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The ampelographic collection – glorious past, challenging present, expectant future

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Abstract. During the more than 190 years since the founding of the first ampelographic collection, the creation of a series of collections is attested on the territory of the Republic of Moldova, each operating in different historical periods and socio-economic conditions, and having contribution to the progress of viticulture in the republic at essential or critical stages of its development: promotion of local and most valuable introduced varieties; transition to grafted vine culture at the beginning of the 20th century; the formation of new assortment, adapted to the new intensive industrial technologies - varieties with resistance to abiotic and biotic unfavorabele factors of environment. In base of two last collections, in the result of breeding programs, the assortment was completed with varieties for divers direction of use, as well as, for the first time, with seedless varieties. For the purposes of transferring the existing ampelographic collection, the principles of its establishment and management have been reevaluated, a strategy for mobilizing genetic resources is developed and refine. Starting from the necessity of proper documentation and management of the future collection the functionality of the existing Information System of grapevine genetic resources was extended.

1. Introduction

The use, based on research, of genetic resources constitutes the foundation of the development of agriculture by introducing, evaluating, creating new varieties of plants, breeds of animals. Because of large biodiversity of vegetal genetic resources the productivity in agriculture increased significantly and during the last century this influence became determinative for their progress. Thus, based on genetic improvement methods, applying as a strategy the change of plant architecture through the wide use of genetic resources, the increase in rice production by 20-25% was achieved, and the productive potential of new wheat varieties – by 10-15%, including due to the valorization of genes of resistance to abiotic and biotic factors of wild species [1, 2].

Being performed a comparative analysis of the average production in Republic of Moldova for four crops (winter wheat, maize, sunflower and sugar beet) in the most favorable and most dry years (1961-1990) their difference is not found significant [3]. The impact of unfavorable weather conditions was diminished by the implementation, during this period, of new varieties, hybrids and compliance and improve of used phytotechnical processes.

Grapevine (*Vitis* L.) makes a major contribution to the diversification of the market with products of high nutritional and curative value, and the wine-growing branch in the Republic of Moldova constitutes an important share of the budget.

2. Presence of grapevine on the territory of republic

The presence of the genus *Vitis* L. on the territory of the Republic of Moldova since prehistoric times is confirmed by paleontological discoveries - the imprint of a fossil grapevine leaf dating from the Upper Miocene was found [4]. Archaeological excavations indicate that already at the end of the Stone Age – the beginning of the Bronze Age, the population of this territory used grapes and their

"domestication" is associated with the Cucuteni-Trypillia culture [5].

There are no data on the evolution and level of development of the vine in the following periods, but in the "Geography" of the famous Greek geographer Strabo (65 BC - ca. 23) the presence, in the middle of the 1st century BC, on the territory of the state of Dacia, which include and the current territory of the Republic of Moldova of a developed viticulture is mentioned [5]. The development of viticulture, including aspects related to the assortment composition, the technological processes applied, etc., took place under the influence of contacts and exchanges with Greece (starting with the 6th-2nd century BC), the Roman Empire (starting with 27 BC), the countries of the Middle East (3rd-6th century - the period of the great migrations of peoples) [6]. The process of formation of the autochthonous assortment ends by the 14th-16th centuries [7].

Vine cultivation was further perpetuated on the territory of Feudal State of Moldova and Bessarabia (after 1812), the main share in the local asortment being held by the old autochthonous varieties. As evidence of the wide spread of these varieties serve more than 170 names (including synonyms) found on the territory of Bessarabia [5].

In all subsequent historical periods, the culture of grapes was linked with the activities of the population, became a part of the cultural heritage of the people.

3. Meteorological particularities of territory of republic

The Republic of Moldova is located in the south-eastern part of Europe between 45°20'-48°20' north latitude and 27-30° east longitude, which, based on its geographical location, corresponds to the northern border of industrial viticulture. Although grapevine has been growing in the republic since prehistoric times, the climatic features of the republic still create certain risks for its industrial cultivation. Thus, in winter, due to air masses of different origin (Atlantic, Afro-Mediterranean, Arctic), the thermal regime is varied and often very unstable. Due to Arctic air masses, the temperature in winter can reach an absolute minimum of -30 ... -34 °C in the northern and central regions and -27 ... -30 °C in the southern regions [8, 9]. When air masses from the Mediterranean penetrate in winter, thaws occur, the duration of which can be up to 45 days in the northern regions and up to 60 days in the south of the republic. These fluctuations affect the presence and stability of snow cover, the water regime of the soil and complicate the wintering of grapevines.

The evolution of air temperatures over a 120-year period (1988-2008) highlights some features over the past 24 years [10]: the number of years with high temperatures has increased and vice versa, years with low temperatures are less common.

The ampelographic collection is located on the territory of the Public Institution National Institute for Applied Research in Agriculture and Veterinary Medicine, on the southern outskirts of the Chisinau municipality (46°58'39.65" N and 28°46'21.68" S), on the south-eastern slope, with an inclination of 3-6°. The soil and climatic conditions of the experimental plots correspond to the conditions of Centru (Codru) wine-growing region of the Republic.

4. Creation of ampelographic collections

4.1. First amplelographic collections

The process of accumulating genetic resources of grapes and founding of ampelographic collections in Moldova has a 190-year history and is mainly associated with the organization of educational, experimental and scientific institutions. The first collection was established in 1832 on the farm of Karl Tardan in the settlement of Shabo, located 8 km south of Akkerman (Cetatea Albă or, at present, Bilgorod-Dnistrovskii) [11]. Having an education received in Geneva, in his farm, in addition to a comprehensive study of viticulture issues (the results were published in his book "Viticulture and Winemaking with Explanatory Drawings"), he first studied the behavior of 85 local varieties. Later, 245 varieties were brought from the Crimea (from Magarach). Thus, more than 330 varieties were accumulated in the collection, of which the best for this area were identified.

The creation of the next ampelographic collection is connected with the activities of the Bessarabian School of Horticulture (founded in 1842). In 1849, a collection of about 200 varieties was created at the school, most of them imported from Crimea. Among them were varieties that were still unknown to the local population: Mourvedre, Pinot Franc, Pinot Gray, Muscat, Traminer, Riesling, etc. They played a major role in improving the grape assortment of Bessarabia. The school's collection was second in importance after that established at the Magarach winery [5].

The invasion of phylloxera and diseases in Europe at the end of the 19th century largely destroyed the old own-rooted vineyards, while also affecting the cultivated assortment. Among the measures aimed at restoring viticulture in the region was the creation of the Experimental Demonstration Garden (Station) in locality Costiujeni, in the vicinity of Chisinau in 1909 (from which the history of our institute begins). The first head of the experimental station, Pavel Antonovich For, who graduated from the agricultural school in Montpellier did a lot to disseminate the best varieties and agricultural techniques in Bessarabia, participated in the publication of popular books, and the training of specialists and workers.

Beginning in 1909, European varieties, rootstocks, and hybrids direct producers (HDP) were received and planted from the Richter nursery in Montpellier, France [12]. From the nurseries of Bessarabia grafted vines of autochthonous varieties Rara Neagra, Plavai, Coarna Neagra, Belardzhe, Zghihara, Pasareasca, Causeni, Cabasma, Galbena were obtained. At the same time, in a separate quarte, an ampelographic collection was established, containing 84 European varieties and 27 HDP. In the following for this

collection was used reference name as "French Collection". Among the tasks set before the station were to test introduced varieties and hybrids, as well as autochthonous varieties and recommend the best of them for introduction into production.

The formation and functioning, in different periods of time, of various institutions (educational, experimental stations, branches of scientific institutes) also contributed to the creation of various collections. Can be mentioned the Tiraspol irrigation and fruit experimental station, Moldavian Branch of All Union Academy of Sciense, Moldavian Branch of Magarach Institute, where were founded Ampelographic Collections [80]. On the initiative of prof. A.M. Negrul', varieties of eastern origin were introduced. Prof. A.M. Negrul' remained a scientific consultant on all subsequently created scientific institutions [80].

4.2. Amplelographic collection of MRIHVW

In 1956 the Moldavian Research Institute of Horticulture, Viticulture and Winemaking (MRIHVW) was created, where the following ampelographical collection were founded. Since during the existence of this Institute (and subsequent institutions) two ampelographic collections were created, the one established in 1957 was later conventionally called the "old" collection, and the one established in 1982 - the "new" one, in the future, to distinguish them, we will adhere to this terminology.

Since 1957, the MRIHVW included in its thematic plan the creation of a grafted ampelographic collection, which was entrusted to Dr. Ekaterina Ivanova [14, 15]. The creation of an ampelographic collection, including a wide variety of genetic resources of grapes, was aimed at the development and promotion of modern viticulture not only in the republic, but also in the former USSR as a whole. It was intended to present in this collection the varieties of the Black Sea basin, including local varieties of Moldova. In addition, the collection was to include: zoned varieties of all viticultural regions of the USSR, varieties of old local selection from all zones of the USSR, new varieties of Soviet and foreign selection, rootstock varieties, HPD, species of the *Vitaceae* family and wild forms.

Biological material was brought from the world's main viticultural centers, as well as from the former Soviet republics – in total from about 53 sources (researche institutes, experimental stations, universities etc.). The collection has 42 quarters: 38 quarters were planted with varieties and forms of *V. vinifera* L., one quarter with HDP varieties and forms with the participation of *Labrusca*, two quarters with varieties of rootstocks, and one quarter with wild forms and species of the *Vitaceae* family. The variety samples planted in the collection were grouped by place of origin or greatest distribution. According to the accepted methodology, each variety in the collection was represented by 10 bushes, and autochthonous varieties - by 20 bushes.

Created collection had acquired the status of a collection of all-Union significance, and in terms of the number of variety samples and genetic diversity it occupied 3rd place in the world among ampelographic collections (after the USA and France). By 1980, this collection included about 2,750 samples of varieties, species, HDP, *Labrusca* representatives, rootstocks, and elite forms from more than 50 points around the world.

In the frame of this collection researches was carried out to evaluate genotypes' resistance to diseases and pests. As for resistance to phyllochera, 1835 genotypes were assessed, of which 11 genotypes with increased resistance, 50 with average resistance, and about 60 varieties and 258 hybrids forms tolerant to phylloxera were isolated. About 100 genotypes with resistance to low temperatures and about 190 varieties with increased resistance to gray rot were identified. More than 150 genotypes were identified for inclusion in breeding programs.

4.3. The present amplelographic collection

By 1980, all the tasks and goals formulated when creating the "old" collection had been basically accomplished [15], and new varieties had been obtained and zoned as a result of the breeding programs. At the same time, new requirements for the assortment provided for an expansion of the range of table grapes and a variety of ripening periods. There was a need to introduce genetic resources with the properties of early ripening and seedlessness. The requirements for resistance to unfavorable abiotic and biotic environmental conditions also remained relevant. These properties were present, to some extent, in some genotypes, mainly separated. The task was to identify and introducing genotypes with these properties, as well as those that have more than two desired properties in one genotype, while possessing high quality and productivity.

Based on these goals, by 1980 the principles for foundation of new collection had been formulated and responsibility for the work was assigned to the Ampelography and Genetic Resources laboratory, head of the laboratory Dr. Gheorghe Savin. Using information about the material accumulated in the "old" collection, as well as from literary sources, genetic resources with early maturity, resistance to low temperatures, diseases and pests, seedlessness, and, if possible, a combination of two or more properties in one genotype were identified. During this period, about 130 varieties of table grapes were introduced, including 18 early-ripening varieties, 16 with increased resistance to diseases and low temperatures; 564 wine varieties, including 8 early-ripening varieties, 34 resistant; 56 promising elite forms; 86 genotypes with varying degrees of seedlessness; 37 forms of wild grapes collected as a result of 3 expeditions in the Kopet-Dag Mountains, Turkmenistan [39]. Representatives of *Proles orientais* Negr., possessing large berries, seedlessness, but susceptible to low temperatures and diseases, were introduced from the VIR branch in Kara-Kala. Varieties and new forms with relative or increased resistance to unfavorable environmental factors were introduced from Bulgaria, Hungary, the Russian Federation and Ukraine.

The Ampelographic Collection, occupying 52 quarters, is organized according to the ecological and geographical origin of the genotypes. Along with old autochthonous varieties, the collection includes varieties from the main regions and centers of viticulture in the world: Europe, the Caucasus, Central Asia, North America. The diversity of these resources included reprezentant of more than 27 species (mainly represented by *V. vinifera L., V. labrusca* L.), new interspecific hybrids, HDP, rootstocks.

In 1982 a quarter of own-rooted varieties of various origins was laid in the collectionand more than 40 years of existence of this section confirmed the increased resistance to phylloxera of some genotypes.

The diversity of seedless genotypes transferred from the "old" collection was replenished with new sources of seedlessness: Sverhrannii bessemeanyi Magaracha, Kishmish AZOS, Rusbol, Perlett, Otilia, Himrood, Bessemeanyi Melnika, Kishmish Tairovsky, Mechta, Kishmish unikalinyi, Kishmish Hishrau, Yubiley VIR. Most of them demonstrated good adaptation to the soil and climatic conditions of the collection. The varieties Kishmish AZOS, Rusbol, Kishmish unikalinyi, Romulus are also characterized by complex resistance to unfavorable environmental conditions.

In the quarters of old autochthonous varieties in the collection, about 40 samples have been collected, planted as both grafted and own-rooted plants. Most indigenous varieties are characterized by increased shoot fertility – 80-100% of fertile shoots, therefore they can ensure high grape yields (for example - Gordin, Iordan, Plăvaie, Bășicată, Cabasmă, Turba plotnaia beleia).

Some genotypes have improved adaptability to the abiotic environment, including drought, low temperatures and diseases: the varieties Bășicata, Fetească regală, Francuşe, Galbena, Fetească neagră, Negru de Căuşeni, Zghihară are resistant to powdery mildew; Fetească regală, Grasă de Cotnari, Fetească albă, Fetească neagră, Băbească neagră – relatively resistant to frost and the varieties Bătura neagră, Iordan – resistant to drought [6].

We note the possibility of cultivating some of these varieties practically in all wine-growing areas of the republic, but also the possibility of producing, based on them, the entire range of oenological products – current consumption wines, quality wines, semi-sweet wines, liqueurs, alcoholic wines, distilled wines, juices [14].

According to the information from the International Catalogue of Vine Varieties (VIVC - http://www.vivc.de/index.php), some of the old autochthonous varieties, registered in the Institute's Collection - 'Brează', 'Ciorcuţa neagră', 'Ciorcuţa roză', 'Damaşin galben', 'Turba râhlaia belaia', 'Turba plotnaia belaia' etc. are presented only in one or in a very limited number of collections. Considering their lack in the industrial plantations, these genotypes are subject to a real danger of extinction.

The re-evaluation, under various aspects of the old autochthonous assortment, in order to reveal and use their potential, partially, was initiated within the framework of regional and international programs: inventory, description of the resources present *ex situ* and *on-farm* evaluation; description, diversity assessment, documentation, identification [19], including the use of molecular genetic methods [20, 21]; re-evaluations in the context of grapevine genetic resources from the entire European area, with the application of phenotyping methods [22] and molecular biology [23].

Ampelographic Collection was completed with the varieties for wine, inclusive Aromat de Iaşi, Crâmpoşie selecţionată, Băbească gri, Mioriţa, Hibernal, Orion, Bianca, Cristal, Lakhedi mezeş, Kunliani, that correspond partially to formulated desire for quality, earliness, resistance. As a result of the studies, the Bianca, Hibernal and Romulus varieties were zoned and included in the assortment [24].

Another important area of research into the accumulated diversity in the gene pool has become the study of seedless genetic resources – varieties and forms present in the collection [25]. Historically, there were no seedless varieties in local assortment, as well as in the assortment of the region as a whole. The first created and homologated seedless variety was Kishmish moldovenesc (Kishmish Moldavskiy) (in 1988), obtained by Mihail Zhuravel. At present, the number of seedless varieties in the list of homologated varieties is relatively small - the "Catalog of Plant Varieties" includes 8 varieties: Apiren Alb, Apiren Basarabean, Apiren Roz, Apiren Roz Timpuriu, Apiren Negru de Grozesti, Kishmish lucistai, Kishmish moldovenesc and Romulus [24].

Introduced seedless varieties and forms from Central Asia (Uzbekistan, Tajikistan, Turkmenistan), Europe (Bulgaria, Romania, Ukraine), America (Argentina, USA), as well as those bred at the Institute and included in the Institute's Ampelographic Collection, represent a wide variety in terms of ripening time, color, size and consistency of berries, and taste, which allows identifying potential candidates for diversification, improving the assortment with varieties for various uses: for fresh consumption, long-term storage, technological processing, including those with increased resistance to abiotic factors and yield. The conducted research [25] aimed at identifying potential parental components for breeding programs, as well as for introduction into production revealed a range of genotypes with desired proprietaries. According the time of full maturity of berries were identified very early genotypes – Himrood, Interlaken; early - Perlett, Flame Seedless, Otilia, Centennial Seedless, Kishmish lucistyi; medium - Perlon, Calina, Mechta, BU 24-6np-4k, Romulus; medium-late - BU 24-4np-3k, V-51-56; late - Seedless Hybrid V-6, VIII-1-24, XI-37-38, IV-32-75, BU 72-23-28. With increased and medium resistance to winter hardiness was mentioned genotypes BU 24-6np-4k, Interlaken, XI-37-38, Romulus, Himrood, Mechta, BU 72-23-28, Seedless Hybrid V-6, Flame Seedless, Otilia, Calina, TAD-VOG, BU 24-4np-3k.

In terms of dry matter content, all varieties meet the requirements for varieties intended for industrial

processing for the preparation of jams, compotes, marinades and raisins.

A significant diversity was established in the studied sample, in particular, the following were identified as potential genetic sources of drought resistance (classified by stomatal density on adult leaves): old autochthonous varieties Coarna Neagră, Negru de Causeni, Feteasca Neagră, Țița Caprei, Galbena; varieties introduced from the Caucasus region - Armenia, Ararati, Rkatsiteli, Mtsvivane Tsiteli; varieties from Central Asia - Guzal-Kara, Kishmish tchiornai, Kishmish tchiornai turkmenskii, Kyrmyzy Kishmish, Agadai [26].

In basis of accumulated in Collection biodiversity were created and included in Register of plant varieties recommended in production process wide variety of cultivars for the majority of climacteric zones of Republic of Moldova [24]. Thus, the assortment for table grape was completed with new created local and introduced varieties: Augustovski, Codreanca, Prezentabil, Rannii Magaracia with early and medium stage of full maturity of berry; Frumoasa albă, Guzun, Leana, Zolotistîi ustoicivîi, Moldova, Muscat de Bugec with mid-late and late stage of full maturity of berry.

For the first time in republic were created and homologated seedless varieties, missed in autochthonous assortment. Newly created seedless varieties: Kişmiş lucistâi and Kişmiş moldovenesc (sensible to winter conditions), Apiren alb, Apiren roz, Apiren negru de Grozeşti (for fresh consumption and technological processing, with advanced resistance to abiotic and biotic unfavorable conditions of environment) were included in assortment. All new created varieties need a reduced number of chemical treatments, so reducing the chemical pressure on environment, allows application of energy-saving technologies.

4.4. Grapevine genetic resources presented *in situ* and *on farm*

Wild forest grapevine (*V. sylvestris* C.C.Gmel.) are one of the most ancient representatives of flowering plants of the local flora. Significant contributions to the study of wild grapevine in our region were made during years by I. Pachesky (1912) (*V. sylvestris* C.C. Gmel. from the Dnieper to the Dniester), Pop (territory of Romania, including Bessarabia), Makovetsky, Yanushevich and Pelyakh (Republic of Moldova) [4]. The need to study *V. sylvestris* C.C.Gmel. is due to several reasons, the most pressing of which is the danger of its complete disappearance from natural habitats. The phylloxera invasion of Europe led to the destruction of not only cultivated grape varieties, but also forest ones [27]. This process is amplified by deforestation (especially since the species is better adapted only to certain tree communities), changes in the humidity regime in the natural habitat (drying up of rivers, springs, changes in the level of groundwater), destruction by humans and wild animals. As an endangered species, it is listed in the Red Book of the Republic of Moldova.

The last extensive expeditions to inventory and study the wild forest grapevine of Moldova, conducted in 1961-1969 [4]. Subsequent assessments were carried out within the framework and with the support of the regional project "Conservation and Sustainable use of Grapevine (Vitis vinifera L.) genetic resources in the Caucasus and northern Black Sea region" (in the period 2003-2007 under the auspices of IPGRI (Bioversity International, Rome) and with the financial support of CRP Gabriel Lipman, Luxembourg). Documentary studies were carried out in the Padurea Domneasca Reserve (Glodeni district, Moara Domneasca village) (Figure 1). Was established the dioecious nature of this population.

In *ex situ* conditions (Ampelographic collection) wild forest grapevine are represented by one sample collected from the Republic of Moldova and 18 forms from Turkmenistan (Central Asia, Kopet-Dag Mountains), discovered and collected in 1986 during scientific expeditions (with the support of the director of the VIR experimental station, Dr. V.A. Nosulchak).

Figure 1. Wild forest grapevine (Padurea Domneasca Reserve, Glodeni district, Moara Domneasca village)

Figure 2. Coarna neagra variety on farm (80-90 year old plant in Sendreni village)

Collection and evaluation of old indigenous grapevine varieties *on farm* continued within the framework of a regional project SEEDNet. It was established thet the source of the original planting material is diverse and not

always known. The vineyards are heterogeneous both in terms of the assortment composition and the age of the bushes. The largest share is occupied by wine varieties, mainly the Aligote variety, and among the table varieties – Shasselas and Coarna neagra. The Plavai variety was found in two visited settlements: in the village of Nemțeni there is a plant whose age, according to information received from the owner, is about 100-120 years, and in Nisporeni - four plants with an average age of 50-60 years. Among the table grape varieties, there are old autohthonous varieties Coarna neagra and Coarna alba (Figure 2). According to general characteristics (mainly mature leaf and bunch), the varieties correspond to the description of varieties from literary sources, as well as to the specimens available in the Ampelographic Collection.

5. Documentation and management of amplelographic collection

An important role in the process of mobilization, preservation and valorization of the agrobiodiversity of genetic resources is held by the documentation of these resources [28]. In order to ensure the necessary effective support in complex process of management and documentation of Ampelographic Collection was developed Information System (IS). Data Base of IS includes information concerning stocktaking of accessions, passport data, ampelographic description, using as methodological support List of Descriptors elaborated by OIV [29]. As a tool for development of IS the Database Management System Visual FoxPro 9.0 is used [30].

As a central entities of IS' Data Base are used the genotype and its accessions entered in Genofond. For each genotype general information is taken from literature sources and/or according own research and includes: the name of the genotype (variety, elite or hybrid combination), the transliteration of the name; genetic origin (if known); country of origin and authors, list of synonyms, all addresses where the genotype is present in the Collection, some general characteristics (berry color, direction of use, ripening period, resistance), access to existing photo images in BD, references to literature sources (Figure 3). The Passport Data for every accession is filed according the list specified in MCPD (Multi Crop Passport Data).

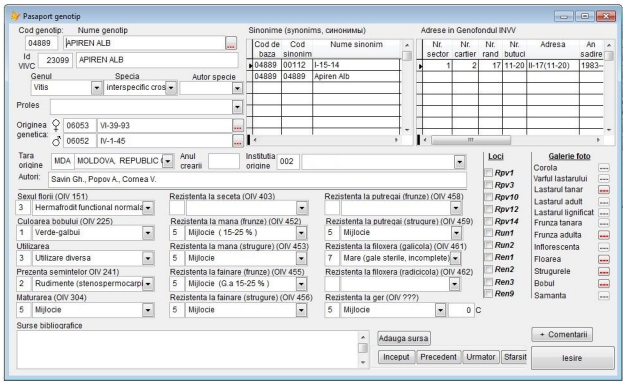

Figure 3. Form for general presentation of grapevine genotype

IS ensure the evidence of "history" of every entry in Genofond – from the moment of registration of date of entry are tracked all regenerations in the frame of Genofond, evolution of biological state of every plant, dissemination of biological material to other research centers and diverse beneficiary. For every presented genotype (some time for every accession of the same genotype) are accumulated ampelographic descriptions according [OIV], data of long-term observations from diverse sources (phenological stages, coefficient of fertility and indices of productivity, other agrobiological parameters).

The development of the module allows the ampelometric description of the mature leaf (characters OIV 601- OIV 618) based on the digital images of the leaf and includes interactive selection of the required image and the consecutive completion of the steps shown on the screen (Figure 4).

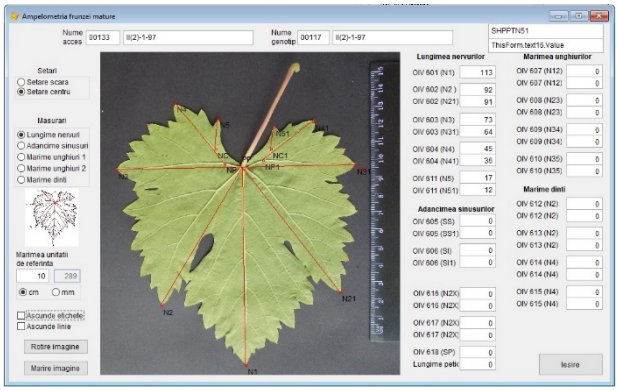

Figure 4. Ampelometric description of mature leaf

Integrating data accumulated over the years (collected in "old" and present collections) allows for a broader assessment, inclusively the evolution of phases, productivity of varieties during the large period of time [31].

6. Principles in planing the next amplelographic collection

Action along the years of abiotic and biotic factors, the relatively old age lead to degradation of physiological state of plants, as a result the necessity of regeneration of Ampelographic Collection is stringently. The principles in foundation of collection are oriented to ensure the safety for tomorrow's viticulture, predicts genetic erosion, preservation of unique genes, preservation of genes adapted to specific conditions. When formulating the principles, we rely on both our own experience and those formulated in literature sources [32-36].

Improvement of assortment with new varieties possessing advanced biological resistance, adaptability and increased ecological plasticity, which are based on the potential of the diversity of grapevine genetic resources, one of the main ways for diminishing of consequences of present and future climatic and socio-economic challenges. Strategy of accumulation and study, for use in breeding programs, of genetic resources is designed, in

part, and through these fluctuations and instability, the objective being to create a new generation of varieties for diverse use with competitive quality and productivity, including the material for an organic vitiviniculture, but with increased resistance [32, 37].

The national grapevine gene pool in the Republic of Moldova includes, in terms of genotypic diversity, the following components: old autochthonous varieties; new varieties and diversified biological materia created by breeders in republic; *in situ* vines (forest vines) and *on-farm* viticultural resources. Also, in Ampelographic collection is presented a large diversity from over the world.

One of the requirements for Genofond is to provide in the future with genetic material that meets not only current needs, but also those that may arise in the future. The importance of special characters that are missing from the varieties in the current assortment is highlighted - dwarf growth (small or medium), erect shoots, short internode, laying fertile buds on internodes 2-4, early, rapid and sufficient lignification (85-90%), fruiting from the second year, and reaching full productivity in the third year, etc. Genotypes with such and other characteristics, accumulated in "prebreeding", will serve as the basis for creating the assortment necessary for viticulture without support and, possibly, on its own roots. Such plants can be cared for according to simplified technology, and the formation of the trunk can create more favorable conditions for the use of space, solar radiation, and other natural resources. In this sense, the specificity of the grapevine offers a number of advantages regarding the valorization of lands unusable for other agricultural crops – slopes, light soils, with low quality, etc. In the above sense, genetic resources are practically unevaluated and unexplored, the evaluations being at the preliminary stage.

The future objectives include more large application of modern biotechnologies in the evaluation and use of the diversity of genetic resources: *in vitro* tehnologies for embrio rescue; genotyping in base of SSR-marker; evaluation regarding the presence of resistance factors (R-factors), in order to initiate breeding programs oriented towards Marker Assisted Selection etc.

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