

I.

**1. DIMITAR MITEV, GALINA NAYDENOVA  
TO THE QUESTION ABOUT THE BEHAVIOUR OF SOME RED  
FESCUE GENERATIONS**

*BANAT'S JOURNAL OF BIOTECHNOLOGY, 2012, III(6), (59-67)*

*DOI: 10.7904/2068 – 4738 – III(6) – 59*

*IF 3.904*

The experiment with a polyhybrid population of Red fescue was performed in the period of 1995-2004. It was set annually during the winter from 1994/95, according to the block method with four repetitions. The seeds were collected consecutively in the period after 1992. They were sowed alone and in a mixture from two different, but consecutive years. The oldest seeds were excluded gradually from the scheme and were replaced by others, which had been obtained in the year before the sowing. The behaviors of the generations (dry substance yields, botanical ingredients) are varied. The genotype variance assessment shows that the differences in the productivity are due to a proven genotype influence, i.e. the different generations behave to one another as if they are different species. When the generations from two different sowings are compared the productivity differences, which are provoked by the genotype influence, are displayed in different years since the grasslands have been used. Considering the productivity, the highest yields were obtained from grasslands created by the combination of seeds gathered in 1993 and 1994, but which were sowed in 1995/1996 and 1996/1997. The investigated generations show a remarkable ability for self-cleaning from weeds. It is found that there are divergences in that tendency. There is a self-sowing of other meadow species which are characteristic for this region. It is assumed that there is a dependence among the formed genetic material and the admission to the environmental factors, durability, the spreading ability. Probably, the particular “structural units” (... , species, population, sort, ...) have a specific “energy configuration”, which is subjected to the Nature rhythm and which represents a peculiar “projection” in Time with a corresponding direction of Evolution.

***Keywords. Red fescue, generations, rhythm, hypotheses.***

**2. VLADIMIR LINGORSKI, DIMITAR MITEV  
COMPARATIVE TESTING OF SOME PERENNIAL DROUGHT  
TOLERANT LEGUME GRASSES BY FOOTHILL CONDITIONS OF  
CENTRAL NORTHERN BULGARIA**

*BANAT'S JOURNAL OF BIOTECHNOLOGY, 2012 III (6), (37-42)*

*DOI: 10.7904/2068 – 4738 – III(6) – 37*

*IF 3.904*

During the 2010-2012 period in RIMSA, Troyan (Bulgaria) the comparative testing of some perennial drought tolerant legume grasses (birdsfoot trefoil, white clover, common sainfoin, hybrid-blue lucerne and hybrid-yellow lucerne) was accomplished. It was found that best bio-productive indicators had the hybrid-blue lucerne. In the triple regime of harvesting it received 4.39 t.ha<sup>-1</sup> green mass and 1.09 t.ha<sup>-1</sup> dry matters, which exceeded the standard (birdsfoot trefoil) by 26.51% and 43.42%, respectively. Hybrid-blue lucerne, hybrid-yellow lucerne and birdsfoot trefoil predominated over weeds and weed infestation decreased from I<sup>st</sup> to III<sup>rd</sup> haymaking.

*Key words: legume grasses, drought tolerance, Central Northern Bulgaria.*

**3. D. MITEV, G. NAYDENOVA**

**PERMANENCE OF SOWN SWARD SITUATED ALONG THE  
SLOPES OF THE CENTRAL BALKAN MOUNTAIN**

*BIOTECHNOLOGY IN ANIMAL HUSBANDRY 30(3), 2014 (509-515)*

*ISSN1450-9156, UDC633.2.03, DOL:10.2298/BAH1403509M, IF 0.667*

The state of mixed swards of red fescue, Kentucky bluegrass and bird's foot trefoil was studied. The experiment was situated along the slopes of the Central Balkan Mountain, during the period of the 1st to the 13th year of their creation. At a high degree of soil gleying, the low part of the slope, the dry matter yields were within the limits of 2,8 t/ha (1997, south-eastern exposure) up to 10.66 t/ha (1999, north-eastern exposure). At a low degree of soil gleying, high part of the slope, the dry matter yields were within the limits of 2.34 t/ha (1994, western exposure) up to 14.34 t/ha (1995, east exposure). The most prominent in productive terms for the period of the study are the variants at the east and south-eastern exposure, slightly gleyed soil. The participation of the sown species in the total forage yield is variable quantity. They reach (at their most) up to 96% in 1998, north exposure, slightly gleyed soils and up to 97% in 2000, north-east exposure, highly gleyed soils. Their share was small in 2004 (44%) and in 2006 (42%) on a western slope, highly eroded soils.

*Key words: red fescue, Kentucky bluegrass, bird's foot trefoil, Balkan*

**4. DIMITAR MITEV & GALINA NAYDENOVA**

**MANIFESTATION OF SOME MEADOW GRASSES OF LOCAL  
ORIGIN, UNDER CONDITIONS OF THE CENTRAL BALKAN  
MOUNTAIN IN BULGARIA**

*Global Journals, V16, Issue4, 2016, (42-51)*

In the period of 2011 - 2015, a field experiment was conducted in the foothill region of the Central Balkan Mountain. The behaviour of some meadow grasses of local origin was studied, which had not been used before, under artificial sowing conditions. It has been found that there is an opportunity to cultivate French rye grass and white bentgrass under conditions of highly gleyed pseudopodzolic soils. Under the experimental conditions, the most productive species were red and tall fescue. The average green matter yield of red fescue was 21.70 t.xa<sup>-1</sup>, and dry matter - 7.032 t.xa<sup>-1</sup>. In comparison, tall fescue surpassed it insignificantly according to average green matter yield (5.07%), but it was also insignificantly inferior according to dry matter (5,73%). Perennial ryegrass and big quaking grass were the most low-yielding grasses in the current study. Their average green mass, for the period of study, was 16.30 t.xa<sup>-1</sup> and 16.10 t.xa<sup>-1</sup>, and dry matter was 4.159 t.xa<sup>-1</sup> and 4.878 t.xa<sup>-1</sup>.

**Keywords: meadow grasses, hypothesis.**

## **II.**

**5. Dimitar MITEV, Galina NAYDENOVA**  
**CHANGES IN SOME ARTIFICIAL MEADOW GRASSLANDS**  
**UNDER CONDITIONS OF THE CENTRAL BALKAN MOUNTAIN**  
**BANAT'S JOURNAL OF BIOTECHNOLOGY, 2015, VI(12), (33-37)**  
**DOI: 10.7904/2068-4738-VI(12)-33**  
**IP & Science – Thomson Reuters**  
**Semiannual ISSN: 2068-4673**

The survey includes a number of conclusions about the behaviour of some meadow grasslands grown individually or in a mixture among them. They are situated over the slopes of the Central Balkan Mountain. There are differences both in their exposure towards the four cardinal points and diversity in soil gleying. The botanical composition of swards is rather variable. It is in a direct relation to the habitat of each of them. The sown meadow species of local origin predominated in established grasslands most of the time during the experiments. Self-sowing of other meadow species of local origin was found. It is considered that this behavior arises from the presence or lack of synchronization with the rhythm of Nature. It is supposed that each “structural unit” (grass combination) has a peculiar “projection in Time”, the “level of energy saturation”, which each of them has reached, has a direct relation to the formation process. It was concluded that each concrete variant represents a

peculiar energy–information system of a different order, with the respective durability both in individual and evolutionary plan, with all the ensuing consequences.

Keyword: Balkan Mountain, slopes, meadow grasses, hypotheses.

**6. D. MITEV, K. BELPERCHINOV**  
**ECOLOGICAL PLASTICITY OF SOME MEADOW**  
**COMMUNITIES CONTAINING RED FESCUE SITED ON THE SLOPES**  
**OF THE FORE MOUNTAIN PART OF THE BALKAN MOUNTAINS III.**  
***PRODUCTIVITY AND BOTANICAL COMPOSITION OF MIXTURE***  
***SWARD CONSISTING OF RED FESCUE AND SMOOTH-STALKED***  
***MEADOW GRASS***

**III.**

***JOURNAL OF MOUNTAIN AGRICULTURE ON THE BALKANS,***  
***VOL.3, 5, 2000, (620-626) ISSN 1311-0489.***

The study was conducted on light grey pseudo podzolic forest soil of varying gleization degree and different siting on the slopes of the fore mountain. Mixed sward including red fescue (*Festuca rubra L.*) and smooth-stalked meadow grass (*Poa pratensis L.*) was established.

The sward productivity over the study period varied depending on the soil gleization degree of the fore mountain slopes and the sward sun related aspect. Higher fresh herbage and dry matter yields were harvested on soil of lower gleization. On east-facing plots the green herbage yield was 2.1 times higher, and the dry matter yield — 3.1 times higher. The impact of soil gleization degree was considerably stronger than the change of the sward aspect towards the sun.

The principal species of the community was red fescue. Over the study period its share varied reaching maximum percentage of 95 at northeast-facing plot on highly gleyey soil and of 91 at west-facing plot and less gleyey soil (3<sup>rd</sup> cut). Minimal values, 38%, were found on very eroded soil and availability of carbonates in the residual soil layer.

(*Festuca rubra L.*)

(*Poa pratensis L.*)

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 , 3,1 .  
 -  
 .  
 ÿ , 95%  
 91%  
 - (III ).  
 - 38%.

**7. K. BELPERCHINOV, D. MITEV**  
**ECOLOGICAL PLASTICITY OF SOME MEADOW**  
**COMMUNITIES CONTAINING RED FESCUE SITED ON THE SLOPES**  
**OF THE FORE MOUNTAIN PART OF THE BALKAN MOUNTAINS IV.**  
**PRODUCTIVITY AND BOTANICAL COMPOSITION OF MIXED SWARD**  
**CONSISTING OF RED FESCUE AND BIRDSFOOT TREFOIL**

**IV.**

***JOURNAL OF MOUNTAIN AGRICULTURE ON THE BALKANS,***  
***VOL. 3, 6, 2000 (699-704) ISSN 1311-0489***

The object of the study was the condition of a mixed grassland of red fescue (*Festuca rubra L.*) and birdsfoot trefoil (*Lotus corniculattts L.*) established on sloped ground in the fore mountain pan of the Balkan Mountains. The soil was light grey, pseudo podzolic, of varying gleization degree and aspect to the sun.

The high gleization and soil erosion processes strongly reduced the grass association productivity. At east-facing sites of low gleization level the fresh herbage yields were up to 4,2 times higher compared to those obtained from sites of high gleization, while the increase found in dry matter was up to three times. The setbacks due to erosion were manifested to a lesser degree than those due to gleization.

Over the study period the shares of red fescue and birdsfoot trefoil gradually went up while that of weeds decreased. For instance, red fescue on

low gleization southeast-facing plots arrived at 89% share at the third cut, Birdsfoot trefoil sown on highly eroded west facing plots accounted for 71% of the total herbage mass at the third cut.

(*Festuca nibra* L.)

(*Lotus corniculaim* L.),

89%

III

71%

III

8. T. TOTEV, K. BELPERCHINOV, B. CHOURKOVA, V. LINGORSKI, TS. MIHOVSKI, D. MITEV

**EFFECTS OF THE NPK FERTILIZER APPLICATION MODES ON THE YIELDS AND ECONOMIC RESULTS FROM MEADOW GRASS SPECIES IN THE REGION OF TROYAN**

C NPK

*JOURNAL OF MOUNTAIN AGRICULTURE ON THE BALKANS, VOL.3, 1, 2000, (43-50 ISSN 1311-0489).*

1994-1997  
pH 4,5 1

NPK,

( )

(N<sub>32</sub>P<sub>32</sub>K<sub>32</sub>) kg/da

:

— N<sub>8</sub>P<sub>8</sub>K<sub>8</sub>; —

( — ) N<sub>16</sub>P<sub>16</sub>K<sub>16</sub>; —

N<sub>32</sub>P<sub>32</sub>K<sub>32</sub>.

From 1994 through 1997 an experiment was conducted in the Troyan region on grey forest soil of pH 4.5 in KC1, using the block method and sowing three forage legumes, three grasses and a mix of them. The study examined the yields and economic results at equal NPK fertilizer rates applied annually, every second year or once in the first year as a reserve. The forage grass species of the study, whether sown in monoculture or mixes, produced high dry matter yields with or without fertilizer application. Under the trial conditions the economically most profitable treatments with the same fertilizer amount of (N<sub>32</sub>P<sub>32</sub>K<sub>32</sub>) kg/da over a 4-year period were: annual application of N<sub>8</sub>P<sub>8</sub>K<sub>8</sub> on white clover, timothy, red fescue and mix; application of N<sub>16</sub>P<sub>16</sub>K<sub>16</sub> every second year (first and third) on cocksfoot; single reserve application of N<sub>32</sub>P<sub>32</sub>K<sub>32</sub> on birdsfoot trefoil and red clover in the first year.

**9. D. MITEV, K. BELPERCHINOV**

**ECOLOGICAL PLASTICITY OF SOME RED FESCUE CONTAINING MEADOW COMMUNITIES SITED ON THE SLOPES OF THE FORE MOUNTAIN PART OF THE BALKAN MOUNTAINS**  
**VII. PRODUCTIVITY AND BOTANICAL COMPOSITION OF MIXED SWARD CONSISTING OF RED FESCUE, SMOOTH-STALKED MEADOW GRASS AND LUCERNE**

***JOURNAL OF MOUNTAIN AGRICULTURE ON THE BALKANS, VOL. 4, 4-5, 2001, (298-304) ISSN 1311-0489***

**VII.**

A field trial was conducted with the objective of determining the ecological plasticity of a meadow sward consisting of red fescue, smooth-stalked meadow grass and lucerne and sown along the slopes of the fore mountain parts of the Balkan Mountains.

The soil gleization degree was a major factor influencing the association productivity and botanical composition.

On plots of low gleization the fresh herbage yield reached up to 6480 kg/da (east-facing plots) and the dry matter — up to 1658 kg/da (southeast-

facing plots). On high gleization sites the same productivity parameters arrived at 2270 kg/da (east-facing plots) and 710 kg/ha (northeast-facing plots), accordingly.

Low gleization favoured higher sward percentage of lucerne in the total mass. It reached 59% on east-facing plots. Gleization increase reduced its percentage.

6480 kg/da, ( ), 1658 kg/da  
( ).  
2270 kg/da ( ) 710 kg/da ( ),  
-  
59%.  
й.

10. K. BELPERCHINOV, D. MITEV  
**ECOLOGICAL PLASTICITY OF SOME RED FESCUE-CONTAINING MEADOW COMMUNITIES SITED ON THE SLOPES OF THE FORE MOUNTAIN PART OF THE BALKAN MOUNTAINS**  
***VIII. PRODUCTIVITY AND BOTANICAL COMPOSITION OF MIXED SWARD CONSISTING OF RED FESCUE, ORCHARDGRASS, RED CLOVER AND BIRDSFOOT TREFOIL***

**VIII.**

***JOURNAL OF MOUNTAIN AGRICULTURE ON THE BALKANS, VOL. 4, 2-3, 2001, (142-150) ISSN 1311-0489***

A field trial was performed to determine the ecological plasticity of mixed temporary grassland sown with red fescue (*Festuca rubra* L.), orchardgrass (*Dactylis glomerata* L.), red clover (*Trifolium pratense* L.) and birdsfoot trefoil (*Lotus corniculatus* L.), located on slopes in the fore Balkan. The grassland siting on the fore mountain slopes is of crucial importance. The soil low gleization level allowed for harvesting of up to 5038 kg/da of fresh herbage and 1834 kg/da of dry matter (SE-facing plots), on average. On high gleization soil,



yields of up to 2095 kg/da of fresh herbage (SE-facing plots) and 644 kg/da of dry matter (NE-facing plots) were collected. Productivity was reduced by low moisture content and highly eroded soil on the west slope.

5038 kg/da, 1834 kg/da  
( ), 2095 kg/da  
( ) 644 kg/da ( )  
)

**11. D. MITEV, Z. TOMIC, K. STOEVA**  
**COMPARATIVE STUDY OF MEADOW GRASS VARIETIES AND**  
**POPULATIONS OF LOCAL AND FOREIGN ORIGIN**

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*JOURNAL OF MOUNTAIN AGRICULTURE ON THE BALKANS,*  
*VOL.9, 5, 2006, (772-781) ISSN 1311-0489*

The behaviour of Bulgarian and Serbian varieties and populations of meadow grasses of the species of cocksfoot, red and tall fescue, meadow timothy was studied under the conditions of the Central Balkan Mountains in Bulgaria. For the study period the meadow grasses of local origin showed better adaptation ability, as compared to the foreign ones.

The differences in total productivity were minimal among the varieties and populations. A greater exceeding, as compared to the conditionally chosen control, was found for meadow timothy variety Krushevac-36 (Serbia), by 27,37 % and for variety Troyan (Bulgaria) by 16,88%.

The content of weed vegetation and self-seeding of other meadow species of local origin, was indicative of the adaptation ability by treatments. In tall fescue variety Krushevac-20 the weeds reached to 38 % of the total mass. The self-sown other meadow species of local origin in red fescue variety Krushevac-38 represented 89 % of the total mass.

( ) - 27,37 % ( ) - 16,88 % -36  
 38 89 % -20  
 38 89 % -

**12. D. MITEV, K. BELPERCHINOV, K. STOEVA  
 DYNAMICS IN THE DEVELOPMENT OF A MIXED SWARD OF  
 RED FESCUE, KENTUCKY BLUEGRASS AND BIRDSFOOT TREFOIL  
 ON THE SLOPES OF THE CENTRAL BALKAN MOUNTAINS**

*JOURNAL OF MOUNTAIN AGRICULTURE ON THE BALKANS,  
 VOL.9, 7, 2006, (1264-1271) ISSN 1311-0489.*

The dynamics in the development of a mixed sward of red fescue, Kentucky bluegrass and birdsfoot trefoil when located on mountain slopes was studied. The results covered the period of the 7<sup>th</sup> to 9<sup>th</sup> year from sward establishment.

At a high degree of soil gleying (lower slope part) the green mass was 710 kg/da to 2340 kg/da. The dry matter was 310 kg/da to 1010 kg/da.

At a low degree of soil gleying 820 kg/da to 2862 kg/da green mass was obtained. The dry matter as 297 kg/da to 1041 kg/da.

Red fescue prevailed in the swards. Its participation reached to 84% at a low degree of soil gleying, with northerly exposure. The content of Kentucky bluegrass and birdsfoot trefoil was insignificant. There was considerable self-seeding of other meadow species of local origin reaching to 57% in some treatments (southeasterly exposure, low degree gleying)

The weed infestation was insignificant with few exceptions.

( )  
 710 / 2340 / 310  
 / 1010 / .  
 820 / 2862 / . 297 / 1041 / .  
 , 84%.  
 , ,  
 57% ( , ,  
 ).

**13. D. MITEV, K. BELPERCHINOV, K. STOEVA**  
**DYNAMICS IN THE DEVELOPMENT OF A MIXED SWARD OF**  
**RED FESCUE, TALL FESCUE AND BIRDSFOOT TREFOIL ON THE**  
**SLOPES OF THE CENTRAL BALKAN MOUNTAINS**

*JOURNAL OF MOUNTAIN AGRICULTURE ON THE BALKANS,*  
*VOL.9, 7, 2006, (1256-1263 ISSN 1311-0489).*

The dynamics in the development of mixed swards of red fescue, tall fescue and birdsfoot trefoil when located on the mountain slopes was determined.

At a low degree of soil gleying 860 kg/da to 2715 kg/da green mass and 321 kg/da to 1082 kg/da dry matter were obtained.

At a high gleying degree the green mass was 650 kg/da to 2670 kg/da. The dry matter was 259 kg/da to 980 kg/da.

Tall fescue prevailed in the swards followed by red fescue. The birds foot trefoil participation was symbolical. The weed infestation, with few exceptions, was insignificant.

860 /  
 2715 / 321 / 1082 / .  
 / 650 / 2670  
 / . 259 / 980 / .

14.

MITEV, D. *FIELD CROPS STUDIES*, 2007, VOL. IV-2, (351-355)  
ISSN 1312-3882.

, 2007, IV-2,  
(351-355)

The study included data on period of use from the 7<sup>th</sup> to 9<sup>th</sup> years after establishment of a mixed sward of red fescue, Kentucky bluegrass and alfalfa, on the mountain slopes. At a low degree of soil gleying, high slope parts, the green mass yield was from 1120 g/da (west facing) to 3343 g/da (southwest facing). The dry matter was from 321 g/da to 1273 g/da. The green mass yield varied from 770 g/da to 2360 g/da (east facing) at a high degree of soil gleying, low slope part. For dry matter, they were from 280 g/da to 986 g/da. The participation of the components in the swards was variable. The share of red fescue was within the range from 11 % to 83 %. Alfalfa had participation from trace to 54 %. Kentucky blue grass had small participation. There was self-seeding of other meadow species of local origin.

**Key words:** *Red fescue - Kentucky blue grass - alfalfa - dynamics - slopes - Bakan mountains*

7 -9 .

(  
) 1120 g/d ( )  
3343 g/d ( ) 321  
g/d 1273 g/d . ( )  
) 770 g/d 2360 g/d ( )  
) 280 g/d 986 g/d .  
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15. STOEVA, K., D. MITEV

**INVESTIGATION ON SOWING DATES OF PERENNIAL GRASSES UNDER THE CONDITIONS OF STRANDJA REGION,**

*FIELD CROPS STUDIES*, 2007, VOL. IV-2, (363-368) ISSN 1312-3882

(363-368)

During the period 1990-1993 in the experimental field of RCRAS - Sredets the following species of perennial grasses were tested: birdsfoot trefoil; orchard grass; red fescue and awnless brome grass. It was established that under the conditions of Strandja region the birdsfoot trefoil developed best after spring sowing. The perennial cereal grasses were cultivated best at autumn sowing, with a yield of dry matter up to 1029 kg/da – 114,08%.

**Key words:** *Strandja - Sowing date - Perennial grasses*

1990 - 1993 .

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1029 kg/da -114,08%.

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**16. DIMITAR MITEV, GALINA NAYDENOVA**  
**DURABILITY OF ARTIFICIAL GRASSLANDS WITH RED FESCUE (*FESTUCA RUBRA L.*) ALONG MIDDLE BALKAN MOUNTAIN SLOPES. PART 1. GENERAL GRASSLANDS STATE**  
***JOURNAL OF BALKAN ECOLOGY, VOL.11, N2, 2008 (171-182)***  
**ISSN 1311-0527.**

The paper deals with the general state of mixed meadow grasses with participation of red fescue along the slopes of Middle Balkan mountains in the period from the 11<sup>th</sup> to the 13<sup>th</sup> year after their creation. It is proved that the differences in the conditions along mountain slopes, which in this experiment are the variability of soil and sun exposure of the different areas, influence the grassland productivity. The differences in the species ingredients of mixtures during their creation are a proven source for variation in the 11<sup>th</sup> (2004) and the 12<sup>th</sup> (2005) year after grasslands creation. In the 13<sup>th</sup> year (2006), the species ingredients had a proven influence on the dry mass yield depending on the habitat conditions.

The species participation in created grasslands varied. The red fescue is the main component in the grasslands. It is in an inversely proportional dependence to the tall fescue, when they are grown together. The combination of grasses and alfalfa is appropriate for this part of the slopes, which are characterized by a slighter level of soil gleying. Mixed grasslands with the participation of birdsfoot trefoil could be grown in regions of a little bit higher

level of soil gleying. The fast decline of the legume components from the grasslands, with high levels of soil gleying, leaves the open opportunity of sowing grasslands without them in accordance with appropriate economic and ecological reasons.

*Key words: meadow grassland, productivity, durability, slope, species ingredient, soil, exposure.*

**17. D. MITEV, G. NAYDENOVA  
PERSISTENCY OF ARTIFICIAL SWARDS WITH  
PARTICIPATION OF RED FESCUE LOCATED ON THE SLOPES OF  
THE CENTRAL BALKAN MOUNTAINS. V. STATE OF MIXED  
SWARDS OF RED FESCUE AND BIRDSFOOT TREFOIL**

*JOURNAL OF MOUNTAIN AGRICULTURE ON THE BALKANS,  
VOL.11, 7, 2008, (1342-1352). ISSN 1311-0489*

State of mixed swards of red fescue and birdsfoot trefoil located on the slopes of the fore/mountain was studied for a 13-year period (1994 - 2006).

At a low degree of soil gleying upper slope part, the average yield was highest, 793 kg/da, at southeaster exposure.

The yield was lowest, 543 kg/da| westerly exposure.

At a high degree of soil gleying lower slope part, the highest average yield of 772 kg/da was obtained northeasterly exposure.

The lowest average yield of 525 kg/da was obtained at southeasterly exposure.

The swards had high sustainability of development, the presence of the sown species in the total forage mass in some variants being up to 97% northeasterly exposure, greatly gleyed soils, year 1996, 2000; northerly exposure, slightly gleyed soils, 1998).

The participation of the sown species was greater at the higher levels of soil gleying, as compared to that at the lower ones.

The percentage of birdsfoot trefoil decreased considerably with advance of the years.

13 .(1994 - 2006 ).

793 kg/da,  
543 kg/daq

772 kg/da, 525 kg/da, 97% ( , 1996 ., 2000 ., , 1998 .).  
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**18. D. MITEV, G. GORANOVA**  
**VARIATION IN SOME MEADOW SWARDS WITH PARTICIPATION F RED FESCUE ON THE SLOPES OF THE CENTRAL BALKAN MOUNTAINS VII. BEHAVIOUR OF A MIXED SWARD OF RED FESCUE, KENTUCKY BLUEGRASS AND BIRDSFOOT TREFOIL**

**VII.**

*JOURNAL OF MOUNTAIN AGRICULTURE ON THE BALKANS, VOL.11, 1, 2008, (81-91) ISSN 1311-0489*

10 12  
 2003) 2610 kg/da 920 kg/da ( . 1, ( . 2, 2004).  
 311 kg/da 909 kg/da, ( . 2, 2003; 2004) ( . 2), 13.1%, 18.0%.

1170 kg/da  
 ( . 5, 2003) 2570 kg/da ( . 1, 2004). 7.8%  
 ( . 4) 19.35 ( . ). 315 kg/da

kg/da (var. A1, 2004). (var. A4, 2003) 1085  
 15.4%, (var. B2)  
 30.3%, (var. B4).  
 и  
 67% (var. B5, 2003).  
 70% (var. B1, 2003).

## 19. . . .

**D. MITEV, G. GORANOVA**

### **SUSTAINABLE DEVELOPMENT OF A MIXED SWARD OF RED FESCUE, KENTUCKY BLUEGRASS AND LUCERNE ON THE SLOPES OF THE CENTRAL BALKAN MOUNTAINS**

*JOURNAL OF MOUNTAIN AGRICULTURE ON THE BALKANS, VOL.11, 2, 2008, (249-258) ISSN 1311-0489*

Behaviour of mixed swards of red fescue, Kentucky bluegrass and birdsfoot trefoil located on the slopes of the Central Balkan Mountains was studied. Results covered the period from the 10<sup>th</sup> to 12<sup>th</sup> year after their establishment.

At a high degree of soil gleying, characteristic of the lower slope part, green mass varied from 920 kg/da at easterly exposure (var. A1, 2003) to 2610 kg/ha at southeasterly exposure (var. A2, 2004). Dry matter was from 311 kg/da to 909 kg/da at southeasterly exposure (var. A2, 2003; 2004).

At southeasterly exposure (var. A2), the exceeding in green mass production, on average for the period, was by 13.1% and that of dry matter by 18.0%.

At a low degree of soil gleying, characteristic of the upper slope part, green mass from 1170 kg/da at northerly exposure (var. B5, 2003) to 2570 kg/da at easterly exposure (var. B1, 2004) was obtained.

The decrease for the different variants, on average for the period, was from 7.8 % (var. B4) to 19.3% (var. B3) Dry matter varied from 315 kg/da at westerly exposure, greatly eroded soil (var. B4, 2003) to 1085 kg/da at easterly exposure (var. B1, 2004). The decrease for the variants, on average for the period was from 15.4% at southeasterly exposure (var. B2) to 30.3% at westerly



exposure greatly eroded soils (var. B4).

Red fescue was a determinant component of the swards. Its participation reached to 67% (var. B5, 2003) at a low degree of soil gleying and northerly exposure.

Kentucky bluegrass and birdsfoot trefoil were slightly represented. There was considerable self-seeding of other meadow species of local origin reaching to 70% some variants (var. B1 2003).

Weed infestation was insignificant with few exceptions.

**Key words:** *red fescue, Kentucky bluegrass, birdsfoot trefoil, Balkan Mountains, slopes.*

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,  
,  
,  
1810 kg/da,  
( . , 1998), 4820 kg/da, ( . 2, 1999).  
476 kg/da,  
( . 4, 1998), 1343 kg/da ,  
( . 2, 1999).  
40.4% ( . 4). 19.9 % ( . 5)  
31.5% ( . 4) 36.8 %  
( . ).  
,  
920 kg/da,  
( . 2, 1997), 2425 kg/da,  
( . , 1999). 324 kg/da,  
( . 1, 1998) 882 kg/da, ( . , 1999).  
48.1% 71.9%.  
,  
88% ( . 1, 1999).  
- 68%  
( . 1, 1997).

The study included results of the period from the 4<sup>th</sup> to 6<sup>th</sup> year after establishment of mixed swards of red fescue, Kentucky bluegrass and Lucerne on the slopes of the Central Baikan Mountains.

At a low degree of soil gleying on the upper slope part, green mass yields were from 1810 kg/da at westerly exposure (var. B3, 1998) to 4820 kg/da at southeasterly exposure (var. B2, 1999).

Dry matter varied from 476 kg/da at westerly exposure, on greatly eroded soils (var. B4, 1998) to 1343 kg/da at southeasterly exposure (var. B2, 1999).

On average for the period, the decrease in the green mass productivity, as compared to the control, varied from 19.9% (var. B5) to 40.4% (var. B4).

For the dry matter, they were from 31.5% (var. B4) to 36.8 % (var. B3).

At a high degree of soil gleying characteristic of the lower slope part, the green mass yields were from 920 kg/da at southeasterly exposure (var. 2, 1997) to 2425 kg/da at northeasterly exposure (var. A3, 1999).

Dry matter was from 324 kg/da at easterly exposure (var. A1, 1998) to 882 kg/da at northeasterly exposure (var. A3, 1999). On average for the period at northeasterly exposure, the green mass exceeded the control by 48.1% and the dry matter by 71.9%.

Botanical composition is a major criterion of sustainable development of the swards. Red fescue predominated in the different variants and years of use and reached to 88% (var. A1, 1999).

Lucerne predominated at lower degrees of soil gleying and in some cases, reached to 68% of the total forage mass (var. B1, 1997). Participation of Kentucky bluegrass was insignificant.

20. G. GORANOVA, D. MITEV

**SUSTAINABLE DEVELOPMENT OF A MIXED SWARD OF RED FESCUE, COCKSFOOT, RED CLOVER AND BIRDSFOOT TREFOIL ON THE SLOPES OF THE CENTRAL BALKAN MOUNTAINS**

*JOURNAL OF MOUNTAIN AGRICULTURE ON THE BALKANS, VOL.11, 3, 2008, (461-470) ISSN 1311-0489*

The study included results of the period from the 4<sup>th</sup> to 6<sup>th</sup> year after establishment of mixed swards of red fescue, cocksfoot, red clover and birdsfoot trefoil on the slopes of the Central Balkan Mountains with a difference towards the four cardinal points.

At a low degree of soil gleying on the upper slope part, green mass was from 1540 kg/da at westerly exposure (var. B3, 1997) to 3650 kg/da at southeasterly exposure (var. B2, 1999).

Dry mass yields were from at a high degree of soil gleying on the lower slope part, the green mass was from 870 kg/da at southeasterly exposure (var. A2, 1997 to 2775 kg/da at northeasterly exposure (var. A3, 1999).

Dry matter was from 287 kg/da to 905 kg/da, respectively.

With prolongation of the utra of the swards, the participation of red fescue increased.

In some variants it reached to 91 % (var. B1, 1999).

The participation of cocksfoot, red clover and birdsfoot trefoil decreased considerably and at the end of the studied period there were only traces of them in the swards.

Weeds, with few exceptions (var. B2, 1999), varied from 6 to 17%.

4 6 ,  
, , ,  
, , ,  
1540 kg/da, ( . , 1997)  
3650 kg/da, ( . 2, 1999).  
425 kg/da 1031 kg/da.  
870 kg/da, ( 2, 1997)  
2775 kg/da, ( . , 1999).  
287 kg/da 905 kg/da.  
91% ( . 1,  
1999).

,  
,  
( . 2, 1999) 6 – 17%.

21. G. GORANOVA, D. MITEV  
**VARIATION IN SOME MEADOW SWARDS WITH PARTICIPATION OF RED FESCUE ON THE SLOPES OF THE CENTRAL BALKAN MOUNTAINS VI. BEHAVIOUR OF A MIXED SWARD OF RED FESCUE, TALL FESCUE AND BIRSDFOOT TREFOIL**

, . , C  
,  
VI.

***JOURNAL OF MOUNTAIN AGRICULTURE ON THE BALKANS, VOL.11, 1, 2008, (60-70) ISSN 1311-0489***

Behaviour of mixed swards of red fescue, tall fescue and birdsfoot trefoil located on the slopes of the Central Balkan Mountains was studied from the 10<sup>th</sup> to 12<sup>th</sup> year after their establishment.

At a low degree of soil gleying, characteristic of the upper slope part, green mass from 1290 kg/da at westerly exposure, greatly eroded soils (var.

B4, 2003) to 2620 kg/da at easterly exposure (var. B1, 2004) was obtained. Dry matter was from 338 kg/da to 961 kg/da, respectively.

At a high degree of soil gleying, characteristic of the lower slope part, the green mass was from 850 kg/da at easterly exposure (var. A1, 2003) to 2380 kg/da at southeasterly exposure (var. A2, 2004).

The dry matter was from 245 kg/da to 824 kg/da, respectively ratio between red fescue and tall fescue in the swards was in inverse proportional relation.

Red fescue participation in some variants was up to 62% (A1, 2005) and that of tall fescue up to 70% (B2, 2003). Birdsfoot trefoil had insignificant participation. Weeds varied from 5% (B2, 2003) to 38% (B3, 2004) in the different variants.

**Key words:** red fescue, tall fescue, birdsfoot trefoil, Balkan Mountains, slopes.

,  
, 10 12 .  
,  
1290 kg/da,  
( . 4, 2003) 2620 kg/da,  
( . 1, 2004). 338 kg/da  
961 kg/da.  
,  
850 kg/da, ( . 1,  
2003) 2380 kg/da, ( . 2, 2004).  
245 kg/da 824 kg/da.  
,  
62% ( 1, 2005),  
70% ( 2, 2003).  
5% ( 2, 2003) 38% ( ,  
2004).

22. G. NAYDENOVA, D. MITEV

**PERSISTENCY OF ARTIFICIAL SWARDS WITH PARTICIPATION OF RED FESCUE LOCATED ON THE SLOPES OF THE CENTRAL BALKANS MOUNTAINS. IV. STATE OF MIXED SWARDS OF RED FESCUE AND KENTUCKY BLUEGRASS**

c

. IV.

***JOURNAL OF MOUNTAIN AGRICULTURE ON THE BALKANS, VOL.11, 6, 2008, (1124-1135) ISSN 1311-0489.***

State of mixed swards red fescue and Kentucky bluegrass located on the slopes of the mountain was studied for a 13-year period (1994 – 2006).

At a low degree of soil gleying, upper slope part, the average yield was highest, 816 kg/da, at easterly exposure. The yield was lowest, 479 kg/da, at westerly exposure.

At high degree of soil gleying, lower slope part, the highest average yield of 692 kg/da was obtained at northeasterly exposure.

The lowest average yield of 476 kg/da was obtained at easterly exposure.

The swards high sustainability of development, the presence of the sown species in the total forage mass in the different variants being up to 98% (westerly exposure, greatly eroded soils, year 1997).

The participation of the sown species according to years and location was variable. It was greater at the higher levels of soil gleying, as compared to that at the lower ones.

13 (1994 - 2006).  
816 kg/da,  
479 kg/da,  
692 kg/da  
476 kg/da  
98% ( , 1997).

23. G. NAYDENOVA, D. MITEV  
**PERSISTENCY OF ARTIFICIAL SWARDS WITH PARTICIPATION OF RED FESCUE ON THE SLOPES OF THE CENTRAL BALKAN MOUNTAINS. II. STATE OF PURE SWARDS OF RED FESCUE**

## II.

*JOURNAL OF MOUNTAIN AGRICULTURE ON THE BALKANS, VOL.13, 1, 2010, (193-205) ISSN 1311-0489.*

State of pure swards of red fescue of local origin was studied for a 13-year period (1994-2006).

They are located on the slopes of the mountain at different exposure towards the four cardinal points.

The low degree of soil gleying characteristic of the upper slope parts, created conditions for obtaining of 220 kg/da (1994; westerly exposure) to 1424 kg/da dry matter (1995; southeasterly exposure).

The high degree of soil gleying characteristic of the lower slope parts, created conditions for obtaining of 239 kg/da (1994) to 1048 kg/da (1999), northeasterly exposure.

Red fescue was the structure-forming component of the swards and its participation in some variants reached to 96% of the total forage mass (northerly exposure, 1996; northeasterly exposure, 1998, 2000).

13 . (1994 - 2006)  
220 kg/da (1994;  
(1995;  
1424 kg/da  
)  
)  
239 kg/da (1994)  
8 kg/da (1999),  
96%  
( 1996, 1998,  
2000).

24. G. NAYDENOVA, D. MITEV  
**PERSISTENCY OF ARTIFICIAL SWARDS WITH PARTICIPATION OF RED FESCUE LOCATED ON THE SLOPES OF THE CENTRAL BALKAN MOUNTAINS. VI. STATE OF MIXED SWARDS OF RED FESCUE, TALL FESCUE AND BIRDSFOOT TREFOIL**

## VI.

State of mixed swards of red fescue, tall fescue and birdsfoot trefoil located on the slopes of the Central Balkan Mountains was studied in the period from 1<sup>st</sup> to 13<sup>th</sup> year after their establishment.

At a low degree of soil gleying, upper slope part, the yields of dry matter varied from 239 kg/da (westerly exposure, 1994) to 1464 kg/da (easterly exposure, 1995).

At a high degree of soil gleying, lower slope part, the yields of dry matter varied from 259 kg/da (southeasterly exposure, 2000) to 1031 kg/da (northeasterly exposure, 1995).

The sward composition showed a state of sustainable development.

The sown meadows herbaceous species of local origin were the structure-forming components of the swards. Their participation in the swards reached to 99% of the total mass (easterly exposure, high degree of soil gleying, 2004).

**Key words:** *red fescue, tall fescue, birdsfoot trefoil, the Balkan Mountains, slopes*

1 13  
239 kg/da ( 1994) 1464kg/da ( , 1995)  
259 kg/da ( , 2000) 1031 kg/da ( , 1995).  
99% ( , 2004.)

**25. D. MITEV, VI. LINGORSKI, B. CHURKOVA  
PERSISTENCY OF ARTIFICIAL SWARDS WITH  
PARTICIPATION OF RED FESCUE LOCATED ON THE SLOPES OF  
THE CENTRAL BALKAN MOUNTAINS. 8. STATE OF MIXED  
SWARDS OF RED FESCUE, KENTUCKY BLUEGRASS AND**

## LUCERNE

*JOURNAL OF MOUNTAIN AGRICULTURE ON THE BALKANS,*  
*VOL.13, 6, 2010, (1565-1577) ISSN 1311-0489.*

They were sown on soils with a high (A) and low (B) level of soil gleying, at easterly (var. A1; B1), southeasterly (var. A2; B2), northeasterly (var. A3), westerly (var. ; B4 greatly eroded soil) and northerly (var. B5) exposure.

It was found that at a high degree of soil gleying, lower slope part, the dry matter yields varied from 228 kg/da (1994 northeasterly exposure) to 1106 kg/da (2002, northeasterly exposure).

At a low degree of gleying, upper slope part, the dry matter yields varied from 209 kg/da (1994, westerly exposum) to 1662 kg/da (1995, easterly exposure).

The swardshad high sustainability of development and in some years the presence of the sown species reached to 98% of total forage mass (1997, northerly exposure, low degree of soil gleying). Weed infestation was low.

Red fescue was the predominant species in the swards. Lucerne predominated in the initial period of study, at a low level of soil gleying.

Presence of self-sown other meadow herbs of local origin, such as white clover, hybrid clover, peavine, etc. was found.

***Key words: mixed swards of red fescue, Kentucky bluegrass and lucerne, slopes, Central Balkan Mountains***

(1994 - 2006 .)  
( ) ( )  
( . 1; 1), ( . 2; 2) ( . ),  
( . ; 4- ) ( . 5) .  
228 kg/da  
(1994 .. ) 1106 kg/da. (2002 .  
)  
, 209 kg/da (1994 ..  
) 1662 kg/da (1995 .. )  
, 98%  
(1997 .. ,



Mixed swards of red fescue, Kentucky bluegrass and lucerne located on the slopes of the Central Balkan Mountains were studied for a 13-year period (1994-2006).

**26. D. MITEV, TSV. MIHOVSKI, B. CHURKOVA  
PERSISTENCY OF ARTIFICIAL SWARDS WITH  
PARTICIPATION OF RED FESCUE LOCATED ON THE SLOPES OF  
THE CENTRAL BALKAN MOUNTAINS. 9. STATE OF MIXED SWARDS  
OF RED FESCUE, COCKSFOOT, RED CLOVER AND BIRDSFOOT  
TREFOIL**

*JOURNAL OF MOUNTAIN AGRICULTURE ON THE BALKANS,  
VOL.13, 6, 2010, (1594-1605) ISSN 1311-0489.*

The experiment was carried out in the experimental field of IMSA in the 1994 - 2006 period.

The state of mixed swards of red fescue, cocksfoot, red clover and birdsfoot trefoil was studied at their location on the slopes of the mountain with a high (A) and low (B) level of soil gleying.

The exposure towards the four cardinal points was easterly (var. A1; B1), southeasterly (var. A2; B2), northeasterly (var. A3), westerly (var. ; B4 – greatly eroded soil) and northerly (var. B5).

It was found that the dry mass productivity at a high degree of soil gleying varied from 202 kg/da (2003, easterly exposure) to 1174 kg/da (1995, northeasterly exposure).

At a low degree of soil gleying the dry mass varied from 279 kg/da (1994, westerly exposure) to 1834 kg/da (1995, southeasterly exposure).

The botanical composition of swards showed their sustainability of development.

The sown meadow species in some variants occupied up to 99% of total forage mass (1996 and 2003, easterly exposure, highly gleyed soils).

Weed infestation of swards was low. Red fescue and cocksfoot

predominated in the initial period of the experiment. Red fescue was the sward forming component for the greater part of the study. Its portion reached to 91% in 1999 at easterly exposure, low gleyed soils.

**Key words:** *mixed swards of red fescue, cocksfoot, red clover and birdsfoot trefoil, slopes, Central Balkan Mountains*

1994  
– 2006 . ,

, ( ) ( )

( 1; 1), ( 2; 2), ( ), ( ; 4 - ( .

) ( 5).

, 202 g/da (2003 ., )

) 1174 g/da (1995 ., 279 g/da (1994 .

) 1834 g/da (1995 ., ).

. 99% (1996 . 2003 ., ,

).

. и 91% 1999 .

, : , , , ,

, ,

27. VI. LINGORSKI, D. MITEV

**EFFECT OF FOLIAR NUTRITION WITH ORGANIC FERTILIZER ON THE PRODUCTIVITY AND WEED INFESTATION OF AN ANNUAL EARLY SPRING MIXTURE**

. , . C

TOP

*JOURNAL OF MOUNTAIN AGRICULTURE ON THE BALKANS, VOL.13, 6, 2010, (1539-1548) ISSN 1311-0489.*

During the 2007-2009 period in the Institute of Mountain Stockbreeding and Agriculture, Troyan the effect of foliar nutrition with organic fertilizer on the yields and weed infestation of an annual early cereal-legume mixture was studied. The following doses of leaf fertilizing with the organic fertilizer

BioLIFE were tested as variants in a mixed stand of oat and spring pea: 1. Untreated (Control); 2. Treatment with 200 ml/da; 3. Treatment with 300 ml/da, 4. Treatment with 400 ml/da.

It was found that its use at the dose of 400 ml/da increased the obtained dry mass by 10.36%, as compared to the untreated control.

The increase in productivity of the same variant, as compared to those obtained at the lower doses of the leaf fertilizer was by 1.84% and 5.91%. These variants exceeded the control in yielding ability by 4.45 and 8.52%, respectively.

When treating with the leaf fertilizer BioLIFE, the weed infestation of the stand was smaller, the different doses having no significant effect on it.

**Key words:** *earllyspring mixture, leaf fertilizer, yields, weed infestation*  
2007-2009

BioLIFE: 1. ( ); 2. 200 ml/da; 3. 300 ml/da, 4. 400 ml/da. 400 ml/da 10.36% 1.84% 5.91%. 4.45 8.52%. BioLIFE

**28. D. MITEV, B. CHURKOVA, V. LINGORSKI, TS. MIHOVSKI  
STUDY ON COADAPTATION CAPACITY OF SOME MEADOW  
HERBACEOUS SPECIES IN THE CONDITIONS OF THE CENTRAL  
BALKAN MOUNTAINS**

***JOURNAL OF MOUNTAIN AGRICULTURE ON THE BALKANS,  
VOL.14, 6, 2011, (1278-1291 ISSN 1311-0489.***

In the 2007-2009 period an experiment was carried out in the experimental field of IMSA - town of Troyan to establish the capacity of a number of meadow herbaceous species of a local origin, such as white clover (3

populations), birdsfoot trefoil, red clover, lucerne, perennial ryegrass, red fescue and white bentgrass, to preserve their stands free of weed infestation. The trial was carried out on pseudopodzolic soils, slightly gleyed, with easterly exposure of the slope. For the conditions of the trial, Lucerne proved to be the most productive with a dry mass yield of 1221.5 kg/da on average for the period. The white clover, population 1, with 377.4 kg/da, had the lowest yielding ability among the sown species for the studied period. The slightest participation in the swards at the end of the studied period was found for white clover variety Debyut (31.9%) and for birdsfoot trefoil (37.3%).

2007-2009 . e

1221.5 kg/da. - 1  
 - 377.4 kg/da. - (31.9%)  
 (37.3%).

29. . . . .  
**B. CHURKOVA, V. LINGORSKI, D. MITEV**  
**EVALUATION OF VARIETIES AND POPULATIONS OF**  
**BIRDSFOOT TREFOIL BY PRODUCTIVITY, BOTANICAL AND**  
**MORPHOLOGICAL COMPOSITION OF SWARD**

*JOURNAL OF MOUNTAIN AGRICULTURE ON THE BALKANS,*  
*VOL.14, 1, 2011, (106-118) ISSN 1311-0489.*

During the 2008-2010 period in IMSA - Troyan, on light grey pseudopodsolic soil, populations of the following origin were studied: Shumen, Nesebar, Kiten, Tryavna, Sadovo, as well as genotypes of the varieties: V. Podolyanskii (Russia), Dedinovskii (Russia), Martanskii (Russia), Zora (Serbia), Bokor (Serbia), Smolenskii (Russia).

The data analysis showed that the population originating from Kiten and variety Dedinovskii had better productivity as compared to the standard variety Targovishte 1 on average for the studied period. They exceeded the standard by 4.1% and 17.9%. High presence of birdsfoot trefoil in the sward was shown by

the population originating from Tryavna (99.2%) in the first year, variety Zora (87.6) in the second year and variety Smolenskii (82.0%) in the third year.

During the years the sward of the studied varieties and populations showed different morphological composition. It depended to a great degree on the genotype and the interaction of genotype - environment.

**Key words:** birdsfoot trefoil, varieties and populations, yield of dry mass, botanical and morphological composition.

2008 - 2010 . - : , , ( ), ( ), ( ), ( ), ( ), ( ). 1 4.1% 17.9%. (87.6), (99.2%), (82.0%).

**30. TS. MLHOVSKI, B. CHOURCOVA, D. MITEV  
COMPARATIVE STUDY OF DIFFERENT VARIETIES OF RED  
CLOVER IN BULGARIAN CONDITIONS,  
AGRICULTURAL SCIENCE AND TECHNOLOGY, VOL.3, 2, June,  
2011, (130-133) ISSN 1313-8820**

During the 2007-2009 period in the experimental field of RIMSA - Troyan, a field trial was carried out with 10 varieties of red clover. Five varieties from Switzerland and four varieties from Japan were studied for Botanical composition, Morphological analysis, Yield of green mass and dry matter and Chemical analysis, comparing them with a Bulgarian candidate variety from Troyan. There were no significant differences with regard to the yields of fresh and dry mass from the different varieties of red clover. The diploid Japanese variety Sapporo was the highest-yielding and it exceeded the candidate variety from Troyan by almost 13% and 11 % for the fresh and dry mass, respectively. It had also the best chemical composition, therefore it can be recommended to the practice in the foremountainous regions of Bulgaria. The highest presence of red clover was found in the second experimental year. The portion of stems was predominant in the fresh mass of red clover, followed by that of leaves and

flowers.

*Keywords: red clover, varieties, characteristics*

**31. D. MITEV, B. CHURKOVA. M. ILIEV  
COMPARISON OF SOME GRASSES AND LEGUMES UNDER  
CONDITIONS OF THE CENTRAL BALKAN MOUNTAINS,**

*JOURNAL OF MOUNTAIN AGRICULTURE ON THE BALKANS,  
VOL.16, 5, 2013, (1233-1246) ISSN 1311-0489.*

2007 - 2012 . e

1485.48 kg/da.

- 639.49 kg/da.

During the period of 2007-2012 was conducted a study at the experimental field of RIMSA - Troyan in order to determine the productivity and capacity of some meadow grasses of local origin such as white clover, birdsfoot trefoil, red clover, lucerne, perennial ryegrass, red fescue and white bentgrass, to preserve their stands free of weed infestation.

The trial was carried out on pseudopodzolic soils, slightly gleyed, with easterly exposure of the slope. For the conditions of the trial, lucerne proved to be the most productive with a dry mass yield of 1485.48kg/da on average for the period.

The small leaved white clover (f.Silvestre) population had the lowest yielding ability among the sown species for the studied period and it was self-sown in a new stand of birdsfoot trefoil - 639.49 kg/da. The red clover, followed by birdsfoot trefoil and perennial ryegrass decrease their participation in the sward most quickly. White bentgrass, red fescue and lucerne keep for a longer period their high share in the total forage yield.

*Key words: local meadow grasses, Balkan Mountain*

**32. DIMITAR MITEV, GALINA NAYDENOVA  
DURABILITY OF ARTIFICIAL SWARD WITH THE  
PARTICIPATION OF RED FESCUE SITUATED ALONG THE SLOPES  
OF THE CENTRAL BALKAN MOUNTAIN VI. STATE OF MIXED  
SWARD OF RED FESCUE, KENTUCKY BLUEGRASS AND  
BIRDSFOOT TREFOIL**

**BANAT'S JOURNAL OF BIOTECHNOLOGY, 2014, V(9), (74-79)  
DOI: 10.7904/2068-4738-V(9)-74**

The state of mixed swards of red fescue, Kentucky bluegrass and birdsfoot trefoil was studied, situated along the slopes of the Central Balkan Mountain, during the period of 1st to the 13th year of their creation. At a high degree of soil gleying, (at) the low part of slope, the dry matter yields were within the limits of 2.8 t/ha-1 (1997, south-easterly exposure) up to 10.66 t/ha-1 (1999, north-easterly exposure). At a low degree of soil gleying, (and) high part of the slope, the dry matter yields were within the limits of 2.34 t/ha-1 (1994, westerly exposure) up to 14.34 t/ha-1 (1995, east exposure). The most prominent in productive terms for period of study are variants at the east and south-easterly exposure, slightly gleyed soil. The participation of the sown species in the total forage yield is variable quantity. They reach (at their most) up to 96% in 1998, north exposure, slightly gleyed soils an up to 97% in 2000, north-east exposure, highly gleyed soils. Their share was small in 2004 (44%) and in 2006 (42%) on a westerly slope, highly eroded soils.

*Key words: red fescue, Kentucky bluegrass, birdsfoot trefoil, Balkan Mountain, slopes.*

**33. D. MITEV  
ADAPTABILITY OF SOME CULTIVARS AND POPULATIONS  
OF LEGUME GRASSES TOWARDS THE ECOLOGICAL  
VARIABILITY IN THE REGION OF THE CENTRAL BALKAN  
MOUNTAIN, .**

***JOURNAL OF MOUNTAIN AGRICULTURE ON THE BALKANS,  
VOL.17, 5, 2014, (1061-1345) ISSN 1311-0489***

During a double sowing in the experimental field of RIMSA - Troyan, two selected local populations of blue alfalfa were compared with the standard cultivars for the country Pleven 6 and Prista 2 in the period of 2010-2013. They were also compared in relation to birdsfoot trefoil and red clover, which are

traditional for the conditions of the pseudopodzolic soils.

The local population No 1 of alfalfa, which is leading for the conditions of the experiment, yielded insignificantly by 1.78% in relation to dry matter productivity to the standard - cultivar Pleven 6, average for the period, in the first sowing, but it exceeded Prista 2 by 3.27%. For the second sowing, the exceeding reached on the average for the period 28.69%, in comparison with cultivar Pleven 6. In relation to cultivar Prista 2, the production exceeding was less.

Local population No 1 exceeded in yield of dry matter the birdsfoot trefoil by 9.7% in the first sowing and by 12.63% for the second sowing. The increase in productivity in relation to red clover in both sowings was significant.

The local population No 1 of blue alfalfa showed greater content in the total forage yield in the second sowing in comparison with the variants included in the examination. In the third year of the experiment, its participation in the sward reached up to 90.1 %.

The self-sowing of meadow grasses of local origin was determined, on the base of available seeds in the soil.

**Key words: Balkan Mountain, legume grasses.**

6 2. 1.78%, 3.27%, 28.69%, 9.7% 12.63% 90.1%.



# COMPARATIVE STUDY ON FODDER POTENTIALITIES OF SOME GRASSES OF LOCAL ORIGIN, FOR THE REGION OF THE CENTRAL BALKAN MOUNTAIN

*JOURNAL OF MOUNTAIN AGRICULTURE ON THE BALKANS, VOL.17, 5, 2014, (1154-1165) ISSN 1311-0489*

In the experimental field of RIMSA - Troyan was studied the opportunity for growing of some grasses of local origin for the region of the Central Balkan Mountain.

The highest yield for the period of 2011 - 2013 had the tall fescue. Its green mass exceeded the control on the average by 13.42%, and the dry mass by 1.39%. The opportunity for growing of French ryegrass and white bentgrass was determined in the condition of highly gleyed pseudopodzolic soils. The perennial ryegrass had the lowest yield. Its green mass was by 30.97% less on the average for the period of study, and the dry mass was by 42.73% less, in comparison with the control. Close in relation to its productivity for the period was *Briza maxima L.*, with average yield of green mass by 29.53% less, and of dry mass by 35.55% less in comparison with the control. The tall fescue had the highest sustainability of development for the period of the study. In the end of the study (2013), it showed the greatest participation (88.9%) in the total forage yield. Great was the content of white bentgrass in the total forage yield – 89.3% for 2012 and of French ryegrass – 86.6% for 2012.

**Key words:** meadow grasses, Balkan Mountain

2011 – 2013 .  
13.42%, 1.39%.  
30.97% - , 42.73% - ,  
29.53% ,  
35.55% -  
(2013 .) - (88.9%)  
- 89.3% 2012 .  
86.6% 2012 .

:

,

.

**35. DIMITAR MITEV, GALINA NAYDENOVA**  
**LEVEL OF WEED INFESTATION OF SOME ARTIFICIAL**  
**MEADOW SWARDS UNDER THE CONDITIONS OF THE CENTRAL**  
**BALKAN MOUNTAIN**

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***JOURNAL OF MOUNTAIN AGRICULTURE ON THE BALKANS,***  
***VOL.18, 1, 2015, (77-89) ISSN 1311-0489.***

The survey includes a number of researches on the level of weed infestation in some artificial meadow swards, of local origin. Species are grown independently or in a mixture among them, along the slopes of the Central Balkan Mountain. Swards have a habitat of different exposure towards the four cardinal points and diversity of soil gleying.

Infestation of swards is a variable quantity during the years. It is in a direct relation to the habitat of each of them. Their share in the initial and final period of study usually is greater.

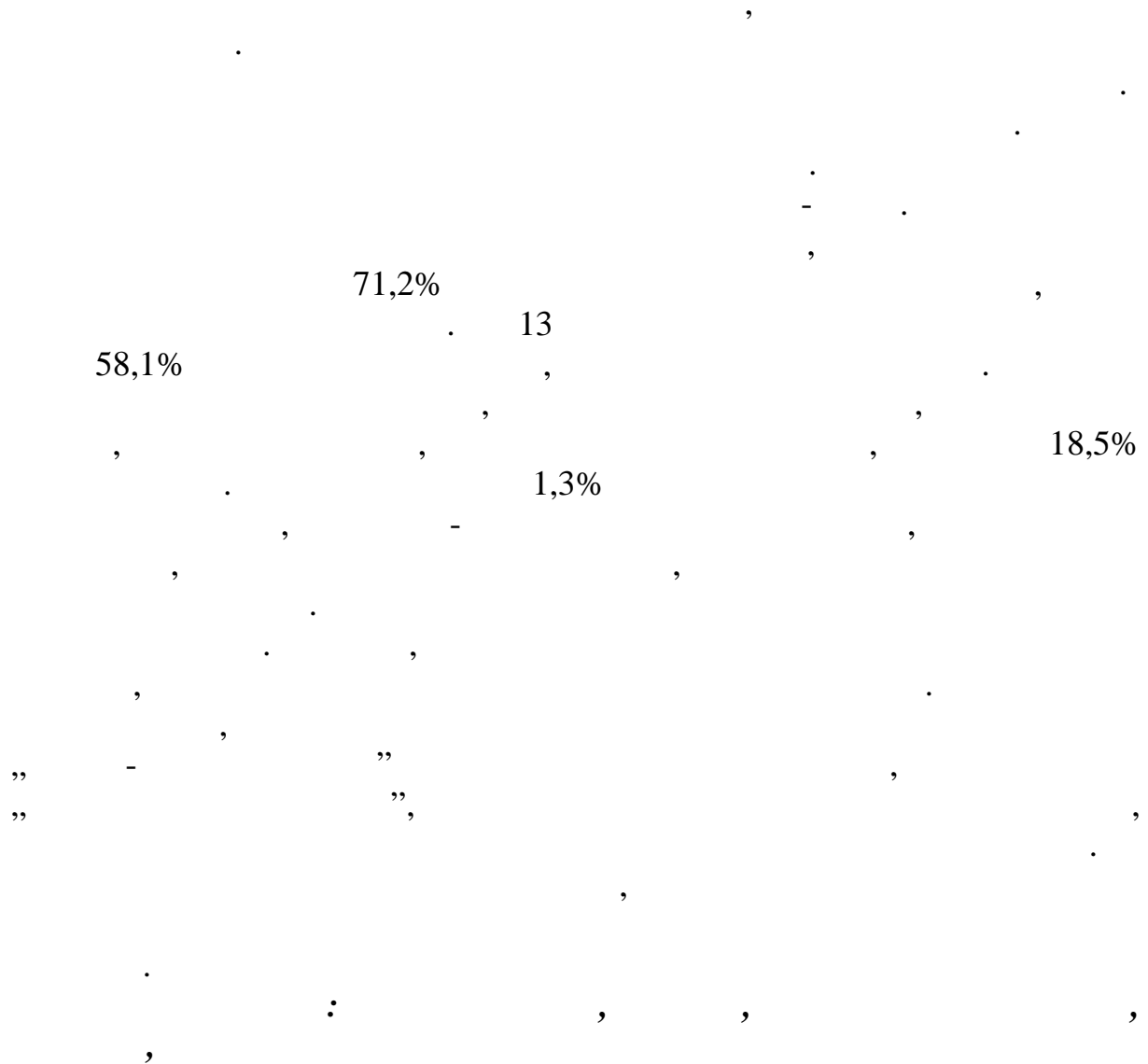
In the year of sowing in a mixed sward of red fescue, Kentucky bluegrass and Bird's-foot-trefoil was found weed infestation of 71% at northern exposure, low degree of soil gleying.

In the 13th year since the beginning of experiment, it was 58% at western exposure, soils of high erosion. In the eleventh harvest year, at south-east exposure, low part of the slope, red fescue, which has been grown independently, allowed 18.5% weed infestation. The weeds were only 1.3% in the sward of red fescue, tall fescue and Bird's-foot-trefoil, which were sown together, at eastern exposure, highly gleyed soil, at the eleventh year since the beginning of the experiment.

Self-sowing of other meadow species of local origin was found. It is considered that the behavior of swards arises from the presence or lack of synchronization with the rhythm of Nature. It was concluded that each concrete variant represents a peculiar "energy-information" system of a different order, with the respective "projection in Time", with all the ensuing consequences, including durability in individual and evolutionary plan.

In accord with the developed hypothesis, it is considered that a part of the factors of the environment could remain inaccessible for use from the plants conditionally for ever.

***Key words: Balkan Mountains, weeds, artificial swards, slopes, hypotheses***



**36. DIMITAR MITEV, GALINA NAYDENOVA  
TO THE ISSUE OF DURABILITY OF SOME ARTIFICIAL  
MEADOW SWARDS UNDER THE CONDITIONS OF THE CENTRAL  
BALKAN MOUNTAIN – BULGARIA 1. PRODUCTIVITY**

**1.**

*JOURNAL OF MOUNTAIN AGRICULTURE ON THE BALKANS,  
VOL. 18, 6, 2015, (983-995) ISSN 1311-0489 (PRINT) ISSN 2367-8364  
(ONLINE)*

The survey includes a number of researches on the behaviour and durability of some meadow grasses with a local origin. They were grown individually or in a mixture between them, along the slopes of the Central

Balkan Mountain, with a different exposure towards the four cardinal points and diversity in soil gleying.

In the beginning of the experiments, the yields from swards at a low degree of soil gleying, high part of the mountain slope, exceeded significantly these from higher levels of gleying, low part of slope.

In the end of the studied period (11<sup>th</sup>-13<sup>th</sup> year) was found a relative balancing in productivity in the variants, at high and slight gleying, especially at east and south-easterly exposure of the slope.

At a low degree of soil gleying, the productivity gradually decreased with the increase of number of years of growing.

Diversity in the behaviour of swards was found in the high degree of soil gleying, the low part of slope. Under these habitat conditions, the different variants increased their productivity in the end of the reported period (9<sup>th</sup>-13<sup>th</sup> year).

The conclusion was drawn, that "each structural unit" (... , species, population, cultivar, ...) represents a peculiar energy- informational system of a different order, with the corresponding "projection in Time", with all consequences in individual and evolutionary plan that arise out of that. "The level of energy saturation" that has been reached is in a direct connection with the formative process. In accord with the developed hypothesis we consider that a part of the environmental factors could remain inaccessible for plants conditionally forever. That determines the productivity, durability and etc.

**Key words:** *Balkan Mountain, meadow grasses, slopes, hypothesis*

37. GALINA NAYDENOVA, VILIANA VASILEVA, DIMITAR MITEV

**PRODUCTIVITY OF BULGARIAN GRAZING ECOTYPES OF PERENNIAL LEGUMES**

HA

***JOURNAL OF MOUNTAIN AGRICULTURE ON THE BALKANS, VOL. 18, 6, 2015, (972-982) ISSN 1311-0489 (PRINT) ISSN 2367-8364 (ONLINE)***

In order to preserve and develop the potential of Bulgarian grazing ecotypes of legumes as genetic resources for selection in grazing direction, the variability in seasonal productivity in grazing ripeness of Bulgarian legume populations, originated by semi-natural or sown pastures was studied in the period 2013-2015 in a field experiment conducted in ESS-Pavlikeni. Study included 10 populations of the following species: bird's-foot-trefoil (*Lotus corniculatus* L.) - 5 populations; red clover (*Trifolium pratense* L.) - 3 and alfalfa (*Medicago sativa* L.) - 2.

Two Bulgarian cultivars, such as bird's-foot-trefoil 'Turgovishte T' and red clover 'Sofia 52', were also included as standards for the intraspecies comparison in the study. The species and populations in the three vegetations did not differ reliably according to productivity in spring growing. Significant differences were found in dry vegetative matter yield in grazing ripeness stage, both on species and population level, for the conditions of second and third cut, as well as in the late summer cut (fourth cut) in third vegetation. The highest dry matter yield in summer regrowing was recorded for the grazing populations of alfalfa, as the differences in their favour were the greatest in the third vegetation under conditions of intensive summer drought. Populations of bird's-foot-trefoil and red clover were chosen with high summer and annual productivity with harvesting in grazing ripeness stage, as well as with good resistance and survival till the end of third vegetation.

***Key words: alfalfa, red clover, bird's-foot-trefoil, seasonal productivity, selection***

C

2013-2015 .  
(*Lotus corniculatus* L.) - 5  
(*Trifolium pretense* L.) - 3  
10  
;  
(*Medicago sativa* L.) - 2.

52". „ 1” „

### III.

38. P. PETROV, D. MITEV L. KOZELOV  
EFFECT OF DIFFERENT FERTILIZING NORMS ON YIELD OF  
DRY MATTER AND PROTEIN FROM AREAS FREE FROM  
BRACKEN FERN

, 3, 2000, (33-36) ISSN 0514-7441

1) ; 2) N10P10; 3)N!0P10K5;4)N!5P15K10.

Orskov et al. (1977).

(151 %) (210 %)  
N15P15K10u N10P10K5.  
( <0.05) in  
sacco

During two years long experiments was determined the yield of dry matter and protein at different norms of fertilization. Experimental patches were located on bracken free areas. Experiments were set up by block method in following variants:

1. control (no fertilizer); 2. N10P10; 3. N10P- -K,-4,N15P15K!0.

Phosphate and potassium fertilizers were spread annually early spring and nitrogen fertilizers - in the beginning of grass vegetation. Dry matter and protein yield per decare were analyzed during the experiments. In parallel the protein and dry matter decomposition was determined by method of Orskov et al., 1977. Based on the carried out experiments the following conclusion were drown:

- fertilization of bracken free areas heavily influenced dry matter and protein yield especially for dry matter (151%) and protein (210%) for areas with N15P15K10 and N10P10K5.

- a tendency was found (P<0.05) for increased in sacco decomposition of dry matter and protein of hey from non fertilized areas.

***Key words: hey, decomposition, dry matter, fertilization, bracken free***

39. P. PETROV, D. MITEV L. KOZELOV  
**EFFECT OF ARTIFICIAL GRASSING ON DRY MATTER AND  
PROTEIN YIELD FROM SURFACES CLEANED OUT FROM  
BRACKEN**

, 5-6, 2000, (5-8) ISSN 0514-7441

N10P10K5  
- N6P8K5

Orskov et al. (1979).

55.7, 36 3%, - 95.7, 4  
14%,  
in sacco

Natural meadows chemically cleaned off of bracken were sown in the following variants: control - without any sowing, alfalfa, hirdslnoil, red clover, white clover, red fescue, red fescue, timothy grass and couch grass.

The grass seeds were sown with direct drill in the spring according the accepted sowing limits. Plots with control and cereal species were annually with N,10P10K5 and legume ones - with N6P8K5.

Dry matter and protein yield were controlled during the experiment. Their dissolving was controlled as well by the method of Orskov et al., 1979, Based on this experiment the following conclusion was drown:

Undersowmg with while clover, timothy grass and tall fescue of natural MEADOWS, cleaned off from bracken, lead to an increase of dry matter yield with 55.7, 26.0 and 3.0%, and of crude protein yield with 95.7, 4.0 and 14.0% in comparison to unsowed plots.

Higher digestibility was found for dry matter and |protein of grassland undresown with white clover, timothy grass and tall fescue compared to the control.



**Key words: natural, meadows, undersowing, dry matter, protein, digestibility**

40. G. NAYDENOVA, D. MITEV, . . . OVA,

**PLANT SCIENCE, 47, 2010, 331-337 ISSN 0568-465X  
, 47, 2010, 331-337**

During the period 2006 - 2008 in the experimental field of IMSA Troyan (384 m a.s.-l.) mixtures of breeding populations of red clover and perennial ryegrass were tested under a combined regime of use. The average yields of hay from the mixed swards were within the limits of 5190 to 5610 kg.ha-1 and those of dry mass from the cuts for grazing between 2370 and 2770 kg.ha-1. As a total for the three-year period, the mixtures of the breeding populations were inferior in productivity to the control pure clover swards. The mixtures of the tested genotypes of red clover did not differ significantly in productivity, but there were differences by seasons and years due to drought resistance and persistency of breeding population Syn C and high productivity of dry mass of Syn A for the cuts that were well supplied with moisture. For the three-year period, the red clover predominated to a high extent in the sward and so the species and variety of the grass component influenced slightly the yield from the mixtures. The differences in biological characteristics between the two synthetic populations of perennial ryegrass were manifested also in mixtures under the ecological

conditions of Central Fore-Balkan Mountains. The population developed from local genotypes with an origin from South-Eastern Bulgaria (BP 2) showed good resistance and fast development in the first two vegetations. The mixtures with it were significantly superior in the sowing year and became equal to the pure clover swards during the second vegetation in net yield of dry mass.

Key words: red clover, perennial ryegrass, mixtures, breeding

2006 - 2008 ( . . 384 m)

5190 - 5610 kg.ha-1,  
2370 - 2770 kg.ha-1.

Syn

Syn

**41. DIMITAR MITEV AND GALINA NAYDENOVA  
SELECTION OF GOLD OAT (TRisetum flavescens L.) FOR  
THE MIDDLE OLD MOUNTAIN RANGE,  
AGRICULTURAL SCIENCE, 44, 4, 2011 (40-45) ISSN 1311-3534**

**(TRisetum flavescens  
L.)  
, 44, 4, 2011 (40-45)**

Eleven accessions were studied in order to evaluate certain biological and morphological characteristics as well as acclimatization of some imported populations gold oat. The study was carried out over the four year period in the mountain region where the soils were primarily unsaturated ptanosols (pH{ KCL) 4.4), Three populations (237710 from Germany, 251599 from Serbia and Goldhafcr

These populations were selected by a set of the criteria among which ground cover, stem height, size of leaves and panicle, resistance to leaf rust, seed yields, re-growth ability. It may be suggested that the assessment of the productivity, sustainability and durability of obtained acclimatized generations of the populations in the swards should be made in mixtures, typical of agro-environmental conditions of the certain region.

***Key words: golden oat grass, selection***

Goldhafer (237710, 251599)

**42. GALINA NAIDENOVA AND DIMITAR MITEV  
SELECTION VALUE OF FOREIGN ACCESSIONS CREEPING  
BENTGRASS (A GROSTIS STOLONIFERA L.)**

**(A GROSTIS STOLONIFERA L.)**

**, 44, 3, 2011 (52-59) ISSN 1311-**

**3534**

**AGRICULTURAL SCIENCE, 44, 3, 2011 (52-59)**

Creeping bentgrass (*Agrostis stolonifera* L.) has potential for major species in the establishment of artificial meadows and seeded pastures for grass regeneration of pasturages throughout the country. In order to select the material for clonal selection and hybridization, during the period of 2006-2009, collection of 21 origin creeping bentgrass - 11 varieties and 10 populations was studied. Rate of development, ability to spread vegetative in the grass swards, durability, compatibility and competitiveness to be legume forage grasses and weeds, yield of green mass and dry matter were characterized. As accessions with selection value in the Central Balkan Mountains varieties Seaside, Emerald, Carmen and PI 439027 populations from Russia, PI 318934; PI 302902 from Spain and PI 204390 from Turkey were expressed. For medium lasting period they formed swards with high and stable yield, in which the participation of bentgrass reached over 60-70%. Because they differ significantly in their phenotypic expression in the observed indices, their hybridization can be a source of significant genetic variability for selection.

***Key words: creeping bentgrass, genetic resources, accessions***

**( ) (Agrostis stolonifera L.)**

**2006 – 2009 .**

21 - 11 10

439027 Seaside, Emerald, Carmen PI  
, PI 318934; PI 302902 PI 204390 .

60-70%.

43. D. GEORGIEV, T. MIHOVA, G. NAYDENOVA, M. GEORGIEVA,  
G. POPSKI, D. MITEV

**INFLUENCE OF DIFFERENT VARIANTS OF GRASS  
ESTABLISHMENT OVER THE CHEMICAL COMPOSITION OF  
BLACKBERRY FRUITS**

HA

HA

. LII, No. 6 PLANT SCIENCE,  
VOL. LII, No. 6 . 2015. Sofia ISSN 0568-465X

Study was conducted in the period of 2013 - 2015. The subject of study was Hull Thornless black-berry cultivar in the collection plantation of RIMSA-Troyan. The plant protection grass species, which are included in the scientific experiment for establishment of inter-row grass cover, are common bird s-foot-trefoil, late ripening bird;s-foot-trefoil! and a mixture of vetch with barley. Their influence over the chemical composition of blackberry fruits was studied.

Higher values were found for the indicators, such as indicators for dry matter according to Re %, dry weight % and tanning substance % of fruits in variants with late ripening and common bird's-foot-trefoil.

*Key words: blackberries, fruits, chemical composition, grass establishment*

44. G. NAYDENOVA, D. MITEV  
**STUDY OF BREEDING POPULATIONS OF BIRDSFOOD  
TREFOIL AND RED CLOVER IN MIXTURES**

In the three years field test elite breeding populations of birdsfoot trefoil and red clover selected for pasture utilization were compared with standard varieties of these species (Targovishte 1 and Sofia 52) in mixtures with meadow timothy and creeping bentgrass. The grass mixtures were cut at two different stages of development of the legumes - stem elongation (when it is appropriate for grazing), and flowering (the stage when it is usually used for hay preparing). A significant variation was found in the yield of the mixtures, which may be considered as an effect of the legume genotypes and related to the time of cutting and grass species included in the mixtures. At the stage of stem elongation the yield of the breeding populations mixtures, including meadow timothy, was equal to the yield of standard varieties mixtures. The results suggested a better productivity of breeding populations in spring growth as well as in late summer regrowth. It was found that breeding populations exceeded standard varieties as regards the establishment and sustainability of the swards, regardless of the time of grass cutting.

***Key words: red clover, birdsfoot trefoil, breeding, mixtures***

### III.

**45. DIMITUR MITEV, DIMITUR P TROV**  
**ON THE ANALYSIS OF THE RELATIONS OF COMPETITION**  
**AMONG PLANTS,**  
*PROCEEDINGS OF THE 5-TH ECOLOGICAL CONFERENCE,*  
*BANSKA BISTRICA, SLOVAKIA, 23-25 NOVEMBER, 1999 (155-161)*

The study suggests that the aggressiveness of the grass species in a three-component grass mixture is several times stronger than a two-component mixture. The determination of aggressiveness in a two-component mixture serves as the basis for its determination in three-component mixtures. The practical application of the formula in three-component combinations of ten meadow grass species has resulted (in 90 % of the cases) in reduced productivity of the grassland compared to the two-component one.

A starting point of our analysis was the paper of McGilchrist and Trenbath (1971) dealing with the competition between the species in two-component grass mixture.

*Keywords: analysis, aggressive behaviour, three components, meadow grass species.*

**46. K. BELPERCHINOV AND D. MITEV**  
**POSSIBILITIES OF EXTENDING THE GRAZING SEASON IN**  
**THE FOOTHILL AREAS OF THE BALKAN MOUNTAINS**  
*PROCEEDINGS OF THE INTERNATIONAL SYMPOSIUM OF THE*  
*EGF, THESSALONIKI, GREECE, MAY 27-29, 1999 (345-348)*

An experiment was conducted during 1993 - 1995, in the vicinity of IUSBA, Troyan, on light-grey (pseudo-podzolic) forest soil, without irrigation. The weather conditions during the period were close to the normal for the region. The object of the experiment was the winter usage (1 November - 1 March) of meadow grasslands with *Festuca rubra* L. and *Festuca arundinacea* Schreb. grown as monoculture and a mixture of *F. rubra* L., *F. arundinacea* and *Lotus corniculatus*. The winter yield of *F. arundinacea* was 1200-2200 kg ha<sup>-1</sup> DM and that of *F. rubra* 850-1400 kg ha<sup>-1</sup>. The mixture produced 1100\*2000 kg ha<sup>-1</sup> DM. The winter usage tended to decrease the yield the following year. The mixed grass stand was more stable compared with the *F. arundinacea* monoculture. The results from the experiment point to the possibility of extending the grazing season from the normally accepted 180 - 200 days to 250 - 280 days.

*Keywords: Central Balkan Mountains, Festuca arundinacea Festuca*

*rubra, mixture, monoculture, winter usage.*

**47. DIMITUR MITEV, KRASIMIR BELPERCHINOV  
ECOLOGICAL PLASTICITY OF SOME MEADOW  
COMMUNITIES CONTAINING RED FESCUE SITED ON THE SLOPES  
OF THE FOREMOUNTAIN PART OF THE BALKAN MOUNTAINS I.  
PRODUCTIVITY AND BOTANICAL COMPOSITION OF RED FESCUE  
MONOCULTURE LEY**

**I.**

*TOM 1, ( 2 )  
, 2000 (274-279)*

The object of the study were the productivity and botanical composition of a red fescue (*Festuca rubra* L.) ley established on light grey pseudo podzolic soil of various degree of gleization and sited on the slopes of the foremountain areas.

The average dry matter yield of the leys over the trial period on soils of lesser gleization and east- and southeast-facing plots, was 2.6 times higher compared to the yield from soils of greater gleization degree. The productivity from soils of similar gleization degree is not considerably affected by the slope aspect.

The share of red fescue in the yield obtained during each trial year and cut varied.

***Key words: plasticity, red fescue, slope, gleization.***

**48. KRASIMIR BELPERCHINOV, DIMITUR MITEV  
ECOLOGICAL PLASTICITY OF SOME MEADOW  
COMMUNITIES CONTAINING RED FESCUE SITED ON THE SLOPES  
OF THE FOREMOUNTAIN PART OF THE BALKAN MOUNTAINS II.  
PRODUCTIVITY AND BOTANICAL COMPOSITION OF A BINARY  
MIXTURE SWARD OF RED FESCUE AND TALL FESCUE**

## II.

, ( 2 )  
*TOM 1*, , 2000 (280-284)

The study was conducted on light grey pseudopodzolic soils of different gleization degree. The swards comprised of red fescue (*Festuca rubra* L.) and tall fescue (*Festuca arundinacea* Schrab) and occupied different sites along the slopes.

The yields obtained from the east and south-east facing variants with soils of lesser gleization degree were 3.6 times higher than those sited on soils of greater gleization. Considerably lower yields were obtained from west-facing swards and the same soil type.

The share of the cultured species in the sward varied depending on the aspect, the soil type and the growth stage - the range of variation being 3-56% for the red fescue and 1-94% for the tall fescue.

Key words: red fescue, tall fescue, yield, slope.

### **49. DIMITAR MITEV, KRASIMIR BELPERCHINOV ECOLOGICAL PLASTICITY OF SOME GRASSLAND COMMUNITIES INCLUDING RED FESCUE AND LOCATED ON THE FOOTHILL SLOPES OF THE BALKAN MOUNTAINS V. BOTANICAL COMPOSITION AND PRODUCTIVITY OF MIXED GRASSLAND COMPRISING RED FESCUE, KENTUCKY BLUEGRASS AND BIRDSFOOT TREFOIL**

*AGRARIAN SCIENCES, V3, 2001, (113-116)*

## V.

– , , 3, 2001, (113-116)

The aim of the study was to determine the productivity potential temporary grassland sown with red fescue (*Festuca rubra* L.), Kentucky bluegrass (*Poa pratensis* L.) and birdsfoot trefoil (*L. corniculatus* L.) and located on slopes in the fore Balkan.

At high soil gleization the highest dry matter yield was obtained of the swards facing north-east - 548 kg/da mean annual yield over the trial period.



At low soil gleization the best dry matter yield results were recorded from an east facing sward - 935 kg/da.

The sward weed infestation varied each year. It was, however, low on soils of high gleization, regardless of the lower yields.

**Key words:** *red fescue, Kentucky bluegrass, birdsfoot trefoil,*

**50.**

”

”, , **2001, (333-340)**

Examination of the productivity and botanical composition of red fescue (*F. rubra* L.) monoculture grassland was conducted from the 4<sup>th</sup> through the 6<sup>th</sup> year of sward establishment with different plot siting on the slopes of the fore mountain.

During the trial period the highest average productivity was found in the variants sited on soil of low gleization level, facing east south - east.

In all the variants tested the red fescue preserved its high percentage in the yield obtained.

(*F. rubra* L.)

( , 1975; 1979; 1984).

( , 1995; 1997).

**51. DIMITER MITEV**  
**STUDIES ON THE BEHAVIOUR OF RED FESCUE UNDER THE**  
**CONDITIONS OF THE CENTRAL BALKAN MOUNTAINS. I.**  
**CONDITION IN A MONOCULTURE AND TWO COMPONENT MIXED**  
**GRASSLANDS**

, , 04-06.10.2002, (158-160)

The survey draws a number of conclusions and develops hypotheses concerning the behaviour of red fescue in monoculture and mixed grasslands together with white clover, birdsfoot trefoil, Lucerne and sainfoin. It is presumed that the behaviour is fixed by the presence or absence of synchronization with the rhythm of Nature. There is a probability according to which the swallow of nutrients and light, the exchange of allelopathic action compounds by the means of air, fog, dew and falling rain, to be an expression of the energy level of saturation of species. Probably it is possible its change to lead to the shrinking or expansion of the species areal of spreading. It is presumed that the attitude toward Time is different with consequences as a result of this. One of them is probably the genetic material transfer.

*Key words: red fescue hypotheses, Balkan*

**52. KRASIMIR MITKOV BELPERCHINOV, DIMITUR KRUSTEV**  
**MITEV**  
**STUDY ON THE PERSISTENCE OF MIXED SWARD OF RED**  
**FESCUE AND TALL FESCUE UNDER THE CONDITIONS OF THE**  
**CENTRAL BALKAN MOUNTAINS**

, , 04-06.10.2002, (154-157)

( MECEH

The study explores avenues for longer testing of a mixed temporary grassland consisting of red fescue (*F. rubra* L.) and tall fescue (*F. arundinacea* Schr.).

On the 6<sup>th</sup> year of sward establishment the dry matter yield was the

highest from plots sited on soil of low gleization level, facing south-east and those sited on soil of high gleization and facing north-east.

The botanical composition assays during the trial period found tall fescue percentage in the yield was up to 80% on plots facing south-east and soil of low gleization. However, on plots facing north-east on high gleization soils the red fescue percentage ranged up to 71%.

L.) (F. arundinacea Schr.) (F. rubra

80%  
71%.

### **53. DIMITAR KRASTEVA MITEVA, DENISLAV IVANOV VALEVA CHARACTERISTICS OF THE THREMMATOLOGY OF THE ANCIENT BULGARIANS.**

”, , 21.10-22.10.2004 .”, (108-117).

In 2005 it has passed 1500 years since the permanent settlement of the Bulgarians in the Balkan Peninsula.

This article tries to make brief bibliographic inquiries. about agriculture of the ancient Bulgarians. There are presented a number of facts about the achievements and innovations in a specific order in contradiction to the imposed view of the nomadic character of our nation. It is taken into consideration, that the agriculture is not a detached and isolated element, but a part of the integral social and economic development. The agriculture comprises information about other aspects from the life of the ancient Bulgarians. As it is traced back for the realization of the basic criteria in the development of the Civilization, it is concluded that the BULGARIAN CIVILIZATION creates CIVILIZATIONS during the millenia.

*Key words: agriculture, ancient Bulgarians, civilization*

### **54. DIMITUR KRUSTEV MITEV, KRASIMIR MITKOV BELPERCHINOV STABILITY OF DEVELOPMENT IN A MIXED SWARD CONTAINING RED FESCUE, TALL FESCUE AND BIRDSFOOT**

## TREFOIL GROWN ON THE SLOPES OF THE CENTRAL BALKAN MOUNTAINS

*SCIENTIFIC CONFERENCE WITH INTERNATIONAL PARTICIPATION, VOL. II, 3-4 JUNE, 2004, STARA ZAGORA, (111-114)*

*, II, , 3-4 , 2004, (111-114)*

The study focused on the stability of development of a mixed sward containing red fescue, tall fescue and birdsfoot trefoil under the effect of different soil types and exposure with regard to the sun along the mountain slopes.

On average for the three-year period up to 3227 kg/da of fresh herbage and 923 kg/da of dry matter was harvested from southeast-facing sites of low gleization, on the east side of the slope.

On northeast-facing sites of high gleization the dry matter amount was 790 kg/da.

Tall fescue prevailed in the swards, followed by red fescue. The share of birdsfoot trefoil gradually diminished toward the sixth year from establishment. The weed infestation rate was negligible.

*Key words: red fescue, tall fescue, birdsfoot trefoil, the Balkan Mountains, slopes*

55. KRASIMIR MITKOV BELPERCHINOV, DIMITUR KRUSTEV MITEV

**STABILITY OF DEVELOPMENT IN A MIXED SWARD CONTAINING RED FESCUE, KENTUCKY BLUEGRASS AND BIRDSFOOT TREFOIL GROWN ON THE SLOPES OF THE CENTRAL BALKAN MOUNTAINS**

*SCIENTIFIC CONFERENCE WITH INTERNATIONAL PARTICIPATION, VOL. II, 3-4 JUNE, 2004, STARA ZAGORA, (115-118)*

*, II, , 3-4 , 2004, (115-118)*

The study focused on the effect of different soil types and exposure with regard to the sun along the mountain slopes on the stability of development of a mixed sward containing red fescue, Kentucky bluegrass and birdsfoot trefoil.

On sites of high gleization the average productivity over the study period reached 2217 kg/da of fresh herbage and 836 kg/da of dry matter on northeast facing sward.

On southeast-facing sites of low gleization the results attained were up to 148 kg/da of fresh herbage and 1093 kg/da of dry matter.

Weed infestation rate was negligible, with small exceptions. Red fescue prevailed in the grass associations formed.

**Key words:** *red fescue, Kentucky bluegrass, birdsfoot trefoil, association, the Balkan Mountains, slopes.*

## **56. DIMITAR KRASTEVA MITEVA STUDY ON THE BEHAVIOUR OF SOME RED FESCUE GENERATIONS**

, , , , 2004, (114-119)

The performance of red fescue polyhybrid population generations was studied. Seeds were collected annually in 1992 - 1997 and sowing started in the winter of 1994/1995.

The generations behaved in a variety of ways depending on the year of seeds' production. They liken to different species at particular occasions. It was found out a proven change in the production with regard to the control. A grassland was set up with a mixture of seeds obtained in 1993 and 1994, 1<sup>st</sup> sowing, harvesting of 1998; generation of 1995, 2<sup>nd</sup> sowing, harvesting of 1999; a seed mixture of 1994 and 1995, 3<sup>rd</sup> sowing, harvesting of 1999.

The red fescue forms a self-clearing weeds associations, but it admits self-sowing of other grass species peculiar for the region.

Potential relations are explored between grass species behaviour and natural cyclic development. Suppositions are made concerning the direction of Evolution.

**Key words;** *red fescue, generations, rhythm.*

## **57. DIMITAR MITEVA, GALINA GORANOVA DYNAMICS IN THE DEVELOPMENT OF A MIXED SWARD OF RED FESCUE AND BIRDSFOOT TREFOIL ON THE SLOPES OF THE CENTRAL BALKAN MOUNTAINS**

, , ,

„ *18.05.2006, (67-72).*

The study includes data on the period of use from the 7<sup>th</sup> to 9<sup>th</sup> year after establishment of a mixed sward of red fescue and birdsfoot trefoil on the mountain slopes.

The green mass yields varied from 860 kg/da to 2380 kg/da at a high degree of soil gleying, low slope part, different exposure to the sun. They were 298 kg/da to 840 kg/da for dry matter. At a low degree of soil gleying, high slope parts (including greatly eroded ones), the green mass yield was 920 kg/da to 2646 kg/da. The dry matter was 296 kg/da to 1020 kg/da.

The participation of the components in the swards was variable. The share of red rescue was within the range of 32-96 %. Birdsfoot trefoil had small participation. There was self-seeding of other meadow species of local origin.

**58. DIMITAR MITEV, GALINA GORANOVA**  
**DYNAMICS IN THE DEVELOPMENT OF A PURE RED FESCUE**  
**SWARD ON THE SLOPES OF THE CENTRAL BALKAN MOUNTAINS**

„ *18.05.2006, (61-66).*

The paper includes data on the period from the 7<sup>th</sup> to 9<sup>th</sup> year after sward establishment, the lower degree of soil gleying, which is characteristic of the higher parts of the mountain slopes, created conditions for productivity increase. The green mass yield from red fescue reached to 3034 kg/da and that of dry matter to 1070 kg/da, for northerly exposure and 9<sup>th</sup> year of use. At a high degree of soil gleying, which is characteristic of the lower parts of the mountain slopes, the green mass yield reached to 2320 kg/da and that of dry matter to 765 kg/da, for north-easterly exposure and 9<sup>th</sup> year of use of the swards.

A high degree of stability was found in the development of the pure red fescue sward.

The share of red fescue in the different treatments reached to 96 % (north-easterly exposure, year 2000).

The study includes data on the period of use from the 10<sup>th</sup> to 12<sup>th</sup> year after establishment of a mixed sward of red fescue and birdsfoot trefoil on the mountain slopes.

The green mass yields varied from 860 kg/da to 2100 kg/da at a high degree of soil gleying, low slope part, different exposure to the sun. They were 292 kg/da to 809 kg/da for dry matter. At a low degree of soil gleying, high

slope parts (including greatly eroded ones), the green mass yield was 1420 kg/da to 2490 kg/da. The dry matter was 303 kg/da to 819 kg/da.

The participation of the components in the swards was variable. The share of red fescue was within the range of 12 (West slope, 2003) to 77 % (East, high slope parts, 2005). Birdsfoot trefoil had small participation. There was self-seeding of other meadow species of local origin.

**59. DIMITAR MITEV, GALINA GORANOVA**  
**CHANGES OF SOME GRASS SWARDS WITH PARTICIPATION**  
**OF RED FESCUE ALONG THE SLOPES OF THE CENTRAL BALKAN**  
**MOUNTAINS. I. INSTABILITY IN THE PURE RED FESCUE**

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I.  
”  
”, 13-14 , 2007, (187-190)

The paper includes data on the period from the 10<sup>th</sup> to 12<sup>th</sup> year after sward establishment. At a high degree of soil gleying, which is characteristic of the lower parts of the mountain slopes, the green mass yield reached to 2280 kg/da and that of dry matter to 692 kg/da, for South-East exposure. The lower degree of soil gleying, which is characteristic of the higher parts of the mountain slopes, created conditions for productivity increase. The green mass yield from red fescue reached to 2330 kg/da, for East exposure, and that of dry matter to 882 kg/da, for North exposure.

A high degree of stability was found in the development of the pure red fescue sward. The share of red fescue in the different treatments reached to 82 % (South-East exposure in 2004).

***Key words: red fescue, instability, slopes, Balkan Mountains***

**60. GALINA GORANOVA, DIMITAR MITEV**  
**CHANGES OF SOME GRASS SWARDS WITH PARTICIPATION**  
**OF RED FESCUE ALONG THE SLOPES OF THE CENTRAL BALKAN**  
**MOUNTAINS II. UNSUSTAINABILITY IN THE DEVELOPMENT OF**  
**MIXED SWARD OF RED FESCUE, ORCHARDGRASS, RED CLOVER,**  
**BIRDSFOOT TREFOIL**

’  
II.

”  
”, 13-14 , 2007, (191-190)

The study included data on the period of use from the 10<sup>th</sup> to 12<sup>th</sup> years after establishment of a mixed sward of red fescue, orchardgrass, red clover and birdsfoot trefoil, on the mountain slopes. At a low degree of soil gleying, high slope parts, the green mass yield was in the range from 1450 kg/da (Nord facing) to 2430 kg/da (East facing). The dry matter was from 370 kg/da (West facing) to 960 kg/da (East facing).

The green mass yield varied from 830 kg/da (East facing) to 2280 kg/da (South-East facing) at a high degree of soil gleying, low slope part. For dry matter, they were from 202 kg/da to 874 kg/da (East facing).

The participation of the components in the swards was variable. The share of red fescue was within the range from 10 % to 73 %. Orchardgrass, red clover and birdsfoot trefoil had small participation. There was self-seeding of her meadow species of local origin.

*Key words red fescue, orchardgrass, red clover, birdsfoot trefoil, unsustainability, slopes, Balkan Mountains*

**61. DIMITAR MITEV, GALINA GORANOVA**  
**CHANGES OF SOME GRASS SWARDS WITH PARTICIPATION**  
**OF RED FESCUE ALONG THE SLOPES OF CENTRAL BALKAN**  
**MOUNTAINS. III. STATUS OF MIXED SWARDS OF RED FESCUE AND**  
**TALLFESCUE**

**III.**

”  
”, 18-19 ,  
2007, (129-134)

The study included data for the period of use from the 10<sup>th</sup> to 12<sup>th</sup> year after establishment of a mixed sward of red fescue and tall fescue on the mountain slopes.

The green mass yields varied from 910 kg/da (East facing in 2003) to 2290 kg/da (West-East facing in 2004) at a high degree of soil gleying, low



slope part and different exposure to the direction of world. Dry matter was from 221 kg/da to 697 kg/da. At a low degree of soil gleying, high slopes parts, the green mass yield was from 1470 kg/d a (West facing in 2003) to 2490 kg/da (East facing in 2004).

The dry mater was from 403 kg/da to 769 kg/da.

The participation of the components in the swards was variable. The share of red fescue was within the range of 9 % to 58 %. Tall fescue had partici pation from 17 % to 64 %. There was self-seeding of other meadow species of local origin. Weeds were with small participation.

**62. GALINA GORANOVA, DIMITAR MITEV  
CHANGES OF SOME GRASS SWARDS WITH PARTICIPATION  
OF RED FESCUE ALONG THE SLOPES OF CENTRAL BALKAN  
MOUNTAINS. IV. DIFFERENCES IN MIXED SWARD FROM RED  
FESCUE AND KENTUCKY BLUE GRASS**

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IV.  
”  
”, 18-19  
2007, (123-128)

The paper included data for the period from the 10<sup>th</sup> to [ year after sward establishment. The lower degree of soil gleying, wich was characteristic of the higher parts of the mountain slopes, created conditions for productivity of green mass yields from 1610 kg/da (West facing in 2003) to 2620 kg/da (East facing in 2004). Dry matter was from 309 kg/da to 858 kg/da. At a high degree of soil gleying, low slope part, different exposure to the direction of world, the green mass yield was from 930 kg/da (East facing in 2003) to 2480 kg/da (South -East facing in 2004). The dry matter was from 280 kg/da to 853 kg/da.

The participation of the components in the swards was variable. The share of red fescue was within the range of 7 -82% (South -East, West facing in 20 04).

Kentucky blue grass was with small participation. The re was self-seeding of other meadow species of local origin.

**63. DIMITAR MITEV, GALINA GORANOVA  
CHANGES OF SOME GRASS SWARDS WITH PARTICIPATION  
OF RED FESCUE ALONG THE SLOPES OF CENTRAL BALKAN  
MOUNTAINS V. DIFFERENCES IN MIXED SWARD FROM RED  
FESCUE AND BIRDSFOOT TREFOIL**

. V.

, 7 – 8      2007, (140–143)

The study includes data on the period of use from the 10<sup>th</sup> to 12<sup>th</sup> year after establishment of a mixed sward of red fescue and birdsfoot trefoil on the mountain slopes.

The green mass yields varied from 860 kg/da to 2100 kg/da at a high degree of soil gleying, low slope part, different exposure to the sun. They were 292 kg/da to 809 kg/da for dry matter. At a low degree of soil gleying, high slope parts (including greatly eroded ones), the green mass yield was 1420 kg/da to 2490 kg/da. The dry matter was 303 kg/da to 819 kg/da.

The participation of the components in the swards was variable. The share of red fescue was within the range of 12 (West slope, 2003) to 77 % (East, high slope parts, 2005). Birdsfoot trefoil had small participation. There was self-seeding of other meadow species of local origin.

*Key words: red fescue, birdsfoot trefoil, slopes, Balkan.*

**64. DIMITER MITEV**

**STATUS OF SOME PERENNIAL MEADOW GRASS SPECIES  
UNDER THE CONDITIONS OF THE CENTRAL BALCAN  
MOUNTAINS**

, TOM I, 7 – 8      2007, (144–152)

The survey includes an analysis on research works of the author concerning the behaviour of some grasses (red fescue, tall fescue, Russian wild ryegrass, Kentucky blue grass, perennial ryegrass, cocksfoot) and legumes (white clover, birdsfoot, Lucerne, sainfoin) meadow grasses, which were cultivated independently and under conditions of interaction. The experiments cover independent and combined seed germination, and an effect on the seeds with aquatic extract of fresh plant material, and interactions in pot trials as well as in field conditions. A conclusion is drawn on the advantages of local grass species and populations in the establishment of meadow communities in comparison to imported ones. On the basis of the species behaviour a possibility is determined for interaction among them in the absence of an immediate contact of their vegetative parts. Their status supposes a distinction in reference to Time with an influence on the transference of genetic material and the admission to the environmental factors and so on. Probably, every “structural unit” (... , species,

population, sort, ...) is characterized by a specific “energy configuration”, which is dependent on the rhythm of Nature and represents a peculiar “projection” in Time with a corresponding direction of Evolution.

*Key words: status, meadow grasses, rhythm, hypotheses*

65.

”, 23.10 – 25.10. 2008, ” (100-104) –

1315

kg/da, 3430 kg/da,

405

kg/da, 1135 kg/da,

830 kg/da,

2425 kg/da,

258 kg/da 885 kg/da.

95%

25 %

**66. DIMITAR MITEV, GALINA NAYDENOVA**  
**PERSISTENCY OF ARTIFICIAL SWARDS WITH**  
**PARTICIPATION OF RED FESCUE LOCATED ON THE SLOPES OF**  
**THE CENTRAL BALKAN MOUNTAINS. III. STATE OF MIXED**  
**SWARDS OF RED AND TALL FESCUE**

. III.

, (160-165)

State of mixed swards of red and tall fescue on the slopes of the mountain was studied for a 13-year period /1994 – 2006/.

At a high degree of soil gleying, lower slope part, dry matter yields were from 248 kg/da /southeasterly exposure, year 2000/, to 1130 kg/da /northeasterly exposure, 1995/.

At a low degree of soil gleying, upper slope part, the dry matter yields were from 224 kg/da /westerly exposure, 1994/ to 1334 kg/da /southeasterly exposure, 1995/.

The swards had high sustainability of development and in some variants the presence of the sown species in the total forage mass reached to 100% /southeasterly exposure, high degree of soil gleying, 2001/. The participation of the sown species was variable according to years and location. It was greater at the higher levels of soil gleying, as compared to the lower ones.

**Key words:** *red fescue, tall fescue, durability, Balkan Mountains, slopes*  
(Mitev and Petrov, 1999)

(Hector, 1998)

(Sanderson et al., 2004).

, . . (Wardle, 1999).

, (Ives et al., 2000).

( , 1985; , 2001 ).

2005 kg/da, 3780  
 kg/da, 584  
 kg/da, , ,  
 1122 kg/da, . 1050  
 kg/da, , 2875 kg/da,  
 368 kg/da 1100 kg/da.  
 87  
 %, , ,  
 , , ,  
 , 40%. ( ap. 2- 4  
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## 68. TESTING OF GRASS MIXTURES GROWN FOR HAY UNDER NON-IRRIGATION CONDITIONS

STOEVA K., Dimitar Mitev

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, . I, (65 – 70), 2006.

In order to determine the productivity and the forage qualities of grass mixtures of lucerne with cereal grasses grown for hay in the region of Strandja, to the period 1995-1998 in RCSAS-Sredets, an experiment was carried out under non-irrigation conditions in 4 combinations-with cocksfoot, smooth bromegrass, crested wheat- grass and meadow fescue on the control lucerne pure crop.

It was found, that the mixture lucerne 50% and smooth bromegrass 50% is the most productive and balance -1159.8kg/da dry mass, who exceeded crude protein -15,14%.

The lucerne breeding independently, mean 4 years formed dry mass yield from 954,5 kg/da and a contents of crude protein on the phase begin in flower - 17,36%.

**Key words:** *Strandja, Grass mixtures, Grown for hay, Productivity*