

**About the status of
Ephippiger terrestris terrestris forma minor AZAM 1892**

(*Orthoptera, Ensifera*)

von

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About ninety years ago, AZAM described a forma minor of *Ephippiger terrestris* (YERSIN). Individuals of this new forma were found at higher altitude and were smaller than type species ones. All authors have conserved this form (for example, CHOPARD, 1951, HARZ, 1969, NADIG, 1980), without noticing other differences with type species.

Moreover, the term form or forma concerns specimens of which taxonomic category is not well-defined, though in the circumstances infraspecific: „We may speak of a „form“ when we do not know whether the phenomenon in question is a full species or a subspecies, or whether it is a subspecies or an individual variant“ (MAYR, 1969). NADIG (1980), who revised the species, only said that: „Die forma minor ist eine kleinere Bergform von t.t.“. And so, we don't know exactly what is *E. terrestris* forma minor AZAM 1892.

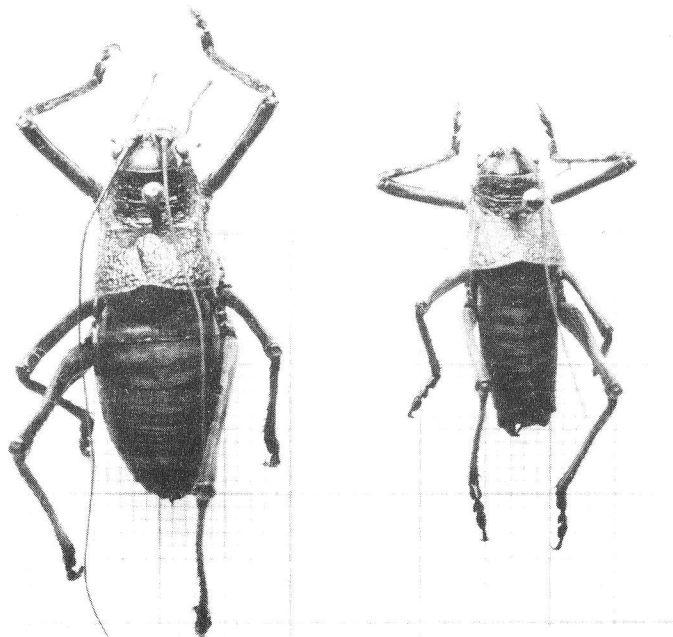
We tried to see whether forma minor is really smaller. On the one hand, we captured some individuals in „Alpes Maritimes“ (France), (51 ♂ and 32 ♀, see table 1), and on the other hand, we examined the collections of AZAM and DE VICHET (Museum National d'Histoire Naturelle, Paris). We have taken as principal character for defining the size the length of hindfemur (L), which is easy to measure with a micrometric ocular and generally considered as well-correlated with size of body.

When expressing these measures in terms of altitude (figure 1), we can see that they vary about linearly from bigger specimens in low altitude (390 m) to smaller specimens (: forma minor) in high altitude (1264 m) in Alpes Maritimes, for our captures; (see also photography 1 for size differences).

The negative correlation between size and altitude is tested respectively for males and females with nonparametric test on coefficient of KENDALL ($K = 0,756$ and $K = 0,750$; $P < 0,005$).

So, we can affirm firstly that the variation of size for this species is relatively continuous, though individuals of *E. terrestris* f. minor AZAM 1892 can be isolated populations of high altitude (from 1000 m to 2100 m, after NADIG, 1980).

Secondly, we study the regularity of size variation. Histograms are drawn with length L and their normality is verified with graphic resolution method



Photography 1:

A big and a small individuals of *Ephippiger terrestris* (YERSIN).

Table 1:

Localities of our captures of *Ephippiger terrestris* (YERSIN) in Alpes maritimes (France, 1980-83).

Colletta (Castellar)	390 m
Grange St. Paul (Menton)	460 m
Vaquierá (Castellar)	550 m
Faissé (Peille)	720 m
Berceau (Castellar)	750 m
Plan de Leuze (Castellar)	750 m
Haut du Berceau (Castellar)	850 m
Col de la Madone de Gorbio (Peille)	975 m
Restaud (Castellar)	1130 m
Cime de Baudon (Peille)	1264 m

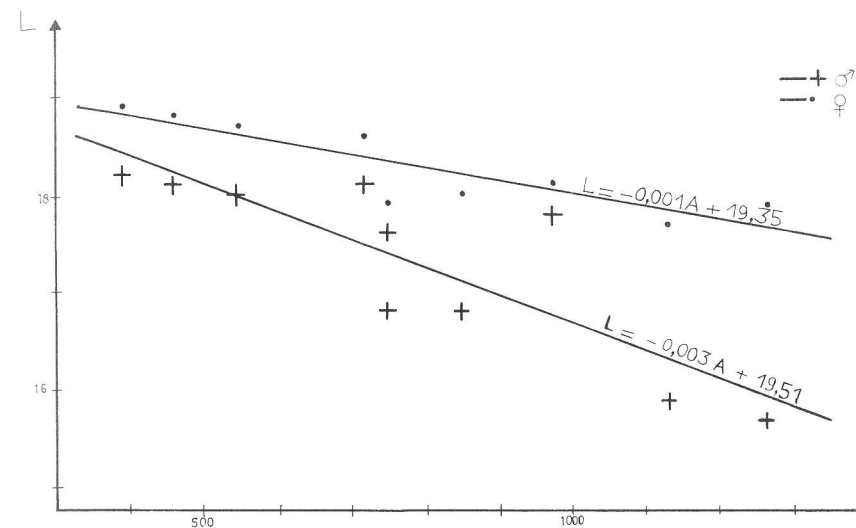


Figure 1:

Decrease of length of hind femur (L) (millimeters) with altitude (A) (meters) for males and females of *Ephippiger terrestris* (YERSIN).

proposed by HARDING (1949): We calculate frequencies for each class, then cumulate frequencies in percentage and we disposed them on a diagram with double logarithmic scale. Histograms are rather regular, except for females of Alpes Maritimes (figure 2 and 3) which are only thirtytwo. Graphics of HARDING are almost straight lines, even if all individuals are considered in spite of great differences of localization (tens of kilometers) and of ages (tens of years) and relatively little samples (method of HARDING is quite good with hundred of mesures) are used.

So, we can think that forma minor AZAM 1892 is only some individuals which are the smaller for this species. The only character - general size - is not good.

In conclusion, we can say that variation of size in Orthoptera has already be noticed (ADAMOVIC, 1950, MASAKI, 1978, CAMPBELL and DEARN, 1980, MONK, 1983, HUGUENY, 1984) and is sometimes identified as a climatic adaptation or as a component of life-history strategy. Differences of size are sometimes directly determined genetically and it is a clinal variation, or not. In two cases, giving a name is not possible.

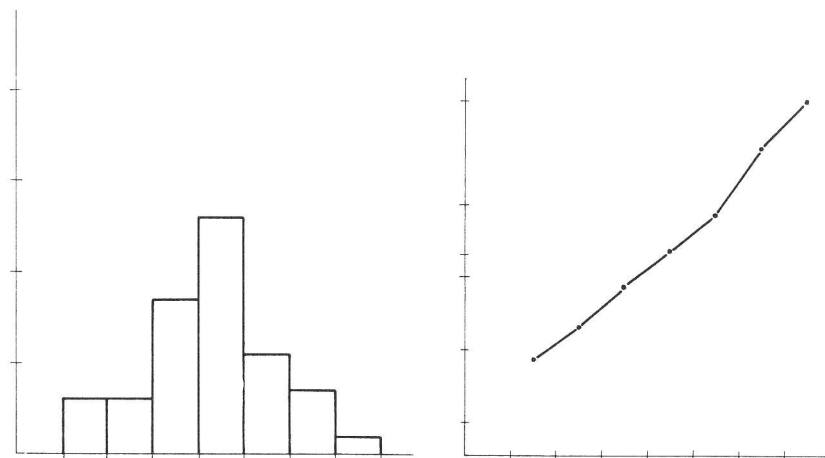
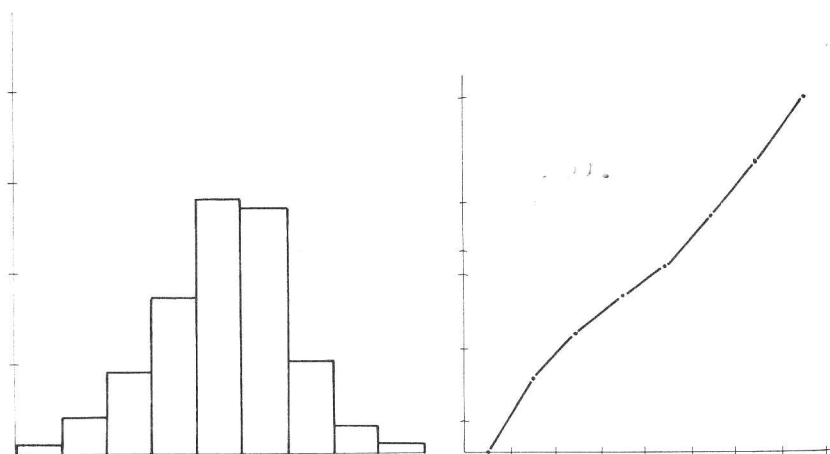
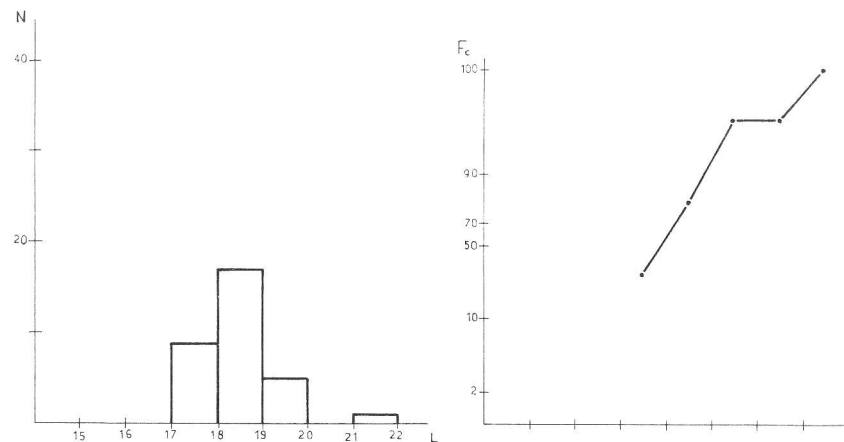
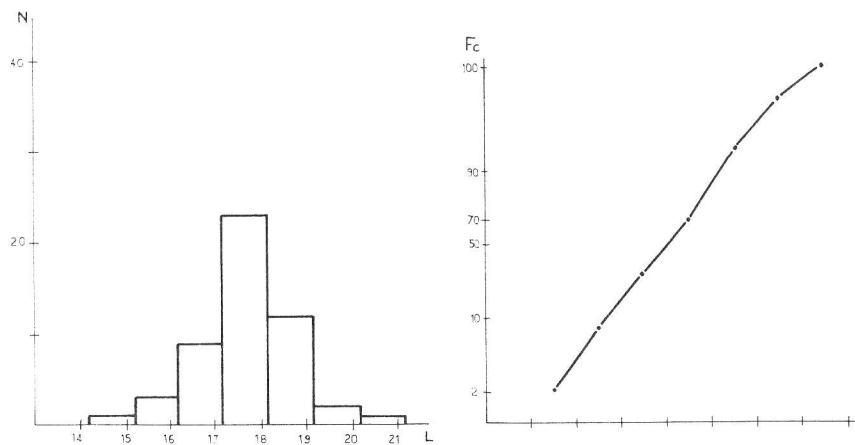


Figure 2:
Histograms of frequencies of length of hind femur (L) on the left and graphic of HARDING, on the right; for individuals of Alpes-Maritimes at the top of the figure and for all individuals at the lower part. Only males.

Figure 3:
id. for the females.

Bibliography

- ADAMOVIC, Z.R., 1950. Quelques analyses biométriques d'*Oedipoda coerulescens* L. Bull. Mus. Hist. nat. pays Serbe, Belgrad. B, 3-4: 333-342.
- AZAM, J., 1892. Catalogue provisoire des Insectes Orthoptères observés jusqu' à ce jour dans les Basses-Alpes. Bull. Soc. scient. litt. Basses-Alpes. 6.
- CAMPBELL, N.A., DEARN, J.M., 1980. Altitudinal variation in, and Morphological Divergence between, three Related Species of Grasshopper, *Praxibulus* sp., *Kosciuscola cognatus* and *K. usitatus* (Orthoptera: Acrididae). Aust. J. Zool. 28: 103-118.
- CHOPARD, L., 1951. Orthopteroides. Faune de France, ed. Lechevalier, Paris. 359 pp.
- HARDING, J.P., 1949. The use of probability paper for the graphical analysis of polymodal frequency distribution. J. Mar. Biol. U.K. 28: 141-153.
- HARZ, K., 1969. Die Orthopteren Europas. Vol. 1. Dr. W. JUNK N.V., The Hague. 749 pp.
- HUGUENY, B., 1984. Etude comparative de caractéristiques du développement et de la démographie, entre populations géographiquement isolées de *Calliptamus barbarus* (Orthoptère, Acrididae). DEA Ecologie, Univ. Paris VI. 84 pp.
- MASAKI, S., 1978. Climatic Adaptation and Species Status in the Lawn Ground Cricket. II Body size. Oecologia (Berl.) 35: 343-356.
- MAYR, E., 1969. Principles of systematic Zoology. Mc Graw-Hill. 428 pp.
- MONK, K.A., 1983. Morphological variation in relation to habitat in some British grasshoppers. Journal of Natural History. 17: 75-85.
- NADIG, A., 1980. *Ephippiger terrestris* (YERSIN) and *E. bormansi* (BRUNNER v. W.) (Orthoptera): Unterarten einer polytypischen Art. Beschreibung einer dritten Unterart: *E. terrestris caprai* ssp. n. aus den Ligurischen Alpen. Revue suisse Zool. 87 (2): 473-512.

Summary

With a biometrical analysis, the author demonstrate that the forma minor of *Ephippiger terrestris* (YERSIN) described by AZAM (1892) concerns only normal specimens of the type species, needlessly separated.

Résumé

A l'aide d'une analyse biometrique, l'auteur montre que la forma minor d'*Ephippiger terrestris* (YERSIN) decrite par AZAM (1892) ne concerne que des individus normaux de l'espece type et qui en avaient ete separees a tort.

Zusammenfassung

Der Autor zeigt mit einer biometrischen Analyse, daß die forma minor von *Ephippiger terrestris* von AZAM (1892) beschrieben, nur normale Individuen des Typus und dessen Variationsbreite umfaßt, eine Abtrennung - wenn auch bloß als Forma - also überflüssig ist.

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