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A230
GENETIC ASPECTS ASSOCIATED WITH THE SEED PER POD TRAIT IN SOYBEAN

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Numerical traits related to yield have different sensitivity to the environment, being the seed per pod (SPP) one of the most stable, providing an opportunity to increase it genetically if lines with high SPP were available. The SPP is a weighted mean that depends on the relative quantity of pods with different number of 2-, 3-, and 4-seeds (2SP, 3SP, and 4SP, respectively). In our Laboratory, lines with SPP > 3.7 (i.e., with +70% 4SP) were developed. In the Argentine market there are no soybean commercial varieties with high % 4SP. The aim of this study was to characterize genetic aspects related to SPP and associated traits such as pod number per plant (PNP), seed number per plant (SNP), % 2SP, % 3SP and % 4SP, and their possible association, during the growing seasons (GS): 2015/16 and 2016/17. A set of 131 recombinant inbred lines (RIL) derived from the cross of two experimental lines: one with SPP = 3.53 (54% 4SP) and the other with SPP = 2.25 (0% 4SP), were used. The RIL population with their parents, hybrids and their reciprocals were planted in a single-line plot of 2 m in length and 0.52 m in width, in a randomized complete block design with three replications. Six plants of each inbred line (genotype) were phenotyped at full maturity for SPP, PNP, SNP and the % of 2SP, 3SP and 4SP. All the screened traits showed variability in the RIL. Mean values for each trait in both GS were: SPP = 2.8 (range: 2.0–3.9); PNP = 68 (range: 13–187); SNP = 189 (range: 20–532); % 2SP = 32% (range: 0–100%); % 3SP = 55% (range: 0–91%); % 4SP = 13% (range: 0–78%). For variance components, genotype explained >85% of the total variation for SPP, as well as % of 2SP, 3SP, and 4SP. Conversely, genotype only explain <5% of the total variation for PNP and SNP. These results show high narrow sense heritability values (h^2) for SPP, % 2SP, % 3SP and % 4SP ($h^2 > 0.95$); and low heritability for PNP and SNP ($h^2 < 0.23$). Correlation coefficients among the different traits were: SPP and % 4SP (r = 0.9, $P < 0.01$); PNP and SNP (r = 0.9, $P < 0.01$); SPP and PNP (r = −0.1, $P < 0.01$). Results proved the strong genetic regulation and limited environmental influence that presents the SPP trait, providing the possibility to improve it through the increase in the % 4SP. Additionally, even though SNP is highly associated with PNP, the low correlation between PNP and SPP proved the lack of tradeoff between these two components. Thus, the positive effect of incorporating the high % 4SP trait on SPP will be maintained regardless of variations in PNP.

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STUDY OF THE PROTEIN PRODUCTION OF *Aspergillus sp.* V1 USING SUGARCANE VINASSE AS SUBSTRATE

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Vinasse is an acidic effluent with a high organic load, which result from ethyl alcohol production. This residue represents a potential hazard for the environment if not responsibly managed. Filamentous fungi can adapt to a wide variety of substrates and grow in large quantities on organic wastes. In turn, bioconversion of residues into protein-rich fungal biomass is of great interest since it can be used as an alternative nutrient source to the expensive aquafeeds such as fishmeal and soybean meal. In a prior study, a filamentous fungus isolated from northwest of the Argentine, *Aspergillus sp.* V1, was able to grow on sugarcane vinasse. The objective of the present work was to evaluate the protein content of *Aspergillus sp*. V1 biomass cultivated on vinasse, with and without supplement of exogenous nutrients. The optimal vinasse concentration for the growth of *Aspergillus sp*. V1 was determined making dilutions of the residue in distilled water (10% to 100%, v/v) at a final volume of 10 mL. Each dilution was inoculated with 1×10^6 spores/mL and incubated at 30ºC (150 rpm) for 96 h under sterile conditions; then dry weight of biomass at 105°C was determined. Biomass production was carried out in 200 mL of sterile vinasse at the selected concentration, with and without supplementation of nitrogen and phosphorous in the following combinations: vinasse without nutrient supplementation (B_1); vinasse supplemented with 2 g/L of $(NH_4)_2SO_4$ (B_2), or 2 g/L of $CO(NH_2)_2$ (B_3); vinasse supplemented with 2 g/L of $(NH_4)_2SO_4$ and 1 g/L of KH_2PO_4 (B_4), or 2 g/L of $CO(NH_2)_2$ and 1 g/L of KH_2PO_4 (B_5). The biomass produced was separated by filtration, lyophilized, and weighed. In each case, percentage of total proteins (Kjeldahl-Arnold-Gunning method using the universal factor of conversion to protein 6.25) and productivity (in terms of milligrams of protein per liter of culture per h) was determined. The highest growth of *Aspergillus* sp. V1 was observed in 100% vinasse, with a biomass production of 41.55 g/L thereby following assays were conducted witn undiluted vinasse. The weight of lyophilized biomasses was 0.89; 0.61; 2.84; 1.00 and 2.99 g/L, with protein percentages of 33%; 49%; 41%; 38% and 36%, and a productivity of 3.0; 3.1; 12.0; 4.0 and 11.1 mg/L h for B_1, B_2, B_3, B_4 and B_5, respectively. According to literature, aquafeeds should contain between 26% to 55% protein. In all cases, protein percentages of *Aspergillus sp*. V1 biomass were within the desirable range. However, B_3 was selected as the most promising biomass for future assays due to its higher productivity (12.0 mg/L h). Our findings demonstrate that the mycelium of *Aspergillus sp*. V1 grown in vinasse could be a promising and inexpensive protein source to be used as aquafeed.

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FUNGAL ENDOPHYTES AS BIOCONTROL AGENTS: IDENTIFICATION OF BIOACTIVE SECONDARY METABOLITES

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The use of endophytes as biocontrol agents is a sustainable, affordable, and eco-friendly alternative to deal with plant diseases of high agricultural importance. The potential lies on the pathogen resistance that endophytes confer to the plant and the mutual benefits generated by the symbiotic association such as the increase in nutrients uptake, the growth promotion, and the higher stress tolerance. With the aim of discovering new biological control agents, the inhibitory activity of three endopthytic fungal strains isolated from the endemic plant *Eupatorium buniifolium* was