COMPARATIVE ANALYSIS OF SOME CORN HYBRIDS BASED ON PROTEIN AND OIL CONTENT

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INTRODUCERE: Among agricultural crops, corn is a plant with a high share globally, of agronomic, ecological, economic and social importance (Wang and Hu, 2021). Corn grains have a series of physical, chemical, biochemical indices, with food and feed value, or for industrialization (Sun et al., 2023). Yield and quality indices in corn varied in relation to genotype, environmental factors (e.g. soil, climate), and crop technology (Liu et al., 2025). Protein content is a relevant indicator for the quality of corn production, in order to support the increasing demand for protein for human consumption and animal feed (Maqbool et al., 2021). Oil content is also an important index for the quality and value of corn production and also in breeding programs (Zhang et al., 2023).

This research evaluated the protein and oil content of fifteen corn hybrids grown in fertilized and unfertilized systems, and comparatively analyzed the performance of the hybrids based on the two quality indices

MATERIAL ŞI METODA DE LUCRU

The study and field research were carried out within ARDS Lovrin. Fifteen corn hybrids were cultivated, originating from NARDI Fundulea. The field experiments were carried out during 2023 – 2024 agricultural year. The corn hybrids were cultivated in a fertilized (F) and unfertilized (UF) system. Complex fertilizers (15/15/15; 300 kg ha^{-1}) and ammonium nitrate (200 kg ha^{-1}) were applied. Sowing was done in early April, at a distance of 70 cm between rows. Pre-emergence herbicide was applied and mechanical and manual weeding (as necessary) was done in the vegetation. According to the source of the biological material, the corn hybrids were assigned numerical codes (8021 to 8035). Each corn hybrid was cultivated in replicates. Grain samples harvested at physiological maturity (Meier, 2001), and protein (Pro, %) and oil (Oil, %) were analyzed. Statistical analysis of the data was performed in the EXCEL mathematical module and PAST software (Hammer et al., 2001)

REZULTATE OBȚINUTE

The recorded values for each corn hybrid in the two fertilization systems, the mean calculated value for each quality index, and the standard error are presented in table 1. For protein content (Pro, %), in the case of the fertilized system, two corn hybrids presented valuesabove the mean, in conditions of statistical safety, respectively hybrid 8023 ($p<0.05$, *) and hybrid 8034 $p<0.001$, ***). Within the unfertilized system, three hybrids presented positive differences from the mean value, in conditions of statistical safety, respectively hybrid 8027 ($p<0.05$, *), hybrid 8024 ($p<0.01$, **) and hybrid 8034 ($p<0.001$, ***), figure 3. For oil content (Oil, %), in the case of the fertilized system, five hybrids showed positive differences from the mean value with statistical safety, respectively hybrids 8029 and 8034 ($p<0.05$, *), hybrids 8030 and 8033 ($p<0.01$, **), respectively hybrid 8023 ($p<0.001$, ***). In the case of the unfertilized system, five hybrids showed positive differences, with statistical safety, respectively hybrids 8029 and 8031 ($p<0.05$, *), and hybrids 8023 and 8034 ($p<0.001$, ***), figure 4. The cluster analysis led to the dendrogram in figure 6 (Coph.corr. = 0.865). Two distinct clusters were found that include the corn hybrids.

Table 1. Values of protein and oil content in grains of corn hybrids in fertilized and unfertilized systems

| Corn Hybrid	Fertilized		Unfertilized	
	Pro	Oil	Pro	Oil
	(%)			
8021	8.07	5.17	8.40	5.10
8022	8.63	5.10	8.37	5.43
8023	8.77	6.37	8.93	6.10
8024	8.47	5.50	9.40	5.63
8025	8.07	5.13	8.40	5.23
8026	8.67	4.93	9.07	5.13
8027	8.70	5.20	9.33	5.37
8028	8.10	5.33	8.37	5.40
8029	7.83	5.77	7.93	5.80
8030	8.13	5.87	8.33	5.70
8031	8.60	5.60	9.07	5.80
8032	7.63	5.60	8.23	5.67
8033	8.33	5.93	9.17	5.63
8034	10.13	5.80	10.63	6.10
8035	8.37	5.70	9.20	5.63
Mean	8.43	5.53	8.86	5.58
SE	±0.15	±0.10	±0.17	±0.08
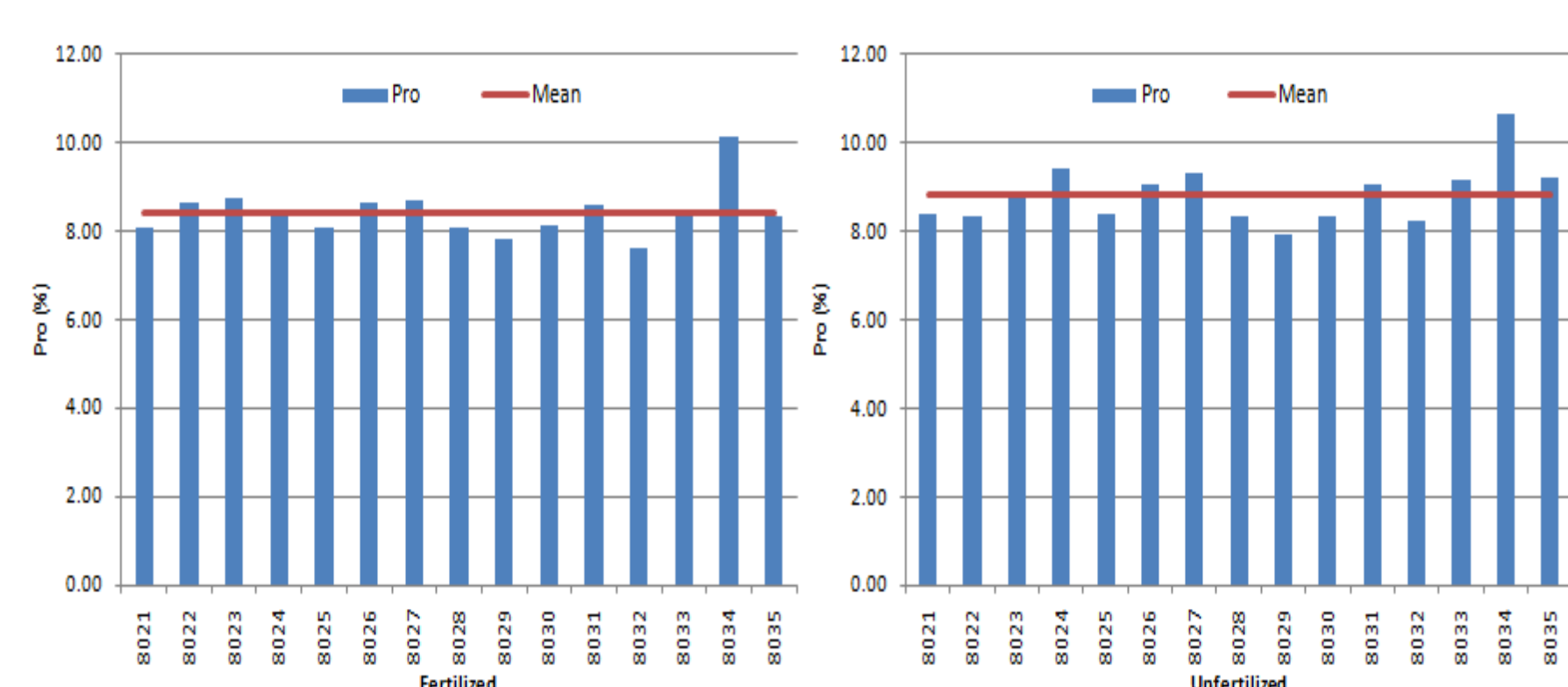
Figure 3. Graphical representation of protein content compared to the mean value, by fertilization systems

Figure 4. Graphical representation of oil content compared to the mean value, on fertilization systems
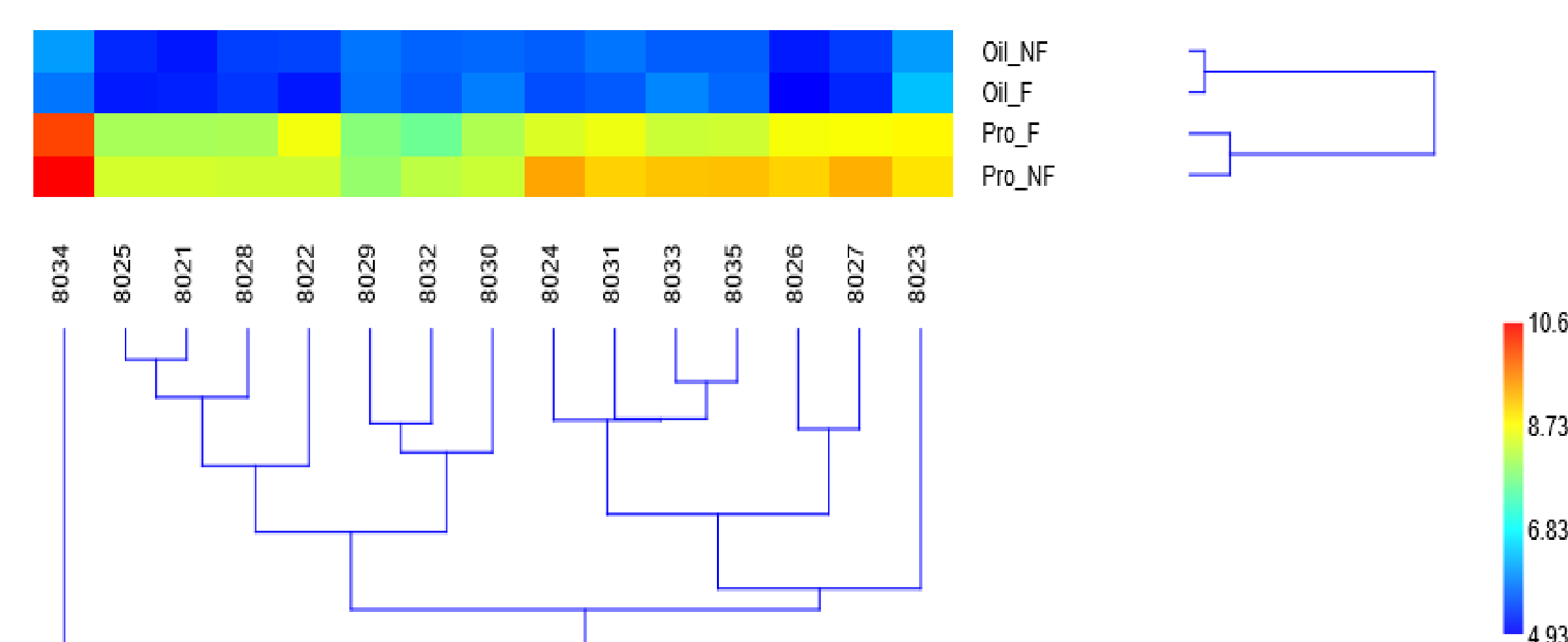

Figure 4. Cluster diagram based on Euclidean distances

CONCLUZII

For protein content (Pro, %), in the fertilized system, two corn hybrids presented values above the mean, in statistical safety conditions, respectively hybrid 8023 ($p<0.05$, *) and hybrid 8034 $p<0.001$, ***). In the unfertilized system, three hybrids presented positive differences from the mean value, in statistical safety conditions, respectively hybrid 8027 ($p<0.05$, *), hybrid 8024 ($p<0.01$, **) and hybrid 8034 ($p<0.001$, ***). For oil content (Oil, %), in the fertilized system, five hybrids showed positive differences from the mean value, with statistical safety, respectively hybrids 8029 and 8034 ($p<0.05$, *), hybrids 8030 and 8033 ($p<0.01$, **), respectively hybrid 8023 ($p<0.001$, ***). In the unfertilized system, five hybrids showed positive differences, with statistical safety, respectively hybrids 8029 and 8031 ($p<0.05$, *), and hybrids 8023 and 8034 ($p<0.001$, ***). The 8034 corn hybrid was noted for its high protein content and statistically significant differences in both, fertilized and unfertilized systems. The 8023 corn hybrid was noted for its high oil content and statistically significant differences in both, fertilized and unfertilized systems. These hybrids showed high genetic stability for the two quality indices in the study conditions.

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