The chromosome number and karyotype of *Polyommatus* (*Agrodiaetus*) *nephohiptamenos* (Lepidoptera: Lycaenidae)

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Abstract. The chromosome number and karyotype of *Polyommatus* (*Agrodiaetus*) *nephohiptamenos* is being presented, analyzed and compared to that of the chromosomally and externally proximate *Polyommatus* (*Agrodiaetus*) *ripartii*.

Samenvatting. Het chromosoomgetal en karyotype van *Polyommatus* (*Agrodiaetus*) *nephohiptamenos* (Lepidoptera: Lycaenidae)
Het chromosoomgetal en karyotype van *Polyommatus* (*Agrodiaetus*) *nephohiptamenos* (Brown & Coutsis, 1978) wordt beschreven, geanalyseerd en vergeleken met dat van de nauw verwante *Polyommatus* (*Agrodiaetus*) *ripartii* (Freyer, 1830).

Résumé. Le nombre de chromosomes et le caryotype de *Polyommatus* (*Agrodiaetus*) *nephohiptamenos* (Lepidoptera: Lycaenidae)
Le nombre de chromosomes et le caryotype de *Polyommatus* (*Agrodiaetus*) *nephohiptamenos* (Brown & Coutsis 1978) sont décrits, analysés et comparés avec ceux de l'espèce apparentée *Polyommatus* (*Agrodiaetus*) *ripartii* (Freyer, 1830).

Key words: Lycaenidae – *Polyommatus* – *Agrodiaetus* – *Polyommatus* (*Agrodiaetus*) *nephohiptamenos* – karyotype – chromosome number – Greece

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Introduction

Polyommatus (*Agrodiaetus*) *nephohiptamenos* (Brown & Coutsis, 1978) was discovered in 1977 on Mt. Pangéo, Makedonía, Greece, and described as a new species on the basis of its external characters and chromosome number, the latter reported as being $n = 8–10$.

Recent testes fixations of this butterfly that were carried out by the first author from both topotypical material as well as from specimens captured on Mt. Falakró, Makedonía, Greece, and eventual chromosome fixations that were carried out by the second author, revealed that the original chromosome number determinations of 1978 were erroneous and grossly inaccurate.

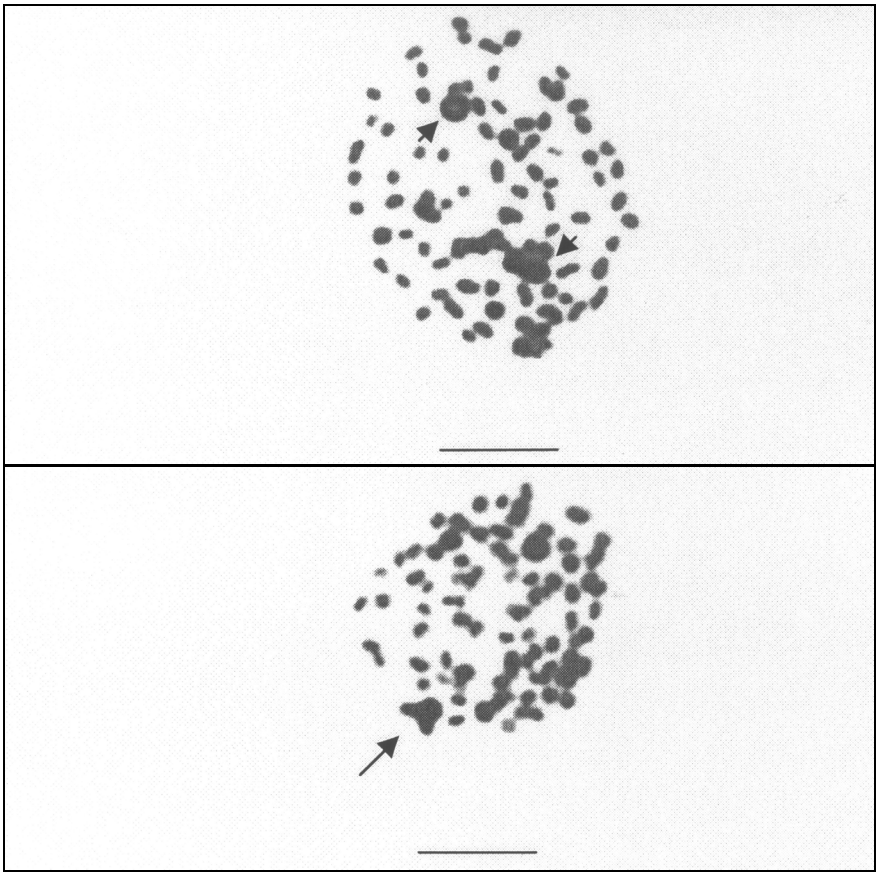
Abbreviations:

TL	Type locality
CN	Chromosome number
n	Haploid chromosome number
MI	Metaphase of first division of primary spermatocyte
MII	Metaphase of second division of primary spermatocyte

Haploid chromosome number and karyotype

The chromosome number of *nephohiptamenos* was found to vary from $n = 84$ to $n =$ ca. 88. These counts were based on 26 MI and 4 MII cells derived from two TL specimens, as well as on 13 MI cells derived from a single specimen captured on Mt. Falakró. The bivalents are extremely variable in size, having an

area of about 0.410 µm² to about 2.750 µm². There are three, large, outstanding bivalents, two of which often act as association centers for the surrounding smaller bivalents. Two of the large bivalents mentioned above are most often located so close to one another as to touch, thus forming a single quadrivalent. The location of the large bivalents varies, but usually the quadrivalent, when present as such, is placed close to the edge of the metaphase plate, while the single large bivalent, together with its associated bivalents, tends to be near the center.



Figs. 1–2. Spermatocyte in MI of *Polyommatus* (*Agrodiaetus*) *nephohiptamenos* from Greece, Makedonía, Mt. Pangéo, 1600–1800 m, 8.viii.1999. Scale bar = 10 µm.
1.– The arrows show a large ring-shaped bivalent and a quadrivalent composed of two large, united dumbbell-shaped bivalents. *n* = ca. 88. **2**.– The arrow shows a quadrivalent composed of two large, united bivalents. *n* = ca. 84.

In all MI cells that were observed there exist associations of up to 10 bivalents that are laterally tightly attached to one another. The high incidence of this phenomenon suggests that this is not the result of bad spreading of the bivalents, but rather is due to their expressed telomeric attachment capabilities.

The bivalents are heteropycnotic and vary in the degree of dye adhesion. The larger ones contain more C-heterochromatin at their telomeric sections; the mid-sized ones are mainly positive pycnotic, while the smallest ones show mainly negative pycnosis.

Discussion

The chromosome number of this species appears to be variable and its karyotype complicated, both being conditions that could conceivably be attributed to hybridization. This hypothesis, however, must be ruled out, as the external characters of *nephohiptamenos* do not show any combination of characters between any two of the other three sympatric brown *Polyommatus* (*Agrodiaetus*) species, such as *P.* (*A.*) *eleniae* Coutsis & J. De Prins, 2005, *P.* (*A.*) *ripartii* (Freyer, 1830) and *P.* (*A.*) *admetus* (Esper, 1783). Furthermore *nephohiptamenos* is an insect of higher altitudes than are *eleniae*, *ripartii* and *admetus*, this being a feature that could have hardly been inherited from any one of these other species.

The CN of *nephohiptamenos* is very close to that of the externally very proximate *ripartii* ($n = 90$), but its karyotype is quite distinct from it. In *ripartii* there are two centrally placed large bivalents, surrounded by much smaller ones that are roughly evenly spaced between them and exhibit a rather weak size gradation; in *nephohiptamenos* there are three large, variably placed bivalents, that often may appear as a single large bivalent and one large quadrivalent. In either case the large chromosomes are as a rule surrounded by medium- to small-sized bivalents that have an uneven density in distribution, and form between them close associations, or clusters. The size gradation of the smaller bivalents is more pronounced in *nephohiptamenos* than it is in *ripartii*.

References

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