



SERBIAN STICK GRASSHOPPER - *Pyrgomorphula serbica* (Pančić, 1882) THE MOST STRIKING BUT LITTLE-KNOWN ENDEMIC OF SERBIAN FAUNA

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Pyrgomorphidae is an ancient grasshoppers family within the monotypic superfamily Pyrgomorpoidea of the order Orthoptera. A typical genus of the family *Pyrgomorpha* Serville, 1838 and a monotypic genus *Pyrgomorphula* Kevan and Akbar, 1963 were merged into the tribe Pyrgomorphini in the subfamily Pyrgomorphinae. Representatives of the mentioned family form a separate, old phyletic line of grasshoppers with a pan-tropical distribution. Only the species *Pyrgomorphula serbica* (Pančić, 1882) is present exclusively in the European continental fauna. Unlike most representatives of the Pyrgomorphini tribe, the Serbian stick grasshopper lives in a small area, which includes several Balkan mountains: Tara, Mokra Gora and Zlatibor in Serbia, and Varda in Bosnia. The habitat of this stenoendemic species is actually much smaller due to the pronounced disjunctivity, with small and isolated populations, which makes the species very rare and extremely endangered. Hence its IUCN status is listed as critically endangered (CR).

Although the research of the *Pyrgomorphula serbica* began in 1882, when it was found and described by Josif Pančić, there were only few and very sporadic. Our research on Tara Mt. in the period 2019-2021 is the first systematic and detailed research of the condition and number of populations of this species. We have also gained important new knowledge related to the biology and ecology of the species. Over the course of three years, we searched more than 300 seemingly suitable locations (most of them two or more times) and registered the presence of the Serbian stick grasshopper at 72 of them. The presence of several individuals or individual specimens at the site was mostly confirmed. It is extremely worrying that we could register only 6 populations numbering more than ten individuals and whose area covers more than a few hundred square meters. Only two populations contained more than fifty individuals and could be conditionally marked as stable.

The limited data from the middle of the 20th century mention numerous populations of this species exclusively in the relict black pine (*Pinus nigra*) forests with a sparse structure and virgin forest type, with winter heath (*Erica carnea*) on the ground floor and numerous stumps and rotten trunks. Presently, there are no such forests at Tara Mountain. We concluded that the presence of the Serbian stick grasshopper is not related to the winter heath or any other specific plant species. Its survival is related to a specific set of optimal habitat conditions: southwestern terrain exposure, semi-open and sunny habitats enabled by sparse forest with older trees, areas with sparse ground vegetation, well-drained or skeletoid soil and proximity to a permanent water source. The species is distinctly thermophilic and moderately mesophilic, but it inhabits habitats that become extremely xerothermic during the spring. Hence, the presence of water sources within the habitat is crucial (especially during late spring and early summer) for the possibility of choosing a location with an optimal humidity regime. In addition to the great negative anthropogenic impact (total deforestation of old pine forests, urbanization, disturbance and destruction of habitats), we also found a favorable effect of human activity for the survival of this species. Steep sections of land above the roads, created by the road construction, have replaced the missing sunny clearings of old pine forests. We noticed a number of individuals of the Serbian stick grasshopper right on the slopes with southwestern exposure, above the old roads, which are overgrown with sparse vegetation of perennial herbaceous plants, individual shrubs and rare trees, with the existence of moisture sources. Such habitats also serve as corridors that enable communication and expansion of populations of the Serbian stick grasshopper.

Today's populations of the *Pyrgomorphula serbica* on Tara Mt. are just few remains previously widespread and possibly larger populations. We believe that the situation could be significantly improved if the remaining habitats were strictly protected, the existing young forests were adequately managed with the potential to become suitable habitats and the urbanization of potentially important areas was stopped.