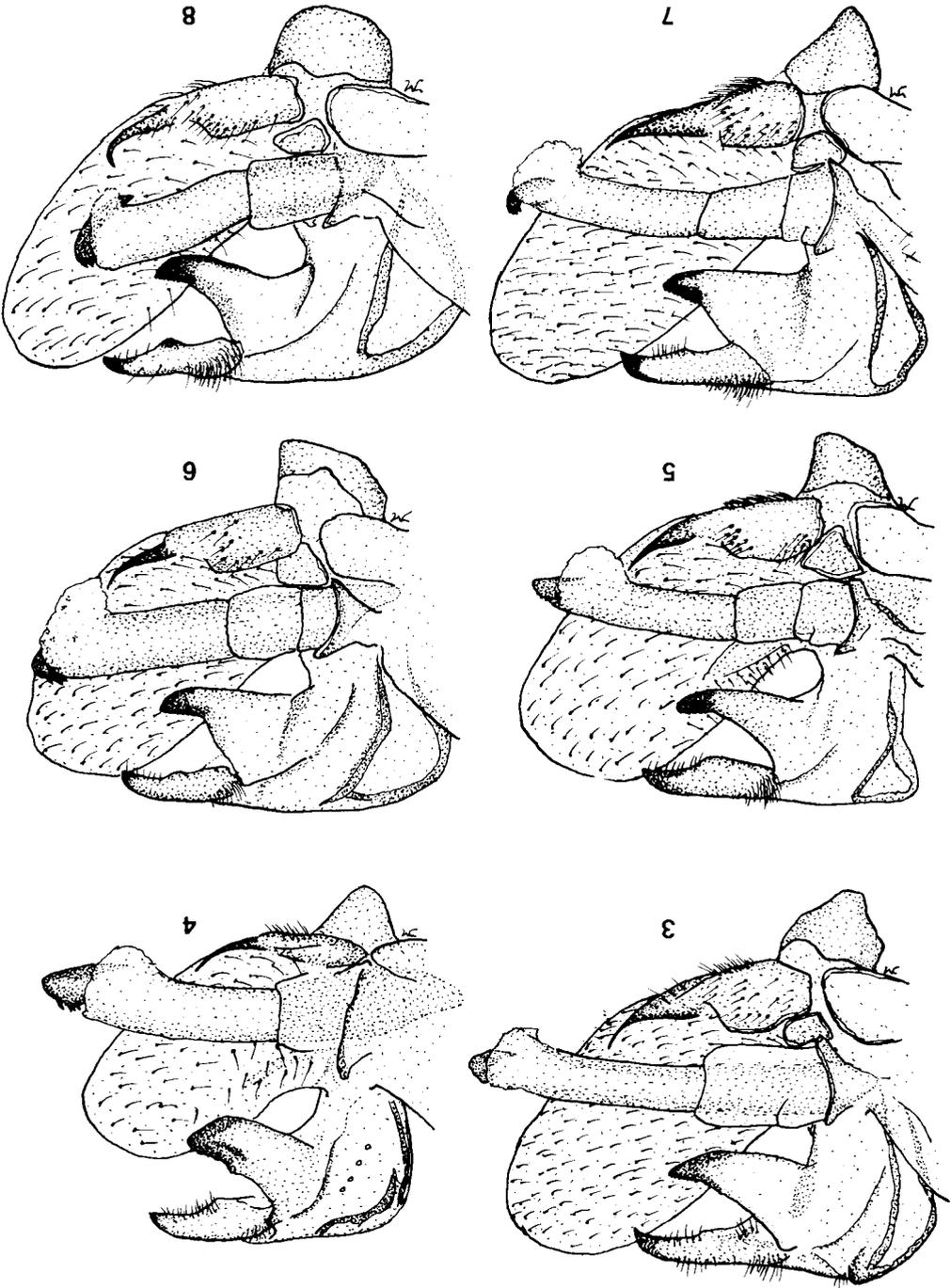
Whether the male genitalia are very useful to distinguish the subspecies of *H. tithymali* from the other species of the *H. euphorbiae*-complex, is not clear; the variation of these characters even in one population is known to be great (Bauer & Traub, 1980). However for the sake of completeness the male genitalia of *H. t. himyarensis* subsp. nov. (figs. 8, 14, 15) are figured together with the male genitalia of the other subspecies (figs. 5, 6, 7, 11, 12, 13) as well as with those of the closely related *H. euphorbiae* (figs. 3, 9) and *H. dahlia* (Geyer, [1828]) (figs. 4, 10).

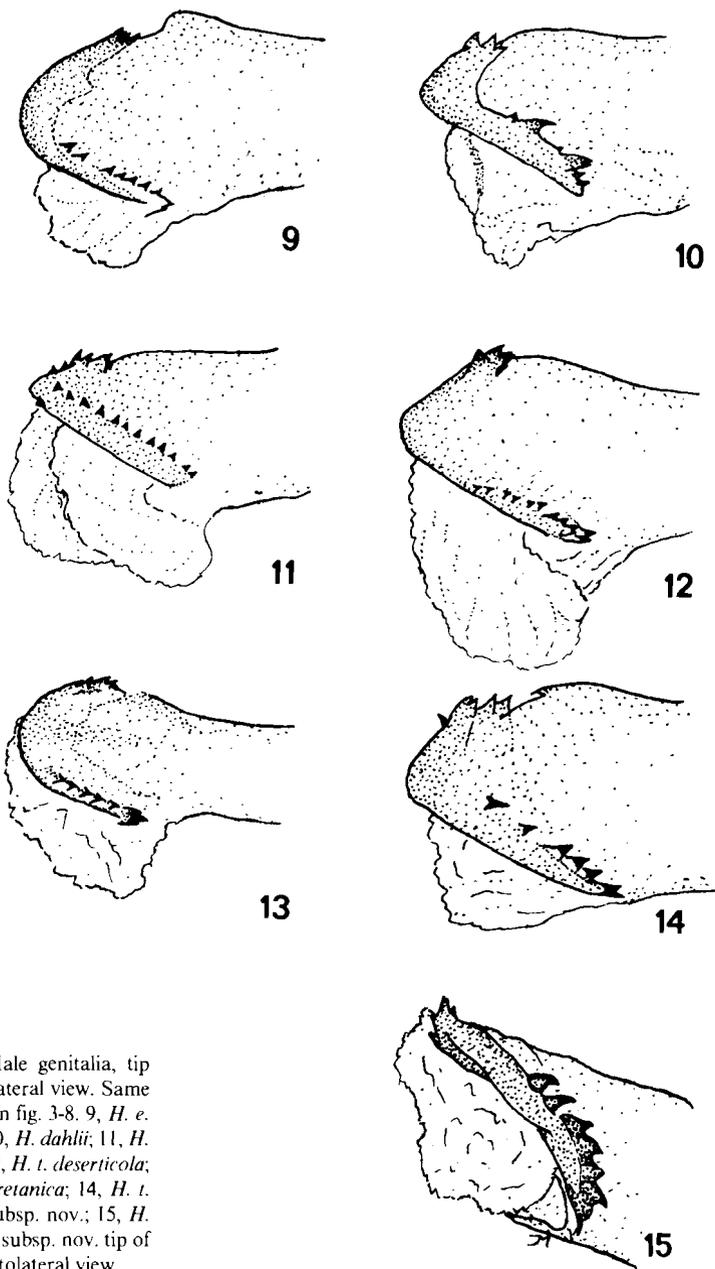
In the larva the single row of circular ocelli and the straight dorso-lateral band clearly sets the new subspecies apart from *H. euphorbiae*. *H. euphorbiae* caterpillars have a double row of vertically oval ocelli and generally a dorso-lateral band composed by wedge-like markings. The orange colour of the rather narrow dorsolateral band separates *H. t. himyarensis* from the other subspecies in which this band is wider and yellow (figs. 16 and 17).

The subspecies of *H. tithymali*

There is considerable confusion regarding the taxonomic status of the taxa associated with *H. euphorbiae*. Many authors consider the North-African and Macaronesian taxa *tithymali*, *mauretanicus* (Staudinger, 1871) and *deserticola* to be subspecies of *H. euphorbiae*. Also de Freina & Witt (1987) hold the same opinion. Pittaway (1983), however, placed them in *H. tithymali*. The adult moths of *H. tithymali* are indeed clearly distinct from *H. euphorbiae*; the very distinct costal shade on the forewing of *H. tithymali* is one of the most striking and constant features. *H. tithymali* shares this character with *H. dahlia*, a species inhabiting the western Mediterranean islands (Masó i Planas et al., 1979), but *H. dahlia* can easily be distinguished from *H. tithymali* by its three pairs of black abdominal patches. The

Figs. 3-8. Male genitalia, left valve not drawn. 3, *Hyles e. euphorbiae*, Les Mees, France; 4, *H. dahlii*, Gonnoslandigja, Sardinia; 5, *H. l. tillymali*, Ten Bel, Tenerife, Canary islands; 6, *H. l. deserricola*, Gran, Algeria; 7, *H. l. mauritanica*, Tizi-N-Tretten, Moyen Atlas, Morocco; 8, *H. l. humyarensis* subsp. nov., holotype, Dhufar, Yemen Arabic Republic.





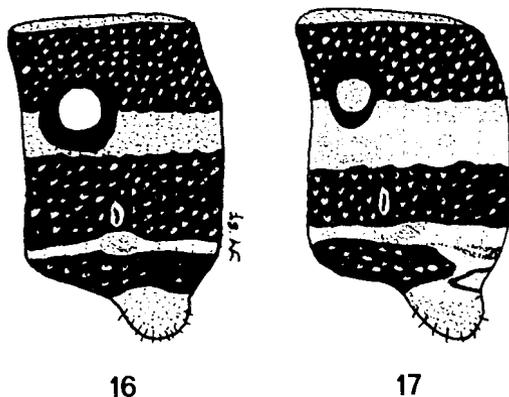
Figs. 9-15. Male genitalia, tip of aedeagus, lateral view. Same specimens as in fig. 3-8. 9, *H. e. euphorbiae*; 10, *H. dahlui*; 11, *H. t. tithymali*; 12, *H. t. deserticola*; 13, *H. t. mauretanicus*; 14, *H. t. himyarensis* subsp. nov.; 15, *H. t. himyarensis* subsp. nov. tip of aedeagus frontolateral view.

caterpillars of *H. tithymali* differ from those of *H. dahlui*, which lack a coloured dorsolateral band and possess a double row of small horizontally oval ocelli.

The subspecies of *H. tithymali* are not always

easy to separate. The S.W. Arabian *H. t. himyarensis* with its strongly contrasting grey-white median stripe and the North-African *H. t. deserticola* with its pale colours and yellow wing underside, being the easiest.

The Macaronesian *H. t. tithymali* has a



Figs. 16-17. Left lateral view of the 4th abdominal segment of two *H. tithymali* caterpillars. 16. *H. t. himyarensis* subsp. nov., Dawrān, Yemen Arabic Republic; 17. *H. t. deserticola*, Douz, Tunisia.

strongly speckled brownish-grey wing underside and nearly always possesses striking light-coloured veins on the upperside of the forewings. The latter character is also found in *H. t. himyarensis* and *H. t. deserticola*. The N.W. African *H. t. mauretanicus* has clearly pinkish wing undersides and very often lacks the light-coloured veins on the forewing upperside. However, intermediates between the subspecies from North-Africa and from Macaronesia do exist, possibly as a result of hybridisation.

It is probably incorrect to label all material from the Canary and other Macaronesian Islands as *H. t. tithymali* and all North-African mainland material as *H. t. mauretanicus* or *deserticola*. The status of the Cabo Verde island populations for example needs further investigation (Bauer & Traub, 1980) as well as the Madeira population that Pittaway (1983) places in *H. t. mauretanicus*.

H. t. himyarensis from S.W. Arabia seems to be the most eastern representative of *H. tithymali*, and is almost certainly the most isolated subspecies. It is, however, insufficiently clear how far eastward *H. t. mauretanicus* and *H. t. deserticola* actually reach in North Africa. Pittaway (1983) mentions *H. t. deserticola* as occurring in western Egypt. There also seems to

occur a race of *H. tithymali* on Crete, as W. N. Ellis photographed a *Hyles* caterpillar on this island in 1972 that shows some features of *H. tithymali* (fig. 18).

Re-examination of material from the whole Mediterranean area could prove to be very interesting in this respect.

Hybridizing and migration obviously enhances the problems of identification of individual specimens or even populations. *H. tithymali* is reported to tend to vagrancy (Gatter & Gatter, 1977). Specimens of one subspecies might therefore get in contact with other subspecies or even other, related species with whom hybridisation might occur. Gómez Bustillo & Fernández Rubio (1976) mention *H. t. deserticola* as an occasional immigrant in continental Spain. Mylius-Joř & Mylius-Joř (1987) mention *H. "gallii"* (Rottemburg) in an immigrant swarm of *H. livornica* (Esper) on the Canary island of Lanzarote. This *H. gallii* record is obviously based on a misidentification and the description of the specimens concerned (Mylius-Joř, pers. comm.) probably refers to *H. t. mauretanicus*.

Apart from the two *H. tithymali* subspecies inhabiting the Maghreb-area of North Africa, the typical *H. euphorbiae* seems to occur here (Pittaway, 1983) (2 specimens from Tunis in Zoölogisch Museum, Amsterdam). In the light of the frequency of hybridization in this genus it would be interesting to study the reproductive barriers that keep these entities apart.

Acknowledgements

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Fig. 18. *Hyles* larva with some features of *H. tithymali* on *Euphorbia paralias* Linnaeus, from near Iráklion, Crete, 28.x.1972. (Photograph by W. N. Ellis.)

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