Concerning the pre-imaginal stadia and taxonomy of *Polyommatus (Plebicula) sagratrox* (Aistleitner, 1986) (Lepidoptera : Lycaenidae)

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Abstract. The larval host-plant of *Polyommatus (Plebicula) sagratrox*, a butterfly species currently believed to be endemic to the Sierra de la Sagra, southern Spain, has been determined as *Anthyllis vulneraria arundana*. This plant subspecies also occurs in the nearby Sierra Nevada, where it is believed to comprise the sole larval host-plant of *Polyommatus (Plebicula) golgus*, presently regarded as endemic to the Sierra Nevada and closely related to *P. sagratrox*. It is argued that the commonality of host-plant detracts appreciably from the justification for the present high-level of taxonomic distinction accredited to *P. sagratrox*. It is further argued that *P. sagratrox* is at best a subspecies and, more probably, an ecological form of *P. golgus*. Superficially at least, no significant differences in the pre-imaginal stadia of *P. sagratrox* and *P. golgus* were noted. *P. sagratrox* hibernates as a larva and is evidently very strongly myrmecophilic. Ants in attendance were determined as *Lasius niger*.

Samenvatting. Over de jeugdstadia en de taxonomie van *Polyommatus (Plebicula) sagratrox*, (Aistleitner, 1986) (Lepidoptera : Lycaenidae)
Anthyllis vulneraria arundana werd gedetermineerd als voedselplant van de rups van *Polyommatus (Plebicula) sagratrox*, een vlindersoort die verondersteld wordt endemisch te zijn voor de Sierra de la Sagra in Zuid-Spanje. Deze plant komt ook voor in de nabije Sierra Nevada, waar hij als voedselplant dient voor de rups van de nauw verwante *Polyommatus (Plebicula) golgus*, een endemische soort voor dit gebergte. Er wordt aangehaald dat, gezien de gemeenschappelijke voedselplant, er wel een erg hoge taxonomische rang wordt toegekend aan *P. sagratrox*. Er wordt verder geargumenteerd dat *P. sagratrox* beter beschouwd wordt als subspecies, en meer waarschijnlijk, als ecologische vorm van *P. golgus*.. Er werden geen signifikante, uiterlijke verschillen tussen de pre-imaginale stadia van beide soorten vastgesteld. *P. sagratrox* overwintert als rups en is duidelijk myrmecofiel. De betreffende mieren werden gedetermineerd als *Lasius niger*.

Résumé. Des premiers stades et de la taxonomie de *Polyommatus (Plebicula) sagratrox* (Aistleitner, 1986) (Lepidoptera : Lycaenidae)
Anthyllis vulneraria arundana a été considérée comme plante-hôte de la chenille de *Polyommatus (Plebicula) sagratrox*, espèce qui sembler endémique de la Sierra de la Sagra dans le sud de l'Espagne. Cette plante existe également dans la Sierra Nevada, toute proche, où elle est également la plante-hôte de *Polyommatus (Plebicula) golgus*, espèce endémique de ladite sierra. L'auteur estime qu'au vu de la similitude de la plante-hôte, le rang d'espèce reconnu à *sagratrox*, est peut-être exagéré, et qu'il serait préférable de considérer ce taxon comme sous-espèce, ou, plus précismément, comme forme écologique de *P. golgus*. Il n'a pas non plus été constaté de différences dans les stades préimaginaux des deux espèces. *P. sagratrox* hiverne à l'état de chenille et est manifestement myrmécophile. Les fourmis-hôtes ont été déterminées comme étant *Lasius niger*.

Key words: ***Polyommatus - Plebicula - sagratrox - golgus - nivescens - dorylas - atlantica - Anthyllis vulneraria - arundana - Lasius niger*** **- host-plant - pre-imaginal**

stadia - ecology - taxonomy - Sierra de la Sagra - Sierra Nevada - Spain.

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The larval host-plant of *Polyommatus (Plebicula) sagratrox* (Aistleitner, 1986)

Greatly intrigued by the discovery of a new, European "Blue" butterfly, (Aistleitner 1986), I gave the Sierra de la Sagra in the province of Granada special attention during a prolonged visit to Spain in 1990. All aspects of the insect elicited my interest, but I was particularly keen to find its larval host-plant.

I was told by people who had gone to this mountain before me, that more than average determination, plus more than average physical fitness was required to reach the butterfly which flew at 2200-2300m. Neither claim, so I was later to learn, had been exaggerated, but I had always recognised that, potentially, the greater problem was in deciding which plants to look for, and then search, once the mountain had been scaled. A working hypothesis was essential and, in fact, I had long since reasoned that the host-plant of *sagratrox* was almost sure to be *Anthyllis vulneraria*. I had formed this opinion largely on the assumption that *Polyommatus (Plebicula) golgus* (Hübner, [1813]), *Polyommatus (Plebicula) dorylas* ([Denis & Schiffermüller], 1775), *Polyommatus (Plebicula) nivescens* (Keferstein, 1851) and *Polyommatus (Plebicula) atlantica* (Elwes, 1906) were most probably all monophagous on this plant species. Although such suspicions are, of course, practically impossible to prove, the supportive evidence is well validated by multiple observations, in a variety of biotopes over several seasons. Data relating to *P. atlantica* has been acquired from Dr. Jacques Hutsebaut of Brussels, Belgium and, independently, from Mr. John Tennent of Whitby, England who both report (pers. comm.) the use of *A. vulneraria* in north Africa. Part of the compulsion for suspecting a closely similar feeding regime for this group of species, is the very obvious, close affinity of the adults themselves.

Legend of Plate 1 :
1. *Polyommatus (Plebicula) sagratrox* (Aistleitner, 1986), larva, Spain, prov. Granada, Sierra de la Sagra, 3.VI.1990.
2. idem, pupa.
3. *Anthyllis vulneraria* Linnaeus, ssp. *arundana* (Boiss & Reuter), Spain, prov. Granada, Sierra Nevada, Pico Veleta, 3.VII.1990.
4. *Polyommatus (Plebicula) sagratrox* (Aistleitner, 1986), male, Spain, prov. Granada, Sierra de la Sagra.
5. idem, female.
6. idem, underside.

Plate 1

Valid or not, the hypothesis was duly tested on 25th May 1990 when the Sierra de la Sagra was climbed. Extremely small, hairy plants of an *Anthyllis* species were first encountered at 1900m. A search of about 100 plants at this altitude secured a single larva. This certainly appeared to be that of a *Plebicula* species, but at this altitude it was almost as likely to be that of *nivescens*. However, at much higher altitudes, 2100-2350m - well above that for which the occurrence of *nivescens* was probable, a total of 11 larvae were found at or below the base of the host-plant feeding on the leaves. These were invariably attended by ants, specimens of which were collected and later identified as *Lasius niger*. The larvae were averagely much smaller than those of *golgus* which had been collected in the Sierra Nevada at 2650-2800m 18 days earlier. Good specimens of flowering plants were scarce, but sufficient were obtained for the purpose of determination: these proved to be *Anthyllis vulneraria* L. ssp. *arundana* (Boiss & Reuter) (Leguminosae) - the same plant (Figure 3), species and subspecies, upon which *golgus* feeds in the Sierra Nevada (Munguira & Martin 1989).

The larva and pupa of *sagratrox* (Figures 1 and 2) were noted to be superficially indistinguishable from that of *golgus*. The only obvious variance related to the colour of the larva which was the same for both species and seems to depend upon, more than anything else, the degree of stretching of the larval skin and its consequence on the density of the copious short silken hairs. Larvae fresh from ecdysis - having an unstretched skin - were sometimes almost silvery grey-green.

In late July 1990, the *sagratrox* biotopes of the Sierra de la Sagra were re-visited for the purpose of acquiring ova. These were noted to be laid mainly on the underside of the leaves of the host-plant. This practice corresponds to that of *golgus*, *nivescens* and *dorylas*. At a magnification x20, the ova of these 4 species appear to be identical, as is the approximate length of the ovum stage, 10-12 days. The duration of the pupal stage seems to depend greatly upon temperature but is about 2 weeks for each of these species. Captive larvae accepted various species of *Anthyllis* and seemed as happy to feed on the flowers as the leaves.

The taxonomy of *Polyommatus (Plebicula) sagratrox* (Aistleitner, 1986)

Although the description relating to this taxon is detailed in respect of the more superficial and readily discernible morphological characters, no reference is made to genitalic examination. To be sure, the differences in wing markings of *sagratrox* (Figures 4-6) and *golgus* are such that no difficulty would be encountered in identifying any non-aberrant specimen of either species. However, such disparity could quite as easily relate to ecological factors and, indeed, the different geologies of the respective biotopes of *sagratrox* and *golgus* suggest that an ecological adjustment, equating roughly in character to the differences in insect morphology observed, is to be expected. The biotope

of *sagratrox* is comprised of a very white limestone, and, whilst such a correlation may seem simplistic, collective empirical evidence indicates that adults of some butterfly species tend to adopt a colouration matching the substrate over which they fly and, more poignantly, upon which they are obliged to settle. The geology of the *golgus* biotope, in contrast, comprises a carboniferous schist, having a dark, slate-grey or brown colour.

One of the key considerations which seems to have featured prominantly in the equation defining the taxonomy of *sagratrox*, is its sheer isolation - a fact best appreciated from the summit of the mountain! Whilst segregation of some sort is, of course, a pre-requisite for speciation, isolation alone does not constitute a driving force guaranteeing speciation - it provides no more than the promise of a possibility. In this context, it is clearly of importance to account for the aforementioned coincidence in the taxonomy of the larval host-plants of *golgus* and *sagratrox*: despite the potential for divergence, their isolation on their respective mountains has apparently left them unchanged - relative, that is, to each other. That which is possible for the host-plant, is, *ipso facto*, possible for the host. Thus, a single item of experimental evidence plus a compelling theoretical case, argue strongly against specificity for *sagratrox*.

Amongst the possibilities for pursuing this interesting problem, determining the chromosome number of *sagratrox* might be expected to provide useful evidence for relatively little effort, since, according to De Lesse (1961, 1969, 1970), the chromosome numbers of *golgus* (CN = 134), *nivescens* (CN = 190-191), *dorylas* (CN = 149-151) and *atlantica* (CN = 217-223) are sufficiently dispersed and apparently invariant enough to allow the affinities of the new taxon to be clearly delineated within this complex.

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