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SUNFLOWER CROP SITUATION IN ROMANIA - COMPARATIVE STUDY OVER THE LAST DECADE

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Abstract: The situation of sunflower crop in Romania was studied in dynamics for the 2015 - 2023 period.. The cultivated area (A, ha), yield (Y, kg/ha) and total production (TP, tons) were analyzed. The mean cultivated area during the study period was A = 1086400 ha. In 2015, 2017 and 2018, negative differences were recorded (p<0.05), and in 2019 a positive difference (p<0.001). The mean yield was Y = 2294 kg/ha. In 2015, 2020 and 2023 negative differences were recorded (p<0.05). Positive differences were recorded in 2019 (p<0.05) and in 2016, 2017 (p<0.01). The mean total production was TP = 2494600 tons. Negative differences from the average were recorded in 2023 (p<0.05), in 2015 (p<0.01). Positive differences were recorded in 2018 (p<0.05) and in 2019 (p<0.001). According to PCA, PC1 explained 68.203% of variance, and PC2 explained 31.75% of variance. Cluster analysis grouped the years of study based on similarity in relation to the analyzed elements (A, Y, TP; Coph.corr. = 0.879).

Introduction

In the category of oilseed plants and the vegetable oil system, sunflower occupies a particularly important place [2], [18], [16]. The sunflower is a multi-valued crop, with agronomic, economic, and social importance, a crop with real opportunities for the "Bio-Circular-Green" economy [4], [2], [1], [20]. The area cultivated with sunflower, yield and marketing elements, have recorded different spatial and temporal variations in relation to ecological, economic and social factors [18], [3]. The dynamics of sunflower cultivation in Romania during the period 2015 - 2023 was analyzed in this study, based on cultivated areas, yield and total seed production.

Material and method

Starting from the recorded fluctuations, this study analyzed the dynamics of sunflower cultivation in Romania, between 2015 and 2023. In relation to the purpose of the study, statistical data recorded by the Ministry of Agriculture and Rural Development were used [25]. Cultivated area (A, ha), yield (Y, kg/ha) and total production (TP, tons) were considered. Each element considered during the study period was analyzed, values recorded annually, compared to the average during the study period. Comparative analysis was used as a mathematical and statistical tool to evaluate differences and statistical reliability [11]. Multivariate analysis was used to explain the variance in the data set, and to identify the association of the years during the study period with the elements characterizing the sunflower crop.



Results and discussions

The mean value was calculated for each of the elements considered (A, Y, TP) in the characterization of the sunflower crop. The situation recorded each year for each element considered was analyzed, compared to the average value over the study period. In the case of the area cultivated with sunflower, the value in 2019 presented a statistically significant difference compared to the mean value of the study period (p<0.001, ***). The area cultivated in 2015, 2017 and 2018 presented a negative difference compared to the mean value (p<0.05, °). In the case of sunflower crop yield (Y, kg/ha), the value in 2019 presented a difference from the mean value of the study period, with statistical safety at the p<0.05 level (*). The yield values recorded in 2017 and 2018 showed positive differences compared to the mean value for the study period at the p<0.01 level (**). The yield values in 2015, 2020 and 2023 showed negative differences compared to the mean value for the study period, at the p<0.05 level (°). In the case of total production (TP, tons), the value recorded in 2018 presented a positive difference from the mean for the study period at the p<0.05 level (*), and the total production recorded in 2019 presented a difference from the mean value for the study period at the p<0.001 level (***). The total production in 2023 presented a negative difference compared to the mean value of the study period (p<0.05, °), and the total production in 2015 presented a negative difference compared to the mean value for the study period at the p<0.01 level (^{oo}). The multivariate analysis led to the PCA diagram in Figure 1, in which the principal components explained the presence of variance, PC1 = 63.203% of the total variance, and PC2 = 31.75% of the total variance. The cluster analysis led to the dendrogram in Figure 2, in which the years of the study period were associated based on similarity, in relation to the values of the elements considered (Coph.corr. = 0.878).

PCA diagram with the distribution of years over the study period in relation to the sunflower reference elements

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Cluster dendrogram for sunflower cultivation, under the study conditions

Conclusions

Differentiated variations in the cultivated area (A, ha), yield (Y, kg/ha) and total production (TP, tons) of sunflower were recorded in Romania, during the period 2015 - 2023. Compared to the mean value over the study period, for each element considered, positive and negative differences were recorded, with statistical certainty. The year 2019 was identified with positive differences compared to the calculated average, with statistical certainty for each element considered (p<0.05 for yield; p<0.001 for area and total production). The year 2018 was identified with positive differences, statistically assured, for total production (p<0.05) and for yield (p<0.01).