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Genetic Resources and Improvement of Forage Plants in Serbia and Montenegro

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Abstract: Review and results of research focusing on genetic resources and improvement of forage plants in Serbia and Montenegro (SMN) are presented in this paper. SMN is extremely rich on natural (native/autohtonous) genetic resources of different forage species. Great number of cultivars of perennial grass and leguminous plants as well as annual forage plants were created in SMN as a result of research work carried out over several decades. Domestic cultivars of forage plants have first of all high productive potential for yield of forage and quality of dry matter.
Keywords: forage plants, genetic resources, improvement, cultivars.

Introduction

Majority of forage plants was created using biodiversity and genetic variability of native populations of SMN. First results in collecting of perennial grasses and leguminous plants in our country which were included in creation of gene bank of forage species were obtained in 1987, this is Gene bank of plant species of former Yugoslavia (BBG). In European cooperation programme for plant genetic resources (ECP/GR) in 1997 Forage plant group received a representative from Yugoslavia. On the meeting held in Norway first results in collecting plant genes of follwoing species in Yugoslavia were presented: *Medicago sativa*, *Trifolium repens*, *Trifolium pratense*, *Trifolium hybridum*, *Dactylis glomerata*, *Lolium perenne*, *Agrostis gigantea*, *Agrostis stolonifera* and *Agrostis capillaris*, or 237 genotypes collected from wild flora (Tomić, 1997a).

Results of research carried out on samples of genetic resource collection, determination from the aspect of taxonomic group, origin of genotypes and population with main traits based on descriptors for forage plants were presented on Symposium on plant and animal resources of Yugoslavia (Tomić et al., 1997c).

Work on multiplication of existing collection in Center for Forage Crops in Kruševac, as well as results relating to new collections established in Research Institute of Field and Vegetable Crops in Novi Sad and Institute «Serbia» - Center for Agricultural and Technological Research in Zaječar, were presented on 7th Symposium on Genetic Resources of Forage Plants in Portugal (Tomić et al., 1999). Also, part of the research of genetic resources of species belonging to *Agrostis* sp. was presented in paper by Tomić et al. (2003).

For improvement and creation of perennial grass cultivars in our country collections of genetic resources of different species of red top (*Agrostis spp.)* and populations of red fescue (*Festuca rubra* L.) were used (Tomić, 1994; Tomić et al., 1996). Native populations have great level of diversity, diversity of positive agronomical traits for selection and creation of cultivars for different growing conditions and exploitation methods, and especially for hilly-mountainous regions (Tomić et Mrfat-Vukelić, 1997b). Also, lot was done on collectins of english ryegrass (*Lolium perenne* L.) and cocksfoot (*Dactylis glomerata* L.) (Sokolović et al., 2003).

More detailed review of results of research carried out in imrovement of forage plant species in Yugoslavia was presented on 8th Symposium on Forage plants in Novi Sad in 1996 (Đukić et al. 1996). Since the beginning of activities and engagement in creation and subsequently acknowledgement of first alfalfa cultivars (Mijatović et Ranković, 1966, cit. Đukić, 1995) and work on creation of cultivars of other species, very good results were achieved in Serbia and Montenegro.

Genetic resources of forage plants in Serbia and Montenegro

Today, Department of genetic resources and genetically modified organisms is active within the Ministry of agriculture, forestry and water management. In European cooperation programme for plant genetic resources (ECP/GR) our results

obtained in VI stage of research were presented and at the same time plan is being prepared for next stage. Activities included also our participation in the project of network of plant genetic resources on Balkan region. SIDA, Swedish agency for international cooperation is financially supporting and assisting the establishing of SEED-net project, South-East European Development network in the field of genetic resources between Balkan partners. Main goal of SEED-net is to contribute to long-term preservation and sustainable use of diversity of GBR (BGR) within the region and by well coordinated net of functional national programmes. Activities of this programme are: In Situ preservation, Ex Situ preservation, use of GBR (BGR) as well as building of institutions and capacities with adequate equipment.

Genetic resources of the Research Institute of field and vegetable crops in Novi Sad

Department of forage crops of the Research Institute of field and vegetable crops in Novi Sad has been working on improvement of alfalfa more than five decades, and as a result of this research nine alfalfa cultivars were created. In creation of cultivars from Novi Sad in majority of cases native populations were used of so called Pannonian type of alfalfa (*Medicago sativa* L). In other words, for creation of hybrid cultivars populations of blue and yellow alfalfa were used (*M. falcata* L.). For improvement and creation of cultivars of alfalfa different methods were used. First domestic cultivar NS-Bačka ZMS I was created using the method of individual selection. Afterwards, by method of individual selection using polycross cultivars NS-Banat ZMS II and NS Vršac ZMS IV were created. Populations of blue and yellow alfalfa, using methods of individual selection and interspecies hybridization hybrid cultivars of alfalfa were created: NS-Mediana ZMS V and Novosađanka H-11 (Lukić, 1998). Using divergent genotypes of different geographical origin, by method of simple (A x B) and double crossing (A x B) x (D x C), that is (F_1 X F_1), in recent years synthetic cultivars of alfalfa were created NS-Slavija (Đukić, 1991), Rasinka (Đukić, 1997), Tisa and Begej (Lukić, 1989).

In process of improvement, wide genetic variability of material that is used in creation of new alfalfa cultivars is very important. From the beginning of work on improvement of alfalfa in this department, one of the goals was increasing of the genetic collection of cultivars and alfalfa genotypes, which were collected not only from native/autochthonous populations but also through exchange with domestic and foreign/international scientific-research institutions. Collecting of divergent germplasm of alfalfa in Research Institute of field and vegetable crops in Novi Sad was intensified mid nineties with tendency of constant exchange with colleagues from institutions of same profile or gene banks. From this exchange genetic collection of cultivars and genotypes and their evaluation and characterization in climatic and edaphical conditions of our country were obtained as result.

Evaluation was carried out on Czech, Iranian, Spanish, Bulgarian and French cultivars which were sowed in comparative trials with domestic cultivars, those created in Novi Sad but also from Kruševac and Zaječar.

Czech cultivars Zuzana, Jarka and Niva regenerated slower and had lower plants compared to domestic. Short internodes were established in case of Jarka (5,2 cm). Yields of dry matter were lower compared to yield of domestic cultivars: Zuzana 12.87 t/ha, Jarka 14.68 t/ha and Niva 12.72 t/ha, and domestic cultivars Banat 17.56 t/ha and Mediana 16.70 t/ha, Milić et al., (2004).

Evaluation of Spanish genotypes (RCIN 60, RAMP 40, RSI 20, RGI 50, RN 30 and RA 10) and Bulgarian cultivars (Prista, Storgozia, Victoria and Obnova 10) was also carried out. High yields of dry matter were characteristic of domestic cultivars NS Banat ZMS II 18.62 t/ha, and of Bulgarian cultivars Storgozia (18,16 t/ha), and Spanish RCIN 60 (18.21 t/ha) and RSI 20 (17.92 t/ha). High content of crude protein were established for domestic cultivars NS Mediana ZMS V (23,74) and NS Banat ZMS II (22,11%), and of foreign – Bulgarian cultivar Victoria (22,1%) and Spanish genotypes RSI 20 (22,16%) and RN 30 (22,64%). The lowest content of crude cellulose was obtained from genotype RN 30 (22,23%), Katić et al. (2003).

Iranian cultivars obtained from exchange of genetic material with the Institute from Karay (Iran) were also evaluated (Ghareh Yon Geh, Baghdady, Nikshahry and Hamadany). Domestic cultivars (NS Banat ZMS II 12,56 t/ha, NS Mediana ZMS V 13,06 t/ha, Novosađanka H-11 13,0 t/ha NS Vršac ZMS IV 12,12 t/ha) gave considerably higher yields of dry matter during investigation period, and of Iranian cultivars the two realized best results Ghareh Yon Geh (10,78 t/ha) and Hamadany (10,51 t/ha). Faster regeneration was established in Iranian cultivars Ghareh Yon Geh 22,4 cm, Nikshshry 27 cm and Baghdady 24,4cm, especially in conditions of drought. High plants in stage of blossoming (time of cutting) were established in case of domestic cultivars NS Banat ZMS II (61,5 cm), NS Mediana ZMS V (58,1 cm) and NS Vršac ZMS IV (60,9 cm), and of Iranian cultivars Ghareh Yon Geh (60,4 cm). Short internodes were determined in following cultivars:Nikshahry (5,4cm), NS Vršac ZMS IV (5,4cm) Baghdady (5,3 cm,) and NS Slavija (5,2 cm), Katić et al. (2002).

Beside evaluation of Czech, Spanish, Bulgarian and Iranian cultivars, French cultivars have been investigated in Department for longer period (Europe, Pecy Orca...), cultivars which are due to their traits (resistant to flattening, high yield and quality especially in years with more moisture) considered as outstanding material to be used for improving and creating of new alfalfa cultivars. In Department in Novi Sad also genetically divergent material is characterized, morphological and biological traits are investigated in wide row sowing/seeding. Characterization of material was especially intensified in last 5 years also through exchange with world institutions: (Gene bank of Braunschweig, Israeli Gene Bank, Nordic Gene Bank, Agricultural Institute – Ukraine, VIR- Sankt-Peterburg, Agricultural Institut-Nikozia Cyprus, Centre for forage plant research – Bolivia, Gene bank Gatersleben, Australian Medicago Genetic Resource Centre-Adelaide, ICARDA – Tel Hadya). In abundant exchange of genetic material over 100 very divergent genotypes were obtained sowed in wide rows (in boxes, individual plants) and on which characterization of germplasm is carried out.

On alfalfa genotypes collected all around the world the following is analyzed: height of plant, number of shoots, number of internodes, length of internodes, thickness of stem base, length and width of blade, and share of leaves in dry matter yield. Also the following are monitored: regeneration, maturation time and resistance to cold conditions. On selected material from foreign exchange genetic collection the crossing and selection of superior offspring are carried out in order to create cultivars of higher genetic potential and better quality of green forage and hay.

Existing genetic resources of red clover genotypes were created through:

- Collecting of local populations from spontaneous flora
- International exchange

As a result of this today we dispose of:

- 30 local populations from the territory of Serbia and Republic Srpska
- 3 domestic cultivars of red clover: K-9, K-17, Kolubara
- 2 diploid and 4 tetraploid cultivars from Hungary: Junior GKT , Diana, GKT 4n, Hungariatetra, Tetra-1-sw and Tetra-2-sw
- 1 diploid and 1 tetraploid cultivar from Switzerland: Milvus (2n) and Temara (4n)
- 1 diploid cultivar from Poland – Viola
- 1 diploid cultivar from Czech Republic - Start
- 3 cultivars from Belgium: Merviot, Mercury and Lemmon (Department plantengenetica en Veredeling, Belgie)
- 26 accesses from Federal Centre for Breeding Research on Cultivated Plants- Braunschweig
- 87 accesses from Nordic Gene Bank
- about 150 accesses from Vagenningen (Plant Research International, the Netherlands)
- 8 accesses from National Centre of Genetic Plant Resources – Ukraine
- 4 cultivars from Vsjesajuzni institut kormov (VIK): VIK 7, VIK 84, Pelikan, Naslednik
- 6 accesses from Australia (Australian Medicago Genetic Resource Centre- South Australia)
- 3 accesses from Romania (Banca de Resurse Genetice Vegetale – Suceava)
- 1 diploid (Jogeva) and two tetraploid cultivars (Varte and Ilte) from Estonia (Jogeva Plant Breeding Institute - Estonia)
- 2 cultivars from Bolivia: Violeta and Kenland (Universidad Mayor de san Simon, Facultad de Sciencias Agricolas)
- 2 accesses from Syria (International Centre for Agricultural Research in the Dry Areas)
- 1 cultivar from Greece – Nessonas (National Agricultural Research Foundation Fodder Crops and Pastures Institute)
- 2 diploid and 1 tetraploid cultivars from Germany: Lucrum (2n), Nemaro (2n) and Titus (4n)

Annual forage leguminous plants were collected during the period from 2001 to 2004 and cultivar of spring fodder/forage peas Javor was acknowledged. This cultivar is characterized with height of 50-70cm and with 10 – 12 pods grouped in top part of the plant carrying 5-7 large, yellow grains. Mass of thousand grains varies between 235 – 250g. Protein peas Javor gives up to 5t/ha of dry grain with protein share of over 25%. Mentioned facts cause justified expectations that cultivar Javor in future should occupy considerable surface in production of proteins of plant origin.

Department of forage plants has realized successful cooperation and exchange of breeding material with following institutions world wide, 34 most important plant breeding centres and institutions.

Result of this exchange is improvement of the Department's genetic collection of annual forage leguminous plants which at the beginning of this year had over 1000 genus samples of *Pisum, Vicia, Lupinus, Lathyrus, Lens, Cicer, Vigna, Ornithopus, Lablab* and *Cajanus.* Primary task for future is characterization and evaluation of newly obtained samples as well as their multiplication in order to create the possibility to set comparative trials, get to know their agronomical traits and possibly use them in improvement as parent components in crossing.

During 2002 and 2003 Department of forage crops was active in collecting of wild populations of genus *Vicia*, mainly on locations on mountain Fruška Gora and in the vicinity of Novi Sad. Department was also actively participating in research on project of the Ministry of Science and environmental protection of the Republic of Serbia on collecting and recognizing of genus *Lathyrus* in Vojvodina.

Genetic resources in Centre for forage crops Kruševac

In order to preserve genetic resources of perennial forage leguminous plants and grasses, in Centre for Forage crops special attention is directed to collecting and studying of wild and native genotypes. Centre for Forage Crops has ample collection of stated species collected from various locations. At the moment, in various field trials approximately 150 samples are investigated, about 20 samples of wild species of genus *Trifolium* (*T. medium, T. pannonicum, T. mantanum, T. alpestre and T. pratense*), 86 samples of perennial grasses (70 samples of cocksfoot and 16 of English rye grass) Sokolović et al., (2003a), 15 samples of bird's foot trefoil and about 30 native alfalfa populations. Investigations are carried out in conditions of individual and dense seeding.

Populations of English rye grass are phenologically and morphologically studies in three year researches analyzing 27 traits (Sokolović et al., 2001; 2002; 2003b) and great variability within population was determined as well as significant difference among samples for all investigated traits. Selected genotypes are used in process of improvement.

Characterization and preliminary evaluation of cocksfoot samples are in progress with individual plants in order to investigate phenological traits of populations and yield. Each population is present with 25 individual plants, distance between them 60x60cm. Standard of cultivars in trial are K-early cultivar, K-40,

Halmark and Baraula. According to preliminary results it was established that cocksfoot populations differed up to 15 days in regard to the time of ear forming.

Due to inadequate conditions of seed storing mentioned material was repeated if necessary. Perspective genotypes were used in further process of selection.

Genetic resources of Centre of Agricultural and Technological Research Zaječar

During previous five years activities were directed towards collection of populations of alfalfa, bird's foot trefoil, esparsette and red clover.

Selected plants characterized with positive traits (high yield of green forage, good quality of dry matter, resistance to various diseases, and especially resistance to drought), were planted in field were plants with positive traits were selected and separated.

Centre today disposes of field containing 1300 plants of mentioned perennial legumes.

The work directed towards collecting of plants with positive traits from populations *Medicago, Lotus, Trifolium* and *Onobrycus* will continue.

Improvement of perennial forage plants

Objectives of improvement of perennial grasses and leguminous plants are different and depend on ecological conditions of growing as well as on way of exploitation. Scientists engaged in plant improvement must always consider the system and way of exploitation of forage culture on which they are working, but also demands of the final user, livestock, small and large ruminants and non-ruminants which are determining by their specific traits the way of consumption, or preparation of livestock feed. New cultivars must satisfy some of the parameters such as:

- Maturation time;
- Increase of the production potential for yield of bio-mass and seed;
- Quality of dry matter and high digestibility;
- Resistance to major diseases, pests and stress factors of the environment;
- Adaptability of cultivars for growing in mixture or association (grass-legumes);
- Adaptability to specific agro-ecological conditions;
- Creation of cultivars for specific purposes and different ways of exploitation (pasture, preparation of silage, production of plant meal – dehydration).

The most efforts are directed towards improvement of alfalfa, red clover and perennial grasses.

Alfalfa is perennial leguminous plant very important in production of livestock feed, especially protein part which is often in deficit. High and stabile yields of hay over the period of several years of utilization with relatively low

investment make it very profitable species. Exceptionally positive effect on structure and quality of soil, ability for nitrogen fixation gives this species also ecological significance. This reduces greatly the need to apply nitrogen fertilizers on alfalfa, as well as crops subsequent to alfalfa.

In accordance with its significance, lot of attention in improvement programmes in our country and world wide is directed towards alfalfa. Various methodologies and procedures are developed which are adjusted to botanical, physiological, genetical and reproductive traits of this species and which have resulted in creation of cultivars characterized with high genetic potential for production of biomass, good quality of hay and tolerance towards pathogens.

Most used methods of improvement in selection process so far were mass selection, recurrent phenotypic selection and polycross method providing synthetic populations with wide genetic base, Chloupek (1994). However, increase of biomass, in spite of well developed improvement programme for this species, is insignificant. Biological traits of alfalfa, its natural auto/selftetra-ploidity, inbreeding depression and longevity make the efforts on improvement of this species extremely difficult. It is estimated that productivity of alfalfa over the last 100 years increased by 20% which is very small in comparison to other species, Rotili et al. (1996). Therefore, the question remains how to increase the yield of this very important fodder species.

Use of genetically distant parents when creating synthetic cultivars of alfalfa enables the greater heterozygous ability, and higher yield. In order to determine the divergence of the selection material, beside morphological analysis, molecular markers are being applied more and more, Veronesi et al. (2003). In our country, such investigations are still at initial stage.

During last ten years all the attention was directed towards the quality and degradability of dry matter, Julier et al. (2003), as well as resistance of alfalfa to stress factors of the environment, Hauptvogel (2003).

In Centre for forage crops, special attention is directed towards constant supplementing of the collection of selection material, whether with foreign cultivars or domestic populations which are rich source of variability for great number of important traits from the aspect of agronomy. Application of different selection methods (individual selection, diallel crossing, polycross method) has resulted in creation of experimental lines with great field resistance and high yields. Lately, more attention is directed towards better studying of existing genetic resources of the species from genus *Medicago sp*, especially wild populations which could be excellent donors of desired genes for further selection process.

According to the importance of **red clover** considerable attention is directed to studying of this species in the world, from the aspect of improvement as well as production technology, Taylor and Quesenberry (1996).

First cultivars of red clover were created by mass selection and selection of individual plants from native populations, Taylor and Smith, (1979). Relatively slow progress in selection using above mentioned methods was caused by the fact that this was perennial species which resulted in promotion of polycross method and method of phenotypic recurrent selection as better

solutions. Results obtained using these methods on red clover in world are great, Bowley et al. (1984) and Taylor et al. (1989).

In spite of important results achieved in improvement of red clover in our country, it can be concluded that these efforts are still not harmonized with the economical importance and potential of this species in production of fodder livestock feed. Use of method of multiple phenotypic selection directed to increase of yield, quality and persistence in Centre for forage crops in Kruševac red clover cultivars K-38 and K-39 were created, Lugić et al. (2002).

Results obtained by method of induced polyploidy in Centre for forage crops were finalized by creation of two cultivars, however due to the difficulties in production of seed and low resistance to drought, none of the mentioned two cultivars were produced commercially. The most important results using this method were obtained in Sweden where these cultivars, due to several of their advantages, occupy 405 of total surface under red clover.

Potential of domestic cultivars in regard to yield is over 15t/ha of hay of excellent quality. However, in practice, potential is utilized bellow 50%. Therefore, in future, beside efforts concentrating on creation of high quality cultivars, attention must also be directed to agro-techniques and production technology of red clover.

Improvement of **perennial grasses** as very important components of mixtures for cutting and grazing has been present in Centre for forage crops from Kruševac for several years. Over longer period 14 cultivars of different characteristics, maturation time and utilization method were created.

Results obtained in improvement of new cultivars are presented in papers in domestic and foreign journals and meetings. First tetraploid cultivar of Italian rye grass was created by treatment of colchicines on three diploid cultivars Tomić and Popović (1996). Cocksfoot cultivar K- rana/early is characterized with early maturation by 20 or more days (2001) whereas cultivar K-40 acknowledged in 2001 is characterized with mid-maturation.

The process of improvement of new cultivar of late maturation type is in progress. Cultivar of Timothy grass cultivar K-41 acknowledged in 2002 is currently at the stage of introduction into production. Beside numerous known cultivars of fescue, final stage of improvement of new cultivar of French rye grass and first domestic cultivar of fodder English rye grass is in progress in Centre.

Tomić et al. (2000) presented results on quality and production of dry matter of cultivars of domestic Italian rye grass cultivars K-13, meadow fescue K-21, tall fescue K-19 and K-20, and cocksfoot cultivars K-rana/early maturation and K-41 with foreign cultivars and *Fesulolium* hybrids. Domestic cultivars are highly productive and on the same level as foreign cultivars with which they were tested.

Today, we dispose of considerable number of cultivars of major forage species and data published in Official journal of the Republic of Serbia No. 50 (2004) are presented in table 1.

Tab. 1. Number of acknowledged cultivars of forage plants in Serbia, domestic, assimilated and foreign (Official journal of the Republic of Serbia No. 50 (2004)

Species	No. of cultivars	origin of cultivars		
		domestic	assimilated	foreign
I Perennial forage leguminous plants				
Alfalfa *Medicago sativa* L.	34	15		19
Red clover *Trifolium pratense* L.	14	6	1	7
White clover *Trifolium repens* L.	7	1	1	5
Bird's foot trefoil *Lotus corniculatus* L.	7	4	1	2
Esparssette *Onobrychis viciaefolia* Scop.	2	1		1
Galega *Galega orientalis* L.	1	1		
Total	**65**	**28**	**3**	**34**
II Perennial grass plants				
Cocksfoot *Dactylis glomerata* L.	5	2		3
Tall fescue *Festuca arundinacea* Schreb.	7	3		4
Italian rye grass *Lolium multiflorum* L.	10	2	8	
English rye grass *Lolium perenne* L.	11	1	1	9
Meadow fescue *Festuca pratensis* L.	5	1	3	1
Timothy grass *Phleum pratense* L.	7	2	1	4
French rye grass *Arrhenatherum elatius* L.	3	2	1	
Red fescue *Festuca rubra* L.	7	2		5
Red top *Agrostis gigantea* Roth.	2		1	1
Meadow fescue *Poa pratensis* L.	2		1	1
Total	**59**	**15**	**16**	**28**
Annual forage leguminous plants				
Fodder peas *Pisum arvense* L. (spring)	16	5		11
Ordinary vetch *Vicia sativa* L. (winter)	1	1		
Ordinary vetch *Vicia sativa* L. (spring)	3	1	1	1
Hairy vetch *Vicia villosa* Roth.	3	2	1	
Pannonian vetch *Vicia panonica* Grantz.	1	1		
Total	**24**	**10**	**2**	**12**
Root forage plants				
Fodder beat *Beta vulgaris var. crassa* Alef.	**26**	**6**	**2**	**18**
Other annual forage plants				
Fodder sorghum *Sorghum bicolor* (I.) Moench.	9	4		5
Fodder rape *Brasica rapa* L.em.	5		3	2
Sudanese grass *Sorghum sudanense* Pers.	4	3	1	
Fodder kale *Brassica oleracea var.acephala* D.C.	1	1		
Facelia *Phacelia tanacetifolia* Benth.	1	1		
Total	**20**	**9**	**4**	**7**
Total	**194**	**68**	**27**	**99**

Conclusion

Our country is rich source of natural (native/autochtonous) genetic resources especially of forage plant species. Majority of grown forage plant cultivars used as livestock feed has relatives in natural meadow plant communities, therefore great number of new cultivars was created by their improvement.

Previous activities were based on work of the Department of genetic resources and geneticaly modified organisms, within European Cooperation Programme for Plant Resources (ECP/GR), and activities which started in the previous year are related to participation in the project – Network of plant genetic resources in Balkan region. SIDA, Swedish Agency for International Development is financially supporting and assisting in establishing of Project SEED-net, Southeast-European Development net in the field of plant genetic resources, between partners on the Balkan.

Long-term programme of collecting, studying and preserving of resources of perennial forage species includes adequate organization on national level but also providing of conditions and engagement of competent experts for the realization of mentioned programme.

Researchers engaged in improvement of forage plants in our country, using modern methods of improvement have created great number of cultivars and hybrids with high production potential and very good nutritive value.

All domestic cultivars are characterized with high potential for yield of biomass and quality as well as satisfactory resistance and competitive ability.

In subsequent research it is necessary to direct attention to creation of perennial grass cultivars and leguminous plants of specific traits such as early maturation, or late maturation, ability for rapid regeneration after cutting, resistance to major diseases and stress factors (drought and low temperatures), increased production potential for yield of seed, etc.

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GENETIČKI RESURSI I OPLEMENJIVANJE KRMNIH BILJAKA U SRBIJI I CRNOJ GORI

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Rezime

U ovom radu dat je pregled i rezultati istraživanja na gentčkim resursima i oplemenivanju krmnih biljaka u Srbiji i Crnoj Gori (SCG). SCG predstavlja izuzetno bogat izvor prirodnih (autohtonih) genetičkih resursa naročito vrsta krmnih biljaka. Veći broj gajenih sorti krmnih biljaka za stočnu hranu ima svoje srodnike u prirodnim livadskim zajednicama. U višedecenijskom radu na oplemenjivanju krmnih biljaka stvoren je veliki broj sorti višegodišnjih trava i leguminoza i jednogodišnjih krmnih kultura sa visokim proizvodnim potencijalom za prinos krme vrlo dobrog kvaliteta suve materije.