

Combining abilities for spike traits in a diallel cross of barley

Kombinacione sposobnosti za osobine klasa ječma u dialelnom ukrštanju

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Abstract

Five two-row winter barley (*Hordeum vulgare* L.) cultivars divergent in spike traits were crossed in all possible combinations excluding reciprocals to produce 10 F₁ and F₂ hybrids for analysis of combining abilities. The analysis of variance of combining abilities showed significant differences for GCA and SCA in F₁ hybrids and F₂ generation, suggesting additive and non-additive gene action. The GCA/SCA ratio in F₁ and F₂ indicated the prevalence of the additive component of genetic variance for spike length, grain weight per spike and spike harvest index. By contrast, the SCA variance for grain weight per spike was higher than the GCA variance, indicating the dominance of non-additive gene action. Good GCAs were found in parents having high values for spike length (Djerdap, NS-293), grain number per spike (Vada, Jagodinac), grain weight per spike (Vada, NS-293) and spike harvest index (Djerdap, Jagodinac). None of the parents had good GCA for all traits, suggesting a potential increase in combining abilities for spike traits. The best SCA were obtained mostly from crosses between parents having high x low, high x high or average x low GCA values. Parents having high GCA values may be used to produce improved lines in hybridisation programmes. Combinations with high SCA values may yield good segregating lines in further selection programmes.

Keywords: barley, combining abilities, gene effect, spike traits

Rezime

Pet sorti ozimog dvoredog ječma (*Hordeum vulgare* L.), divergentnih za dužinu klasa, broj i masu zrna po klasu i žetveni indeks klasa dialelno je ukršteno (isključujući recipročna) i dobijeno je deset F₁ i F₂ hibrida za analizu kombinacionih sposobnosti. Analizom varijanse kombinacionih sposobnosti utvrđene su signifikantne razlike za OKS i PKS kod F₁ hibrida i F₂ generacije što ukazuje da su analizirana svojstva uslovljena genima sa aditivnim i neaditivnim delovanjem. Odnos OKS/PKS u F₁ i F₂ ukazuje na preovladavanje aditivne komponente genetičke varijanse u determinaciji dužine klasa, mase zrna po klasu i žetvenog indeksa klasa, dok je za broj zrna po klasu varijansa PKS veća od varijansi OKS i ukazuje na preovladavanje neaditivnog delovanja gena. Roditelji koji su imali visoke vrednosti za dužinu klasa (Djerdap, NS-