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THE INFLUENCE OF SOME NPK MINERAL FERTILIZERS DOSES ON FIELD PEAS

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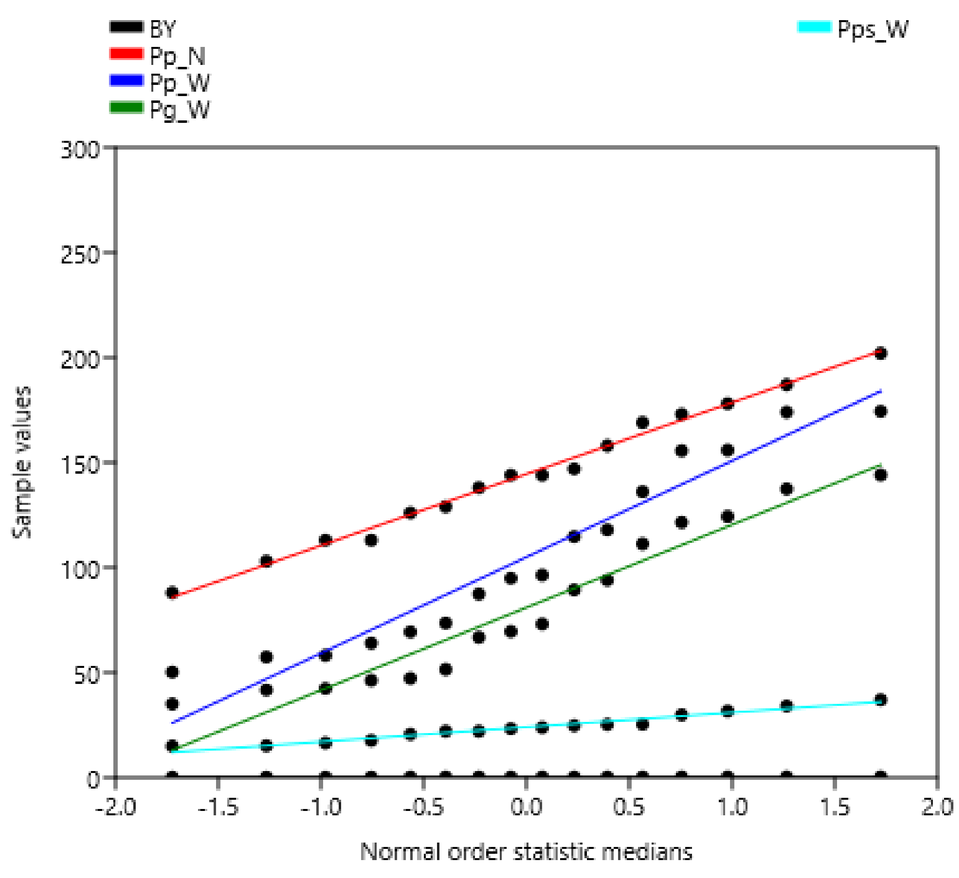
Abstract: *The influence of mineral fertilization on the field pea crop was analyzed based on some elements of productivity and biological yield. Fertilizers with nitrogen (0, 25, 75 kg a.s. /ha; a.s. active substance), phosphorus (0, 80 kg a.s. /ha) and potassium (0, 40, 80, 120 kg a.s. /ha) were applied to the field peas crop Boxer cultivar. The number of pods (Pp_N) varied between 88.00 - 202.00 /m². The weight of the pods (Pp_W) varied between 50.20 – 174.40±10.77 g/m². The weight of the peas grains (Pg_W) varied between 35.10 – 144.10±9.26 g/m². The weight of pea pods shells (Pps_W) varied between 15.00 – 37.00±1.64 g/m². Biological yield (BY) varied between 0.23 - 0.38±0.01 kg/m². The ratio between PgW/Pp_W was calculated and values between 0.680 – 0.830±0.011 were recorded. The Pps_W/Pp_W ratio was calculated and values between 0.170 - 0.320±0.011 were recorded. Different levels of correlation were recorded between determined parameters. Mathematical models were obtained that described the variation of the parameters considered, in relation to NPK fertilizers.*

• Introduction

Legumes are important for humans and occupy the second place, after grasses [9]. The authors analyzed the importance of leguminous plants in different soil conditions, in natural and agricultural environments, and highlighted the direct importance through the productions achieved, as well as the importance for the soil and subsequent crops. It was recorded the high importance that leguminous crops present for sustainable agricultural systems through the ecosystem and socioeconomic services they provide [16]. The leguminous crops were analyzed in terms of the benefits they bring to human and animal nutrition (production of proteins, fibers, fodder, etc.) as well as based on the benefits in agricultural crop rotations through nitrogen fixation [12]. Legumes have been studied under conditions of intercropping, for the favorable "eco-agricultural" effects they have, beneficial to successive crops and the soil [4].

• Material and method

The study analyzed the variation of some productivity elements in field peas, in relation to mineral fertilization, agricultural year 2022-2023. The study took place in ARDS Lovrin, Romania. The field experiment was located on a chernozem type soil with medium fertility. The biological material, the variety 'Boxer', was cultivated in a non-irrigated system. Sowing was done in March, the optimal time. Mineral fertilization was provided by fertilizers with nitrogen (ammonium nitrate), phosphorus (superphosphate) and potassium (potassium sulfate). Fertilizers with phosphorus (0, and 80 kg a.s./ha) and potassium (0, 40, 80, and 120 kg a.s./ha) were applied in autumn and incorporated with the plowing work. Nitrogen fertilizers (0, 25, and 75 kg a.s./ha) were applied in spring.

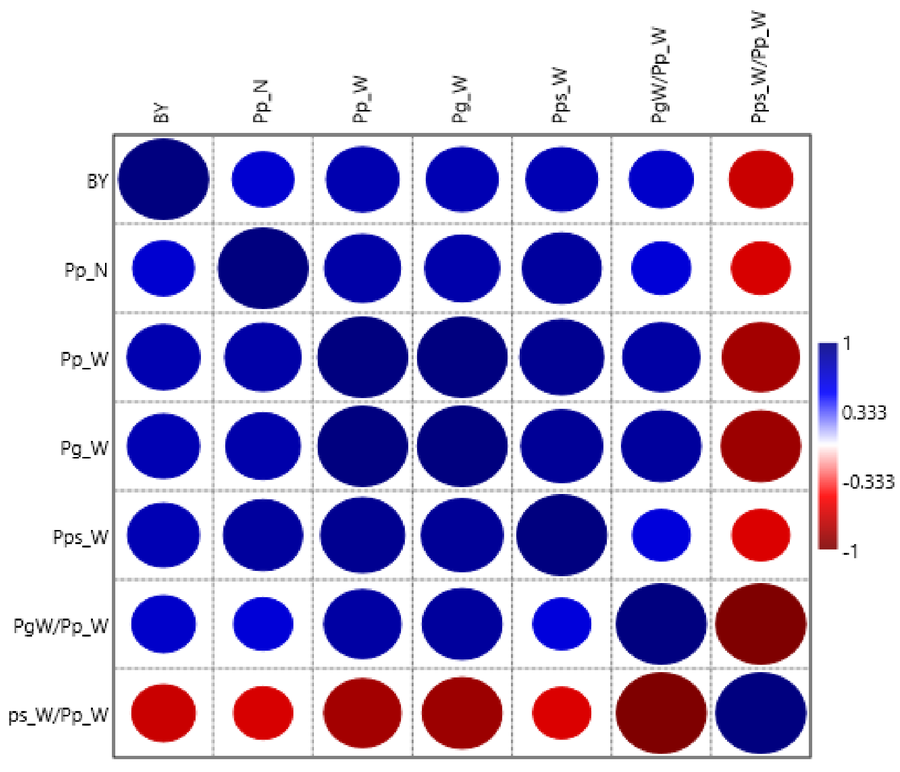


Probability plot for determined parameters

• Results and discussions

The analysis of the parameters considered representative for the field pea crop, in relation to mineral fertilization, led to the values presented in table 1. Thus, the determined parameters presented variation values (min, max) as follows: BY = 0.23 – 0.38±0.01 kg/m²; Pp_N = 88.00 – 202.00±8.00 pea pods/m²; Pp_W = 50.20 – 174.40±10.77 g/m²; Pg_W = 35.10 – 144.10±9.26 g/m²; Pps_W = 15.00 – 37.00±1.64 g/m². In the case of the calculated ratios, they presented sub-unit values, as follows: Pg_W/Pp_W = 0.68 – 0.83±0.01, and Pps_W/Pp_W = 0.17 – 0.32±0.01.

The correlation analysis identified variable levels of correlation, represented graphically in figure 2. Very strong, positive correlation was recorded between Pg_W and Pp_W (r=0.998), between Pps_W and Pp_W (r=0.933), and between Pps_W and Pg_W (r=0.909). Very strong negative correlation was recorded between Pps_W/Pp_W and PgW/Pp_W (r=-0.999). Strong correlation was recorded between Pp_W and BY (r=0.809), between Pg_W and BY (r=0.800), between Pp_W and Pp_N (r=0.847), between Pg_W and Pp_N (r=0.830), between Pps_W and Pp_N (r=0.880), between PgW/Pp_W and Pp_W (r=0.857) and respectively between PgW/Pp_W and Pg_W (r=0.884). Strong negative correlation was recorded between Pps_W/Pp_W and Pp_W (r=-0.857) and between Pps_W/Pp_W and Pg_W (r=-0.884). Moderate and weak correlations were also recorded at the level of the other parameters. It was analyzed how the NPK fertilizers, in the applied doses, determined the variation of the main parameters (BY, Pp_N, Pp_W, and Pg_W). The BY variation was described in relation to NPK by equation (1), under conditions Multiple R=0.432. The Pp_N variation was described by equation (2) in relation to NPK, under conditions of Multiple R=0.503. The variation of Pp_W in relation to NPK was described by equation (3) under conditions of Multiple R=0.409. The variation of Pg_W in relation to NPK was described by equation (4) under conditions of Multiple R=0.399.



Correlation matrix diagram in the case of the parameters analyzed in the field pea crop, Boxer variety

• Conclusions

NPK mineral fertilization through the doses applied in the study conditions generated variable response in terms of productivity parameters and yield in field pea crop, Boxer variety. The recorded results showed a normal distribution, under statistical safety conditions. The parameters Pp_W (CV=41.024) and Pg_W (CV=45.738) showed high variability. Various levels of correlation were recorded between parameters determined in the pea crop, in response to the applied mineral fertilization.

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