

palpi; *antennae* entirely wanting; *ocelli* small, situated near base of mandibles at apex of parietale. *Thorax*: *prothorax* chitinous, the *prothoracic spiracles* situated just above intermediate pair of legs; *meso-*, and *metathorax* soft, similar in construction to segments of abdomen. *Abdomen* fleshy, deeply creased, rounded on dorsal surface, flat on ventral surface, considerably bent in middle, with nine visible segments present, tapering towards apex; eight pairs of *spiracles* present, which are circular, large, and deep; *anus* round, surrounded by three round prominences; all the segments of the abdomen are covered with very fine widely scattered hairs (which are not shown in the figure). *Legs* three-jointed (similar in shape to maxillary and labial palpi), basal joint large, broad, furnished with a number of long bristle-like hairs, apical and intermediate joints narrow with a ring of bristles at apex.

Long.—about 12 mm. if stretched out.

On *Zygaena rhadamanthus*, Esper, with special reference to the races of its subspecies *oxytropis*, Boisd.

By ROGER VERITY, M.D.

Oberthür, in his *Ét. de Lépid. Comparée*, vol. iv., p. 586 (1910), maintains that *rhadamanthus* of the South of France and Spain, and *oxytropis* of Italy belong to the same species. I quite agree with him; when two insects resemble each other as much as these do and inhabit two different regions, and when furthermore these regions are in close proximity and the insects do not keep distinct, but overlap and blend on the boundary, I think there can be no doubt that they are both representatives of the same species. I do not see why the red collar of the *rhadamanthus* larva, absent in that of *oxytropis*, should necessarily be anything more than a variation, similar to those one observes in the imago. Oberthür observes that the *rhadamanthus* race of the Maritime Alps differs less from *oxytropis* than it does from other races of the former; the existence of this transition seems quite conclusive. I would only add that the French and the Italian races might very naturally be grouped into two subspecies, such as there are in most species of *Zygaena* when their specific limits are established on a wider scale than has hitherto been done. On comparing *graslini*, Led., of W. Asia with the *Zygaenae* in question, I find such a perfect identity of structure and wing-markings that I feel quite confident this is but a third subspecies, which completes most admirably the series of variations of the species, from *graslini* with dark scaling extremely reduced in extent, especially in its form *confluens*, Obth., to *oxytropis* race *laterubra*, and race *oxytropis*, and then on to *rhadamanthus* race *oxytropiferens*, and race *rhadamanthus*, culminating in the melanic form *kiesenwetteri*, H.S. All the wide-spread and variable species of *Zygaenae* show this scale of variation when their real, broad limits are established; see, for instance, the variations of *Z. loti* from the form *miltosa*, Cand., of its race *occidentalis*, Obth., to the extreme melanism of *calabrica*, Calb., in its subspecies *transalpina*, Esp. Another remark I must make is that no author seems to have noticed the close resemblance of *Z. anthyllidis*, Boisd., of the Pyrenees with *rhadamanthus*. I am in no way prepared to include it as another subspecies of the latter, but I certainly think it should be classified next to it and that it connects it admirably to what one might call the lowest group of species of the genus (*exulans*, *purpuralis*, etc.), whereas otherwise *rhadamanthus* would stand alone with *lavandulae* or would only vaguely be connected to distant Asiatic species, such as *cambysea*, Led., through

graslini. The globular shape of the cocoon points to the same conclusion and one can deduct a closer relationship than has as yet been recognised between the group *purpuralis-erythrus* and *rhadamanthus* also by the following observation: Italy is in most species of *Zygaenae* the country of melanic forms and races, but in those just mentioned, as well as in *Z. sarpedon* race *dystrepta*, F. d. W., exactly the reverse takes place. The group *purpuralis* produces *rubicundus*, Hb., which is the most extensively red-scaled *Zygaena* in existence; *purpuralis* produces the race *fiorii*, Costantini, which in many females is as red as the rare aberration *polygalae*, Esp., of Central Europe, whereas the most melanic *purpuralis* are produced in the coldest Alpine and Northern regions; the Italian races of *sarpedon* produce the extreme red form and race *dystrepta*, F. d. W., whereas that species produces the most melanic forms in France and Spain. All this is exactly as in *oxytropis* compared with *rhadamanthus*, for never has even a melanic aberration of the former been found, whereas the latter produces very dark individuals freely in the Maritime Alps and in Catalonia.

Subspecies *oxytropis* is proper to Italy, except for individual variations similar to it in the Maritime Alps and in Catalonia; it spreads from Piedmont to Sicily, but it has a tendency to localise. It usually flies in May; in the highest mountains it emerges in June. It varies very little as compared with *rhadamanthus*, both individually and geographically; however, a very distinct high mountain race exists and a few minor races are also discernible; they can be described as follows from large series collected by Querci, part of which I will preserve as "typical." The localities mentioned have been described in Querci's paper on *Z. loti* subsp. *transalpina*, Esp. (*Ent. Rec.*, page 28).

In all these races the *antennae* are larger and thicker in the male sex, but vary markedly; the females in Florence often show faint traces of a white collar and epaulettes, which are extremely rare and never as marked in the other sex; the red scaling is more extensive, but a little paler in the former and the dark scaling inclines more to greenish. Variation in both sexes only affects the upperside of forewings, for the red patch resulting from the confluence of the red spots on the underside and the thin dark marginal band of the hindwings on both surfaces offer but very slight differences.

Boisduval in his *Essai d'une Monographie des Zygénides*, where *oxytropis* is first described and named, gives "Piedmont and Italy" as its habitat and adds that it has been collected in Rome (Querci has never found it in the neighbourhood of this city), and by Passerini in Florence. In his *Eur. Lep. Ind. Meth.*, published at the same time (1829), Boisduval only mentions "Tuscany." It is very likely his "types" were got from Passerini. In Florence there exists a race of *oxytropis* with the red spots more reduced in extent and consequently tending to separate from each other more than in any other locality Querci or I know of. In Boisduval's original figure they are reduced to an extent which is very seldom seen, but which anyhow only the Florence race approaches in its extreme form; that author figures and mentions particularly spot 3 (anterior median) as exceedingly small; spot 6 is confluent with spot 5, but it has very little extent too; the two basal spots are as short and as isolated from each other and from the median ones as they are ever met with in this species. I think on

the strength of these observations the Florentine race on the whole can be considered the "nymotypical" one; dealing with individual forms the name *conspicua*, Rocci, can be used, when necessary, to designate particularly the individual variation standing opposite to Boisduval's by its larger size, more extensive red spots and brighter look generally. The Florence race is one of the most vividly coloured, of a bright indigo (with no trace of green) and deep red in the male. In 64% of the specimens one finds the median spots are separated from each other, or only just touching at one corner, and in 20% also the apical spots are distinctly separate, which is quite a feature of the race. In only 1 or 2% of the males has the anterior basal spot been found to extend along the costal margin so far as to blend with the median one. No specimen of either sex has ever been found with all the spots united; in a few very rare females the median and apical spots are united by a streak. The Ligurian race of Genoa, described by Rocci, seems quite like the Florence one [*Atti. Soc. Lig. Sc. Nat. e Geogr.*, 1918].

Race **pumila**, mihi. At the highest altitude recorded for the species in Tuscany (Traversa, 2700 ft., on the Futa Pass road to Bologna) the smallest race known is met with; it looks still smaller than might seem from the figures mentioned below on the table of expanses, on account of its narrow wings and frail build; otherwise it is quite similar to the Florentine race and in no way approaches *sibyllina*, as might have been expected. I do not think the name *minima*, Rocci, given to dwarf aberrations of any locality should be used in this case.

Race **laterubra**, mihi. In the race of the Mainarde Mts. of Southern Italy (near Villalatina at Vallegrande, 1500 ft.), one finds some characters which distinctly remind one of *sibyllina*, and notably the red colouring, slightly paler than in Tuscany, and the dark scaling less bright and inclining more to blackish. The distinctive character of this race is, however, the tendency of the red scaling to expand so that the spots become confluent. In one specimen alone out of 115 are the apical spots separated from each other and even then not completely. The two basal and the two median spots blend respectively in 74% of cases. The confluence of spots 1 and 3 along the costal margin in 62% of the specimens is remarkable (form *unita*, Rocci); magnificent examples of form *confluens*, Zick., with all the spots united, are comparatively frequent. Size much more variable than at Florence.

Race **quercii**, mihi. This is the largest race of *oxytropis*. It has been collected by the Quercis on Mt. Cuccitiello, 2000 ft., near S. Martino delle Scale (Palermo). Size very constant, from 26 to 30 mm. It shows mountain characters still more markedly than *laterubra*, especially with reference to thin scaling. Its other distinctive characters are the decidedly green tinge of the indigo scaling in both sexes, so that this comparatively light colour makes a deep black marginal band vaguely discernible also on forewing. The red scaling is decidedly of a pink hue in the female and pale also in the male. Variation is small; apical spots always confluent; median ones not markedly so.

Race **sibyllina**, Vrty. [*Bull. Soc. Ent. Italiana*, xlvii., p. 77 (December, 1915)]. I have described from a series of Bolognola, 2700 ft., in the Sibillini Mts. (Marche), the most distinct race of *oxytropis* as yet known, being evidently its high-mountain variation.

It is not as small as on the arid and barren slopes along the Futa road in Tuscany, but its mountain characteristics consist in the very thin scaling, which makes it much more translucent and shows off a diffused black marginal band also on the forewing, and in the dull colouring, which is very different from the gaudy metallic one of the other races; the dark scaling is of a blackish indigo and the red one is pinkish; the extent of the latter is on the whole greater than in Florence and about the same as in Sicily. Rocci has found this race also on the highest Ligurian mountains.

The following tables, drawn out from measurements of the wing expanse made by Querci, shows the individual variations of each race:—

Expanse.	Florence.		Traversa.		Villatina.		S. Martino.		Bolognola.	
mm.	♂	♀	♂	♀	♂	♀	♂	♀	♂	♀
22 to 23			1		1					
23 to 24				2	4	3	1		1	
24 to 25	2		2	1	14	6			7	
25 to 26	8	4	1	1	16	13			18	1
26 to 27	22	10			12	18	2		20	2
27 to 28	5	6			9	11	9	7	17	2
28 to 29		1			2	6	5	2	2	1
29 to 30							1	3		

The races and many striking individual forms of the very variable subspecies *rhadamantus* have been admirably described and partly figured by Charles Oberthür in his *Ét. Lép. Comp.*, vol. iv. (1910), where he summarises also what had been published before by himself and others. I can do no better than refer the reader to this work. I am sure M. Oberthür will pardon me if I take this occasion to mention my personal impression that he should have fixed by a name some of the races he has so well described, and if I take the liberty of suggesting the following for those of *rhadamantus*:—

Race **pyrenæa**, mihi, for the race of La Traucada d'Ambouille in the Pyrenees (page 590), which corresponds to *sibyllina* of *oxytropis*.

Race **barcina**, mihi, for the race of Barcelona (Spain), (page 590), small, very bright, with body covered with white hair, in which specimens quite similar to *oxytropis* (I have seen a Spanish one too) occur together with form *kiesenwetteri*.

Race **oxytropiferens**, mihi, for the race of the Maritime Alps Département (page 592), particularly beautiful and variable, ranging from individuals indistinguishable from *oxytropis* to the darkest *kiesenwetteri* and producing the lovely form with a white streak along the cubital nervure of forewing, which should be called **albovittata**, mihi.

Finally I think the name *grisea*, Obth., given to a form with indigo scaling replaced by very pale gray, which is the prevailing one at Digne, should be extended to the entire race (page 591).

Synoptic table of characters in the different races of *oxytropis*:—

Locality	Sibillini Mts.	Florence.	Futa Pass.	Mainarde Mts.	Palermo.
Name	<i>sibyllina</i> , Vty. nymotypical.		<i>pumila</i> , Vrtty.	<i>laterubra</i> , Vty.	<i>quercii</i> , Vrtty.
Usualexpanse	25-28 mm.	26-27 mm.	23-25 mm.	25-27 mm.	27-29 mm.
Density of scaling	Very thin.	Thick.	Moderately thick.	Moderately thick.	Thin.

Locality	..	Sibillini Mts.	Florence.	Futa Pass.	Mainarde Mts.	Palermo.
Light coloured	♂	dull red.	Bright red.	Red.	Red.	Light red.
scaling	..	♀ red.	Bright red rarely pinkish.	Red.	Pale red.	Pinkish.
Dark scaling	{	♂ blackish indigo and dull.	Indigo.	Indigo.	Indigo.	Greenish indigo.
		♀ greenish indigo.	Greenish indigo.	Greenish indigo.	Greenish indigo.	Very pale indigo.
Extent of spots	..	Very limited.	Limited.	Limited.	Very extensive.	Limited.
Apical spots (5 and 6)	..	Confluent.	Often separate.	Confluent.	Confluent.	Confluent.
Confluence of spots 1 and 3 along costa	..	Never occurs.	Very rare.	Never occurs.	Frequent.	Never occurs.

Statistical table of variations of upperside of forewing in different races :—

	Basal spots.	Median spots.	Apical spots.	Sibillini Mts.		Florence.		Mainarde Mts.		Palermo.	
				♂	♀	♂	♀	♂	♀	♂	♀
Isolated	..	Separate.	6th obliterated.	1							
Isolated	..	Separate.	Separate.			9		1			
Isolated	..	Confluent.	Separate.			1					
Confluent along costa with median	..	Confluent.	Separate.			1					
Ditto	..	Separate.	Separate.	1							
Isolated	..	Separate.	Confluent.	54	5	13	15	12	17	13	10
Isolated	..	Confluent.	Confluent.		1	1	2	12		5	
Confluent along costa with median	..	Separate.	Confluent.					10	10		
Ditto	..	Confluent.	Confluent.			2	3	18	17		2
Isolated	..	Confluent.	Confluent with median.				1				
Confluent along costa with median	..	Confluent.	Ditto.					3	12		
Confluent along costa with apical	..	Separate.	Diffused.							1	
Total of spec. examined				56	6	27	21	56	57	18	12

Ants from Mesopotamia and North-West Persia. (With plate V.)

By W. C. CRAWLEY, B.A., F.E.S.

The following paper contains a list of some thirty species, sub-species and varieties of *Formicidae* taken in Mesopotamia and North-west Persia by Mr. P. A. Buxton and Lieut. W. E. Evans, principally during the years 1918 and 1919. Though the number of forms is small, it contains two new species, one new race, and four new varieties, in addition to a new species and a new variety described by Mr. H. Donisthorpe in 1918. I have included in the paper the record of three South African species taken by Mr. Buxton.

It is interesting to note that among Lieut. Evans' Mesopotamian



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