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# 77 YEARS OF UNINTERRUPTED AGRICULTURAL RESEARCH IN SUCEAVA

In 1946, by decision no. 1933 of the Ministry of Agriculture, the first agricultural research unit in the northern part of Moldova (the Suceava Experimental Agricultural Station, currently the Suceava Agricultural Research and Development Station) was established, as a necessity for the development of agriculture in Bucovina. After three years of operation in the submontane area from Ilisesti (19 km from Suceava), by decision no. 564249 of August 24 of the same ministry, the resort was transferred to Suceava. The area where the cantonment is located is individualized by specific pedoclimatic conditions, characterized by thermal restrictions, the non-uniformity of the hydrological regime — from insufficient to excessive — and by a great diversity of soil types, from soils with low fertility to those with good fertility. The consequence of this ecological diversity was, from the beginning, the need to diversify the concern related to research activity in response to solving the main problems of agriculture in the Suceava Plateau. If in the year of establishment (1946) the concerns were directed towards the cultivation of potatoes, meadows and fodder plants, over time it can be seen by following the evolution of concerns and the way of achieving the basic objectives of agricultural research, in Suceava, a continuous expansion of the problem areas addressed as well as the amplification of their complexity.

**agricultural research; genotypes; pedoclimatic conditions; resistance**

In the first period, the experiments carried out contributed to the zoning of varieties for the main crop plants, seed production and the development of technologies for field crops, fodder plants, as well as for the improvement of pastures and hayfields.

In the sphere of concerns over time, the following research directions can be found:

— the creation of cereal varieties: wheat, rye, barley with high production potential, superior in quality, adapted to the growing conditions specific to the more humid and cooler areas of the country with improved resistance to the action of biotic and abiotic restrictive factors;
— the creation of early and extra-early corn hybrids, adapted to the colder conditions in our country, of superior quality, with increased resistance to breaking and falling;
— the creation of productive, early and semi-early potato varieties, with high ecological plasticity, tolerant to the attack of downy mildew, viral diseases and pests;
— improving the cultivation technologies for perennial grasses and legumes and for annual fodder plants;
— establishing the role of fertilizers in increasing soil fertility, crop yield and improving harvest quality indices;
— development of culture technologies specific to varieties and hybrids created and approved at SCDA Suceava;
— testing the resistance to black rust of the new potato genotypes created at the potato breeding centers in our country;
— evaluation and monitoring of diseases and pests in the main field crops specific to the NE area of the country;
— the production of seeds from the higher biological categories from the varieties and hybrids created by SCDA Suceava;
— the transfer of research results to the main beneficiaries: farmers, associations, specialists from the county agricultural directorates, etc.

***Results obtained***

**In wheat breeding**, S.C.D.A. Suceava has carried out, since its establishment, a sustained research activity in the field of improvement, initially aiming at sorting and identifying the most suitable varieties of autumn wheat, local and foreign, with a view to introducing them into culture and replacing the old cultivars of extensive (A15, Cenad 117, Tg.Frumos 16, Roşu de Botoşani, etc.) with some with high performances.

Research organized on the basis of a national system of wheat variety experimentation developed only after 1950, expanding after 1970, when special improvement works were initiated in the direction of creating new lines and more valuable wheat varieties and better adapted to the ecological and cultural conditions of Moldova and the northern part of the country. Through the development of breeding research, superior wheat genotypes were created, this being one of the safe and effective ways to increase the productivity, stability and quality of harvests

From the year 1946 until 2020, during seven decades, a number of 6761 wheat varieties and lines of perspective, of which 1795 varieties of domestic origin, were checked, in terms of behavior in vegetation and production, in comparative crops and foreign. The most valuable of these varieties were introduced and generalized in production, occupying significant areas in different periods.

**1. Autumn wheat cultivars approved by S.C.D.A. Suceava in the period 1979—2004**

| Variety | Year of crossing | Year of homologation | The metod of getting |
|---|---|---|---|
| *Bucovina* | *1968* | *1979* | *Individual selection (pedigree method)* |
| *Suceava 84* | *1969* | *1984* | |
| *Aniversar* | *1970* | *1986* | |
| *Magistral* | *1986* | *1998* | |
| *Gaşparom* | *1984* | *1998* | |
| *Esenţial* | *1988* | *2001* | |
| *Drobeta* | *1991* | *2003* | |
| *Putna* | *1994* | *2004* | |

After the pioneering period, starting in 1973, in the breeding activity, the first successes appear in the direction of creating wheat varieties that have superior characteristics compared to the old cultivations in terms of resistance to falling, resistance to diseases and pests, perfectly adapted to regional conditions and with a high and stable production over time. As a result of the improvement works, the Bucovina wheat variety was approved in 1979, then in the following years the Suceava 84 and Aniversar varieties, and after 1998 Magistral, Gasparom, Esenţial, Drobeta and Putna.

Valuable genetic sources were used for the creation of the eight winter wheat varieties whose genealogy and method of obtaining are summarized in table 1, most of them adapted to the north and north-west of Moldova.

The tests carried out over time on the main physiological characteristics of the new cultivars highlighted their value, classifying the varieties Gaşparom, Magistral, Esenţial, Drobeta and Putna among the wheat genotypes with increased resistance to the action of risk factors, biotic and abiotic (table 2).

Thus, under the ratio of winter resistance, there was a progressive improvement of this property, the varieties created at the Suceava Resort being characterized, from this point of view, as very resistant (note 2—3), as well as against the climatic stress caused by the drought conditions of some springs and summers, the new varieties proved resistant (note 2—3).

**2. The main physiological characteristics of the created wheat cultivars**

| Nr. crt. | Variety | Resistance to disease and climate stress (notes*) | | | | | | Precocity at maturity: ± days to control variant |
|---|---|---|---|---|---|---|---|---|
| | | Hibernation | Drought | *Erysiphe graminis* | *Septoria Tritici* | *Puccinia recondita* | Fall | |
| *1* | *Flamura 85 — mt.* | *5* | *3* | *4* | *6* | *5* | *2* | *0 (mt.)* |
| *2* | ***Aniversar*** | *4* | *5* | *5* | *6* | *4* | *5* | *–2* |
| *3* | *Gaşparom* | *2* | *3* | *3* | *3* | *4* | *4* | *0* |
| *4* | *Magistral* | *2* | *2* | *4* | *4* | *4* | *1* | *–2* |
| *5* | *Esenţial* | *3* | *3* | *3* | *5* | *3* | *2* | *0* |
| *6* | ***Drobeta*** | *2* | *4* | *3* | *4* | *4* | *3* | *+ 1* |
| *7* | *Putna* | *3* | *3* | *3* | *4* | *3* | *2* | *+ 2* |
| ** Notes in the FAO scale: 1 = very resistantt; 9 = very sensitive* | | | | | | | | |

Also, the resistance to the attack of foliar diseases (powdery mildew, septoriosis and brown rust) has been greatly improved, which in the growing conditions of northern Moldova are often important factors that influence the stability and quality of wheat harvests. Compared to the attack of these diseases, the new varieties show significant improvements, the resistance of the genotypes being obviously increased from medium resistant forms to resistant forms (note 3—4).

According to the duration of the vegetation period, the varieties Aniversar and Magistral belong to the early wheat forms, reaching maturity two days earlier than the control Flamura 85, while the varieties Gaşparom, Esenţial, Drobeta and Putna belong to the group of semi-early varieties, maturing up to two days later than Flamura 85.

Appreciating the value of the varieties in terms of productivity (table 3) in the ten years of experimentation, it is found that the varieties created at S.C.D.A. Suceava, namely Aniversar, Gaşparom, Magistral and Esenţial, which achieved average productions from 6333 kg/ha to 6576 kg/ha, exceeding the production of 5720 kg/ha of the control variety Flamura 85, with large increments, from significant (613 kg/ha) to very significant (856 kg/ha), which represents 11% and 15% respectively. At the same time, they were also distinguished by a greater stability of the productions, proven by the step of the amplitude of the productions, relatively smaller, from 1938 kg for the Anniversary variety to 2581 kg for the Magistral.

Over time, the performance of the Suceava 84 and Aniversar varieties was evidently enhanced by the highly competitive ecological response. Thus,

**3. The production of grains obtained from the varieties created by S.C.D.A Suceava compared to other varieties**

| Nr. crt. | Variety | Numbers of years of experience | Limits of variation kg/ha | Average production: | | | Semnification |
|---|---|---|---|---|---|---|---|
| | | | | kg/ha | % | Difference ± kg/ha | |
| *1* | *Flamura 85 — mt* | *10* | *4239 — 6842* | *5720* | *100* | *-* | |
| *2* | *Fundulea 4* | *10* | *4143 — 7100* | *5511* | *96* | *- 209* | |
| *3* | *Dropia* | *10* | *4274 — 6610* | *5588* | *98* | *- 132* | |
| *4* | *Gabriela* | *10* | *3418 — 6730* | *5252* | *92* | *- 468* | |
| *5* | *Apullum* | *10* | *4705 — 6638* | *5427* | *95* | *- 293* | |
| *6* | *Arieșan* | *10* | *4563 — 7345* | *6036* | *105* | *316* | |
| *7* | ***Suceava 84*** | *10* | *5031 — 6856* | *6137* | *107* | *417* | |
| *8* | ***Aniversar*** | *10* | *5332 — 7270* | *6397* | *112* | *677* | ** |
| *9* | ***Gașparom*** | *10* | *5594 — 7679* | *6576* | *115* | *856* | *** |
| *10* | ***Magistral*** | *10* | *4806 — 7387* | *6394* | *112* | *674* | ** |
| *11* | ***Esențial*** | *10* | *4785 — 7338* | *6333* | *111* | *613* | * |
| *DL 5% = 484 kg/ha; DL 1% = 641 kg/ha; DL 0,1% = 829 kg/ha* | | | | | | | |
| *12* | *Flamura 85 — mt.* | *7* | *4239 — 6842* | *5547* | *100* | *-* | |
| *13* | *Eliana* | *7* | *4507 — 7073* | *5477* | *99* | *- 70* | |
| *14* | ***Drobeta*** | *7* | *5524 — 7337* | *6669* | *120* | *1122* | ** |
| *15* | ***Putna*** | *7* | *5625 — 7630* | *6567* | *118* | *1020* | ** |
| *DL 5% = 616 kg/ha; DL 1% = 844 kg/ha; DL 0,1% = 1150 kg/ha* | | | | | | | |

due to its productive value and good behavior in vegetation, the Suceava 84 variety had a wide spread in cultivation in Moldova, until 1998, when it was gradually replaced by Gasparom and Magistral, and the Aniversary variety occupied smaller areas from 2002, being replaced by Putna.

For **autumn rye**, breeding research started after 1950, shortly after the establishment of S.C.D.A Suceava, through checks on the behavior of different local populations and foreign varieties in the growing conditions of the western part of the Suceava Plateau, constituted a preliminary stage to the systematized organization and the amplification of rye breeding works, which developed after 1970, thus appreciating that, with this, the culture of autumn rye, like other plants in the area, entered an upward trajectory.

S.C.D.A Suceava did pioneering work, especially until 1975, when the collection was established and studied, which would later give the first lines and then the first valuable varieties with high production capacity. After this period, the determining concern is the improvement of intensive varieties

with a short waist (90—120 cm) and a capacity of 75—80 q/ha. The repeated genetic research carried out at the Suceava Station with the combined use of hybridization, mutagenesis and inbreeding methods led to the discovery of new genetic sources with dominant determinism for straw shortening like Sv 130, Sv.781, Sv.623 which made it possible to improve rye in our country, to go towards the possibility of widening the assortment of varieties with dwarf cultivation.

In 1983, the Gloria variety was approved, the first Romanian variety of short-stemmed rye that was quickly put into production in all areas of the country. Starting with 1998, the Orizont and Ergo varieties were approved, then Suceveana in 1996. Specially intended for the production of sclerotia of the rye horn Claviceps purpureea — the «Carpați» line was created with a high receptivity to the attack of the fungus.

When creating valuable varieties and lines, valuable genetic sources were used, combining both genes from the European germplasm, included in the hybrid population through the high-production Polish and German varieties, as well as ecologically differentiated genes, from the autochthonous germplasm pool, introduced through inbred lines characterized by short stature and increased resistance to falling and diseases.

The period 1996—2020 was characterized by progress made in the direction of creating forms with short straw, of high productivity and with improved resistance to falling.

The phenological observations made on the breeding material experienced during this period, highlighted the different behavior of the new genotypes in terms of plant growth and their resistance to the action of biotic and abiotic risk factors.

The limited assortment of domestic rye varieties represented by Gloria, Orizont and Ergo was enriched with the Suceveana variety, which stands out from the others due to its productive performance and better resistance to falling and disease attack.

In 1995, the first variety of spring rye, Impuls, was approved.

**In triticale**, the aim was to create productive hexaploid and octoploid varieties with short straw, suitable for crops on acid, wet and cold soils in the north-west of the Suceva Plateau and in areas with similar conditions in the country. In this way, two valuable varieties were homologated in terms of production and resistance to breaking, falling, diseases and pests and perfectly adapted to the zonal conditions Silver (1992) and Prospect (1993).

**Spring barley** occupies a significant place in the region served by the Suceava Resort, both by cultivated areas and by importance. Since 1949, research has been carried out on the behavior of different varieties in culture, the experimental data provided periodically contributing to the replacement of the old extensive varieties sensitive to fall and poorly productive, with foreign varieties, more intensive and which responded positively to our conditions zonal.

The period after 1980 is characterized as a new stage in the development of research in the field of spring barley improvement, in which, in parallel with the study of the world collection of over 1500 varieties regarding the identification of the most valuable cultivars to be introduced into culture, they greatly amplified the actual improvement works for the creation of autochthonous varieties with high production.

Starting from the need to increase the production capacity and its stability, due importance was given to this grain for the creation, through hybridization, of hybrid populations capable of showing a high positive compatibility of valuable genes. By combining the methods of hybridization and mutagenesis and applying a rigorous selection on the experimental material, new lines resistant to disease and fall, productive and earlier than the existing cultivars at that time were created. Thus, starting with the year 1988, 8 varieties of spring barley were approved, superior in terms of productivity, precocity, quality and resistance to the restrictive action of biotic and abiotic environmental factors, which favor an increased yield of industrialization. In 1988, the Prima variety was approved with a good resistance to breaking and falling, then the Farmec variety in 1995, Maria in 1998, Avbnt in 2001, varieties with a very good production capacity.

The presence of a very varied and rich germplasm fund has allowed the identification of valuable genetic sources that demonstrate, at the level of the primary lines in the breeding process, that it is possible to obtain orzoaica forms with much wider production possibilities and with improved resistance properties. Thus the Succes varieties were approved in 2002, and in 2003 Suceveana 3, Stindard and Narcisa.

At the end of the 70s, the first oat variety was approved: Suceava 100, which was grown on large areas in the area served by the Resort.

Sustained research has been carried out on potatoes since the establishment of the unit. Experimental data on the identification of new potato varieties more valuable for production, resistant to pathogens contributed in the first stage to the replacement of old foreign varieties, poorly productive and susceptible to diseases, with new varieties from countries with a recognized tradition in the field of potato breeding.

The increase in the requirements regarding the **potato** for consumption and industrialization, as well as the appearance of new pathogens and pests, made that starting from 1960, the research in the field of potato improvement entered a new stage characterized by works supported by actual improvement, in the direction of increasing resistance varieties against viruses, degeneration and pests, with a high production capacity, superior culinary qualities and suitable for mechanization. The first variety created at S.C.D.A Suceava, Sucevița was approved in 1982, being cultivated on large areas in Romania and beyond. It was followed in 2000 by the Moldovița and Dragomirna varieties, in 2001 by Magic and Astral, in 2002 by the Rapso-

dia and Triumf varieties, in 2003 by Alina and Claudiu, then by the Loial variety in 2004. The next variety — Expres was approved in 2011, Temerar in 2016, and the latest potato creations were approved in 2023 — Impuls and Event varieties.

**In flax for fiber**, the initial concerns were oriented towards the identification of the most suitable varieties to meet the zonal requirements. As a result of the improvement works initiated in 1977, some lines were obtained that stand out for their high fiber productions, superior to the varieties cultivated until then. Thus, in 1996, the flax variety for Eemina fibers was approved, then in 2000, the Ada variety with very high productions of very good quality fibers.

The Suceava resort has carried out extensive research to identify and improve some species of fodder plants such as: spring pea, timothy and fodder gourd.

**For spring peas**, the variety Suceava 54 (De Suceava) was created and approved in 1965, very well adapted to the growing conditions in our country, generalized in production in all growing areas.

In the case of **timothy** (*Phleum pratense*), it was aimed to create new forms and varieties, later than those existing in the culture, resistant to the attack of diseases, with high production capacity and improved rotting properties, through improvement works.

Considering that this species is used in both hay and pasture mixtures, specific varieties models for the two ways of use have been proposed. In both cases, the priority objective was to obtain more than 10 t/ha S.U. in the most differentiated conditions, so with the greatest possible ecological plasticity. In this way, the Tirom variety was approved in 1979, then in 1994 the Favorit variety. Quality in forage plants is best expressed through conversion to animal products. That's why improvement aims to create forms with a relationship as favorable as possible to it. The Horia and Rarău varieties were obtained and approved on these principles in 2002.

For **fodder gourd**, the objective of the improvement research carried out over time at the Suceava Station was to obtain high-productivity genotypes, capable of frequently achieving 90—100 t/ha. For this purpose, improvement works were focused on improving resistance to diseases, especially viruses, which decrease the ability to keep the cuttings and depreciate the nutritional qualities. Thus, two fodder gourd varieties were approved: Victoria, in 1985 and Dana, in 2000. After correcting a series of characteristics with implications in production capacity, in 2002, the Ana Maria variety was approved.

Considering the pedo-climatic conditions in the area, the main objective of the **maize breeding** activity was to create early and extra-early hybrids with high production potential, of superior quality with resistance to cold, breakage, fall, diseases and pests, adapted to the cold and wet areas of the country.

Breeding works began in 1955 through the collection and study of local populations, from which the cultivars Hângănesc de Suceava (1958) and Suceava 1 (1967) were obtained. The creation of the two varieties of corn represented an important stage in the breeding action of corn production per unit area. But no matter how productive the cultivars are, they will never be able to provide production levels comparable to hybrids. The vigor of the heterosis phenomenon, obtained through the directed crossing of varieties, constituted a technical possibility to increase the yield.

The successes recorded worldwide in the improvement of corn by capitalizing on the heterosis resulting from crosses between inbred lines as well as the results obtained in this direction were convincing so that selection works in order to obtain inbred lines should also be addressed at the Suceava Station. The concretization of the selection works, carried out in the direction of obtaining inbred lines and the creation of hybrids, was achieved in 1976, when the Suceava 95 double hybrid was approved.

The purpose of the maize breeding activity in the unit was to create genotypes adapted to the pedo-climatic conditions offered by the area. Besides this objective specific to all the seasons that produce corn hybrids, the Suceava Station had to produce extra-early and early hybrids, productive and with good cold tolerance, especially in the first phases of vegetation, an objective imposed by the natural conditions of the zonal ecosystem.

The genetic difficulties that appear in the improvement of extra-early and early forms, due to the antagonisms between earliness and grain production, on the one hand, and between earliness and plant resistance to breaking and falling, on the other hand, are very difficult to overcome, but with a strategy adequate and with sustained efforts these antagonistic correlations were overcome.

In 1980, the trilinear hybrid Suceava 108 was approved, which is superior to the other hybrids created up to that time and which is characterized by a very good tolerance to low temperatures. A strong asset of this hybrid was the fact that seed production could be done without castration, the simple hybrid mother being totally androsterile, and the male line being totally restorative.

After five years, the Suceava 99 trilineal hybrid was approved, which was created to complete the range of hybrids grown in the third corn growing zone in Romania. At the time, it presented the advantage that it could be used for silage due to the fact that the leaves remained green after harvesting.

The hybrid Suceava 97 was approved in 1989 for the production of sorghum. Three years apart, in 1992 the Montana hybrid was approved to complete the range of early hybrids, then in 1994 the Bucovina hybrid was approved. The Nordic hybrid, approved in 1995, completes the range of hybrids from the third cultivation area, having a good resistance to breaking and falling as well as to low temperatures in addition to a high production.

Two trilinear hybrids Millenium and Decebal were approved in 2000 and 2003 respectively, being vigorous hybrids, very resistant to breaking and falling and with a very good production, and in 2018 the Suceava M hybrid was approved. Currently they are being studied and tested several promising lines, and some are in the procedure for homologation.

At S.C.D.A Suceava throughout the period from the establishment of the corn breeding laboratory until now, a very large number of genotypes have been created and verified, of which 11 hybrids have been approved.

In parallel with the breeding program, S.C.D.A Suceava supported an extensive research activity in the direction of establishing culture technology for this species

The research topic in the field of **agrophytotechnics** was oriented towards the development and improvement of production technologies, differentiated according to the great diversity of the natural environment of the area of influence and the specific requirements of cultivated varieties and hybrids. The experiments carried out brought new contributions regarding the role of rotation and rotation, tillage, fertilization, sowing time and density, combating diseases, pests and weeds in increasing the quantitative and qualitative production.

**Description of the activity at the Pojorвta Agricultural Research Center**.

In 1968, the Pojorвta Agricultural Research Center, also called the «Potato Black Rust Control Center», passed under the administration of the Suceava Agricultural Development Research Station, with the activity of — Testing the resistance to black rust produced by the fungus Synchytrium endobiticum, a new potato lines that go through the breeding process and new domestic and foreign potato varieties».

The center has a plot of land of 0.5 ha, heavily infested with akinetosporangia of Synchytrium endobioticum, where this type of activity has been carried out since 1954, and that plot is intended only for testing potato resistance to black rust. From 1968 until now at the Pojorвta Center over 70,000 potato genotypes have been tested under field conditions through natural infection and over 6,000 lines under greenhouse and laboratory conditions through artificial infection.

The Research Center is located on the first terrace of the Moldova River, at an altitude of 700 meters, and is the only location in our country where the testing of the resistance to black rust, produced by Synchytrium endobioticum, of the new potato genotypes created by the breeding laboratories is carried out of the potato and the imported material.

Considering that the submontane and mountain areas of Romania are traditionally home to large herds of animals and that the structure of crops in these areas is quite small, one of the main problems is the production of vegetable proteins in sufficient quantities, necessary to balance the fodder balance. In this sense, the cultivation of legumes for grains on large areas

is of interest, a group of plants that includes the grain, whose fodder value consists in the high content of digestible protein (24—45%). If for some ecological areas of our country this protein requirement is ensured both in food and in feed, by growing legumes such as peas, beans and soybeans on large areas, the same cannot be said about the cold and humid areas (submontane and mountains). In this sense, the grain represents for these agro-ecological areas, where other protein-providing plants do not find optimal growing conditions, the plant that mainly provides the necessary source of protein for fodder as a concentrated fodder, but it can also be used and food purpose (var. major).

In this context, since 1982 it has been organized at the Suceava Agricultural Development Research Station, at the Pojorвta Agricultural Research Center, located in Obcinile Bucovina

(Suceava county), a research program on the Improvement of the bean (*Vicia faba L.*), a program in which, from the beginning, an intense activity regarding the collection, study and conservation of the initial material imposed by the need for knowledge and use in the process of improving a genetic background as wide as possible.

In a relatively short time, this objective was realized with a collection composed of 360 genotypes, of which 190 foreign from different ecogeographic areas (54 countries on 3 continents) and 170 native populations from 7 counties.

In the grain improvement activity, the exploration of the germplasm from the world and domestic collection was imposed from the beginning to find new sources of genes related to the control of the value of productivity components, quality and influencing factors, the accumulation of valuable genes in new genotypes, the increase of phenotypic plasticity and genotypic varieties, in order to obtain maximum yields under optimal agrotechnical conditions, breaking existing negative correlations between productivity elements or these and some biological properties.

In order to achieve the objectives proposed in this program, directed hybridization was used as improvement methods and techniques, for the meeting in the hybrid organism of the desired hereditary characters belonging to two or more genetically different parental forms and mutagenesis, through which to create sudden changes favorable in the genetic constitution, both methods followed by individual selection.

The bean improvement works were materialized by the approval in 2000 of the Montana bean variety and in 2004 of the Moldoviţa variety, which belong to the species *Vicia faba L., var.* Major Harz.

The Montana variety was obtained by the individual selection method, from a hybrid population resulting from crossing the Sv 24-67-85 grain line with the Minica variety. The hereditary endowment of this new variety combines genes from the West-European germplasm, induced in the hybrid

through the Minica variety of French origin, as well as ecologically distant genes, introduced through the improvement line Sv 24-67-85 of Romanian origin originating from a local population of Pojorata.

The genotype was approved in 2000, being recommended for all areas favorable to grain cultivation in our country, cold and humid areas.

In our country, a very narrow biodiversity is registered, expressed by a small assortment of cultivated varieties, more frequently there are some local populations in culture characterized by a wide fluctuation of production and labile ecological stability.

By creating the Montana bean variety, the aim was to complete the assortment with a more valuable bean genotype, with adaptability to wider culture and environmental conditions, improved disease resistance properties, capable of achieving increased productivity and greater stability in production.

The Moldoviţa variety was obtained by the method of individual selection, from a hybrid population, resulting from the hardening of the Sv 24-29-87 bean line with the Cluj 84 variety. The hereditary endowment of this new variety combines genes from the germplasm of the major and minor varieties, induced by the line Sv 24-29-87 (mother form — var. major), a line belonging to the author, obtained by individual selection from the heterogeneous local population of Pojorata and the Cluj 84 variety (father form — collection — minor var.) of Romanian origin. In the period 1995—2003, the obtained genotype was tested in comparative crops and in 2004 it was approved under the name of Moldoviţa, authorized for production in all areas favorable to grain cultivation in our country for fodder and food purposes. By creating this genotype, the aim was to complete the Romanian assortment with a new grain genotype, intended for fodder and food, more valuable, with improved properties of resistance to diseases, with wider adaptability to the conditions of culture and environment, capable of achieving a productivity increased and greater stability in production.

In the field of **plant protection**, the research activity considers the study of pathogens and pests that cause significant damage, the knowledge of their range, biology and ecology, as well as the development of prevention and control measures.

The main concerns were: the development and improvement of technologies to prevent and combat pathogens and pests from cereal crops, technical and fodder plants in order to increase the effectiveness of treatments, avoid the emergence of the phenomenon of resistance to pesticides and reduce the risk of environmental pollution, the implementation of insecticides biorational in the integrated management of pests in order to preserve the biodiversity of agricultural ecosystems, the assessment of the impact of biotic and abiotic factors on the evolution of the pathogenic complex in the main crops in the north of the country, the rationalization of the chemical

control of diseases and pests in cereal crops, technical plants and fodder by diversifying and broadening the assortment of pesticides, reducing the doses, establishing the number and the optimal moment of their application.

**Objectives and scientific directions to follow in the future.**

For the next period, the unit aims to continue the activities within the specific major objectives and to develop new activities in time in order to solve the existing problems and those that appear in the agriculture of the area. The major objectives in the field of plant breeding are represented by the creation of competitive genotypes and the production of seeds from superior biological categories.

Increasing the economic efficiency of autumn wheat, rye, spring wheat, corn and potato crops will be achieved by creating superior genotypes by improving certain of their properties, capable of counteracting or even annihilating the limiting action of some environmental factors less favorable, attack of diseases and pests and other properties of unsatisfactory resistance.

Through the seed production process, the aim is to ensure quantities of high biological value that satisfy the demands of growers in the coverage area. A special attention should be given to the promotion of the seed production system and of some genotypes created by units from the country and abroad.

The creation of new genotypes will be carried out through activities that will take place in the following specific directions of the plant breeding team:

— for the autumn wheat, improvement works will be oriented with priority in the direction of improving the resistance to the attack of diseases, primarily to powdery mildew, septoriosis, yellow and brown rust and fusariosis. This priority is imposed by the optimal conditions that our area offers for the development, almost every year, of a broad spectrum of very virulent cryptogamic diseases that frequently reduce production by up to 50% and greatly deplete its quality. In parallel, the shortening of the plants' waists, the increase of precocity and the improvement of the resistance to sprouting in the ear will be followed;

— in the case of spring barley, the researches will focus on increasing the production capacity and its stability and on improving the industrialization properties, at the same time, the selection pressure will be intensified regarding the improvement of the resistance to specific diseases: helminthosporiosis, septoriosis and rusts;

— for corn, which in the area of Suceava approaches the northern limit of culture for our country, there are special conditions of temperature and humidity, which ecologically substantiates the need to improve extra-early and very early forms precisely in this part of the country. The corn improvement strategy for such areas will provide

for the creation of high-yield hybrids with ecological plasticity, with guaranteed resistance to low temperatures in the spring and especially with a short vegetation period and with a genetic resistance to diseases and pests. Specific improvement works will be continued in the direction of mitigating, at the genetic level, antagonistic correlations existing between some processes, so that the created maize genotypes come as close as possible to the proposed ideotype;

— the research on the improvement of the potato will be oriented towards improving the precocity, the photosynthetic capacity and the superior valorization of fertilizers, which, based on the resistance to diseases, viruses and pests, will provide conditions for the realization of genotypes capable of offering high and constant productions. The dominant presence of some restrictive factors dictates the need to increase the selection pressure in order to obtain genotypes with obvious precocity of tuberization in the early stage of vegetation so that by July 10—15 they accumulate 75—80% of the total production;

Another major objective in the field of plant improvement is the maintenance of the germplasm collection from the unit's heritage and its enrichment through mutual exchanges with different institutions.

The maintenance of this germplasm will continue to be used in the improvement process as important sources of initial material.

In order to promote the new creations of the unit, special attention will be paid to their registration in the ISTIS national network in order to obtain invention patents.

In the field of agrophytotechnics, research will focus on two priority directions: optimization of the fertilization system to ensure higher levels of production without affecting the environment and the continuation of long-term experiences with fertilizers. Studies on the soil-plant relationship will be intensified, major changes that have occurred — as a result of the application of different doses of fertilizers for over 50 years.

For fodder plants, the research will aim at widening the range of species depending on the culture areas and the concentration of different animal species and finding new possibilities of using mineral and organic fertilizers to obtain ecological products. Concerns will also focus on improving natural meadows by applying agrophytotechnical measures and finding ways to rationally exploit them with animals in order to obtain ecological productions.

In the field of plant protection, the research will pursue the improvement of technologies for preventing and combating pathogens and pests from cereal crops, technical and fodder plants in order to increase the effectiveness of treatments, avoid the emergence of the phenomenon of resistance to pesticides and reduce the risk of environmental pollution.

The particularly high pressure of pathogens in this area requires the intensification of research on mitigating the destructive effects caused by

their evolution. Special attention will be paid to ensuring the quality of production in conditions of increased pathogenic pressure by perfecting some technological sequences of plant protection. Another priority research direction will consist in the implementation of biorational insecticides in the integrated management of pests in order to preserve the biodiversity of agricultural ecosystems.

Research will be continued on the development of strategies to combat pests in the potato crop through various non-conventional methods (the use of metabolites extracted from native plants and commercial bioinsecticides) in order to obtain potato tubers in an organic system.

Another direction of research is the adaptation of autumn rape to the conditions of biotic and abiotic stress, as well as the optimization of the culture technology in order to expand the range of this species. The influence of technological systems in reducing inputs for optimizing energy ratios and maximizing profits will be followed.

In order to promote Romanian and foreign varieties of potato, at the Pojorata center, research will be continued regarding the testing of resistance to the black blight of new lines and varieties under field conditions through natural infection and laboratory conditions through artificial infection.

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## 77 років безперервних сільськогосподарських досліджень в Сучаві

У 1946 році рішенням № 1933 Міністерства сільського господарства було створено першу сільськогосподарську дослідну станцію в північній частині Молдови (Сучавська дослідна сільськогосподарська станція, нині Сучавська сільськогосподарська дослідна станція), як необхідність для розвитку сільського господарства в Буковині. Після трьох років роботи в передгірній місцевості від Ілішешть (19 км від Сучави), рішенням № 564249 від 24 серпня того ж міністерства, установа була переведена до Сучави. Територія, на якій розташована дослідна станція, індивідуалізована специфічними педокліматичними умовами, що характеризуються тепловими обмеженнями, нерівномірністю гідрологічного режиму — від недостатнього до надмірного — і великою різноманітністю типів ґрунтів, від ґрунтів з низькою родючістю до ґрунтів з хорошою родючістю. Наслідком такого екологічного розмаїття з самого початку була необхідність диверсифікації науково-дослідницької діяльності у відповідь на вирішення основних проблем сільського господарства на Сучавському плато. Якщо в рік заснування (1946) діяльність товариства була спрямована на вирощування картоплі, луків і кормових рослин, то з часом, слідкуючи за еволюцією товариства і способом досягнення основних цілей сільськогосподарських досліджень в Сучаві, можна помітити постійне розширення проблем, що досліджуються, а також посилення їх складності.

**сільськогосподарські дослідження; генотипи; педокліматичні умови; стійкість**

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