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COMPARATIVE EVALUATION OF MAIZE HYBRIDS UNDER IRRIGATION IN THE GREAT ISLAND OF BRAILA

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Abstract: This study presents preliminary results regarding the performance of maize hybrids cultivated under irrigated conditions in the Great Island of Brăila, Romania. The research aimed to identify high-performing hybrids suitable for inclusion in doctoral studies focused on optimizing maize production through differentiated irrigation methods. Data were obtained from demonstrative trials conducted at SCDA Brăila during 2024–2025 under uniform technological conditions. Significant variability in grain yield was observed among hybrids, with productions ranging from 5.9 to 12.37 t/ha in 2025 and exceeding 14 t/ha in 2024 for top-performing hybrids. Quality indicators, including thousand kernel weight and hectoliter mass, were also evaluated. The results provide a scientific basis for hybrid selection and future irrigation optimization studies under the pedoclimatic conditions of the Great Island of Brăila.

• Introduction

Maize (*Zea mays* L.) is one of the most important crops in Romania, with productivity increasingly influenced by climate change and water availability. The Great Island of Brăila is a major agricultural area characterized by fertile soils and irrigation infrastructure, but also by increasing climatic variability affecting crop performance. Under these conditions, hybrid selection and efficient water use become essential for achieving stable yields. Genetic differences among maize hybrids lead to significant variability in production and adaptability under irrigated conditions. The demonstrative trials conducted at SCDA Brăila during 2024–2025 highlighted important differences in both yield and quality parameters among hybrids. The aim of this study was the comparative evaluation of maize hybrids cultivated under irrigated conditions in the Great Island of Brăila in order to identify stable and high-performing genotypes suitable for further research on irrigation optimization.

• Material and method

The research was carried out at the Agricultural Research and Development Station Brăila (SCDA Brăila), under the specific pedoclimatic conditions of the Great Island of Brăila, during 2024 and 2025. The study was conducted within demonstrative plots with maize hybrids cultivated under irrigated conditions, in an agricultural area characterized by high productive potential and irrigation infrastructure. The biological material consisted of maize hybrids from different breeders and seed suppliers included annually in the demonstrative trials. A total of 47 hybrids were evaluated in 2024 and 52 hybrids in 2025 under similar technological conditions. The applied crop technology included soil preparation, sowing, fertilization, weed control, phytosanitary treatments, and irrigation management specific to maize cultivation in the study area. The evaluated parameters included grain yield (kg/ha at standard moisture of 14%), grain moisture at harvest, hectoliter mass (HM, kg/hl), and thousand kernel weight (TKW, g). The obtained data were comparatively processed using descriptive statistical indicators (mean values, minimum and maximum values, and variation range) in order to identify high-performing and stable hybrids suitable for further research regarding irrigation optimization.

• Results and discussions

The results obtained in the demonstrative trials conducted at SCDA Brăila during 2024 and 2025 highlighted a high variability in maize production under irrigated conditions, mainly determined by the genetic characteristics of the evaluated hybrids. In 2025, grain yield ranged between 5987 and 12370 kg/ha, with an experimental average of 9054 kg/ha. The hybrids GIRO, IZZLI and DKC 4655 exceeded the average by 28–34%, demonstrating high productive potential under the pedoclimatic conditions of the Great Island of Brăila. These results confirm the major influence of hybrid selection on maize productivity under irrigation conditions.

In 2024, yields varied between 7450 and 14074 kg/ha, with an average of 10289 kg/ha. The higher average production compared to 2025 (+1235 kg/ha) suggests more favorable climatic conditions during the 2024 growing season. The EW4836 hybrid recorded the highest yield, exceeding 14 t/ha under optimal water supply conditions. The comparative analysis identified several hybrids with stable performance in both years, including GIRO, DKC 4109, DKC 4728, FORTURIO and KXC 2454, indicating good adaptability to local conditions. At the same time, differences observed between years emphasize the interaction between genetic factors and climatic variability. Quality indicators, such as thousand kernel weight (TKW) and hectoliter mass (HM), also varied among hybrids, highlighting differences in grain quality and the necessity of an integrated evaluation of hybrid performance. Overall, the obtained results confirm that hybrid choice is a key factor for achieving stable and high maize yields under irrigated conditions and provide a scientific basis for further studies on irrigation optimization.

Table 1. Results obtained in 2025 (irrigation conditions, SCDA Brăila)

No	Hybrid	Production	% compared with average	HM (kg/hl)	TGM (g)	U%
1	GIRO	12370	134	68.6	284.7	14.2
2	IZZLI	12059	131	71.7	281.8	13.7
3	DKC 4655	11820	128	66.6	224.9	13.2
4	ADONISIO	11358	123	71.7	274.7	13.7
5	DKC 4533	11235	122	69.7	244.7	13.0
6	5330C	11229	122	73.0	291.3	13.5
7	FORTURIO	10895	118	69.9	271.9	13.5
8	KXC 2454	10758	116	69.2	264.8	13.6
9	KASHMIR	10394	112	67.6	260.3	13.7
10	LDZ23414	10143	110	73.1	275.6	13.0

Table 2. Results obtained in 2024 (irrigation conditions, SCDA Brăila)

No	Hybrid	Production	% compared with average	HM (kg/hl)	TGM (g)	U%
1	EW4836	14074	137	66.4	252.83	13.1
2	DKC5110	13183	128	69.1	264.41	13.0
3	DKC4897	12546	122	69.3	274.26	13.2
4	BANATO	12517	122	70.2	263.61	13.0
5	DKC4728	12505	121	71.7	220.52	12.8
6	DONJUAN	12450	121	70.4	271.46	13.3
7	DKC5404	12003	117	70.8	251.87	13.2
8	P9911	11919	116	72.7	356.72	17.7
9	P0260	11631	113	73.6	301.51	17.2
10	DKC5911	11566	112	72.0	247.37	14.3

• Conclusions

- The results obtained in 2024–2025 highlighted significant variability in maize yield under irrigated conditions, confirming the major influence of hybrid selection and climatic conditions on crop performance.
 - Several hybrids demonstrated superior productivity and stability across years, providing a scientific basis for further irrigation optimization studies in the Great Island of Brăila.

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