

Performance of legume-based annual forage crops in three semi-arid Mediterranean environments

P. Annicchiarico,^{1,*} I. Thami Alami,² K. Abbas,³ L. Pecetti,¹ R. A. M. Melis,⁴ C. Porqueddu⁴

¹Council for Agricultural Research and Economics (CREA), Research Centre for Fodder Crops and Dairy

²Institut National de la Recherche Agronomique (INRA), Centre Régional de Rabat, Rabat, Morocco.

³Institut National de la Recherche Agronomique d'Algerie (INRAA), Agro-system East Division, Sétif,

⁴National Research Council (CNR), Institute for the Animal Production System in the Mediterranean En

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Abstract

Legume-based annual forages could be pivotal for the sustainable intensification of forage production in drought-prone Mediterranean cereal-livestock systems. This study aimed to optimise the composition of these crops for three climatically contrasting areas. Four legumes (field pea of semi-dwarf and tall type; Narbon vetch; common vetch) and two cereals (oat; triticale) were grown in three autumn-sown sites (Sassari, Italy; Sétif, Algeria; Marchouch, Morocco) for 2 years as pure stands and legume-cereal binary and four-component mixtures. We assessed dry matter yield, weed content and farmers' acceptability of the crops, and legume content and Land Equivalent Ratio of the mixtures. Legumes' competitive disadvantage ranged from very high in Sétif to nearly nil in Sassari. Pea- and common vetch-based mixtures outperformed Narbon vetch-based ones in terms of yield, legume content and farmers' acceptability. The tall pea, featuring greatest competitive ability against cereals, maximised the yield and legume content of legume-cereal crops. Vetch-cereal mixtures exhibited lower weed content than the average of the components' pure stands. Oat monoculture was top-yielding but modestly appreciated by farmers. Pea provided the only legume monoculture combining good yielding ability and high farmers' appreciation. Greater species diversity as provided by complex mixtures did not display any production advantage over binary mixtures.

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