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## Screening of interspecific and varietal differences in small grains' suitability for *Sitophilus oryzae* (L.) development

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**Abstract:** The rice weevil [*Sitophilus oryzae* (L.)] is an economically important polyphagous primary pest of different grain commodities and cereal-based products (Stejskal et al., 2004). It is often a limiting factor in a post-harvest storage of small grains in Serbia. The rice weevil's preference for wheat has been previously confirmed, in comparison to other small grains (Athanassiou et al., 2008; Majd-Marani et al., 2023), although weevils development and population growth can be influenced not only by the grain species but also by a variety (Doherty, 2023). Therefore, defining an exact seed trait (physio-morphological, nutritive trait, biochemical composition etc.) that affects insect's bionomy is a crucial for differentiating suitable and/or tolerant varieties. Further knowledge on the suitability of a certain grain commodity and variety, as well as the specific responsible trait, is important for improving pest management programs and developing new breeding strategies.

The aim of the study was to test the suitability and/or tolerance of different small grain species and varieties, i. e., nine varieties of common wheat (*Triticum aestivum*), eleven varieties of oats (*Secale cereale*), and nine varieties of barley (*Hordeum vulgare*) for the rice weevil development. We monitored weevil progeny production (number of newly emerged adults) and feeding intensity (% of consumed grains) in correlation to seed nutritive traits [protein, starch, oil and fibre content (%)] and seed hardness (N). The experiment was carried out under controlled conditions (27 °C, and relative humidity 60 %), in six replicates. The parenteral population of the rice weevil was reared on wheat grains (variety Pobeda) for 10 generations. Before being used in this experiment, the grains were kept in a freezer at -80 °C for 4 hours in order to eliminate both visible and hidden infestation of insects, mites, pathogenic fungi and bacteria. Progeny production was assessed after 56, and 84 days, while feeding intensity was measured after 84 days.

The rice weevil progeny production and feeding intensity were strongly correlated to small grain species, but also significant varietal differences were observed. The progeny production, i.e. the number of newly emerged adults after 56 and 84 days, as well as % of consumed grains were generally the highest on wheat grains, all varieties except variety Banaćanka, and on oat varieties OO1, OO7, OO8, OO10 and OO12 (Figure 1). The lowest number of emerged adults and the % of consumed grains after the same period was recorded on all barely varieties, except UNK-R-42 and NS Mile, which were the most suitable for the rice weevil development. In general, the progeny production was in strong correlation with protein and starch content while the oil, fibre and ash content did not affect this trait, neither the % of consumed grains. On the other hand, the % of consumed grains was strongly correlated to grain hardness and starch content.

**Key words:** grains, varietal differences, rice weevil, tolerance traits

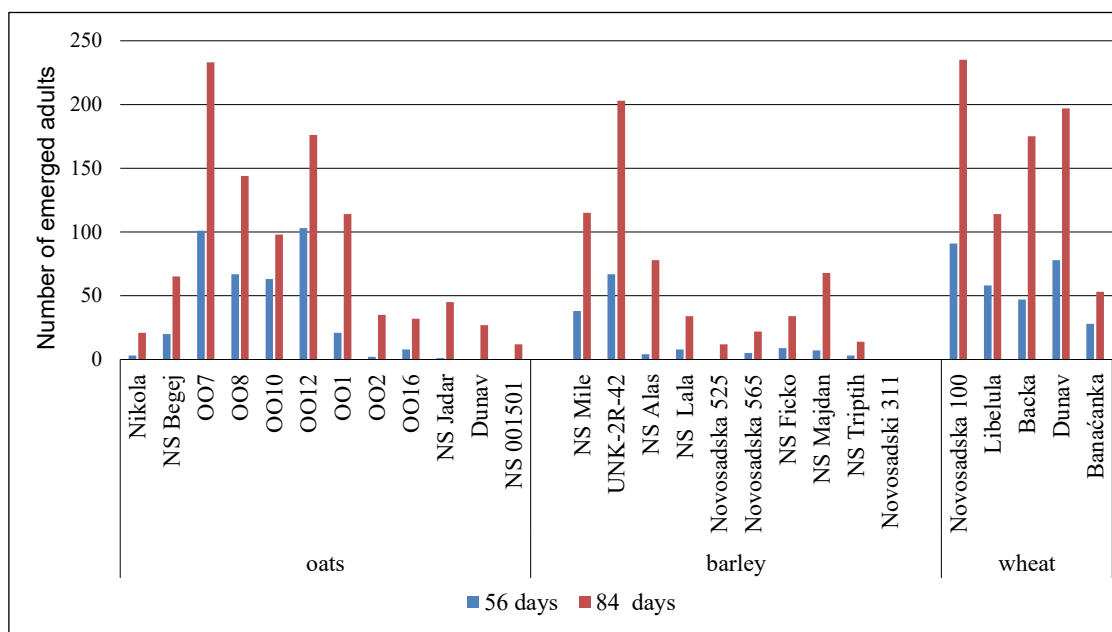


Figure 1. Progeny production (number of newly emerged weevils) after 56 and 84 days.

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