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Gegenes pumilio Hoffmannsegg, 1804 ; a review with cytological evidence that two species are involved (*Hesperiidae*)

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Summary

Western Mediterranean populations of *Gegenes pumilio* Hoffmannsegg 1804 (Hesperiidae) have a haploid chromosome number of n = 24. Eastern Mediterranean populations have n = 41. These differences clearly suggest that two species are involved, but no specific characters were established in morphology or genitalia. Further cytological evidence is necessary before final taxonomic, nomenclatural and biogeographical conclusions can be drawn.

Résumé

Chez les populations de Méditerranée occidentale de *Gegenes pumilio* Hoffmannsegg 1804 (Hesperiidae), le nombre de chromosomes haploïdes est de n = 24, tandis que chez celles de Méditerranée orientale, il est de n = 41. Une telle différence suggère qu'on se trouve en présence de deux espèces, mais on n'a pas trouvé de caractères distinctifs spécifiques dans la morphologie ni dans les genitalia de ces populations. Avant de tirer des conclusions définitives quant à la taxonomie, la nomenclature et la biogéographie, il convient d'attendre de nouvelles preuves cytologiques.

Taxonomy and nomenclature

G. pumilio over time has engendered a fair amount of confusion and synonymy. In 1937, Evans recognised three subspecies of *pumilio* ; the nominate from the Mediterranean to northwestern India ; ssp. *gambica* Mabille in most of dry Africa ; and ssp. *monochroa* Rebel from the island of Socotra off Somalia. He admitted that the three subspecies were weakly characterised ; in 1949 he drew the logical conclusion and synonymised them. The following available names are currently considered to be junior synonyms of *pumilio*.

Gegenes pumilio Hoffmannsegg, 1804 (Napoli)
= *pygmaeus* Cyrilli, 1787 (Napoli) Homonym
= *aetna* Boisduval, 1840 (Sicily)
= *lefebvrii* Rambur, 1842 (Sicily)
= *gambica* Mabille, 1878 (Gambia)
= *occulta* Trimen, 1891 (Barberton, S.A.)
= *ursula* Holland, 1896 (Kenya)
= *monochroa* Rebel, 1907 (Socotra)
= *major* Ragusa, 1919 (♀ form, Italy)

It will be noted that all available names refer to Italian or to African populations.

Distribution

G. pumilio is normally localised and occurs in discrete colonies ; it is missing from extensive areas where in principle it should be able to occur. The following brief summary of the distribution is not meant to be fully comprehensive, but it is believed to outline the true extent of the general pattern and to reveal genuine discontinuities in the distribution pattern.

North Africa : Chneour (1954) does not mention it from Tunisia, but there is a specimen from Ain Draham in the collections of the British Museum (Natural History). There are many records from Algeria, but I have not seen Moroccan specimens, though it may occur there.

Spain : There has been considerable controversy over the status of this butterfly in Spain ; Manley & Allcard (1970) decide against its presence. Obviously *pumilio* is rare and localised in Spain but it does occur in Catalonia around Barcelona as pointed out by Bustillo & Rubio (1974). There is an undoubted specimen in the Musée National d'Histoire Naturelle in Paris from Granada.

France : G. pumilio is local on the coast of Var and Alpes Maritimes in places such as Monte Carlo, Nice, Menton, Cap Martin and Lavandou.

Italy : Widely distributed on the western coastline in four groupings of very localised colonies : around Genua, on Elba and the facing mainland, between Rome and Napoli, in the toe of Italy (Calabria) and on Sicily. The species is common on Malta, from where Mr. Valetta was kind enough to send me a series.

Yugoslavia : Localised on the Dalmatian and Montenegrin coast as well as in Albania (Lorković, 1971). Reports from Bosnia and Croatia are questionable.

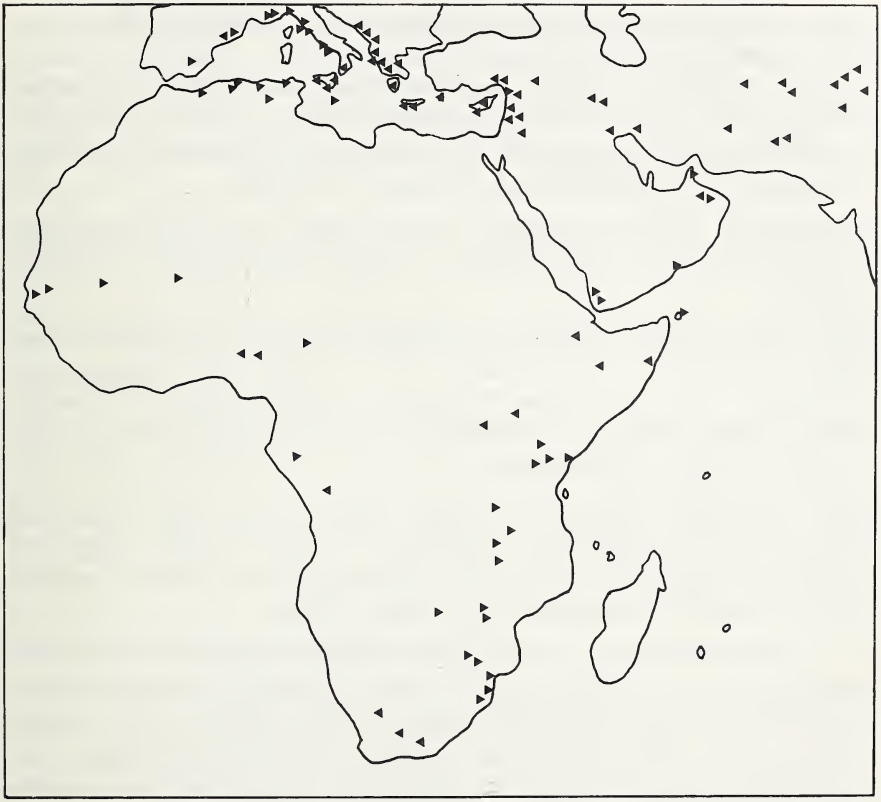

Fig. 1. Black triangles indicate records of *Gegenes pumilio* substantiated by the author. In Europe each triangle usually covers many records in the general area of the triangle. Discontinuities in Europe are probably genuine ; those in Asia and Africa probably partly reflect lack of data.

Greece : There are many records from Greece, but the species, is uncommon and local ; among the localities are Corfu, Sounion, Kammena Vourla, Olympus, Parnas, Epirus, Lakonia, Mesochorion, Spetsai Island, Crete and Rhodos. It is notable however, that there are no records from Thessaly and eastern Greece.

Turkey : Koçak (1975) reported the first Turkish specimens in print from Adana province ; I have caught it at Iskenderun in the same general area, but have been able to trace no records from other parts of Turkey. Apart from the Rhodos specimens it thus appears to be missing between Adana and Greece. Admittedly not much collecting has taken place in Turkey, but it would be surprising if this species had been totally overlooked.

Levant : Generally speaking *pumilio* appears to be more common in Syria, Lebanon and Cyprus than anywhere else (see LARSEN, 1974 for Lebanon). It is less common in Jordan and Israel where its southern distribution limit is found. There is a specimen labelled Egypt in the Paris Museum ; if correctly labelled it must be from Gaza or the northern Sinai. It is uncommon in Jordan (LARSEN & NAKAMURA in press).

Iraq to India : There are sporadic records from Iraq, Iran, Afghanistan and Baluchistan, and more frequent records from northern Punjab to Kashmir.

Arabia : No Arabian material was available until a few specimens were caught in Dhofar in 1977 (LARSEN, 1979). I later caught specimens in northeastern Oman and in the Musandam Peninsula opposite to Bandar Abbas (LARSEN, 1980). In 1980 and 1981 I found the species for the first time in the Yemen Arab Republic.

Africa : Scattered records from Gambia, Niger, Mali, Haute Volta and Nigeria in West Africa. The same is true for Ethiopia, Somalia, Kenya and Tanzania in East Africa. The species appears rather more common in Zambia, Rhodesia, Mozambique and South Africa.

The wider distribution of *pumilio* shown in the map indicates that three main distribution areas are involved. First, the western Mediterranean to Greece. Second, the extreme SE Turkey to India. Third, the dry parts of tropical Africa. The eastern and western Palaearctic populations are separated by a band of more than 2000 km between Israel and Tunisia, and by 700 km between Adana and Rhodos or Crete. The discontinuity of distribution at the northern part of the range would have been more impressive still, had *pumilio* been absent from Rhodos. Its presence there is almost certainly allied to that of the Pelopponese and Crete since several Rhodian faunal components show more affinity to Greece than to the Turkish mainland (e.g. *Gonepteryx cleopatra* Linné (KUDRNA, 1975)). An interesting paper by DE JONG (1976) discusses the affinities between the African and the European butterfly faunae and also deals with some initial comments of mine on the *Gegenes*. I agree that the *Gegenes* are basically eremic butterflies which developed in the zone now covered by the great Saharan and African deserts. The dessication of the deserts split the distribution into a northern and a southern component, but when and exactly how the sequence of events took place is impossible to say as yet.

Bionomics

The distribution of *pumilio*, at least in the Mediterranean area from where adequate information is available, appears to be fragmented into clusters

of colonies separated from other such clusters by long stretches of land where the butterfly does not occur. The individual colonies within each cluster are also strongly localised, indicating that the ecological tolerance of *pumilio* is low. Typical habitats are dried out river beds in Mediterranean garrigue, especially in coastal areas. I have been struck by the similarity of localities in France, Lebanon, Jordan and even Oman. It is quite possible to develop a "feel" for *pumilio* habitats. Whether the situation in the Punjab is different I cannot say. It should be noted that *Gegenes nostrodamus* F., which has a somewhat similar distribution pattern except that it is missing from most of tropical Africa, is basically an oasis insect or an insect of the shade. It is rare to find the two in the same locality.

In its chosen territory, *pumilio* spends most of its time sitting on a rock or some other vantage point, from where it occasionally flies off at a furious speed to chase away any invaders. It is one of the species which is genuinely territorial and quite often a specimen which has been thoroughly scared off with a misdirected swipe of the butterfly net will return to the very same spot twenty minutes later. The flight is normally very close to the ground. Both sexes come to flowers ; in Lebanon species of *Heliotropium* were especially popular.

There are two or three broods a year in most places ; the spring brood is a small one and the species is normally much more common in autumn than in spring. The only records of the food plant which I traced was that of *Ehrhartia erecta* Lam. (Graminaceae) from South Africa (Murray, 1959). The extreme localisation of *pumilio* might be linked to the choice of food plant ; other skippers, such as *Heteropterus morpheus* Pallas, are very choosy.

Variation

During studies on the chromosome numbers of Lebanese butterflies some years ago (Larsen, 1975), I determined that the haploid chromosome number of a specimen of *Gegenes pumilio* from Hazmiye, Beirut, 14.v.1974 was n = 41. Since de Lesse (1960) had determined the number for a speciman from Nice as n = 24, I decided not to publish my own finding until I had a chance to research the problem in more depth.

In addition to the specimen of *pumilio* from Nice with a haploid chromosome number of n = 24, de Lesse had also determined the same number in a specimen from Algier (de Lesse, 1967). In his thesis, de Lesse (1960) listed a *Gegenes* sp. from Gülek near Adana in Turkey as having n = 41, the same number as I found in Beirut. I was able to locate the

specimen in the collections of the Musée National d'Histoire Naturelle in Paris and it is unequivocally *pumilio* ; DE LESSE undoubtedly omitted the specific name because the natural determination would clash with the undoubted *pumilio* from Nice with n = 24. On 4.viii.1974, I examined a further three specimens of Beirut *pumilio* ; on one, three first order and two second order metaphases confirmed the chromosome count of n = 41, in the two others a few second order metaphases confirmed n = 41.

Confusion with the rather similar *G. nostrodamus* FABRICIUS is ruled out. In Nice, *pumilio* is the only representative of the genus ; the Taurus specimen has been verified by me ; the Beirut specimens are certain ; and finally my not fully conclusive counts on *G. nostrodamus* from Cairo in December 1974 indicated n = ca 15-16. SAITOH (1979) confirmed n = 15 in Dead Sea *nostrodamus* kindly communicated to me by I. NAKAMURA.

Dr. K. SAITOH kindly examined a single male *pumilio* which I collected in Yemen in 1980. This had a haploid chromosome number of n = 41.

Discussion

Although the number of specimens involved is small, the large difference in number of chromosomes and the stability between the two sets of localities makes it certain that two distinct species are involved. Fragmentation of chromosomes has been noted in the Hesperiidae (DE LESSE, 1960) but this leads to variation in chromosome numbers even within the same specimen and the karyological pattern of fragmentation is obvious ; the Beirut karyotypes were quite normal.

The presence of the taxon with n = 41 in both the eastern Mediterranean and in southwestern Arabia makes it almost certain that the African, Arabian and Asian populations belong to one taxon. The presence of the taxon with n = 24 in both North Africa and near Nice indicates that it embraces the Spanish populations as well. It is tempting to conclude that the Italian populations belong to this taxon as well, but judging from the distribution patterns of other Rhopalocera this is far from certain. Several species are found from North Africa to southern France without entering the Italian peninsula while others do. In the absence of cytological evidence it is impossible to assess the status of the Greek populations. The apparent absence of *pumilio* from peninsular Turkey may indicate that the taxon with n = 24 is the best guess.

An unfortunate consequence of this interesting situation is that we do not know to which of the two species the name *pumilio* applies. This must await cytological study of material from Napoli, the type locality of the species. If it is found to be n = 24, the n = 41 population should be known

as *G. gambica*. If it is n = 41, then the North African, Spanish and Nice populations need to be described.

It would be useful to check the Sicilian populations as well. It is just possible that they do not belong to the same taxon as Napoli material, in which case the name *aetna* Boisduval may be resurrected.

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Book reviews – Buchbesprechungen – Analyses

Dr. C. Wagner-Rollinger : Les biotopes de nos papillons diurnes. 1980 Luxembourg. Impr. P. Worré-Mertens. Adresse de l'auteur : 19, rue Adolphe, Luxembourg.

Cette étude très fouillée et originale vient combler une réelle lacune dans la littérature lépidoptérologique. La plupart des auteurs des manuels et publications lépidoptérologiques se bornent en effet à indiquer comme biotopes «bois et prairies», expression vague et banale, sans préciser de quels bois et de quelles prairies il s'agit effectivement.

L'ouvrage de M. Wagner répond donc à une véritable nécessité. Il est basé sur plus de 65 années d'observations sur le terrain et mérite à coup sûr une très large diffusion dans tous les milieux lépidoptérologiques.

Ce travail constitue de plus indiscutablement un heureux complément au grand Catalogue des Lépidoptères du Grand-Duché de Luxembourg, avec lequel on devrait en somme le relier quand auront paru les dernières «Notes supplémentaires» (dans Linneana Belgica) qui suivent le Supplément VIII et dernier.

E. de Bros