Nota lepid. 4 (3) : 80 ; 30. IX. 1981 ISSN 0342-7536
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Anthropogenic resistance in Lepidoptera : the role of population spatial structure

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Anthropogenic effect on entomofauna manifests itself indirectly, through radical changes in natural biotopes. Resistance of butterfly species to these changes is essentially dependent on the pattern of spatial and time dynamics of the population, i.e. on the population spatial structure.

The overwhelming majority of butterfly species of the Urals and Siberia is non-migratory. Populations of these species inhabit areas varying from 1-10 ha. to several square kilometres depending on the radius of activity of individuals. It is quite possible to destruct the habitat of an isolated non-migratory population and consequently the population itself. Even if this event occurred during the flight period, individuals could never bridge the distance to the next suitable biotope : The majority of *Nymphalidae, Pieridae, Hesperiidae* and all *Satyridae, Lycaenidae* and *Papilionidae* of our region are non-migratory. Migrations are typical of some *Nymphalidae (Nymphalinae)* and *Pieridae* (*Pierinae*) species. Their populations inhabit enormous territories and migrate over the range of hundreds and thousands of kilometres, this peculiarity being an essential part of these species biology. The complete disappearance of migratory Rhopalocera from a regional fauna may result only from complete extermination of some natural community types.

Radii of individual activity are of high taxonomic importance. Mean travelling distances of imagos are nearly the same for the species of the same genus and are similar for closely related genera. Evidence is being accumulated that the radius of individual activity is closely related to the size of non-migratory species populations. Such important species characteristics as potential fecundity and oocytes maturation rate, the range and type of trophic connections and the type of population dynamics, are also dependent on the peculiarities of the spatial structure of lepidopterous populations. If spatial structures of species are known, one can obtain a high degree of accuracy when forecasting results of various anthropogenic effects on faunistic complexes of lepidopterous insects of a certain region as well as possible changes in the role that this phytophagous group plays when ecosystems are transformed.

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Digitale Literatur/Digital Literature

Zeitschrift/Journal: Nota lepidopterologica

Jahr/Year: 1981

Band/Volume: 4

Autor(en)/Author(s): Baranchikov Yu. N.

Artikel/Article: Anthropogenic resistance in Lepidoptera : the role of population spatial structure 80