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**Camelina a New Multipurpose Oilseed Crop For Improving Farm
Diversification Across Europe**

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Introduction

European agricultural systems mostly rely on few staple crops, and this poor diversification led to undisputable problems, mainly linked to weed and disease pressure, loss of biodiversity and high risks of failure for farmers in view of climate change. In this scenario, the new oilseed crop camelina [*Camelina sativa* (L.) Crantz] can play a role, since it is characterized by wide environmental adaptability and high resistance against biotic and abiotic stresses. **Aiming at defining the most suitable genotype and sowing date in the Mediterranean and Balkan region a common trial has been established in autumn 2020 comparing four camelina genotypes across three experimental sites in Italy, Serbia and Spain.**



Fig. 1A. View of the camelina trial in Bologna in early sowing. Fig. 1B View of the camelina trial in Bologna in late sowing (photo taken May 19, 2021, by B. Alberghini – UNIBO).

Materials and Methods

Four commercial camelina genotypes (1 winter + 3 spring) were grown at the three test locations (Bologna – Italy, Lleida – Spain, Novi Sad – Serbia) comparing 2 different sowing date (early vs. late). The tested camelina varieties were as follow, for the spring genotypes: **Alba** (supplied by Camelina Company Spain), **Calena** (supplied by Saatbau, Austria), **Sonny** (supplied by KWS, Germany), for the winter genotype: **Joelle** (supplied by USDA-ARS, USA). At all the locations similar seeding rate, row distance, plot size, and experimental design were adopted in order to collect data easy to compare among locations. Two sowing dates were established in Italy and Spain, corresponding to 22/10/2020 and 02/03/2021 in Italy (Fig. 1), and 19/11/2020 and 29/01/2021 in Spain. In Serbia due to adverse meteorological conditions during autumn only late sowing was performed on the 04/03/2021.

Results

✓ The three test locations confirmed to be very different in terms of meteorological conditions (Table 1), but all the camelina genotypes adapted well and were able to reach maturity. As expected Spain had the shortest and driest growing season, in autumn sowing, while Italy had almost half the precipitation of Serbia despite a similar cycle length in spring sowing. Joelle (winter type) was characterized by a longer growing cycle in particular in the late sowing.

SD	Precipitation (mm)		GDD*		Cycle length (d)	
	Early	Late	Early	Late	Early	Late
Italy	297	98	1441	1144	237	112
Serbia	-	172	-	1142	-	119
Spain	158	-	1011	-	179	-

Table 1. Cumulative precipitation, GDD, and cycle length from sowing to harvest in the early and late sowing at each test location. *Base temp for GDD calculation = 4°C.

✓ Emergence rate was the lowest in Italy, intermediate in Serbia and the highest in Spain reporting 29%, 56% and 68% ($P \leq 0.05$), respectively. In Italy emergence rate was affected by the interaction “cultivar x sowing date”, with Calena showing remarkably lower emergence in the late sowing than in the early one (5 vs. 26%, respectively).

✓ Unfortunately in Spain, due to bird predation, the late sowing date was not harvested. So only comparisons between early sowing in Spain and Italy (Fig. 2a), and late sowing (Fig. 2B) between Serbia and Italy were possible.

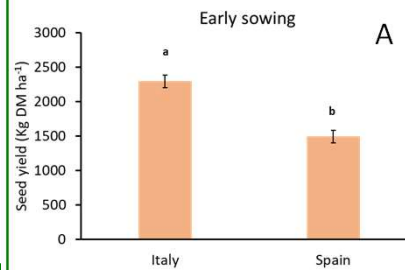
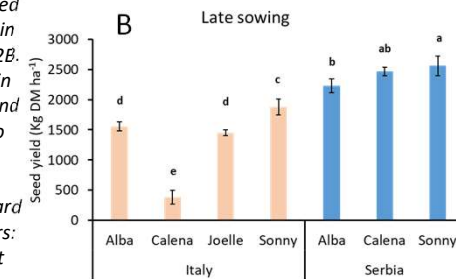


Fig. 2A. Camelina seed yield in early sowing in Italy and Spain. Fig. 2B. Camelina seed yield in late sowing in Italy and Serbia, in response to “country x cultivar” interaction.



Vertical bars : standard error. Different letters: significantly different means for $P \leq 0.05$.

Conclusions

The present study gave preliminary results on the wide environmental suitability of camelina. Early sowing appeared the best option for the semi-arid climate of Lleida (Spain), but seed yield was higher in Italy than in Spain. Otherwise in late sowing Serbia seemed more suitable to camelina growth than northern Italy, presumably in relation to higher precipitation availability. The spring cultivar Sonny seemed a promising genotype in late sowing, while Calena was highly performing in early one.

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