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New Maize Hybrids Turda 350 and Turda 59: Breeding, Characterization and Agronomic Performance

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ABSTRACT

Maize breeding plays an essential role in developing high-yielding and stable hybrids adapted to diverse agroecological conditions and increasing environmental stresses. In this context, the maize breeding program of the Agricultural Research and Development Station (ARDS) Turda aims to develop hybrids combining high yield potential with good ecological adaptability, stress tolerance, and efficient use of technological factors. As a result of this breeding program, two new maize hybrids, Turda 350 and Turda 59, were registered in 2025, both belonging to the FAO 360 maturity group. The two hybrids distinguished themselves by their high yield potential, improved agronomic traits, and superior ability to capitalize on technological factors. The two hybrids were tested in the State Institute for Testing and Registration of Varieties (SITRV) network, at nine testing centers as well as under five different ecological conditions within the network of the Academy of Agricultural and Forestry Sciences (AAFS) at Turda, Târgu Mureș, Secuieni, Livada and Lovrin. The trials were conducted under non-irrigated conditions between 2021 and 2023. During the testing period, the hybrids were designated HST 148 and SUR 18/399, respectively.

Turda 350 and Turda 59 are characterized by tall plants with semi-erect leaves, long cylindrical cobs, dent grains, normal yellow in color, with 18-22 rows of grains, while thousand-kernel weight (TKW) ranges from 260 to 280 g , the shelling percentage between 83-85%. Also, the new creations have a good ecological plasticity, very good resistance to low temperatures in the first part of the vegetation period, resistance to falling, very good tolerance to drought, heat and hardening of the grains. Both genotypes were distinguished by a yield potential of over 13.000 kg/ha. Seed production can be carried out using an improved seed-production formula that eliminates the need for manual detasseling in hybridization plots.

Based on their agronomic performance and ecological adaptability, the hybrids Turda 350 and Turda 59 are recommended for cultivation in the Transylvanian Plain, the neighboring plateaus, the meadows of the Mureș, Someș and Târnave rivers, central and north-eastern Moldova, as well as in the hilly areas of western Romania. The highest production results were obtained at a plant density of 70,000 plants/ha.

Keywords: breeding, hybrid, new maize, high quality, best production.

INTRODUCTION

Maize is a cereal with a high production capacity, but also with a wide distribution area, being cultivated in various environmental conditions. Moreover, it has a high tolerance to drought, heavy rains, but also to diseases and pests, and agrotechnical and harvesting works can be fully mechanized (Haș et al., 2018).

Because maize is of great economic importance, maize breeding programs have been developed in the major maize-growing areas of the world, in North America and Europe, resulting in significant genetic advances in productivity, as well as other important agronomic and physiological traits. In the context of current climate change, emphasis is placed on significantly improving the adaptive capacity of maize to biotic and abiotic stress conditions (Horhocea et al., 2019).

According to FAOSTAT data, worldwide, during 2021-2023, maize ranks second in both area and production. In Romania, in 2021, corn ranked first in terms of production, being overtaken in the next two by wheat, due to unfavorable conditions in the south and Moldova.

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Maize hybrids represent an important contribution of genetics to plant breeding for applied purposes. The main factor of progress in maize cultivation is the expansion in production of earlier, more productive hybrids, more resistant to stem falling and breaking at maturity, which possess ecological plasticity (Varga et al., 2022). The maize hybrids created at SCDA Turda are also characterized by their resistance to low temperatures in the first part of the vegetation period (their frequency in the Transylvanian Plateau being quite high).

The diversity of pedoclimatic conditions in the northern half of the country makes it necessary to cultivate a wider range of hybrids, from very early ones to the group of semi-early hybrids. The dynamics of the integration processes in the European seed market oblige local breeders to respond to intensive cultivation conditions, but at the same time to take into account the socio-economic conditions of farmers in this part of the country (Haş, 2003). The creation of corn hybrids adapted to the specific conditions of Transylvania raises some particular problems determined by the deficient thermal regime, the relatively shorter frost-free interval, the climatic diversity, the rugged relief and the soils often with different particularities even from one field to another. As a result of these specific conditions of the area, the major share (over 50%) of the maize breeding activity at ARDS Turda Turda is the creation of early (FAO 240-300) and mid-early (FAO 300-380) hybrids (Căbulea and Grecu, 1982; Căbulea et al., 1999; Haş and Grecu, 2007).

As a result of climate change, the objectives of the maize breeding program at ARDS Turda have also changed (Haș et al., 2017), requiring the need to exceed production levels, adapt the vegetation period, and find more efficient hybridization formulas, which required the adoption of new guidelines:

- promoting as starting materials, in the creation of inbred lines, genotypes with a longer vegetation period (Haș et al., 1999);
- the share of new mid-early hybrids (FAO 350-380), with superior production capacity (Haș et al., 2014) increased to over 60%.

The vegetation period of promising hybrids, tested in the SITRV network (State Institute for Variety Testing and Registration), as well as those recently registered, reflects the trend of recent years in the creation of maize hybrids, promoting mid-early genotypes from the FAO 300-400 group (Haș et al., 2021).

Within this breeding strategy, two new mid-early maize hybrids, Turda 350 and Turda 59, belonging to the FAO 360 maturity group, were developed at ARDS Turda and registered in 2025. The aim of the present study was to characterize these new hybrids in terms of yield potential, agronomic and technological traits, ecological adaptability, stress tolerance, and seed production characteristics, based on their performance in multi-location trials conducted under contrasting environmental conditions.

MATERIAL AND METHODS

The portfolio of maize hybrids developed at ARDS Turda has recently been enriched with two new creations, Turda 350 and Turda 59, registered in 2025 as single-cross hybrids belonging to the FAO 360 maturity group. The new creations can be produced based on an improved formula, eliminating the need for castration in hybridization batches. The new hybrids showed higher yield potential than the previously released Turda hybrids, together with favorable quality traits and an improved capacity to respond to crop management practices

The parental material used in the development of the single-cross hybrid Turda 350 consisted of a female inbred line belonging to the IODENT + B73 germplasm group and a male parental line derived from a commercial hybrid belonging to the IODENT germplasm group.

The parental forms of Turda 59 were derived from two distinct sources. The female parental form was obtained through selection from a commercial hybrid, where as the male parental form was developed through selection from the Tu SRR Comp. B composite population.

Table 1. The origin of the parental forms of Turda 350 and Turda 59 hybrids

Hybrid	Parental form	Origin of the material	Germplasm group
Turda 350	LC - A	Commercial hybrid	Iodent + B 73
	LC - B	Commercial hybrid	Iodent + Oh. 43
Turda 59	LC - A	Commercial hybrid	Iodent + B 73
	LC - B	Selection Tu SRR Comp. B	Oh 43+Mo 17+C103

*LC-inbred line

The two hybrids were experimented in the SITRV network in nine variety testing centers. Thus, the Turda 350 hybrid was tested under the name HST 148, during the period 2021-2023, and the Turda 59 hybrid was experimented under the name SUR 18/399, during the period 2019-2020. The two hybrids were also experimented under non-irrigation conditions, during the period 2021-2023, in the ecological conditions of the stations in the AAFS network: ARDS Turda, ARDS Secuieni, ARDS Livada, ARDS Lovrin and CBRDS Târgu Mureș.

The hybrids were tested in comparative cultures, in accordance with the experimental protocols of AAFS and SITRV, in three repetitions and two rows/plot. Each variant was sown at a density of 70,000 plants/ha, in two rows of 8.7 m length and 0.7 m between rows, respectively, 12.2 m^2 harvestable area.

At harvest, the following determinations were made: production capacity, grain moisture at harvest, sensitivity to breakage and falling, production elements: mass of 1000 grains, hectoliter mass, yield, sensitivity of plants and cobs to *Ostrinia nubilalis* attack. During the vegetation period, observations were made according to the requirements of the UPOV system.

RESULTS AND DISCUSSION

The climatic conditions recorded during the 2021–2023 experimental period differed considerably among years and had a marked influence on maize growth and yield formation. The year 2021 was characterized by generally favorable conditions for maize cultivation, both in the Turda area and in other maize-growing regions of Romania. Relatively high temperatures combined with adequate precipitation during the critical pollination period provided favorable conditions for grain formation and contributed to high yields. The year 2022 began with a shortage of soil water and although precipitation was recorded during the sowing period, it was insufficient. The drought in June, July and August compromised the maize crop in many areas. In all three months, maximum temperatures were recorded above 35ºC. The climatic conditions in 2023 were characterized by relatively abundant summer precipitation; however, periods of very high temperatures occurred during the growing season. The combination of high temperatures and fluctuations in water availability adversely affected maize growth and yield formation, despite the occurrence of substantial rainfall during the summer months.

The first hybrid studied is Turda 350, which is characterized as a simple, semi-early hybrid from the FAO 360 group, with tall plant height and semi-erect leaf habit. The ear is cylindrical in form, long, the grain type is dentate, normal yellow in color, with 18-22 rows of grains, the MMB is between 260-280 g, the yield is between 83-85% and the rachis is red. The hybrid is distinguished by good ecological plasticity, good resistance to low temperatures in the first part of the growing season, resistance to lodging, very good tolerance to drought, heat and grain cracking. The best production results were obtained at a density of 70,000 plants/ha.

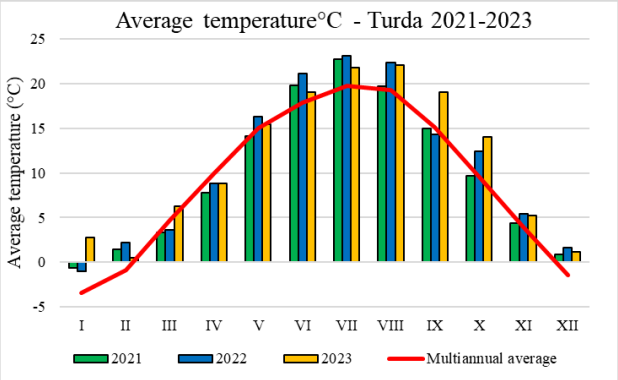


Figure 1. Thermal regime during hybrid testing

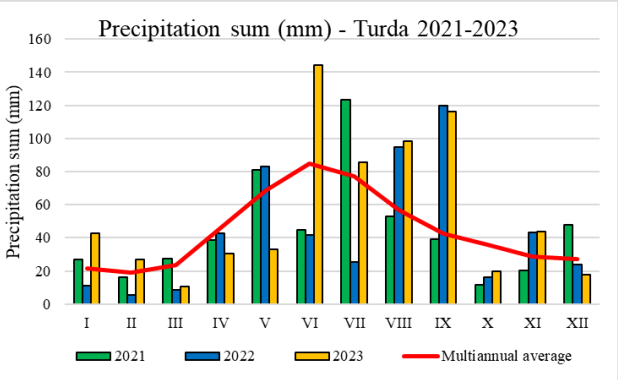


Figure 2. Rainfall regime during the hybrid testing period





Photo 1. Turda 350 Hybrid (Original)

The production data and grain moisture at harvest obtained from the Turda 350 hybrid and the Turda 332 control hybrid, during the period 2021-2023, in the. SITRV network, in 9 testing centers in the country, are presented in Table 2.

In the 3 experimental years, in the 9 localities, the Turda 350 hybrid recorded an average production of 9,561 kg/ha, thus exceeding the Turda 332 control by 15%. The new hybrid exceeded the production of the control in all 3 experimental years. In the localities of Inand and Târgovişte, due to unfavorable climatic conditions, the hybrid recorded the lowest productions in all 3 experimental years. In the other 7 localities, productions ranged between 8,409 kg/ha (Negreşti) and 13,449 kg/ha (Rădăuţi). High average yields were also recorded in Dej (12,514 kg/ha) and Luduş (11,531 kg/ha). The maximum production potential was recorded in Dej in 2023, 16,848 kg/ha (Table 2).

In the network of research stations within AAFS, during the period 2021-2023, the Turda 350 hybrid recorded an average production of 7741 kg/ha. The highest productions achieved by the Turda 350 hybrid were achieved in 2021 at CBRDS Târgu Mureş (14,571 kg/ha), recording an average production in the three experimental years of over 11,000 kg/ha.

The average grain moisture at harvest was 21.3%. The crushing resistance of the plants at harvest of the Turda 350 hybrid was better compared to the average of the two controls (Table 3).

Table 2. Grain yield (kg/ha) and grain moisture at harvest of Turda 350 hybrid and control hybrids at the SITRV, 2021-2023

Locality/ hybrid	Târgoviște	Șimleul Silvaniei	Sibiu	Satu Mare	Rădăuți	Negrești	Luduș	Inand	Dej	Average	%mt
2021											
Turda 350 Grain yield (kg/ha)	5386	9581	11748	10667	12635	8042	11006	4057	11116	9359	106
moisture (%)	16.3	27.4	28.3	23.5	31.6	25.8	24.1	23.1	23.6	24.9	115
Turda 332 mt Grain yield (kg/ha)	4957	9506	11778	10634	13412	7415	8424	3372	10537	8892	100
moisture (%)	17.1	23.5	24.3	17.5	24.5	23.3	22.3	18.6	23.2	21.6	100
2022											
Turda 350 Grain yield (kg/ha)	4998	7750	8320	8964	13604	8988	9233	2833	9579	8252	117
moisture (%)	16.2	26.6	25.3	20.4	23.6	22.1	22	18.1	22.8	22	116
Turda 332 mt Grain yield (kg/ha)	4422	8359	6065	8925	10339	8217	8093	2003	7153	7064	100
moisture (%)	15.5	21.3	21	17.5	22.2	18.1	18.3	19.3	19.8	19	100
2023											
Turda 350 Grain yield (kg/ha)	7390	8204	10079	11044	14109	8198	14354	9416	16848	11071	105
moisture (%)	15.6	26.3	25.4	18.4	21.6	17.9	18.2	16.5	16.5	20	111
Turda 332 mt Grain yield (kg/ha)	7475	9603	8420	11172	12033	9058	11842	8501	16356	10496	100
moisture (%)	16.1	26.4	24.4	18	21.6	15.9	15.8	14.3	13.3	18	100
Average - 3 years											
Turda 350 Grain yield (kg/ha)	5925	8512	10049	10225	13449	8409	11531	5435	12514	9561	115
moisture (%)	16	26.8	26.3	20.8	25.6	21.9	21.4	19.2	21	22.3	114
Turda 332 mt Grain yield (kg/ha)	5618	9156	8754	10244	11928	8230	9453	4625	11349	8817	100
moisture (%)	16.2	23.7	23.2	17.7	22.8	19.1	18.8	17.4	18.8	19.5	100

Table 3. Grain yield (kg/ha) and some characteristics of te Turda 350 hybrd and the control hybrids, in the AAFS network, 2021-2023

Locality/ hybrid	Grain Yield (U = 14%) (kg/ha)						Grain moisture at harvest (%)	Plants broken at harvest (%)	Relative selection index (%/mt)
	Turda	Târgu Mureș	Secuieni	Livada	Lovrin	Average			
2021									
Turda 350	9953	14571	11104	9131	9279	10807	22.6	1.5	97
Turda 332 (mt)	10906	14254	12348	9734	4873	10203	20.6	2.0	100
Turda 344 (mt)	10905	12343	10183	9592	6894				
Mean	10588	13723	11212	9486	7015	10405	21.6	1.8	90
LSD 5%	*2548*	*1352*	*1887*	*1482*	*2322*	-	-	-	-
2022									
Turda 350	6482	7337	5437	6062	1865	5437	19.0	1.0	97
Turda 332 (mt)	6002	5567	4734	5607	1766	5244	17.4	1.5	100
Turda 335 (mt)	6722	6270	5753	8119	1900				
Mean	6402	6391	5308	6596	1844	5308	18.2	1.3	93
LSD 5%	*703*	*714*	*642*	*1655*	*1038*	-	-	-	-
2023									
Turda 350	6766	12245	4891	5160	5838	6980	22.4	1.0	62
Turda 335 (mt)	7505	15766	8395	10213	10407	9817	20.5	1.5	100
Turda 380 (mt)	7756	15452	7888	7313	7472				
Mean	7342	14488	7058	7562	7906	8871	21.5	1.3	104
LSD 5%	*1213*	*1571*	*642*	*3107*	*1865*	-	-	-	-

Average/3 years									
Turda 350	7734	11384	7144	6784	5661	7741	21.3	1.2	85
Mean of control	8299	11609	8217	8430	5552	8421	19.5	1.7	100
Mean	8017	11497	7681	7607	5607	8081	20.4	1.5	93
LSD 5% = 1266 for hybrids									

Along with the Turda 350 hybrid, the creations from SCDA Turda include another achievement, the Turda 59 hybrid, registered in 2025, a simple semi-early hybrid, belonging to the FAO 360 group. The new creation can be produced based on an improved formula, eliminating the need for castration in hybridization batches. The hybrid stood out for its superior production potential over the "Turda" hybrids in cultivation, its superior qualitative characteristics, as well as its superior capacity to capitalize on technological factors.

Turda 59 hybrid is a hybrid with a tall plant height, semi-erect leaf habit. The spike is cylindrical in shape, long, the grain type is dentate, normal yellow in color, 18-22 rows of grains, the MMB is between 260-280 g, the yield is between 83-85% and the rachis is pink.

The hybrid stands out for its good ecological plasticity, very good resistance to low temperatures in the first part of the growing season, very good resistance to falling, and very good tolerance to drought and heat.



Photo 2. Turda 59 hybrids (Original)

The Turda 59 hybrid was evaluated within the State Institute for Testing and Registration of Varieties (SITRV) network during 2021-2023. Over the three experimental years, the hybrid was tested at nine localitons (Table 4), where it achieved an average yield of 9,601 kg ha^{-1}, exceeding the average yield of the Turda 332 control (8,817 kg ha^{-1}) by 784 kg ha^{-1}. Turda 59 exceeded the control yield in each of the three experimental years. The highest productions were recorded the VTC Dej locality, with an average in the 3 experimental years of 13,683 kg ha^{-1}, the maximum production potential of 18,380 kg/ha was obtained in 2023 at VTC Dej. High yields were also recorded at the Luduş (13,433 kg ha^{-1}) in 2023. At Rădăuţi, in all 3 experimental years, yields exceeded 12,000 kg ha^{-1}. The lowest three-year average yields were recorded at Inand (5,064 kg ha^{-1}) and Târgovişte (5,973 kg ha^{-1}), reflecting the differences in environmental conditions among the testing locations.

Table 4. Grain yield (kg ha^{-1}) and grain moisture at harvest of Turda 5 hybrid and control hybrids at the SITRV, 2021-2023

Locality/ hybrid	Grain yield/ moisture	Târgoviște	Șimleul Silvaniei	Sibiu	Satu Mare	Rădăuți	Negrești	Luduș	Inand	Dej	Average	%/ mt
2021												
Turda 59	Grain yield (kg ha^{-1})	4331	9836	11681	10317	12184	7851	11441	4023	11309	9219	104
	Moisture (%)	15.2	26.2	25.5	21.7	26.9	24.7	25.6	23.5	24.7	23.8	110
Turda 332 mt	Grain yield (kg ha^{-1})	4957	9506	11778	10634	13412	7415	8424	3372	10537	8892	100
	Moisture (%)	17.1	23.5	24.3	17.5	24.5	23.3	22.3	18.6	23.2	21.6	100
2022												
Turda 59	Grain yield (kg ha^{-1})	5064	8570	7629	9195	12854	8006	9898	2295	11361	8319	118
	Moisture (%)	19.5	15.9	21.5	22.1	22.7	19.5	23.2	24	16.1	21	100
Turda 332 mt	Grain yield (kg ha^{-1})	4422	8359	6065	8925	10339	8217	8093	2003	7153	7064	100
	Moisture (%)	16.1	24	23.2	19.5	22.7	22.1	18.3	19.3	19.5	21	100
2023												
Turda 59	Grain yield (kg ha^{-1})	8525	8492	10609	11873	12877	8318	13433	8874	18380	11265	107
	Moisture (%)	14.9	22.5	22.2	19.5	18.1	16.7	18.2	16.5	16.2	18	100
Turda 332 mt	Grain yield (kg ha^{-1})	7475	9603	8420	11172	12033	9058	11842	8501	16356	10496	100
	Moisture (%)	16.1	26.4	24.4	18	21.6	15.9	15.8	14.3	13.3	18	100
Average - 3 years												
Turda 59	Grain yield (kg ha^{-1})	5973	8966	9973	10461	12638	8058	11591	5064	13683	9601	108
	Moisture (%)	16.5	21.5	23.1	21.1	22.6	20.3	22.3	21.3	19	20.9	107
Turda 332 mt	Grain yield (kg ha^{-1})	5618	9156	8754	10244	11928	8230	9453	4625	11349	8817	100
	Moisture (%)	16.4	24.6	23.6	18.3	22.9	20.4	18.8	17.4	18.8	19.5	100

The data in Table 5, from AAFS, highlighted the fact that the grain yields of the Turda 59 hybrid were influenced both by the environmental conditions of the 3 experimental years and by the experimental localities. Thus, the Turda 59 hybrid obtained an average yield of 9,344 kg ha^{-1}, exceeding the 2 controls Turda 322 and Turda 344 (8,882 kg ha^{-1}). The highest average yield achieved by Turda 59 was recorded in Târgu Mureș (13,367 kg ha^{-1}), and the lowest yields were obtained in the localities of Lovrin (6,978 kg ha^{-1}) and Secuieni (7,337 kg ha^{-1}).

The average grain moisture at harvest of the Turda 59 hybrid was 21.4%, the breaking strength of the plants at harvest was weaker compared to the average of the other 2 hybrids.

Table 5. Grain yield (kg ha^{-1}) and some characteristics of te Turda 59 hybrd and the control hybrids, in the AAFS network, 2021-2023

Locality/ hybrid	Grain yield (U = 14%) (kg ha^{-1})						Grain moisture at harvest (%)	Plants broken at harvest (%)	Relative selection index (%/mt)
	Turda	Târgu Mureș	Secuieni	Livada	Lovrin	Media			
2021									
Turda 59	11411	16576	11765	10027	10735	12103	22.2	3.8	107
Turda 332 (mt)	10906	14254	12348	9734	4873	10195	20.6	4.8	100
Turda 344 (mt)	10905	12343	10103	9592	6894				
Average	11074	14391	11405	9784	7501	10831	21.4	4.3	90
LSD 5%	*2548*	*1352*	*1887*	*1482*	*2322*	-	-	-	-
2022									
Turda 59	7224	7025	6020	7963	1868	6020	20.2	3.2	107
Turda 332 (mt)	6002	5567	4736	5607	1766	5245	17.5	4.9	100
Turda 335 (mt)	6722	6270	5753	8119	1900				
Average	6649	6287	5503	7230	1845	5503	18.9	4.1	93
LSD 5%	*703*	*714*	*475*	*1655*	*1038*	-	-	-	-
2023									
Turda 59	8159	16789	6330	9351	8918	9909	21.8	14.5	92
Turda 335 (mt)	7505	15766	8395	10213	10407	9817	20.5	6.5	100
Turda 380 (mt)	7756	15452	7888	7313	7472				
Average	7807	16002	7538	9024	8932	9861	21.2	10.5	104
LSD 5%	*1213*	*1571*	*642*	*3107*	*1865*	-	-	-	-

Average/3 years									
Turda 59	8865	13367	7337	9055	6978	9344	21.4	7.4	102
Mean of control	8539	9493	7179	8179	5842	8419	19.5	5.4	100
Average	8702	11430	7258	8617	6410	8882	20.5	6.4	101
LSD 5% = 1266 for hibrids									

The Turda 59 hybrid was distinguished by a very fast rate of grain water loss of 0.98%/day, followed by the Turda 350 hybrid, with a moisture loss of 0.57%/day, and Turda 344, which lost 0.51%/day of grain water in the same period. Based on the data obtained, the following hybrids can be recommended as hybrids that lose water from grains quickly: Turda 59, Turda 350 and Turda 344 (Table 6).

Table 6. Dynamics of grain moisture loss in "Turda" maize hybrids, 2022

Hybrid	Stage I 23.08	Stage II 30.08		Stage III 06.09		Stage IV 13.09		Sum of the differences IV-I	Rate of water loss U% /day
	U%	U%	Dif. II-I	U%	Dif. III-II	U%	Dif. IV-III		
Turda 332	37,4	29,0	-8,4	27,5	-1,5	24,9	-2,6	-12,5	0,37
Turda 344	33,3	27,2	-6,1	25,9	-1,3	22,1	-3,8	-11,2	0,51
Turda 350	40,7	33,2	-7,5	31,1	-2,1	28,1	-3,0	-12,6	0,57
Turda 59	49,0	32,7	-16,3	31,1	-1,6	27,4	-3,7	-21,6	0,98
Average	40.1	30,5	-9,6	28.9	-1.6	25.6	-3.3	-14,5	0.60

Table 7. Some yield characters of the hybrids Turda 350 and Turda 59 and the two control hybrids at ARDS Turda, 2021-2023

Hybrids	Yield (%)	Mass of 1000 grains (MMB) (g)	Hectoliter mass (g/cm^3)	Cob weight (g)	Grain weight (g)
Turda 350	85	280	61,4	240	200
Turda 59	85	280	61,2	191	161
Turda 332 (mt.1)	82	240	58,5	230	195
Turda 344 (mt.2)	83	250	59,1	197	164
Average	84	263	61	215	180

Analyzing some production elements, it can be observed (Table 7) that the proportion of grains per cob of the Turda 350 and Turda 59 hybrids is on average 85%, and the mass of 1000 grains of the two hybrids (280 g) presents higher values than that of the control hybrids: 250 g (Turda 344) and 240 g (Turda 332). The Turda 350 hybrid is also distinguished by both a cob weight and a grain weight (240 g, respectively, 200 g) higher than that of the control hybrids.

Table 8 presents some characteristics of the Turda 350 hybrid, according to the UPOV system (International Organization for the Protection of Plant Varieties), requested for the registration of the hybrid in the SITRV testing.

The Turda 350 hybrid is vigorous, with a height between 255-260 cm, and the average ear insertion height is 95 cm. The main ear weighs up to 240 g and is 20-22 cm long. It is distinguished by a very strong intensity of the anthocyanin coloration of the cob lobes.

Table 8. Some characters of the hybrid Turda 350 - UPOV description

No. crt.	Character	Character expression	Note
1	Leaf: leaf width	middle	5
2	Leaf: length/width ratio	middle	5
3	Panicle: emergence period 50% of plants	early	3
4	Panicle: the beginning of flowering	average	5
5	Cobs: silking period (50%)	average	5
6	Leaf at ear insertion: length (measured-cm) VIR	long (75-80 cm)	7
7	Panicle: panicle length	high (35-40 cm)	7
8	Plant: height (including panicle) VIR	high (255-260 cm)	7
9	Cobs: insertion height of the main spike relative to the total height of the VIR plant	high (90-95 cm)	7
10	Cobs: VIR length	20-22 cm	7
11	Cobs: diameter (middle) VIR	4-5 cm	7
12	Cobs: shape	cylindrical	7
13	Cobs: the intensity of the anthocyanin coloration of the spikelets	strong	7
14	Ear weight (g) VIR	230-240 g	7

According to Table 9, the hybrid Turda 59 is a hybrid with a height between 210-230 cm, and the insertion height of the main ear is average, between 60-70 cm. The main ear has a weight of approximately 200 g and a length of 18-22 cm. It presents a weak intensity of the anthocyanin coloration of the cobs.

Table 2. Some characters of the hybrid Turda 59 - UPOV description

No. crt.	Character	Character expression	Note
1	Leaf: leaf width	middle	5
2	Leaf: length/width ratio	middle	5
3	Panicle: emergence period 50% of plants	early	3
4	Panicle: the beginning of flowering	average	5
5	Cobs: silking period (50%)	average	5
6	Leaf at ear insertion: length (measured-cm) VIR	long (65-70 cm)	7
7	Panicle: panicle length	high (30-35 cm)	7
8	Plant: height (including panicle) VIR	high (210-230 cm)	7
9	Cobs: insertion height of the main spike relative to the total height of the VIR plant	average (60-70 cm)	7
10	Cobs: VIR length	18-22 cm	7
11	Cobs: diameter (middle) VIR	4-4,5 cm	7
12	Cobs: shape	cylindrical	7
13	Cobs: the intensity of the anthocyanin coloration of the spikelets	low	7
14	Ear weight (g) VIR	180-200 g	7

For the Turda 350 and Turda 59 hybrid, seed production is based on an improved formula, namely, the mother (inbred line) is cytoplasmically male sterile (cms), and the father line is pollen fertility restorer. The parental forms have a good coincidence between flowering and the appearance of stigmas, the father line being a vigorous plant, good pollinator (Table 10). Seed production for both hybrids began in 2025, after their registration with SITRV and will be available for cultivation starting in 2026.

Table 10. Technological peculiarities in seed production of corn hybrids Turda 350 and Turda 59

Technological features	Turda 350	Turda 59
Hybrid type	Single-cross hybrid	Single-cross hybrid
Reaction to male sterility	Male-sterile (androsterile)	Male-sterile (androsterile)
Isolation distance from other maize crops	500 m	
Relationship between parental forms: mother-father	4:2 ; 6:2	
Sowing method of parental forms	Simultaneous	
Sowing density for: - female - male	60-65.000 60-70.000	
Specific field operations	Biological purifications; verification of male sterility	
Recommended seed-production areas	Favorable areas for corn cultivation of Transylvania, the neighboring plateaus, the floodplains of the Mureș, Someș and Târnave rivers, central and northeastern Moldova, the hilly areas in the west of the country.	
Production capacity in the hybridization batch	3000-3500	

CONCLUSIONS

The Turda 350 hybrid is a simple hybrid with a high production potential of over 15,000 kg/ha, especially under favorable conditions. It is particularly well adapted to the Transylvanian Plain and adjacent plateaus, the floodplains of the Mureș, Someș, and Târnave rivers, central and northeastern Moldova, and the hilly areas of western Romania.

- The Turda 350 hybrid was noted for its rapid rate of grain water loss, which represents a valuable trait for timely harvesting and grain drying.
- The hybrid is noted for its good ecological plasticity, good resistance to low temperatures in the first part of the growing season, good resistance to falling, very good tolerance to drought, heat and grain cracking.
- Seed production of the Turda 350 hybrid is based on the perfected formula, the female parent (inbred line) is cytoplasmically male sterile (cms), and the male parent is a pollen-fertility restorer line.

The Turda 59 hybrid, registered in 2025, is a simple hybrid with a high production potential of over 10,000 kg ha^{-1}, especially in favorable areas of the Transylvanian Plain, the neighboring plateaus, the floodplains of the Mureș, Someș and Târnave rivers, central and northeastern Moldova, as well as the hilly areas in the west of the country.

• The Turda 59 hybrid was distinguished by a very fast rate of water loss from the grains.

• The hybrid is distinguished by good ecological plasticity, very good resistance to low temperatures in the first part of the vegetation period, very good resistance to falling and very good tolerance to drought and heat.

• The hybrid is recommended to be cultivated at a density of 70,000 pl/ha, and seed production can be achieved based on an improved formula.

Turda 350 and Turda 59 are scheduled for commercial introduction in 2026, with the seed multiplication process having started in 2025.

REFERENCES

Căbulea, I., and Grecu, C., 1982. *25 ani (1957-1982) de ameliorare a porumbului la Staţiunea de Cercetare Agricolă Turda*. Contribuţii ale Cercetării Ştiinţifice la Dezvoltarea Agriculturii, Volum omagial: 243-294.

Căbulea, I., Grecu, C., Haș, I., Haș, V., Copândean, A., Teban, A., 1999. *Crearea hibrizilor de porumb la Staţiunea de Cercetări Agricole Turda în perioada 1983-1997*. Contribuţii ale Cercetării Ştiinţifice la Dezvoltarea Agriculturii, VI: 73-98.

FAOSTAT, https://www.fao.org/faostat/en/#data/QCL, FAOSTAT, 2026.

Haș, V., Căbulea, I., Haș, I., Grecu, C., Copândean, A., 1999. *Progresul genetic realizat în crearea liniilor consangvinizate de porumb la SCDA Turda*. Contribuţii ale Cercetării Ştiinţifice la Dezvoltarea Agriculturii, VI: 99-114.

Haș, I., 2003. *Hibrizii de porumb Turda 165 şi Turda 201, creaţi la Staţiunea de Cercetare-Dezvoltare Agricolă Turda, înregistraţi în anul 2002*. Info-Amsem, 2: 22.

Haș, V., and Grecu, C., 2007. *Ameliorarea porumbului*. Staţiunea de Cercetare-Dezvoltare Agricolă, Turda -

A 50-a aniversare, 1957-2007 - Rezultate obținute în activitatea de cercetare-dezvoltare: 13-25.

Haș, V., Haș, I., Copândean, A., Mureșanu, F., Varga, A., Sut-Gherman, R., Rotar, C., Șopterean, L., 2014. *Comportarea noilor hibrizi creați la SCDA Turda*. Analele INCDA Fundulea, LXXXII: 99-110.

Haș, V., Copândean, A., Vana, C., Varga, A., Călugăr, R., 2017. *Șase decenii de cercetări realizări în ameliorare porumbului la Turda*. Contribuţii ale Cercetării Ştiinţifice la Dezvoltarea Agriculturii, VII (Volum omagial, 60 ani SCDA Turda): 87-130.

Haș, V., Copândean, A., Varga, A., Vana, C., Călugăr, R., Mureșanu, F., 2018. *Hibridul de porumb "Turda 344"*. Analele INCDA Fundulea, LXXXVI: 85-95.

Haș, V., Copândean, A., Tritean, T., Varga, A., Vana, C., Călugăr, R., Mureșanu, F., Șopterean, L., 2021. *Noi realizări în domeniul ameliorării porumbului la SCDA Turda*. Analele INCDA Fundulea, LXXXIX: 49-61.

Horhocea, D., Martura, T., Iordan, H.L., Băduț, C., Ciocăzanu, I., 2019. *Felix, un nou hibrid semitardiv de porumb creat la INCDA Fundulea*. Analele INCDA Fundulea, LXXXVII: 82-94.

Varga, A., Haș, V., Tritean, N., Vana, C., Călugăr, R., Mureșanu, F., Șopterean, L., 2022. *Hibrid de nouă generație semitimpuriu Turda 380 adaptat schimbărilor climatice din zona de centru a țării*. Analele INCDA Fundulea, XC: 63-71.

Proiect ADER 212: *Cercetări asupra germoplasmei hibrizilor de porumb extratimpurii și timpurii în vederea extinderii acestora în zonele favorabile culturii porumbului din arealele secetoase, cu menținerea performanțelor productive și a indicilor de calitate specifici hibrizilor raionați în zonele secetoase.*