AB159: Identification of faba bean (*Vicia faba* L.) genotypes and rhizobial strains for biological nitrogen fixation in under rainfed Mediterranean environments

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Faba bean (Vicia faba L.) is one of the major cool season legume crops cultivated in semi-arid environment worldwide and the process of biological nitrogen fixation (BNF) is helpful to fix atmospheric nitrogen. However, the efficiency of BNF in faba bean depends on the compatibility of rhizobium strain with host genotype, environments, and their interactions. This study was conducted at the International Center for Agricultural Research in the Dry Areas (ICARDA), Morocco to determine the best combination of genotype x rhizobium strain for BNF in faba bean under rain-fed conditions. Five small-seeded faba bean genotypes viz., Alfia-21, Alfia-25, Alfia-317, Alfia-321, and FLIP-305F, were used with two different faba bean rhizobial strains, FB-418 and FB-419. Genotypes inoculated with rhizobium strains showed the better nodulation at maximum flowering stage; when compared to genotypes which were not inoculated with any rhizobium strain (control). Among the genotypes, Alfia-25 and Alfia-21 inoculated with FB-419 individually produced the higher nodulation, as opposed to cultivar Alfia-317, Alfia-321 and FLIP-305F whose nodulation was higher with the mixture of strains (FB-418 + FB-419) compared to uninoculated (control). Across all the five genotypes when compared to single strain inoculation, the mixture of strains inoculation showed significantly the higher mean shoot dry weight and seed yield. However, the mixture of strains inoculation was not significantly different for the mean shoot dry weight and grain yield due to single strain inoculation with FB-419. The genotypes viz., Alfia-21, Alfia-317 and FLIP-305F inoculated with the mixture of strains had demonstrated the highest mean shoot dry weight and seed yield. However, Alfia-25 and Alfia-321 produced highest shoot dry weight and seed yield with FB-419 inoculation individually. Overall, the results from this study revealed that the two faba bean rhizobium strains, FB-418 and FB-419 demonstrated consistently better performance in terms of nodulation, shoot dry weight and seed yield among the five faba bean genotypes tested in this study. The mixture of strains inoculation is the best suited treatment to achieve high shoot dry weight and seed yield. It appears, the combination of rhizobium treatment is required to boost up the yields of faba bean cultivated under rainfed conditions.