



Novel technologies, strategies and crops to sustain forage production in future climate

Abstracts of the 35th Meeting of
the EUCARPIA Fodder Crops and
Amenity Grasses Section in cooperation with
the EUCARPIA Festulolium Working Group

Brno

10–14 September, 2023



Palacký
University
Press

Edited by David Kopecký, Ivana Frei, Tomáš Vymyslický

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- Agricultural Research Ltd. Troubsko, Czech Republic
- Institute of Experimental Botany ASCR, v.v.i., Olomouc, Czech Republic
- EUCARPIA Fodder Crops and Amenity Grasses Section
- EUCARPIA *Festulolium* Working Group



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Agronomical traits, seed color and protein content of protein pea (*Pisum sativum* L.) cultivars grown in European conditions

Ana Uhlarik¹, Marina Ćeran¹, Đorđe Krstić², Zlatica Mamlić¹, Snežana Katanski¹, Sanja Vasiljević¹, Anja Dolapčev Rakić¹

¹Institute of Field and Vegetable Crops, Novi Sad, National Institute of the Republic of Serbia

²University of Novi Sad, Faculty of Agriculture, Serbia

Protein pea (*Pisum sativum* L.) is a protein-rich legume (up to 33% of seed protein). Using pea in the human and animal diet provides one of the best solutions for the long-term lack of plant-based protein. Although soybean is one of the primary plant protein sources, the advantage of growing pea is their wider geographical area and colder climates adaptability.

The objective of this study was to determine the impact of different agro-ecological conditions in 64 protein pea cultivars on seed protein content and agronomical traits related to seed yield. A two-year trial on two European sites (Serbia and Belgium) was done using an augmented block design. The average temperatures and total precipitation amount during the vegetative period (March-August) in Serbia trials were 18.4 °C and 381.4 mm for 2019 and 18.1 °C and 488.9 mm for 2020, and in Belgium trials 14.9 °C and 268.9 mm for 2019 and 14.7 °C and 184.6 mm for 2020. Agronomical traits (flowering duration FD, plant seed yield PSY, thousand seed weight TSW, and seed per pod SPP) were determined using ten plant samples, while seed protein content (SPC) was determined using near-infrared spectroscopy (Table 1). Statistically significant differences between localities were determined by T-test, and Pearson's correlation coefficients were determined between traits. Multivariate analysis was performed based on the examination of mean values of traits for both localities, in order to investigate the population structure of 64 pea genotypes differing in color and seed type. Significant positive correlation was observed between TSW and PSY (0.60), and between SPP and SPC (0.25). A significant negative correlation was determined between SPC and TSW (-0.66) and between SPC and PSY (-0.41). The results of multivariate analysis based on seed color show the separation of pigmented seeds from mixed non-pigmented seeds by the first axis (35.9%) and yellow non-pigmented seeds by the second axis (17.9%), with no clear grouping in relation to seed type (smooth, wrinkled, dimpled).

The similar values of the main agronomic traits that affect the yield confirm the great ability of protein pea to adapt to different agroecological conditions.

Table 1: Pea agronomic traits in two trials

	Serbian trial			Belgian trial		
	Mean	Min	Max	Mean	Min	Max
FD **	22.3	14.6	27.5	14.9	11.4	18.8
PSY **	8.4	4.2	11.6	6.3	4.1	9.7
TSW	182.6	57.5	256.4	185.3	109.2	288.4
SPC	27.3	25.0	29.8	27.4	25.1	30.2
SPP	4.4	3.7	5.4	3.8	2.5	5.2

$p \leq 0,01$ (**)

FD-flowering duration (days); PSY- plant seed yield (g); TSW- thousand seed weight (g); SPC-seed protein content (%), SPP- seed per pod (#)

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The Book of Abstracts of the 35th International Conference of the Fodder Crops and Amenity Grasses Section of EUCARPIA 'Novel technologies, strategies and crops to sustain forage production in future climate' summarizes the latest findings in breeding, ecology, physiology and genetics of forage grasses, clovers and amenity grass species. The book contains over sixty contributions from authors from Europe, America, Australia and New Zealand. We are living in a time of increased climate change, with more frequent occurrences of severe climate catastrophic events, as well as less visible minor climate changes, both of them leading to reduced sustainability of crop, and downstream livestock production. The central theme of the conference is therefore the timely topic of adaptation to climate change. This includes ecological adaptations of plants, but also modifications of breeding approaches, as well as the introduction of new technologies and strategies to successfully combat climate change. The aim of the conference and of the papers summarized in this book of abstracts is therefore to provide the latest information regarding research and breeding of forage and amenity grasses for future climatic conditions.

