Concerning the biology and conservation of *Polyommatus* (*Agrodiaetus*) *iphigenia* (Herrich-Schäffer, [1847]) in Greece (Lepidoptera: Lycaenidae)

Tom Tolman

Abstract: The larval host-plant of *Polyommatus* (*Agrodiaetus*) *iphigenia* in Greece has been determined as *Onobrychis alba*. The species hibernates as a small larva. The larva is strongly myrmecophilous. Attending ants have been identified as *Lasius alienus*. The rarity of *iphigenia* on the plateau of Mt. Chelmos, Peloponnesos, is attributed to intensive grazing.

Samenvatting. Over de biologie en de bescherming van *Polyommatus* (*Agrodiaetus*) *iphigenia* (Herrich-Schäffer, [1847]) in Griekenland (Lepidoptera: Lycaenidae)
De voedselplant van de rups van *Polyommatus* (*Agrodiaetus*) *iphigenia* in Griekenland werd gedetermineerd als *Onobrychis alba*. De vlindersoort overwintert als jonge rups. De rups is erg myrmecofiel. De mieren werden gedetermineerd als Lasius alienus. De zeldzaamheid van iphigenia op het plateau van de Chelmos, Peloponnesos, wordt toegeschreven aan intensieve begrazing.

Résumé. Sur la biologie et al conservation de *Polyommatus* (*Agrodiaetus*) *iphigenia* (Herrich-Schäffer, [1847]) en Grèce (Lepidoptera: Lycaenidae)
La plante nourricière de *Polyommatus* (*Agrodiaetus*) *iphigenia* en Grèce a été déterminée comme *Onobrychis alba*. L'espèce hiverne dans un stade larvaire jeune. La chenille est très myrmécophile. Les fourmis ont été déterminées comme *Lasius alienus*. La rareté d'*iphigenia* sur le plateau du Mont Chelmos, Peloponnèse, est causée par un broutement très intensif.

Key words: *Polyommatus* (*Agrodiaetus*) *iphigenia nonacriensis* - host-plant - *Onobrychis alba* - larva - pupa - myrmecophily - *Lasius alienus* - conservation - ecology - Mt. Chelmos - Greece.

Tolman, T.W.: Brock Hill, Hook Crescent, Ampfield, Romsey, Hants. SO51 9DE, England.

The larval host-plant of *Polyommatus* (*Agrodiaetus*) *iphigenia nonacriensis* (Brown, 1977)

Reported originally from the Peloponnesos, southern Greece (Brown & de Worms 1975) provisionally as *Agrodiaetus damone* Eversmann, this taxon was later described by Brown (1977) as subspecies *nonacriensis* of *Polyommatus* (*Agrodiaetus*) *iphigenia* (Herrich-Schäffer, [1847]).

In an effort to determine the larval host-plant of *P.* (*A.*) *iphigenia*, a visit to Mt. Chelmos was made in 1987. Some difficulty in achieving this objective was anticipated in view of the reputed rarity of the insect (Coutsis 1978): it was noted, with particular concern for example, that, following the discovery of the first males, 7 years elapsed before the acquisition of the first female (Coutsis 1983). In view of the presumed difficulty of locating a female, ovipositing or otherwise, it was considered more profitable to search for pre-imaginal stadia on probable host-plants in suitable-looking biotopes. The larval host-plant was assumed to be an *Onobrychis* species. In the event, biotope character quickly became of secondary concern owing to the scarcity of *Onobrychis* within the 1200-1600m altitude range reported for the butterfly (Brown 1977). Moreover, no biotopes corresponding to the description given by Brown (l.c.) were found to contain *Onobrychis* species. However, in one location, containing *Onobrychis arenaria* (Kit.) DC., at 1350m on the north-western part of the mountain, 12 or so male and 5 female *iphigenia* were found during the first few days of July. Oviposition was not observed. In the spring of 1989, a search of the *O. arenaria* at the exact site of discovery of the *iphigenia* females produced 12 hibernated lycaenid larvae, all 7 survivors of which

Plate 1

Figs 1-6: *Polyommatus* (*Agrodiaetus*) *iphigenia* (Herrich-Schäffer, [1847]), Greece, Peloponnesos, Mt. Chelmos, 1650 m:
1. Larva, May 1993; 2. Pupa; 3. Larval host-plant, *Onobrychis alba*, June 1993; 4. Male upperside, July 1992; 5. Female upperside, July 1992; 6. Female underside, July 1992.

proved to be *Polyommatus* (*Agrodiaetus*) *pelopi* (Brown, 1976). Other small samples of larvae located in nearby as well as remote colonies of the same host-plant produced *Polyommatus* (*Agrodiaetus*) *aroaniensis* (Brown, 1976), *P.* (*A.*) *admetus* (Esper, [1783]) as well as more *P.* (*A.*) *pelopi*. As it would appear to be of some ecological significance, it is noted here, that larvae of these three species were never found within the same colony of their common host-plant.

In the early spring of 1991, in a different part of the mountain at 1600m, a few lycaenid larvae were found feeding on the developing leaves of *Onobrychis alba* (Waldst. & Kit.) Desv., whilst others, still in hibernation, were located on the underside of small stones in the immediate vicinity of the host-plant. By the middle of June, these produced a short series of male and female *iphigenia*. Attending ants, which had evaded capture in 1991, were secured subsequently in a visit to the same area in 1993, when several large larvae were found. The capture of the ants, later determined as *Lasius alienus*, was greatly facilitated by their pre-occupation with the dorsal nectary organ of the nearly mature caterpillars. Post-hibernation larval development occupied approximately 20 days. The pupal stage lasted 15-19 days. The full-grown larva and pupa are shown in Plate 1.

Concerning the conservation *P.* (*A.*) *iphigenia* on Mt. Chelmos

So far as is known, *iphigenia* is confined to the Aroanian Mts., of which Mt. Chelmos is a prominent peak, and the immediate environs (Brown & de Worms l.c.; Brown l.c.; Coutsis l.c.; Fuchs 1985 & 1987; Taymans et al. 1984; Leestmans & Arheilger 1987). Whilst it is very clear that this butterfly attracts much attention from collectors, it is no less apparent that the greater threat to its continued existence arises from the ever-growing pressure on its biotopes from grazing animals. The damage caused by sheep and goats arises in distinct but related ways. Sufficiently intensive grazing of vulnerable plants at critical times in their seasonal development - flowering and fruiting - will eventually lead to their extinction. Such seedlings as may arise and survive initially are, of course, no less susceptible to the same threat. More physically obvious is the direct damage to the surface soils caused by the hooves of wandering animals. The roots of plants thus exposed immediately or subsequently by the erosive forces of wind and rain may die, thereby reducing the protection of the soil and enhancing the risk of further erosion. On many parts of Mt. Chelmos, the consequence of this initial damage is exacerbated by topography. This is most evident in that well-known area universally referred to as the plateau, but which in reality comprises a complex array of miniature hills and hollows. Very fine, loosened soil from these little hillocks, enriched by the excrement of sheep and goats, is soon washed down by heavy rains into the hollows, where it becomes compacted - "puddled" - and, thereafter, fit only for the support of those familiar coarse and robust plants such as *Verbascum, Urticae, Rumex, Cirsium* - one of the standard signs of human interference with nature. Effectively, this reduces the available grazing area, thereby increasing the pressure on intact habitat, since grazing animals either shun or otherwise are not permitted to ingest these invasive plants - weeds in the true sense of the word.

An incidental but far from negligible consequence of grazing is the need for roads, principally for the transport of milk. Inevitably, the building of a mountain road involves the disturbance of consolidated soils and rock formations. The direct loss of habitat is probably negligible in most situations, but the subsequent erosion of the road itself by flood-water from heavy rain can be locally devastating, with thousands of tonnes of soil and stones being transported great distances, inundating large areas of habitat. Even at the

periphery of this enchroachment, where the damage may appear slight, a profound alteration of the ecosystem may be inflicted by the deposition of just 1 or 2cm of rain-washed silt. Indeed, in areas well removed from the site of obvious superficial damage, just as much detriment may result from permanent hydrological changes, arising mainly from topographical modification. The general problems are more acute with roads on steep hillsides - not an uncommon occurrence in mountains - where the consequence of gravity is, clearly, at its worst. The recurring need for maintenance, necessited by the very modest quality of such roads, involves the further destruction of consolidated ground. Whilst disruption of this cycle can be effected by improved engineering, the desire for a better environment must first be matched by the willingness to pay for the same. Regrettably, tangible evidence that the pursuit of profit at the expense of the environment has priority over its protection is never far from hand, and, indeed, the most parochial as well as poignant example is provided by the ski-centre which now dominates the famous Xirokambi plateau of the Chelmos mountain itself. Whether this scenic obtrusion may, with justification, be equated to desecration calls for a careful consideration of many factors, but the fact remains that a visibly significant area of the upper landscape of the mountain has suffered direct physical damage by the provision of ski-runs comprising some very wide, very deep and very extensive incisions on the steeper and higher slopes where the erosive forces of water are greatest and therefore consequential, not only locally, but quite expansively at much lower altitudes.

As the plateau of the Chelmos mountain provides many of the biotopes of *iphigenia*, it is perhaps little wonder that the butterfly is so scarce. It is, moreover, evident that the only areas where the insect occurs are those where sheep and goats do not go. This is not to say that sheep and goats are never in the vicinity of the butterfly, quite the contrary, but the small, widely scattered reserves of host-plants and insects appear to owe their existence to nothing more complicated than the grazing routes dictated by the preferences or habits of local shepherds. For example, one of the areas in which *iphigenia* flies, approximates to an isosceles triangle whose sides of about 250m are defined by the traditional paths taken by the local herd of 450 goats in their daily routine. Within this boundary, plant species such as *Onobrychis*, relished by grazing animals, are relatively abundant, but even here it is noticeable that they tend to avail themselves of the protection of spiny or shrubby plants. It is evident, for example, that much of the *iphigenia* host-plant owes its survival to the protective, browse-detering, spiny stems of plants such as *Astragalus parnassi* Boiss amongst which it frequently grows.

On the generally over-grazed Chelmos plateau, it is evident that the host-plants of many other specialized butterflies survive largely or only because of the presence of other plants affording cover. *Vicia cracca stenophylla* Velen. [=*Vicia dalmata* A. Kerner], the host-plant of *Polyommatus* (*Neolysandra*) *coelestinus* (Eversmann, 1843) (Coutsis 1972, Fuchs 1986, Leestmans & Arheilger 1987), for example, is, quite frequently, to be found thrusting its tendrils upwards from within the interior of *Crataegus pycnoloba* Boiss & Heldr. bushes. Whilst the upper parts of the legume may be grazed, the lower aerial stems and roots remain safe.

Acknowledgements

The author is indebted to Dr Brian Adams, Department of Botanical Taxonomy, University of Southampton, England, for the determination of *Onobrychis alba*, the larval host-plant of *Polyommatus* (*Agrodiaetus*) *iphigenia*. Thanks are also due to Dr Konrad Fiedler, Theodor-Boveri-Institut für Biowissenschaften (Biozentrum) der Universtität

Würzburg, Germany, for the determination of *Lasius alienus*.

References

Brown, J., 1977. On the status of a recently discovered Grecian *Agrodiaetus* Huebner (Lep., Lycaenidae). - *Entomologist's Gaz.* **28:** 3-8.

Brown, J. & de Worms, C.G.M., 1975. *Agrodiaetus damone* (Eversmann) (Lep., Lycaenidae) discovered in the Peloponnese.- *Entomologist's Gaz.* **26:** 191-196.

Coutsis, J.G., 1972. The foodplant of *Agrodiaetus coelestina* Eversmann. - *Entomologist's Rec.J.Var.* **84:** 215.

Coutsis, J.G., 1978. List of Grecian butterflies: Additions and corrections.- *Entomologist's Rec. J. Var.* **90:** 137-140.

Coutsis, J.G., 1983. The female of *Agrodiaetus iphigenia nonacriensis* Brown. - *Entomologist's Rec. J. Var.* **95**:196-199.

Fuchs, J., 1985. 10 Tage Schmetterlingsbeobachtungen in Griechenland. - *Galathea* **1:** 122-128.

Fuchs, J., 1986. Beobachtungen über die Lycaenide *Agrodiaetus coelestinus* (*Plebicula coelestina*) in Griechenland, Peloponnes. - *Galathea* **2:** 117-119.

Fuchs, J., 1987. Ergänzungen zu meinen Artikel in Galathea, 1 (4) 1985: 10 Tage Schmetterlingsbeobachtungen in Griechenland (Liste der im Chelmosgebiet Peloponnes beobachteten Tagfalter). - *Galathea* **3:** 2-4.

Leestmans, R. & Arheilger, T., 1987. Les Lépidoptères du massif du Chelmos (Péloponnèse, Grèce): inventaire et considérations zoogéographiques (première partie). - *Linn. belg.* **11:** 150-192.

Leestmans, R. & Arheilger, T., 1988. Les Lépidoptères du massif du Chelmos (Péloponnèse, Grèce): inventaire et considérations zoogéographiques (deuxième partie).- *Linn. belg.* **11:** 209-232.

Taymans, C. *et al.*, 1984. Les Rhopalocères de Grèce. - *Bull. cercle Lépid. Belgique* **13:** 62-76.