

## VARIETIES OF PERENNIAL GRASSES AND LEGUMES MADE IN RESEARCH AND DEVELOPMENT INSTITUTE FOR GRASSLANDS BRASOV

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The activities of breeding the grasses and leguminous perennial grassland in our country were started in the interwar period (1921) by Dr. Wilhelm STEPHANI (1884-1948), an agronomist in model farm of selection seed of fodder plants Bod, Brasov county, where the meadow fescue (*Festuca pratensis*) Local of Brasov and red clover (*Trifolium pratense*) Of Transylvania and others were realized.

After 1950 the stations ICAR Marculesti, Moara Domneasca Magurele, Suceava and Lovrin, continued research works on breeding grasses and legumes. This activity has intensified in specialized institutions like the Central Research Station for Grassland Cultivation Magurele - Brasov, founded in 1970, now a day the ICDP Brasov with two profile stations Timisoara and Vaslui and Laboratory of breeding and fodder plant seed production ICCPT-current INCDA – and subordinate station network.

Romanian varieties of perennial grasses and legumes, with the main ecotypes of spontaneous

genetic resources, have proved to be resistant to frost, drought, pests and diseases, with a high dry matter and seed production.

Having different precocity, the Romanian varieties are very suitable to the seed mixtures of grassland conveyers for animal grazing or mowing.

In competition with foreign varieties, Romanian varieties have proved the most superiority on all levels, higher production, forage quality, very good resistance to climatic changes and water stress, diseases and pests. Currently, there are difficulties with seed production of these varieties. This problem needs to be solved in the future with the establishment of specialized farms in production of perennial grasses and legumes pasture seeds.

### PERENNIAL GRASSES

Orchard grass (*Dactylis glomerata*)

This grass is widespread species in the grassland on clay soils or sandy-loamy, deep, nutrient-rich. The area of culture is from the plains up to the limit of the spruce level and sublevel of beech forests.

It has resistance to drought, winter hardiness is average, but sensitive to temperature oscillation in spring. It does not support the humidity excess and it is quite sensitive to yellow rust disease. It responds well to nitrogen fertilization based. Under optimum conditions it can produce 10-14 t DM / ha, with a protein content of 13 to 16.5% and digestibility coefficients ranging between 60-62%. It is recommended for use in simple and complex mixtures of perennial grasses and legumes both for grazing and haymaking, with a capacity of high competition. In variant when the species is used in a mixture with alfalfa an excellent forage quality results.

After the appearance of inflorescences, cocksfoot quality decreases, therefore, it is recommended for haymaking the cutting must be done immediately after earing. The cocksfoot Intensiv variety approved in the 1988, is a synthetic variety constituted of 4 clones selected from local and foreign populations.

Variety with a high size, a good capacity of tillering, shows very good spring growth and a high regrowth after cutting. It is highly resistant to the principal leaves diseases (*Puccinia spp.*, *Erysiphe sp.*, *Scolecotrichum graminis*), resistant to drought and late frosts. It has large ecological plasticity, very competitive with other species, it could be grown alone or in complex mixtures with other species

of perennial grasses and herbage legumes. The potential production of this variety expressed in green mass, dry matter and the seed yield, obtainable per unit area are presented in Tab. 1.

The Magda variety, recorded in 2004, is a synthetic variety created from four selected parental forms and varieties of native and foreign populations. It is a semi tardy variety, 2-3 days earlier than the variety Intensive, installation has a fast rhythm, a uniform distribution of yield on vegetation period and a good regeneration capacity. It proves a good resistance to foliar diseases to drought and has a high ecological plasticity. Production potential of this variety and the following is presented in the same Tab. 1.

#### Tall fescue (*Festuca arundinacea*)

It is prevalent in the forests, particularly in floodplains. Supports well the humidity excess, high temperatures, and the low. Performs well on permeable and fertile soils, but also in the heavy temporary excess water.

It grows in soils with pH - the range of 4.5 to 9.5.. It has a high degree of adaptability different ecological conditions, and a very good perenniality (8-10 years).

Table 1

Potential green mass, dry matter and seed production of the main varieties of perennial grasses and legumes from ICDP Braşov

Species name	Variety	Production:		
		Green mass (t/ha)	Dry substance (t/ha)	Seed (kg/ha)
<b>Perennial grasses</b>				
Orchard grass ( <i>Dactylis glomerata</i> )	INTENSIV	55	12	800
	MAGDA	50 - 55	11 - 12	800
Tall fescue ( <i>Festuca arundinacea</i> )	ADELA	55 - 60	12 - 13	900
Meadow Fescue ( <i>Festuca pratensis</i> )	TRANSILVAN 2	50 - 55	11 - 12	900
Red fescue ( <i>Festuca rubra</i> )	CĂPRIOARA	40 - 45	8 - 9	600
	CRISTINA	40 - 45	8 - 9	600
Perennial ryegrass ( <i>Lolium perenne</i> )	MARA	45 - 50	9 - 10	700
Reed canary grass ( <i>Phalaris arundinacea</i> )	PREMIER	65 - 80	16 - 20	800
<b>Perennial legumes</b>				
Birdsfoot trefoil ( <i>Lotus corniculatus</i> )	DORU	40 - 50	9 - 10	400
White clover ( <i>Trifolium repens</i> )	MIORIȚA	40 - 45	9 - 10	300

By point of view of quality forage it has a protein content of 10-13% and crude fiber is 24-28%. The quality of young plants is far superior before earing, which makes the young plant to be well consumed by animals, especially sheep. It can be used to simple and complex seed mixtures of grassland. The use mode can be haymaking, grazing or mixed.

It is a good species for soil erosion control, due to both developed and strong radicular

system and very low soil requirements.

Adela variety certificated in 2001, is a synthetic variety created from 8 selected parental forms and varieties of native and foreign populations.

It is a semi early variety with very good perenniality and regeneration after use, resistant to leaf diseases, winter and drought, the leaves are fine, high palatability.

Green mass production is rational distributed on use cycle

periods. It is destined to be cultivated in pure or mixed with other varieties of perennial grasses and forage legumes. It can be used as green mass (grazing or mowing) or preserved (hay or silage).

Meadow fescue (*Festuca pratensis*)

It grows best in heavy loamy soils, rich in nutrients, on clay alluvial soils of riverside. But it is found on many types of soils except those poor or dried.

The culture zone is forest steppe area, until in the spruce forest level. The reaction of both at the organic and mineral fertilizers is very good.

The production capacity is 10-13 t DM / ha, with a relatively high protein content between 11-15% depending on the growth phase of harvesting, and a high digestibility coefficient (63-67%). Because foliage is rich and smoothness leaf is high, it provides a high nutritional value of the forage.

It performs very well in mixtures with legumes (alfalfa, clover), and other perennial grasses (ryegrass, orchard grass). It is recommended mixed use, grazing and mowing. Transilvan 2 variety was approved in 1988 and it is a synthetic variety, composed of 12 selected clones of local and foreign materials.

It is a semi tardy variety, earing on around May 20, with good feed quality, good resistance

to winter, drought and disease resistant and medium to drop. Variety is intended for use as hay or mixed crop, it can be grown in pure culture and mixtures with other varieties of perennial grasses and legumes in the same precocity class.

Red fescue (*Festuca rubra*)

It is frequently met in the grassy carpet of permanent grasslands from 300 m to 1500 m altitude (lowland areas, collinear and under collinear areas). It has good resistance to frost and late spring frosts. It grows in a big range of soils, not pretentious any soil, any humidity and responds well to fertilization by sheep paddocking. In terms of forage, its value is enhanced by the structure of mixtures of perennial species that are cultivated for establishment of temporary meadows of long period, used by grazing. Regarding the chemical composition, crude protein is 9-11% of DM, crude cellulose of 28-30% and digestibility recorded a rate of 60 - 65% of DM. It is well suited to the grazing, though latter grassing is relatively slowly. It is recommended for improving the permanent degraded grasslands by over seeding works.

Caprioara variety, is a synthetic variety certificated in 2010, semi tardy, earing between May 21- 31, with resistance to disease, frost and drought and resistant to frequent cuttings.

It can be used in complex mixtures for long-term grasslands, used by grazing, mowing and for turf.

Cristina variety, certificated in 2010, is a synthetic semi tardy variety, earning between May 21 to 31, with drought, diseases and frost resistance, suitable to frequent cuttings.

It can be utilized in complex mixtures of long period grasslands, used by grazing, mowing and turf.

#### Perennial ryegrass (*Lolium perenne*)

It is met spontaneously or cultivated in grasslands from riversides, on fertile soils with ground water contribution. In mountain regions, it is found up to 1300 - 1400 m altitude. The optimum temperature for development is 18-20 Celsius degrees. It prefers areas with mild winters and little snow, and it is sensitive to dry frost and dry summers. Regarding the soil, they prefer the clay, rich.

It is a species susceptible to rusts (*Puccinia spp.*) and snow mold (*Fusarium nivale*). By point of view of the chemical composition the forage quality is very good, having a crude protein content range between 14-17% and 24-28% raw cellulose. It has been discovered that the plant has a high content of soluble carbohydrates.

It is a typical species for grazing because it resists to animal hoof pressure and has a good

recovery after being exploited. It can be also used in mixtures for hay, grazing and turf. It is recommended the nitrogen fertilization. In mixture it has a high competitiveness, especially in the second year of vegetation.

Mara variety certificated in 1989, is a synthetic variety, consisting of selected clones of Romanian population and foreign varieties. It is a tardy variety, with good winter resistance, drought and disease and a good regeneration capacity. It is recommended for grazing, in simple or complex mixtures with *Festuca pratensis*, *Festuca rubra*, *Trifolium repens* and *Poa pratensis*.

It may also be used for parks and sports grounds, it is suitable on fertile lands with sufficient moisture.

#### Reed canary grass (*Phalaris arundinacea*)

It grows on soils with high humidity from the majority of riversides, both in dry areas and in wet and cold areas. It prefers slightly acidic and neutral soils. Are suitable in mixtures for haymaking and silage.

Production of substance is between 16 to 20 t DM/ ha, the forage quality is relatively low, the protein content is between 8-11% and the digestibility coefficients are between 53-56%.

It is recommended to use for improving the areas with excess

moisture and flooded, for ecological restoration of degraded fields of different origins.

Having a very large dry substance it can be used as biomass to obtain biofuel.

For animal feeding it is recommended in mixtures with perennial legumes such as red clover or alfalfa with the purpose to improve the forage quality, where other consecrated perennial grasses are not suitable.

Premier variety, certificated in 2004, has as starting five selected clones and varieties of indigenous populations. It is an early variety, blooming around the time 20th of May, has average quality, it is resistant to winter, drought, diseases and pests. It is suitable for cultivation for forage and biomass.

#### Perennial legumes Birdsfoot trefoil (*Lotus corniculatus*)

It is spread on the plain grassland and to those of lower mountain level, on soils with low fertility, acidic, mainly on podzol soils.

By point of quality view, the plant is valuable, but having a low intake rate in green stage, due bitter taste imprinted of a glycoside.

The trefoil produces a rich forage in protein, with high value nutritional, but lower than alfalfa, clover and sainfoin species. It contains approximately 13-14% crude protein, 22-31% raw cellulose depending of the stage of harvest

and an appreciable amount of Ca and Mg.

It is recommended for use in combination with other species for Improvement of permanent grassland by over seeding or reseeded grassland.

For establishing the reseeded grasslands, it is recommended the simple mixtures with different perennial grasses (meadow fescue, perennial ryegrass, tall fescue) or complex mixtures intended for a mixed use. Given the large ecological amplitude that this species has, are recommended areas where alfalfa and red clover give lower results.

Doru variety, certificated in 2004, is a synthetic variety created from selected clones of Romanian local populations.

It offers a good forage quality, determined by the abundance of leaves, very good resistance to fall, very good winter and drought resistance and good resistance to diseases (*Rizoctomia sp.*, *Pythium spp.*, *Uromyces sp.*). It is recommended in mixtures with perennial ryegrass varieties for use by grazing or mixed. This variety can be grown in areas with precipitations exceeding 600 mm/year, where alfalfa and white clover are not performing well.

#### White clover (*Trifolium repens*)

It is a herbage legume, with the largest area of growth, from the plain to spruce forest level, to

except areas too dry, because of drought sensitivity.

It is unpretentious species to soil conditions, supporting heavy, poor, neutral or slightly acidic soils. It prefers soils rich in phosphorus and potassium, fixes nitrogen amounts into the soil.

Forage quality is very good, with the following indices: 20-22% crude protein, crude fiber 19-21%, and a large digestibility coefficient of 65-70%. Harvesting at flowering, hay contains about 13-14%. It can be used for grazing and mixed. Miorita variety certificated in 1989, is a synthetic variety created from selected clones and varieties of indigenous and foreign populations, belonging to the type *Hollandicum*, within class mid early varieties. Very good quality of forage and high resistance to diseases, good winter, drought resistance and low inflorescence falling.

The variety was created to be cultivated in mixtures with perennial ryegrass varieties for use in a grazing and mixed mode. It can be grown in areas where the precipitations exceed 600 mm / year, supports a larger nitrogen fertilization (100-150 kg N/ha)

applied in two or three rates, divided on harvest cycles.

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These are the main 10 varieties of perennial grasses and herbage legumes recorded by the State Institute for Variety Testing and Registration, Bucharest in THE OFFICIAL CATALOG OF VARIETIES OF CROP PLANTS IN ROMANIA in 2016.

The process of improvement of the 6-grass species and two species of perennial legumes will be continued within ICDP Braşov, given especially their adaptability to climate changes from current time.

After a wider multiplying the seed of these varieties valuable and their marketing, farmers and households that produce animal fodder will make suitable mixtures of perennial grasses and forage legumes for establishing the reseeded or over seeded grasslands, depending on the stationary area conditions, use mode and level of intensification of production.

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