

Assessment of collection samples of pease and chick pea investigated in conditions of Steppe

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The purpose. To introduce samples of pease and chick pea, to study and select valuable economic sources (donors), to form working and educational collections, to register valuable samples and collections. **Methods.** Field, laboratory. Operation was executed under practical standards in the field of study of collections of grain bean cultures. The exposition of collection samples on morphological characters and biological properties was spent according to classifiers of conforming stems: *Pisum* L. And *Cicer* L., statistical analysis and analysis of variance of the gained data was made with the use of conventional methods. **Results.** Study of samples of pease and chick pea made it possible to determine the most valuable genotypes for their use in selection programs. By results of 3-years cycle of study the sources with valuable economic attributes are selected. **Conclusions.** All studied samples of pease and chick pea at their growing in zone of Steppes had different level of valuable economic attributes. At creation stuff with hi-tech and productive parameters it is possible to recommend samples which combine valuable economic attributes: pease — Lug 64/12, LDS01158, UKR; Lug 65/12, LDS01159, UKR; Lug 87/12, LDS01161, UKR; Lug 82/12 LDS01160, UKR, Lug 161/10, LDS01153, UKR; chick pea — Lug 39/09, LDS00809, UKR; Lug 56/10, LDS00797, UKR; Lug 66/10, LDS00807, UKR.

Key words: *genetic resources, introduction, pease, chick pea, sources (donors).*

The basic premise of new high-yielding varieties of chickpeas and peas with high quality performance products that are resistant to disease lesions suitable for existing production technology, genetics bank is forming and comprehensive study of the entire gene pool of these crops.

Research carried out in areas of enrichment and preservation of genetic diversity of plants peas and chickpeas, the selection of donors and sources of the main features valuable economic and biological properties and then use them in the selection process. Replenished database collection formed to implement them in theoretical and applied research, educational programs in schools and institutions of expertise.

Purpose - the introduction of peas and chickpeas samples of their study, the selection of commercial sources, formation and training of workers collections, registration of designs and collections and preservation seed samples provides a genetic basis for the implementation of the breeding programs of different directions.

Materials and methods of research. It the National scientific center «Institute for soil science and agrochemistry research named after O.N. Sokolovskiy» in close cooperation with the main institution - the National Centre for Plant Genetic Resources Ukraine - were objects of research sample collections peas and chickpeas. The gene pool of the laboratory protection and rational use of land has 1123 sample of peas from 42 countries (the largest number of samples with Ukraine - 278, Russia - 246, Great Britain - 103, France - 58, USA - 51, Canada - 42, Germany - 42, etc.) and 831 samples chickpeas from 44 countries (the largest number of samples with Ukraine - 202, Syria - 108, India - 87, Iran - 38, etc.). From 1992 to the present employees of the laboratory have been created and allocated 311 varieties and lines: peas - 139 lines and 13 varieties chickpeas - 152 lines and 7 grades. Many certificates of registration of designs and collections.

Working with collection samples is conducted in accordance with "guidelines for study collections of grain legumes" [1]. Description of samples for morphological features and biological properties were carried out according to the relevant classifications families: *Pisum* L. [2], *Cicer* L. [3,4]. Statistical analysis of the data was performed by the method Рокицького П.Ф.[5], variance analysis - method Доспехова Б.А. [6].

Samples of peas and chickpeas sowed in the collection nursery (50 seeds per section 1) with the nutrition area about 30 × 10 cm. Every 10 samplers were sew sampler-standarts.

The study of the economic and biological indicators, botanical traits and breeding values of each of the studied samples was performed by reproducing them in different years (minimum three years). During the growing season phenological observations from germination to full maturity the plants were carried out by interfacial periods fixed morphological features of plants. In vitro plants were analyzed for yield structure elements.

Results and discussion. The study of plant genetic resources held in the laboratory under natural field conditions humid support. All samples after three years of study systematized on yield, yield structure elements, the length of the growing season, and morphological features of plants resistant to diseases and pests. During the period of study collection samples of peas and chickpeas characterized by low degree of defeat fusarium, askohyta and damaging pests.

The research results peas. Studying samples of peas allowed to identify the most valuable genotypes for use in breeding programs. As a result of the three-year cycle study, conducted in 2013, 2015 and 2016, respectively, marked signs of economic sources of peas to be further involved in the collection:

- for a set of economic attributes allocated 5 samples: Lug 64/12, LDS01158, UKR; Lug 65/12, LDS01159, UKR; Lug 87/12, LDS01161, UKR; Lug 82/12, LDS01160, UKR, Lug 161/10, LDS01153, UKR. All these samples have such valuable properties as medium ripe, suitability for mechanized harvesting, high yield, resistance to disease (fusarium) and pests;

- for the duration of the growing season and ultra quick samples (samples that would have during the growing season less than 60 days) was not. Besides testing for years duration of the growing season had significant fluctuations, which are dependent on weather conditions, cultivation of peas. For medium early ripe (the length of the growing season 61-70 days) stood out 9 samples: Lug 180/09, LDS01149, UKR; Lug 182/10, LDS01150, UKR; Lug 224/10, LDS01152, UKR; Lug 126/10, LDS01154, UKR; Lug 63/12, LDS01157, UKR; Lug 64/12, LDS01158, UKR; Lug 65/12, LDS01159, UKR; Lug 82/12, LDS01160, UKR; Lug 87/12, LDS01161, UKR;

- the mass of 1000 grains (one component of the performance characteristics of plants) was only one great seeds sample (1000 grain weight > 250 g) - Lug 82/12, LDS01160, UKR;

- for suitability for mechanical harvesting (high attachment of the lower tier the beans above the ground (more than 45 cm) - 13 samples: Lug 180/09, LDS01149, UKR; Lug 182/10, LDS01150, UKR; Lug 63/12, LDS01157, UKR; Lug 64/12, LDS01158, UKR; Lug 65/12, LDS01159, UKR; Lug 87/12, LDS01161, UKR; Lug 235/10, LDS01151, UKR; Lug 161/10, LDS01153, UKR; Lug 89 / 11, LDS01155, UKR; Lug 224/10, LDS01152, UKR; Lug 126/10, LDS01154, UKR; Lug 130/11, LDS01156, UKR; Lug 82/12, LDS01160, UKR;

- high seed yield (% of the standard) > 115 had 5 samples: Lug 161/10, LDS01153, UKR; Lug 64/12, LDS01158, UKR; Lug 65/12, LDS01159, UKR; Lug 87/12, LDS01161, UKR; Lug 82/12, LDS01160, UKR.

Among the analyzed samples should be mentioned like Lug 82/12, LDS01160, UKR, which has high technological and productive parameters (medium early ripe, tall, suitable for mechanical harvesting, great seeds (weight of 1000 seeds – 253,2 g), yield 556,5g to 1m² and sample Lug 161/10, LDS01153, UKR - this sample is high, suitable for mechanized harvesting, a high number of seeds per plant 1 (41.4 pc.), high seed weight per 1 plant – 9,9 g and high yield of 1 m² - 492,5g. Samples were resistant to diseases and pests.

The research results chickpeas

The study sample chickpea was conducted according to the «methodical specified by VIR Study leguminous crops». Morphological description, classification by economic and biological properties was carried out according to the «Classifier genus Cicer L.». To describe the features of «bush form» used this grading 1 - creeping, 2 - spreading, 3 - and 4 standing-compact.

Samples of chickpeas with high or elevated technological parameters and performance:

- for a set of business features 3 separated sample: Lug 39/09, LDS00809, UKR; Lug 56/10, LDS00797, UKR; Lug 56/10, LDS00797, UKR; Lug 71/11, LDS00807, UKR;

- for medium ripe (the duration of the growing season 71-75 days) - (4) Lug 66/10, LDS00801, UKR; Lug 71/10, LDS00802, UKR; Lug 71/11, LDS00807, UKR; Lug 39/09, LDS00809, UKR;

- for precocity (the length of the growing season 76-80 days) – (8) Lug 76/09, LDS00796, UKR; Lug 56/10, LDS00797, UKR; Lug 58/10, LDS00798, UKR; Lug 60/10, LDS00799, UKR; Lug 62/10, LDS00800, UKR; Lug 74/10, LDS00803, UKR; Lug 59/11, LDS00805, UKR; Lug 63/11, LDS00806, UKR;

- the mass of 1000 grains, as were samples with large seeds (weight of 1000 seeds 251-350 g) – (8) Lug66/10, LDS00801, UKR; Lug 39/09, LDS00809, UKR; Lug 76/09, LDS00796, UKR; Lug 58/10, LDS00798, UKR; Lug 60/10, LDS00799, UKR; Lug 62/10, LDS00800, UKR; Lug 59/11, LDS00805, UKR; Lug 63/11, LDS00806, UKR, and very large seeds (1000 seeds weight > 350 g) – (3) Lug 56/10, LDS00797, UKR (m1000 = 388,1 g); Lug 74/10, LDS00803, UKR m1000 = 390,9 g); Lug 71/11, LDS00807, UKR m1000 = 375,7 g);

- high-tech, that is suitable for mechanized harvesting were all 12 samples: Lug 66/10, LDS00801, UKR; Lug 71/10, LDS00802, UKR; Lug 71/11, LDS00807, UKR; Lug 39/09, LDS00809, UKR; Lug 76/09, LDS00796, UKR; Lug 56/10, LDS00797, UKR; Lug 58/10, LDS00798, UKR; Lug 60/10, LDS00799, UKR; Lug 62/10, LDS00800, UKR; Lug 74/10, LDS00803, UKR; Lug 59/11, LDS00805, UKR; Lug 63/11, LDS00806, UKR. It should be noted that the compact Hive, the better beans are above ground, such Lug 39/09 - height of the lower attachment bean - 47 cm, Lug 59/11 - 45.2 cm;

- productivity plants - resulting feature high seed yield (% of the standard) > 115 had two samples: Lug 56/10, LDS00797, UKR; Lug 66/10, LDS00801, UKR.

- the shape of the bush in all samples chickpeas - standing, except – 39,9 Lug 59/11 and Lug 59/11 - these samples had a compact form of the bush.

- for complex traits should be separately identified samples Lug 56/10, LDS00797, UKR - like precocious (79 days from germination to maturation), long stem, suitable for mechanical harvesting (height lower attachment bean – 37,2 cm) standing bush form , m1000 = 388,1 g and a high yield and Lug 66/10, LDS00807, UKR - like ultra-early ripe (75,5 days from germination to maturation), long stem, suitable for mechanical harvesting (height lower attachment bean 32.3 cm), standing shrub form, high weight of 1000 grains - 331,5g and high yield.

Conclusions

The analysis of samples of peas and chickpeas were the following samples that have high technological and productive parameters:

- in peas a Lug 82/12, LDS01160, UKR, which has high technological and productive parameters (medium early ripe, tall, suitable for mechanical harvesting, Great seeds(mass of 1000 seeds (> 250 g) (weight of 1000 seeds – 253,2 g), yield per 1m² and 556,5h like Lug 161/10, LDS01153, UKR - like high, suitable for mechanized harvesting, a high number of seeds per plant 1 (41,4 pieces), high seed weight per 1 plant – 9,9 g and a high yield of 1 m² - 492,5h, high resistance to diseases and pests resistant to lodging;

in chickpeas – Lug 56/10, LDS00797, UKR - like precocious (79 days from germination to maturation), long stem, suitable for mechanical harvesting (height lower bean - 37.2 cm) standing bush form, m1000 = 388,1g and high productivity, Lug 66/10, LDS00807, UKR - like ultra-early ripe (75,5 days from germination to maturation), long stem, suitable for mechanical harvesting (height lower attachment bean 32.3 cm) standing form bush, high weight of 1000 grains - 331,5n and high yield and Lug 71/10 - ultra-early ripe (75,0 days from germination to maturation), very long stem, suitable for mechanical harvesting (height lower attachment bob 43,0 cm) standing shrub form, high number of seeds per 1 plant – 34,9 pieces (which is 40% more than the standard), high yield seeds (relative standard) - 115% (409 g/m²), high resistance to diseases and pests, drought and resistant to lodging.

In general, the study of all samples of peas and chickpeas showed high diversity characteristics when grown in the steppe zone of Ukraine. When creating a material with high-tech and productive parameters may recommend designs that combine valuable business features (peas - Lug 64/12, LDS01158, UKR; Lug 65/12, LDS01159, UKR; Lug 87/12, LDS01161, UKR; Lug 82 / 12, LDS01160, UKR, Lug 161/10, LDS01153, UKR; chickpeas - Lug 39/09, LDS00809, UKR; Lug 56/10, LDS00797, UKR; Lug 66/10, LDS00807, UKR).

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