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# DETERMINATION OF SOME AGRONOMIC CHARACTERISTICS OF SOME PEANUT GENOTYPES USED IN THE BREEDING PROCESS

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## INTRODUCTION

Peanuts are cultivated worldwide in tropical and temperate regions, mainly for their seeds. The annual global production of peanuts is approximately 45 million tonnes (Carrin and Carelli, 2010 and FAO, 2015). Approximately two-thirds of the total peanut production is used for oil extraction, and the remaining one-third is used in confectionery products (Dwivedi et al.1996). For this reason, peanuts (Arachis hypogaea L.) are an important oilseed crop for vegetable oil production in the world (peanut oil accounted for 3.0% of global vegetable oil production) (FAO, 2015). Peanut seeds contain 44–56% oil, 22–30% protein and 15.0–18.0% carbohydrates. In addition, they are a good source of minerals (P, Ca, Mg and K) and vitamins (E, K and group B). For this reason, it is an important source of edible oil and protein for human nutrition in the world. Peanuts are also a cheap source of protein, a good source of essential vitamins, minerals and a component of many food products (Savage and Keenan, 1994 and Gulluogluet. al., 2016a).
Cultivar choice is one of the main factors that plays an important role in yield and quality of production.
The aim of this work was to determine some agronomic characteristics of some peanut genotypes grown on sandy soils in southern Oltenia and used in the breeding process.

## MATERIALS AND METHODS

The study was carried out during 2023-2024 at RDSCPS Dăbuleni and was used as breeding material for four indigenous peanut genotypes and seven foreign peanut genotypes.
The experiment was set up in randomized blocks with three repetitions. The experimental variant included three rows spaced 70 cm and 20 cm between plants per row. The seeds were sown on April 26, 2023 and May 5, 2024. During the growth and development period, the peanut cultivation technology developed by RDSPCS Dăbuleni was applied. The plants were harvested manually on September 28, 2023 and September 25, 2024.
At harvest, observations and determinations were made regarding the number of pods/plant, pod weight per plant, 100 pod weight, percentage of mature pods, percentage of peeling, 1000 grain weight, pod production/ha

## RESULTS AND DISCUSSIONS

Number of pods per plant and weight of pods per plant in 2023,2024 and average for the two years

| Genotype | Number of pods/plant | | | | | Weight of pods per plant (g) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 2023 | 2024 | Average | Difference from the control (g) | Semnification | 2023 | 2024 | Average | Difference from the control (g) | Semnification |
| Dăbuleni | 29,3 | 23,5 | 26,4 | -4,7 | | 64,2 | 51,5 | 57,8 | -17,4 | |
| Viviana | 32,0 | 26,3 | 29,1 | -2,0 | | 82,6 | 62,3 | 72,4 | -2,8 | |
| HYY 1 | 33,5 | 30,8 | 32,1 | +1,0 | | 75,2 | 71,2 | 73,2 | -2,0 | |
| HYY 2 | 32,0 | 32,3 | 32,1 | +1,0 | | 78,3 | 70,0 | 74,1 | -1,1 | |
| HYY 3 | 29,3 | 29,9 | 29,6 | -1,5 | | 82,6 | 65,3 | 73,9 | -1,5 | |
| Viorica | 33,5 | 30,8 | 32,2 | +1,1 | | 81,5 | 69,5 | 75,5 | +0,3 | |
| Prov.China2 | 30,5 | 29,5 | 30,0 | -1,1 | | 83,2 | 62,3 | 72,7 | -2,5 | |
| Ning | 33,3 | 30,3 | 31,8 | +0,7 | | 93,6 | 67,0 | 80,3 | +5, 1 | |
| Henan Province | 33,0 | 32,5 | 32,7 | +1,6 | | 84,0 | 72,3 | 78,1 | +2,9 | |
| Brâncoveana | 30,6 | 29,5 | 30,1 | -1,1 | | 86,3 | 76,3 | 81,3 | +6,1 | * |
| L5/18 | 36,8 | 34,3 | 35,5 | +4,4 | ** | 89,2 | 87,2 | 88,2 | +13,0 | ** |
| Average (control) | 32,2 | 29,9 | 31,1 | Mt. | | 81,8 | 68,2 | 75,2 | Mt. | |
| LSD 5% | 2,86 | 3,45 | 2,75 | | | 6,48 | 8,1 | 5,2 | | |

The number of pods per plant in the studied lines varied between 29.3-36.8 pods per plant in 2023, between 23.5-34.3 pods per plant in 2024 and 26.4-35.5 pods per plant on average over two years. According to the two-year average, the highest number of pods per plant was obtained by the line at L5/18 (35.5 pods per plant), with a distinctly significant difference compared to the control, and the lowest number of pods per plant was recorded in the peanut variety Dăbuleni (26.4 pods per plant).

Pod production and grain production in the peanut genotypes studied

| Genotype | Pod production (kg/ha) | | | | | Grain production (kg/ha) | | |
|---|---|---|---|---|---|---|---|---|
| | 2023 | 2024 | Average | Difference from the control (g) | Semnification | 2023 | 2024 | Average |
| Dăbuleni | 2607 | 2248 | 2539 | -1276 | | 1603 | 1475 | 1539 |
| Viviana | 2744 | 4035 | 3389 | -426 | | 1871 | 2804 | 2337 |
| HYY 1 | 2830 | 3906 | 3256 | -559 | | 1771 | 2476 | 2123 |
| HYY 2 | 4185 | 5451 | 4818 | +1003 | ** | 2670 | 3532 | 3101 |
| HYY 3 | 4748 | 2907 | 3827 | +12 | | 3157 | 2495 | 2826 |
| Viorica | 4089 | 4030 | 4059 | +244 | | 2506 | 2589 | 2547 |
| Prov.China2 | 4905 | 4108 | 4506 | +691 | | 3065 | 2875 | 2970 |
| Ning | 3778 | 3714 | 3746 | -69 | | 2569 | 2603 | 2586 |
| Henan Province | 2832 | 2689 | 2760 | -1055 | | 1855 | 1758 | 1806 |
| Brâncoveana | 3934 | 2537 | 3235 | -580 | | 2510 | 1649 | 2079 |
| L5/18 | 5608 | 6048 | 5828 | +2013 | *** | 4054 | 4445 | 4249 |
| Average (control) | 3842 | 3788 | 3815 | Mt. | | 2512 | 2609 | 2560 |
| LSD 5% | 445,8 | 439,5 | 442,7 | | | 291,5 | 302,7 | 297 |

As a result over two years, the highest grain production was obtained by the L5/18 line (4249 kg/ha), the HYY2 variety (3101 kg/ha), the Provenience China 2 variety (2970 kg/ha), and the lowest production was recorded by the Dăbuleni variety (1539 kg/ha).

Weight of 100 pods and percentage of mature pods in 2023,2024 and average over the two years

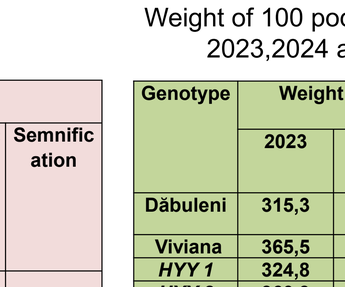
| Genotype | Weight of 100 pods (g) | | | Percentage of mature pods (%) | | |
|---|---|---|---|---|---|---|
| | 2023 | 2024 | Average | 2023 | 2024 | Average |
| Dăbuleni | 315,3 | 305,5 | 310,4 | 76,0 | 82,3 | 79,1 |
| Viviana | 365,5 | 295,3 | 330,4 | 79,5 | 83,5 | 80,5 |
| *HYY 1* | 324,8 | 298,3 | 311,5 | 78,2 | 74,0 | 76,1 |
| *HYY 2* | 360,3 | 312,2 | 336,2 | 77,5 | 68,0 | 72,7 |
| *HYY 3* | 345,6 | 298,2 | 321,9 | 74,3 | 76,0 | 74,1 |
| *Viorica* | 392,3 | 305,1 | 348,7 | 78,5 | 77,0 | 76,7 |
| *Prov.China2* | 353,8 | 325,6 | 339,7 | 76,0 | 75,6 | 75,8 |
| *Ning* | 385,5 | 336,8 | 361,1 | 81,2 | 72,8 | 76,0 |
| *Henan Province* | 345,3 | 300,4 | 322,8 | 76,3 | 79,7 | 77,0 |
| *Brâncoveana* | 381,6 | 310,6 | 346,1 | 81,5 | 74,5 | 77,0 |
| *L5/18* | 452,3 | 328,2 | 390,2 | 76,2 | 72,2 | 74,2 |
| Average (control) | 365,6 | 310,5 | 338,1 | 77,7 | 76,0 | 76,2 |
| DL 5% | 25,72 | 21,84 | 16,13 | 4,68 | 4,82 | 4,84 |

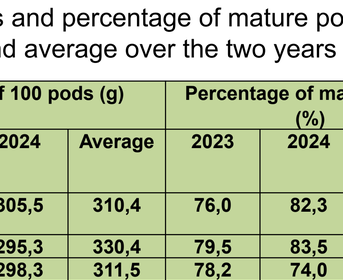
According to the two-year average, the highest 100-pod weight was obtained in the L5/18 line (390.2 g) and the lowest in the Dăbuleni variety (310.4 g).
As an average over two years, the percentage of mature pods was the highest in the Viviana variety (80.5%) and the lowest in the peanut line L6/18.

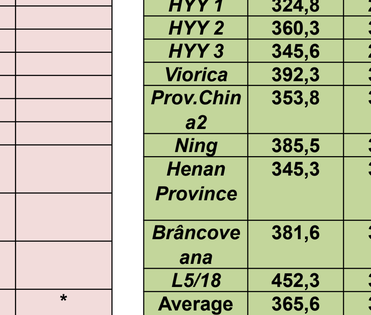
Peeling percentage and 1000 grain weight

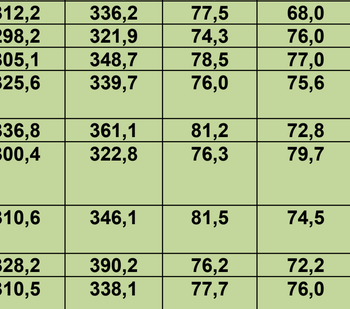
| Genotype | Peeling percentage (%) | | | Weight a 1000 grain (g) | | | | |
|---|---|---|---|---|---|---|---|---|
| | 2023 | 2024 | Average | 2023 | 2024 | Average | Difference from the control g) | Semnification |
| Dăbuleni | 61,5 | 65,6 | 63,5 | 794,0 | 521,0 | 657,5 | -137,5 | |
| Viviana | 68,2 | 69,5 | 68,8 | 730,0 | 920,0 | 825,0 | +30 | |
| HYY 1 | 62,6 | 63,4 | 63,0 | 799,0 | 822,0 | 810,5 | +15,5 | |
| HYY 2 | 63,8 | 64,8 | 64,3 | 702,0 | 848,0 | 775,0 | -20 | |
| HYY 3 | 66,5 | 65,2 | 65,8 | 808,0 | 829,0 | 818,5 | +23,5 | |
| Viorica | 61,3 | 63,8 | 62,5 | 847,0 | 843,0 | 845,0 | +50 | |
| Prov.China 2 | 62,5 | 63,8 | 63,1 | 750,0 | 830,0 | 790,0 | -5 | |
| Ning | 68,0 | 69,5 | 68,7 | 870,0 | 815,0 | 842,5 | +47,5 | |
| Henan Province | 65,5 | 63,7 | 64,6 | 732,0 | 600,0 | 666,0 | -129 | |
| Brâncoveana | 63,8 | 65,0 | 64,4 | 728,0 | 798,0 | 763,0 | -32 | |
| L5/18 | 72,3 | 73,5 | 72,9 | 958,0 | 945,0 | 951,5 | +156,5 | *** |
| Average (control) | 65,1 | 66,2 | 65,6 | 792,5 | 797,3 | 795,0 | Mt. | |
| LSD 5% | 3,32 | 3,37 | 3,35 | 37,8 | 38,0 | 37,9 | | |

The value of the peeling percentage of the breeding lines, averaged over two years, was found to be between 63.0-67.3%. The 1000-grain weight of the breeding lines ranged from 728-958 g in 2023, 521-945 g in 2024 and 657.5-951.5 g on average over two years. The highest value of 951.5 g was recorded by the L5/18 line, with a very significant difference of 156.5 g compared to the control.



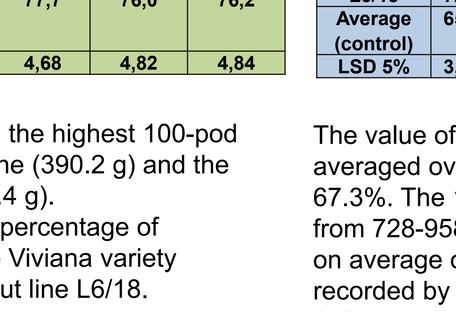






## CONCLUSIONS

The data on the average pod production per ha and the average grain production per hectare of the studied peanut genotypes show that, for most genotypes, they were higher than the world average production.



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