РЕЗЮМЕТА НА НАУЧНИТЕ ПУБЛИКАЦИИ

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представени в конкурс за академична длъжност „професор",
обявен от Институт по фуражните култури, Плевен в ДВ бр.8/30.01.2015 г.

I. КНИГИ, РЪКОВОДСТВА

77. Атанасов А., А. Илчев, Г. Ганчев, Г. Михайлова, Д. Гиргинов, Д. Пенков, З. Шиндарска, **Й. Найденова**, К. Неделков, Н. Тодоров, С. Чобанова, 2010. Практикум по хранене на животните, под ред. Проф. Н. Тодоров, Изд. Изток-Запад, София, ISBN 978-954-321-733-5, 462 стр.

Настоящият Практикум има задача да опише основните практически действия, свързани с изследването, окачествяването на фуражите и с осигуряването на правилно хранене на животните. На първо място той е предназначен да улесни практическото обучение по образователно квалификационните степени бакалавър, магистър и доктор по различните дисциплини, свързани с храненето (основи на храненето, приложно хранене на отделните видове и категории продуктивни животни, хранене на домашни любимци, технология на комбинираните фуражи, планирането на фуражното производство във фермите и други). Практикумът е съобразен с нуждите на всички висши училища, обучаващи по различните земеделски специалности. Авторският колектив също включва учени от различни университети. В Практикума са дадени по-голям брой единици, отколкото са включени в програмите по отделните специалности, което позволява да се изберат само необходимите единици и същевременно да се покрият интересите на всички. На второ място Практикумът може да бъде в помощ на учените в областта на животновъдството при извършване на анализи на фуражи и животински продукти, съставяне на дажби за различни животни, както и при избор на подходящи схеми и провеждане на физиологични и научно-стопански опити. Практикумът е необходимо помагало за специалистите в отделните направления в животновъдството (говедовъдство, овцевъдство, свиневъдство, птицевъдство, зайцевъдство и други), за ветеринарни лекари, икономисти, мениджъри на ферми, химици, лаборанти, ученици от професионалните гимназии и други специалисти, които се докосват до проблемите на храненето на животните и анализа и окачествяването на фуражи и животински продукти. Стремежът е бил да се дадат официално приетите методи за анализи и научни изследвания, като се посочат оригиналните източници, където са описани. Това е важно за доверието в методите и за възможността да се цитират в публикациите. Някои от описаните методи не са приети официално, а редица методи, норми, стандарти и законодателни актове се изменят и усъвършенстват непрекъснато. Амбициите на авторите са били да се даде състоянието към 2010 година. *Практикумът е до голяма степен колективно дело, защото всички автори са взели участие в неговото обсъждане и техните бележки са взети под внимание при окончателното редактиране на текста.* Авторите са готови да отговарят на въпроси, свързани с използването на Практикума и ще приемат с благодарност всякакви критични бележки и предложения, целящи подобряването и допълването му.

II. НАУЧНИ ПУБЛИКАЦИИ В БЪЛГАРСКИ, МЕЖДУНАРОДНИ И ЧУЖДЕСТРАННИ СПИСАНИЯ

78. **Naydenova Y.,** A. Katova, 2006. Digestibility in vitro dry matter screening test for perennial ryegrass (*Lolium perenne* L.), *Journal of Mountain Agriculture on the Balkans, ISNN 1311-0489; 9, 6, 997-1004.* **Найденова Й.,** А. Кътова, 2006. Смилаемост *in vitro* на сухото вещество скрининг тест за оценка качеството на фураж от пасищен райграс *(Lolium perenne* L.*)*

The enzymatic *in vitro* dry matter digestibility determined by the method of Aufrere as a screening test before chemical analyses of composition was applied to characterize perennial ryegrass (*Lolium perenne* L.) varieties and populations in breeding process. Four comparative field variety trials, each of which included fourty-six varieties and populations differing by origin, ploidy and group of maturity at different environment limits – two levels of density, with and without irrigation were carried out during the period 2002-2004 in the Institute of Forage Crops, Pleven, Bulgaria. The varieties and populations were distributed and ranged in three maturity groups (MG): Early MG – 20 strains; Intermediate MG – 21 strains and Late MG – 6 strains and by level of ploidy the distribution was in two groups of diploids – 28 strains and tetraploids – 18 strains. The varieties and populations in each MG were ranged and compared at different environment limits and mean arithmetic, minimum and maximum values, standard deviation and coefficient of variation were calculated. For the strains from Early MG the mean value of digestibility was 61.18%, for these from Intermediate MG 63.42% and for the Late MG – the highest mean IVDMD 64.68%. In each MG the strains which exceeded mean IVDMD value for the group

were evaluated. The final decision for selection was done after comparison between varieties and populations by their IVDMD value, which exceeded the total mean between the three MG IVDMD value. The digestibility as a forage quality parameter of perennial ryegrass breeding materials showed variability CV 6-11% and can be applyed as a breeding criterion.

79. Игнатова М., З. Шиндарска, М. Кръстева, **Й. Найденова**, А. Кирилов, 2007. Химичен състав и хранителна стойност на земната ябълка, *Растениевъдни науки,* ISSN 0568-465X, *44, 5, 461-464. Ignatova M., Z. Schindarska, M. Krasteva, **J. Naydenova,** A. Kirilov, 2007.Chemical composition and nutritive value of Jerusalem artishoke.*

Определени са химическия състав (основен състав по Веенде системата, влакнинен състав по детергентен анализ на Goering&Van Soest, минерален и витаминен състав), смилаемостта и хранителната стойност на различните части на земната ябълка (*Heliantus tuberosus*) през фазите на вегетация. Установено е високо съдържание на сухо вещество в цялото растение през месеците септември и октомври, ниско съдържание на сурови влакнини в клубените и висока *in vitro* смилаемост на сухото им вещество. Съдържанието на суров протеин в отделните части на растеието варира от 8,0 до 19,0% и е най-голямо в листната маса. Химическият състав и хранителната стойност на земната ябълка я правят подходящ фураж, както в свежо, така и в консервирано състояние за селскостопанските животни и птици.

80. **Найденова Й.**, И. Пачев, 2008. Хранителната стойност на фураж от люцерна, отглеждана при различна обработка на почвата и торене, *Растениевъдни науки,* ISSN 0568-465X *45, 497-502.* ***Naydenova Y.,*** *I. Pachev, 2008. Forage feeding value estimation of Lucerne, grown at different soil cultivation and fertilizing.*

Оценени са потенциалната енергийна и протеинова хранителност на фуража от люцерна (*Medicago sativa* L.), отглеждана в полски опит (2002-2005) с големина на опитните парцелки 30 m^2 при точно определена почвена агрохимична характеристика, при различни дълбочинни обработки на почвата и нива на торене. Промените в климата налагат прилагането на нови агротехнологични приоми. В този аспект азотното хранене, торенето и обработката на почвата са от особено значение за създаването на подобрени звена от технологията при отглеждането на люцерна за фураж. Приложени са различни норми на азотно, фосфорно и калиево торене (1) контрола – без торене; 2) $N_6 P_{10} K_8$ по утвърдената технология; 3) $N_{2,3} P_6 K_{3,5}$, като азотът е внесен - ½ през първата година, а фосфорът и калият по ½ през първата и третата година на отглеждане; 4) $N_{2,3} P_{10} K_{3,5}$, като азотът е внесен еднократно, а калият и фосфорът по ⅓ през първата, втората и третата година на отглеждане; 5) $N_{3,5} P_8 K_{5,0}$; 6) Амофос - 25 kg da^{-1}, изчислен при норма $N_{2,7} P_{12} K_0$), при обработка на почвата на дълбочина между 12 и 35 cm. Въз основа на химическия състав и смилаемостта на органичното вещество, определени експериментално, е направена оценка на потенциалната хранителност на фуража от люцерна по Френската, Българската и Холандската системи. С най-висока *енергийна хранителност* са фуражите при обработка на почвата: оран на 30-35 cm 0,725-0,601 UFL-UFV и оран на 22-24 cm 0,721-0,600 UFL-UFV; нива на торене: 3) $N_{2,3} P_6 K_{3,5}$ 0,731–0,617 UFL-UFV и 5) $N_{3,5} P_8 K_{5,0}$ – 0,725–0,615 UFL-UFV. С най-висока *протеинова хранителност* са фуражите при обработка на почвата: разрохкване на 10-15 cm и оран на 30-35 cm - PBD 172 , PDIN 136 g kg^{-1} CB; нива на торене: 6) Amofos - PBD 174 , PDIN 138 g kg^{-1} CB, 5) $N_{3,5} P_8 K_{5,0}$ - PBD 172, PDIN 137 g kg^{-1} CB и 3) $N_{2,3} P_6 K_{3,5}$ - PBD 172, PDIN 136 g kg^{-1} CB при $GD_{5\%} = 0,65$; $GD_{1,0\%} = 0,94$; $GD_{0,1\%} = 1,38$.

81. **Naydenova Y.**, I. Pachev, D. Pavlov, 2008. Protein feeding value estimation of Ukrainian varieties of forage pea (*Pisum sativum* L.), ***Plant Genetic Resources Roslin Scientific Journal, Ukrainian*** *Acad. Agric. Sci., Kharkov, Ukrain,* UDK 635.656:575; *5, 86-91.* **Найденова Й.**, И. Пачев, Д. Павлов, 2008. Оценка на протеиновата хранителна стойност на Украински сортове фуражен грах (*Pisum sativum* L.).

The Ukrainian varieties of spring forage pea (*Pisum sativum* L.), grown in competitive variety field trial in the Institute of Forage Crops, Pleven, Bulgaria, 2005-2007 in comparison of standard Bulgarian variety Pleven 4 show high protein content. The digestibility of all pea varieties in the tree stages is high - standard *Pleven 4* has digestibility 70 % of dry matter; only *Rezonator* has mean lower digestibility and all others Ukrainian varieties were more digestible than 70 %. The maximum digestibility of introduced Ukrainian varieties is 76,3 %. The crude protein content in whole pea plant has a different rang in different vegetative stages. Standard variety *Pleven 4* keep highest protein content in the first two vegetative stages, but not in the stage wax maturity, when Ukrainian varieties *Usatii 90* and *Harkovskii 74* exceeded it by 3.07% units.The total digestible protein (French system) shows mean values in the three vegetative stages of pea range from 133 to 149 g kg^{-1} dry matter, with a maximal value 149 g kg^{-1} in the stage beginning of flowering and mean value 141 g kg^{-1}, equal as those in stage wax maturity. By the parameter PDIN - digestible protein depending on nitrogen content, as a parameter TDP the first four varieties shown highest rang, as leader was *Pleven 4* variety. By the parameter PDIE -

digestible protein depending on energy it is mentioned light rang displacement. The standard *Pleven 4* variety has highest protein feeding value. The coefficients of variation for protein feeding value were high (PDIN: CV 9-13 %) which proved the possibility for their application as breeding criteria.

82. **Naydenova Y.,** R. Todorova, D. Pavlov. 2008. Composition and digestibility of the biomass of soybean (*Glycine max* (L.) Meer.) varieties from different maturity groups, *Journal of Mountain Agriculture on the Balkans,* ISNN 1311-0489; *11, 6, 1101-1123.* **Найденова Й.,** Р. Тодорова, Д. Павлов. 2008. Състав и смилаемост на биомасата на сортове соя (*Glycine max* (L.) Meer.) от различни групи на зрялост.

Soybean (*Glycine max* (L.) Merr.) seed type varieties and lines from three groups of maturity (MG) Olimpia and Korada from Early stage MG; varieties Pavlikeni121, Bachka, Dida, Ricci, Rosa and two lines from Middle-early stage MG; varieties Beeson and Wayne from Middle-late stage MG, grown at field experiment in the breeding program of the Pavlikeni Department of the Institute of Forage Crops, Pleven during the period 2004-2007 were studied. All crop varieties and lines were studied in growth stages: Beginning of flowering (R3), Flowering (R4), Flowering end–Pod formation (R5), Full seed formation (R6) and milk-wax maturity (R7) by forage quality evaluation – protein content (Weende analysis), plant cell wall fiber components content by Goering&Van Soest, and pepsin-cellulase *in vitro* digestibility by cellulase "Onozuka R-10" by the method of Aufrere. Soybean varieties and lines, never mind of variability in protein and plant cell wall fiber components content in different growth stages R3, R4, R5, R6 show high forage digestibility and nutritive value. The highest forage digestibility of dry matter and feeding value observed in Full seed stage (R6) 72-78 % Beeson and Wayne varieties from Middle-late stage MG; Korada 76 % and Olimpia 69 % from Early stage MG. The varieties Bachka 70 % and Pavlikeni 121, Dida 71 % from Middle-early stage MG at Full seed formation stage (R6) and higher 73-74 % in Flowering end-Pod formation stage (R5). The high degree of variation ADL CV 21-23 % in all stages of growing prove that the lignin may be specific breeding criteria for evaluation in soybean process. The digestibility (IVDMD) is predicted by plant cell wall fiber components content with high accuracy R 0,634–0,845 at high statistical significance $p<0.0001$ and slowly by days from the beginning of the vegetation R 0,508–0,568 in reason of un regular growing of the plants. In comparative analysis of protein content and digestibility the differences between varieties and lines in vegetative stages in the groups of maturity as well as inside them were established. The highest protein content was observed in Early flowering stage: in Early stage MG and in Middle-late stage MG 23–25%; and in Middle-early stage MG 20-27%. The high protein content show in Early flowering stage Pavlikeni 121 variety 23,83% and line N4 26,78%.

83. **Naydenova Y.**, I. Pachev, 2009. Forage quality analysis of lucerne grown at different soil cultivation and fertilizing, *Journal of Mountain Agriculture on the Balkans,* ISSN 1311-0489, *12, 2, 291-303.* **Naydenova Y.**, I. Pachev, 2008. Анализ качеството на фураж от люцерна отглеждана при различна обработка на почвата и торене.

The composition and digestibility of dry matter as the general parameters of forage quality were estimated in lucerne (*Medicago sativa* L.), grown at different depth soil cultivation and fertilizing levels. The changes in climate necessitate applying new agro-technological practices. Soil nitrogen nutrition, fertilizing and cultivation are of particular significance for developing improved links of the technology of lucerne, grown for forage. The field experiment was carried out in the Second experimental field of the Institute of Forage Crops, Pleven, in the period 2002-2006 with size of trial plots 30 m^2 and exactly determined soil agrochemical characteristic. Different rates of nitrogen, phosphorus and potassium fertilizing were applied (1. unfertilized control; 2. $N_6 P_{10} K_8$ by accepted technology; 3. $N_{2,3} P_6 K_{3,5}$ where nitrogen was applied ½ in the first year, and the phosphorus and potassium by ½ in the first and third year of growing; 4. $N_{2,3} P_{10} K_{3,5}$, where nitrogen was applied in a single application and potassium and phosphorus by ⅓ in the first, second and third year of growing; 5. $N_{3,5} P_8 K_{5,0}$; 6. Amofos - 25 kg da^{-1}, calculated at a rate $N_{2,7} P_{12} K_0$), with soil cultivation at a depth of 12 to 35 cm. The highest mean protein content was at Amofos fertilizing 219,4 g kg^{-1} of dry matter and lowest CF at ploughing 22-24 cm 233,4 g kg^{-1} of dry matter and fertilizing levels $N_{3,5m} P_{8m} K_{5,0}$ and Amofos 252,0 g kg^{-1}. The lowest detergent fiber mean values, corresponding to those of CF were at fertilizing levels $N_{3,5} P_8 K_{5,0}$ NDF 409,1; ADF 355,8; ADL 71,5 g kg^{-1}; and soil cultivation ploughing 30-35 cm NDF 400,6; ADF 355,8 but the lowest ADL 76,8 g kg^{-1} at ploughing 22-24 cm. Corresponding highest mean digestibility was determined at ploughing 22-24cm 62,13% and $N_{3,5} P_8 K_{5,0}$ – 62,95%; the highest 63,04% at ploughing 12-15 cm and 22-24 cm 64,63%. The fertilizing level $N_{2,3} P_{10} K_{3,5}$ and ploughing at 10-15 cm cause digestibility 63,37%. The high mean digestibility - at Amofos fertilizing 62-63% and ploughing of 22-24, 18-20, 30-35 cm was established ($GD_{5.0\%}$=1,46; $GD_{1.0\%}$=3,37; $GD_{0.1\%}$=10,74). At the stage applied nitrogen and supplied Phosphorus and Potassium lucerne forage quality was highest in comparison with control and fertilizing level $N_6 P_{10} K_8$. At fertilizing level $N_{3,5} P_8 K_{5,0}$ quality forage was obtained. The significance of quantity of nitrogen fertilizing was great for obtaining quality lucerne forage.

84. **Найденова Й.,** Р. Тодорова, 2009. Хранителна стойност на пролетни форми фуражен грах *(Pisum sativum* L.*)* с оглед на селекцията, *Field Crop Studies, Dobroudja Agricultural Institute, General Toshevo, Bulgaria,* ISSN 1312-3882, *5, 2, 347-356.* **Naydenova, Y.,** R. Todorova, 2009. Feeding value of forage pea *(Pisum sativum* L.*)* spring forms in breeding.

Проучени са основните хранителни характеристики за оценка качеството на фураж от зелена маса на пролетни форми фуражен грах *(Pisum sativum* L.*)* в полски опит – конкурсно изпитване на линии, изведен в ИФК – Плевен, филиал Павликени и Опитна станция по соята – гр. Павликени, съответно 2008 и 2009 г. Шест перспективни линии, нов кандидат сорт – *Мишел* и стандартния за страната сорт *Плевен 4* са прибрани в три фази на развитие – бутонизация, масов цъфтеж и образуване на пълни долни бобове. Оценено е качеството на фуража от цяло растение по показателите на химическия състав и ензимната *in vitro* смилаемост на сухото вещество. С най-високо протеиново съдържание - 248,7 g kg^{-1} сухо вещество, ниско влакнинно съдържание и най-висока смилаемост 80,12 % се отличава новия кандидат сорт, следван от *линии L5, L4* и *L6*, докато стандартния сорт *Плевен 4* заема ранг 7. Потенциалната протеинова хранителност, оценена по Френската система като общ смилаем протеин TDP/PBD (Total digestible protein/ Protein brute digestible), PDIN – смилаем протеин, зависещ от азота и PDIE – смилаем протеин, зависещ от енергията, е най-висока за *L5* (ранг 1): PBD/TDP 180; PDIN 142; PDIE 114g kg^{-1} и за новия кандидат сорт *Мишел:* PDIE 114 (съответстващ на ранг 1); PBD/TDP 173; PDIN 137 g kg^{-1} (ранг 2), следвани от сорт *Плевен 4* и линия *L6.* С най-висока потенциална енергийна хранителност са линия *L5:* UFL 0,938 UFV 0,862; FUM 0,778 FUG 0,704 и кандидат сортът *Мишел.* При оценка на аритметичната сума от ранговете по основните лабораторно изследвани показатели на качеството на фуража се отличава кандидат сортът *Мишел.*

85. Kirilov A., K. Ivanov, **Y. Naydenova**, 2010.Variation in development stage yield and composition of pea and vetch. II. Variation in developmental stage, morphological and chemical composition, *Journal of Mountain Agriculture on the Balkans,* ISSN 1311-0489, *13, 2, 428-437.* Кирилов. А., К. Иванов, **Й. Найденова**, 2009. Промени през стадия на развитие, добива и състава на грах и фий. II. Промени в стадия на развитие, морфологичния и химичния състав.

The previous paper presented a scale for determining and giving a numerical expression of the mean stage of development of spring pea, variety *Pleven 4* and spring vetch, variety *Obrazets 666.* Very good relationships were found between mean stage of development and data on dry matter content and yield. The objective of this study was to extend the possibilities for using the mean stage of development, searching for relations with the characteristics of morphological and chemical composition. For the purpose, variation in the proportion of leaves, stems and grain pods was determined, as well as that in the characteristics of chemical composition – crude protein, crude fiber, crude fat, NDF, ADF and ADL in pea and vetch, which correlated with variation in the mean stage of development very well. These relations allow using data on the mean of development of pea and vetch in mathematical models for predicting the characteristics of morphological and chemical composition. It was concluded that more profound and systemic studies are needed in this direction.

86. **Naydenova Y.,** A. Kyuchukova, N. Georgieva, 2010. Forage feeding value estimation of birdsfoot trefoil (*Lotus corniculatus* L.), *Journal of Mountain Agriculture on the Balkans,* ISSN 1311-0489, *13, 6, 1539-1548.* **Найденова Й.,** А. Кючукова, Н. Георгиева. 2010. Оценка хранителната стойност на звездан (*Lotus corniculatus* L.).

The changes during different years and growths in protein and fibers, analysed by classical chemical Weende and Van Soest analyses, *in vitro* enzymatic digestibility of organic matter were determined in forage from promising strains and standard variety "*Targovishte 1"* of birdsfoot trefoil (*Lotus corniculatus* L.), grown in competitive variety trials. The field experiment was carried out in the Institute of Forage Crops, Pleven, (2002-2005). Crude protein content of studied patterns varied from 167 to 184 g kg^{-1} dry matter. In the frames of the years the variation was from weak CV 1, 75 – 3, 3% to middle CV 13, 6%. The correlation between the crude protein content and crude fiber was high negative r = - 0,996 as minimal content of crude fiber formed pattern № 24, which was with 8, 0 g kg^{-1} lower than standard. Mean for the period the patterns № 24 and № 6 distinguished towards standard. The patterns № 24 and № 6 distinguished towards standard with the lowest mean fiber content of NDF 281 g kg^{-1} (11,6 %) and 302 g kg^{-1} (5%) respectively and ADF: 258 g kg^{-1} and 262 g kg^{-1} (3,0 and 1,5% respectively). The content of ADL was mean 68 g kg^{-1} as the variation was from 60 to 75 g kg^{-1} at lower values for patterns № 6 and № 24 respectively with 12, 9 and 7, 1%. The enzyme digestibility of organic matter was high – mean 0,68 g kg^{-1}. The digestibility of organic matter, mean for the period corresponded (for the pattern № 17) or was higher (for the patterns № 6 and № 24) from the standard digestibility. By the net energy feeding value all estimated patterns exceeded the standard as the range was in following increasing order № 17, 24, 6 (UFL-UFV: 0,767-0,792 – 0,.667-0,695 and concerning of FUM-FUG – 0,636-0,656 – 0,545-0,568). The highest protein feeding value had the pattern № 24: total digestible protein TDP (PBD): 134 g kg^{-1}, PDIN: 111 and PDIE: 96 g kg^{-1}.

87. **Naydenova Y.**, N. Georgieva, I. Nikolova. 2010. Influence of preparations with different biological action on plant cell wall fiber components content and enzyme degradability of spring forage pea (*Pisum sativum* L.), *Journal of Mountain Agriculture on the Balkans,* ISNN 1311-0489*; 13, 6, 1519-1538.* **Найденова Й.,** Н. Георгиева, И. Николова, 2010. Влияние на препарати с различно биологично действие върху влакнинния състав и ензимната разградимост на пролетен фуражен грах (*Pisum sativum* L.)

In point of view to establish the influence of preparations with different biological effect – Atonic (growth stimulator), Masterblend (combined foliar fertilizer) and Confidor 70 VG (insecticide) applied single or combined, once (budding and flowering stages) and twice (budding + flowering) on the protein and plant cell walls fiber component content and enzyme *in vitro* degradability of dry matter of spring forage pea (*Pisum sativum* L.), variety Pleven 4, grown for biomass, the field crop experiment was carried out in the Institute of Forage Crops – Pleven (2007-2009). At the single application of the preparations Atonic, Masterblend and Confidor, the forage with increased protein content was formed average with 7,5 g kg^{-1} in comparison with combined application. The protein changed as follows: 173,2, 154,3 и 152,6 g kg^{-1} influenced by the factor treatment stage from budding stage to budding-flowering and flowering. The content of NDF varied: 392,5 - 409,3 g kg^{-1}. The highest value was reached at the single application of Atonic and for combined – Confidor-Atonic. Fiber fractions ADF and ADL decreased by 7,0 and 16,9% respectively under influence of the preparations with exception of treatment with Masterblend for ADF and Atonic for ADL. The once application at budding stage determined the highest values of ADF and ADL decreasing disproportionate towards once treatment at flowering stage and twice – at stages budding-flowering. Digestibility of dry matter of spring forage pea was high 70,8 - 73,65% as at single use was highest under treatment with Atonic and at combined – with Atonic-Masterblend. At budding stage the most strongly expressed was the influence of the triple combination Atonic-Masterblend-Confidor, at flowering stage and at budding-flowering stages – of the double combination Confidor-Masterblend in which was counted the highest productivity.

88. **Найденова Й.,** Н. Георгиева, И. Николова, 2011. Влияние на препарати с различно биологично действие върху влакнинния състав и ензимната разградимост на пролетен фий (*Vicia sativa* L.), *Животновъдни науки,* ISSN 0514-7441; *48, 1, 40-49.* **Naydenova Y.**, N. Georgieva, I. Nikolova. 2011. Influence of preparations with different biological action on plant cell walls fiber components and enzyme degradability of forage vetch (*Vicia sativa* L.) spring forms.

Влиянието на препаратите с различен биологичен ефект Атоик, Мастербнд и Конфидор, приложени самостоятелно или комбинирано, еднократно (във фазите на развитие бутонизация и цъфтеж) или двукратно (бутонизация + цъфтеж) бе проучено в полски експеримент на ИФК, Плевен (2007-2010) върху съдържанието на влакнинните компоненти на клетъчните стени и ензимната разградимост на фураж от пролетен фий. Фракциите на влакнинните компоненти на клетъчните стени на пролетния фий силно положително се влияят от действието на препаратите във всички случаи на действие и фази на развитие, докато протеиновото съдържание на биомасата се понижава. Съдържанието на НДВ е 402,0 - 416,4 g kg^{-1} от сухото вещество на биомасата. Най-силен ефект имат Мастербленд 6,4% и Конфидор-Атоник-Мастербленд - 4,5%. Съдържанието на КДВ се повлиява от Конфидор 8,2 g kg^{-1} (2,5%) и Конфидор+Атоник 14,6 g kg^{-1} (4,5%). Съдържанието на КДЛ има сравнително високи стойности 60,0–66,0 g kg^{-1}. Конфидорът най-силно повлиява повишението на КДЛ стойностите 70,8 g kg^{-1} (10,0%), както и Конфидор+Атоник 69,4 g kg^{-1} (8,9%). Ензимната разградимост на сухото вещество на фуража е 63,0 - 71,1% и се повишава под влияние на всички препарати, начини на третиране и фази на развитие.

89. **Найденова Й.,** Н. Георгиева, И. Николова, 2011. Хранителна стойност на пролетен фуражен грах, отглеждан за зелена маса при влияние на препарати с различно биологично действие, *Животновъдни науки,* ISSN 0514-7441*; 48, 1, 50-57.* **Naydenova Y.**, N. Georgieva, I. Nikolova. 2011. Feeding value of forage pea (*Pisum sativum* L.) spring forms cultivated for fresh biomass and influenced by preparations with different biological action.

От гледна точка проучване влиянието на препарати с различен биологичен ефект – Атоник (растежен стимулатор), Мастебленд (комбиниран листен тор) и Конфидор 70 VG (инсектицид), приложени еднократно (във фазите на развитие бутонизация и цъфтеж) или двукратно (бутонизация + цъфтеж) са оценени потенциалната енергийна хранителна и потенциалната протеинова хранителна стойности на биомасата от пролетен фуражен грах (*Pisum sativum* L.), сорт *Плевен 4,* отглеждан за зелена маса в полски експеримент (2007-2009), изведен в ИФК, Плевен. Най-висока енергийна хранителна стойност е установена за фуража, получен след третиране с растежния стимулатор Атоник: КЕМ 0,846; КЕР 0,758 и най-висока протеинова хранителна стойност TDP/PBD 130 g kg^{-1} ; 109 и 100 g kg^{-1} PDIN, PDIE респективно. Комбинираното приложение на биологичноактивните препарати повишава енергийната, но не и протеиновата хранителна стойност на пролетния фуражен грах. Най-значително се повишава енергийната хранителност при третиране на граха във фаза бутонизация при комбинираното прилажение на трите

препарата и при комбинираното приложение на на Конфидор и Атоник. Протеиновата хранителна стойност се повишава във фаза бутонизация. Само растежният стимулатор Атоник повиши протеиновата хранителност при самостоятелно приложение във фазите на развитие бутонизация и цъфтеж.

90. Georgieva N., I. Nikolova, D. Pavlov, T. Zhelyazkova, **Y. Naydenova,** 2011. Influence of some growth regulators on energy efficiency of spring pea (*Pisum sativum* L.) cultivated for fresh biomass, *Agricultural Science and Technology, Int. Journal Published by Faculty of Agriculture, Trakia University, St. Zagora, Bulgaria,* ISSN 1313-8820, *3, 1, 25-30.* Георгиева Н., И. Николова, Д. Павлов, Ц. Желязкова, **Й. Найденова,** 2011. Влияние на някои растежни регулатори върху енергийната ефективност на пролетен грах (*Pisum sativum* L.), отглеждан за зелена маса.

For establishing the effect of different growth regulators: Atonic – 0,6 l ha^{-1}, Masterblend – 1,6 kg ha^{-1} and Confidor 70 VG – 0,15 kg ha^{-1} applied alone and in combination in budding; budding + flowering and flowering on the productivity, composition, nutritive value and energy efficiency, field experiment with spring pea, cultivated for fresh biomass was conducted at Institute of Forage Crops, Pleven. Energy efficiency was calculated by balance method (energy input and output) by energy equivalents for all operations and energy value of the biomass calculated by composition and digestibility. Treatment of spring pea variety Pleven 4 with Atonic, Confidor and Masterblend had a positive effect and increased the yield of biomass and had no effect on chemical composition, nutritive and energy value of the biomass. Application of combination Confidor + Masterblend in budding + flowering stages leads to increasing the yield of dry matter with average 25,3 % and output gross energy with 26,5 %. The coefficient of energy efficiency (conversion of gross energy) of spring pea cultivated for fresh biomass is average 10,7. Treatment of pea with combination Confidor + Masterblend increases the coefficient of energy efficiency of GE with 21 %.

91. **Naydenova Y.,** N. Georgieva, I. Nikolova, 2011. Feeding value of spring vetch (*Vicia sativa* L.) influenced by preparations with different biological effect, *Agricultural Science and Technology, International Journal Published by Faculty of Agriculture, Trakia University, Stara Zagora, Bulgaria,* ISSN 1313-8820, *3, 2, 112-116.* **Найденова Й.,** Н. Георгиева, И. Николова, 2011. Хранителна стойност на пролетен фий (*Vicia sativa* L.) при влияние на препарати с различно биологично действие.

During the period 2007-2009 in the Institute of Forage Crops – Pleven was carried out two-factorial field experiment by the split plot method with the purpose of studying the influence of preparations with different biological effect, used single and combined on energy and protein feeding value of spring vetch. The results showed that the single and combined application of preparations Atonic, Masterblend and Confidor influensed positively on energy feeding value of spring vetch forage, increasing it by 1,0 to 5,8% for UFL and 6,0 to 7,7% for UFV. The highest mean value was established for treatment with combination Confidor-Masterblend followed by Confidor-Atonic. The combined application of the preparations was more effective (UFL-UFV: 0,765-0,666; FUM-FUG: 0,635-0,544) in comparison of the single (UFL-UFV: 0,758-0,656; FUM-FUG: 0,628-0,537). The protein feeding value (Total digestible protein) of spring vetch under influence of the preparations with different biological effect decreased in comparison of the control average by 8,0%. On the PDIN value at least degree had treatment with Masterblend and combined by Confidor-Atonic and the largest – combined treatment by Confidor-Masterblend. In regard to PDIE value was established a similar tendency as the variation in the values was wicker. The treatment stage determined the preparation application at flowering stage as more effective reaching maximal values which exceed those at budding stage and at budding-flowering stages by 5,2 and 2,1% for PDIN and PDIE, respectively.

92. Georgieva N., I. Nikolova, D. Pavlov, T. Zhelyazkova, **Y. Naydenova**. 2011. Energy efficiency of spring vetch (*Vicia sativa* L.) cultivated for fresh biomass, *Bulgarian Journal of Agricultural Science, Sofia,* ISSN 1310-0351, *17, 5, 712-720.* Георгиева Н., И. Николова, Д. Павлов, Ц. Желязкова, **Й. Найденова.** 2011. Енергийна ефективност на пролетен фий (*Vicia sativa* L.), отглеждан за зелена маса. **IF 0,189**

Field experiment with spring vetch, cultivated for fresh biomass was conducted for establishing productivity, composition, nutritive value and energy efficiency under the influence of different growth regulators: Atonic 0,6 l ha^{-1}, Masterblend – 1,6 kg ha^{-1} and Confidor 79 VG – 0,15 kg ha^{-1} applied in budding; budding + flowering, flowering. Energy efficiency was calculated by balance method (energy input and output) by energy equivalents for all operations and energy value of the biomass calculated by composition and digestibility. Treatment of spring vetch with Atonic, Confidor and Masterblend had a positive effect and increased the yield of biomass and had no effect on chemical composition, nutritive and energy value of the vetch biomass. Energy equivalent of the examined growth regulators is very low – 0,019 to 0,55 % from the total energy input, and has no essential effect on energy input in vetch cultivation. Treatment of spring vetch with combination Confidor + Masterblend or Confidor + Atonic increased energy output with about 28-29% and improved energy conversation, increasing the coefficient of energy efficiency with 24 to 26%.

93. **Naydenova Y.**, A. Kyuchukova, D. Pavlov, 2013. Plant cell walls fiber components analysis and digestibility of birdsfoot trefoil (*Lotus corniculatus* L.) in the vegetation, *Agricultural Science and Technology, International Journal Published by Faculty of Agriculture, Trakia University, Stara Zagora, Bulgaria,* ISSN 1313-8820, *5, 2, 164-167.* **Найденова Й.,** А. Кючукова, Д. Павлов, 2013. Анализ на влакнинните компоненти на растителните клетъчни стени и смилаемост на звездан (*Lotus corniculatus* L.) през вегетацията.

The changes in plant cell wall fiber components content and digestibility by Goering and Van Soest detergent analysis and *in vitro* enzymatic digestibility of Bulgarian plant breeding materials of birdsfoot trefoil (*Lotus corniculatus* L.) in the vegetation with a view to characterize plant species and to develop predictive regression models for forage quality evaluation are presented. The study was carried out at the Institute of Forage Crops, Pleven, as a part of its breeding program. The plants were grown during the period 2002-2004 on experimental plots and harvested at eight development stages from pasture stage to full pod formation stage in the first spring and second summer growths. During the vegetation both in spring and summer growths cell wall fiber components changes were presented as NDF, ADF, ADL. The rate in all parameters content increasing of cell wall fiber components is great till full flowering stage, after that intensity decrease. The degree of plant lignification is evaluated. Digestibility at each plant development stage in spring growth compared to those of summer is higher from 2,4 to 5,7 % points at average-day decreasing by 0,22% units (pasture stage-full flowering stage) in spring and 0,26% units (pasture stage-beginning pod formation stage) in summer growth. The linear regression mathematical models predict *in vitro* dry matter digestibility by different cell wall fiber fractions with high accuracy, coefficient of determination R: 0,847-0,937. When digestibility was predicted by all fractions, the predictive accuracy was highest R: 0,986-0,994. Accuracy of estimation of fiber components and digestibility by days of vegetation as independent variable was also high in spring growth R: 0,859-0,944 and in summer growth R: 0,906-0,989.

94. **Naydenova Y.**, A. Katova., 2013. Forage quality evaluation of perennial grass species in breeding process, *Journal of Mountain Agriculture on the Balkans,* ISNN 1311-0489*; 13, 6, 1519-1538.* **Найденова Й.,** А. Кътова, 2013. Анализ качеството на фураж от многогодишни житни треви при селекционен процес.

Forage quality evaluation of three perennial grass species was performed by the parameters of plant cell walls fiber components content (Van Soest detergent analysis), degree of lignification and enzymatic *in vitro* dry matter digestibility (DMD). The grass species were grown in competitive variety field trial (2001-2004), six variates: 1) synthetic population with 5 components of orchardgrass; 2) standard of orchardgrass, variety "Dabrava"; 3) breeding population Agropyron cristatum L. Gaertn., diploid (2n); 4) local standard *Agropyron cristatum* L. Gaertn.; 5) breeding population *Agropyron desertorum* Fisch.Schultes, tetraploid (4n); 6) local standard *Agropyron desertorum* Fisch.Schultes, tetraploid (4n). A total 5 growths (three in the second and two in the third year of growing) were evaluated. Forage quality evaluation demonstrate the changes in plant cell walls fiber components content and DMD in the vegetation – spring, summer and autumn growths, between three forage perennial grass species. Plant cell walls fiber components content in the second growth increased while DMD decreased. In the third growth the tendency was in contrary. Plant cell walls fiber components content and DMD had a huge variation in second and third growths between and within species. *Agropyron desertorum* (4n) had the lowest plant cell walls fiber components content and the highest DMD, followed by orchardgrass and crested wheatgrass. In summer growth *Dactylis glomerata* L. had better forage quality characteristics. The most variable parameters for the whole experimental period are ADL and degree of lignification (CV 34,4; 35,0). The mean IVDMD value for two years and 5 growths is 53,80%. The species *Dactylis glomerata* L. and *Agropyron desertorum* Fisch. Schultes as breeding populations and reference exceed this value. For *Agropyron desertorum* Fisch. Schultes is character the highest values for degree of lignification 12–13% at the same time the highest values of digestibility: IVDMD 56,29 %. Principally for high degree of lignification correspond low digestibility. The reason is that *Agropyron desertorum* Fisch. Schultes is tetraploid and cell content has high proportion to plant cell walls content. Higher degree of lignification correspond well to erected habitus of Agropyron desertorum Fisch. Schultes plants without loging problems.

95. **Naydenova Y.**, 2014. Forage quality analysis of perennial grass and legumes species in pure stands and mixtures, *Journal of Animal Science, Sofia,* ISSN 1310-0351, *18, 1-2, 176-183.* **Найденова Й.,** 2014. Анализ качеството на фураж от многогодишни житни и бобови видове в самостоятелни посеви и тревни смески.

The changes in principal composition and structural plant cell walls fiber components content by classical chemical Weende and Van Soest analyses and *in vitro* enzyme digestibility of forage perennial legumes birdsfoot trefoil, sainfoin, white clover (*Lotus corniculatus* L., *Onobrychis* Adans., *Trifolium pretense* L.) and grasses: crested wheatgrass, orchardgrass (*Agropyron cristatum* L., *Dactylis glomerata* L.) in pure stands and mixtures – two-, three- and multi-components in field trial (22 variates) at the Institute of Forage Crops – Pleven in the period 2003-2006. The ratio of legume:grass species in mixtures was equal, as well as participation in grass or legumes quotes. It was established: 1.The

mixtures of crested wheatgrass, orchardgrass with legume crops demonstrate fiber components content values for all plant cell wall fiber components fractions, lower than these of grasses and higher than those of legumes – birdsfoot trefoil, sainfoin, white clover. 2. The relationships of fiber components in pure stands of grass and legume mono-crops determine higher digestibility of forage dry matter for legume mono-crops (68,57 ± 7,12%), lower grass digestibility (62,15 ± 7,14%) and medium, but sufficient high for harvesting of mixed growing of two-, three and multi- component mixed stands. 3. The mixtures of crested wheatgrass with white clover and orchardgrass with white clover are established as high nutritive. 4. The multi component mixtures of perennial forage legumes and grasses showed medium forage quality between those of contained components.

96. **Naydenova Y.**, A. Katova., A. Petrov, 2014. Forage plant cell walls fiber components content and digestibility of new varieties perennial grasses in the vegetation, *Journal of Animal Science, Sofia,* ISSN 1310-0351, *18, 1-2, 184 -191.* **Найденова Й.,** А. Кътова, А. Петров, 2014. Влакнинни компоненти на растителните клетъчни стени и смилаемост на нови сортове многогодишни житни треви през вегетацията.

The forage plant cell walls fiber components, determining energy feeding value and enzyme *in vitro* digestibility as the main forage quality characteristics are variable in the vegetation. The aim of the study is to establish the changes in plant cell walls fiber components content – poliosides and lignin and enzyme *in vitro* degradability (digestibility) of new registered perennial grass varieties in OECD list, Official variety list of the Republic of Bulgaria as well as perennial grass breeding populations. The perennial grass species and varieties present high forage quality in pasture development stage. Changes in forage quality appeared forward vegetation process but they have different temp. Tetraploid perennial ryegrass populations remains high quality forage for the longest period in the first spring growth which allow enlarged pasture period near to a month. The tetraploid perennial ryegrass breeding population *NBG* demonstrates the best forage quality characteristics in comparison with other studied species and varieties. *Pasture stage* forage fiber components, lignification and digestibility are presented as follow: 2012: NDF 53,70%, ADF 28,2%, ADL 2,77%, Lignification 5,2 and IVDMD 76,54 and for 2013 respectivelly: 46,60%, 24,16%, 1,07%, coeff. 2,3, 81,61%. *Flowering stage* forage fiber components, lignification and digestibility are presented as follow: 2012: NDF 54,5%, ADF 29,97%, ADL 2,8%, Lignification 5,1 and IVDMD 71,88% and for 2013 respectivelly: 60,24%, 45,14%, 3,66%, coeff. 6,1, 54,42%. The tetraploid perennial ryegrass breeding population *SBG* demonstrates faster changes in forage quality characteristics because it is the earliest in maturity. *Pasture stage* forage fiber components, lignification and digestibility are presented as follow: 2012: NDF 55,4%, ADF 30,65%, ADL 3,25%, Lignification 5,9 and IVDMD 67,94% and for 2013 respectivelly: 44,27%, 24,1%, 1,2%, coeff. 2,7, 81,66%. *Flowering stage* forage fiber components, lignification and digestibility are presented as follow: 2012: NDF 56,08%, ADF 32,67%, ADL 3,89%, Lignification 6,9 and IVDMD 62,96% and for 2013 respectivelly: 60,90%, 37,00%, 4,49%, coeff. 7,4, 52,63%. Forage quality for two wheatgrass varieties has higher values of plant cell walls fiber components content and lower digestibility in comparison with perennial ryegrass. Desert wheatgrass *Morava* in the vegetation process present higher values of plant cell walls fiber components content and lower digestibility in comparison with diploid crested wheatgrass *Svejina.*

97. Georgieva N., I. Nikolova, D. Pavov, Ts. Zhelyazkova, **Y. Naydenova**, 2014. Energy assessment of forage pea production under influence of organic and synthetic products, *Banat's Journal of Biotechnology, ISNN 2068-4738, V(9), 15-22.* Георгиева Н., И. Николова, Д. Павлов, Ц. Желязкова, **Й. Найденова,** 2014. Енергийна оценка на продукцията от фуражен грах при влияние на органични и синтетични продукти. JSI**F 3,904**

Energy assessment based on a system of parameters (energy value, energy input, energy output, energy efficiency) in spring forage pea production under influence of organic products (bioinsecticides NeemAzal and Pyrethrum, foliar biofertiliser Biofa, growth regulator Polyversum) and synthetic products (insecticide Nurele D Chlorsyrine 550 EC and growth regulator Flordimex) was performed for three years period. The alone and combined treatment with organic and synthetic products was applied once (at stage of budding) and twice (at budding and flowering) for total of 24 variants. It was established that alone and combined application of organic products is characterized with lower energy consumption (8432.56 MJ ha–1) compared to cultivation with use of synthetic products (8533.81 MJ ha–1). In regard to amount of energy output trend are reverse–raised values of gross energy, metabolizable energy and net energy under use of synthetic products. Balance between energy input and output determined as most effective combined treatment with organic products Biofa+Pyrethrum that led to increase of coefficient of energy efficiency (for metabolizable energy and net energy) on average by 22.4% to untreated control followed by combined treatment with synthetic products Flordimex+Nurele D (increase with 21.9%). For conditions of organic production could be recommended and combined use of organic products Polyversum+Pyrethrum and Polyversum+NeemAzal (excess of coefficient for metabolizable energy and net energy to control by 20.6 and 16.5%). Combined use of products as well as their double application as factors contributed to increase of energy efficiency in spring forage pea production.

98. Кертикова Д., **Й. Найденова,** Д. Янков, 2014. Оценка на елитни клонове люцерна по продуктивност и качество, *Аграрни науки, Аграрен университет – Пловдив, ISNN 1313-6577, VI, 16, 25-31.* Kertikova D., **Y. Naydenova,** D. Yankov, 2014. Evaluation of the productivity and quality of elite alfalfa clones.

An evaluation of five elite alfalfa clones for productivity and quality was carried out with regard to the selection. The highest productive potential was found in clone № 30. It succeeded in forming fresh vegetative mass of 1,380 g/plant within one growing season. It was distinguished by the highest height (an average of 60.2 cm) of the plants before harvesting and a fast recovery after cutting (score 9). The dry and organic matter digestibility of the feed of the surveyed clones was high - over 70%. The clone with the highest average performance was № 27 (72.22%), followed by clones № № 30, 31 and 28. The examined quality indicators differed in variation degree at a clone level. It was found that the strongest genotype ↔ environment interaction was observed in clone № 31, taking into account the highest degree of variability. CV values were over 20%, respectively for Hemicellulose – 53.6%, for ADL – 26.6%, for NDF – 21.6% and for ADF – 20.2%. The rest of the clones showed a weaker interaction, clone № 30 being relatively the most stable for most of the indicators. In all clones, a slight variation in the dry and organic matter digestibility values of CV from 1.6% (№ 30) to 7.4% (№ 31) was observed. The CV average values in descending order were as follows: Hemicellulose – 33.6%, ADL – 11.3%, Lignif.(coeff.) – 10.3%, NDF – 9.9%, ADF – 9.1%, Cellulose – 8.8% CP – 7.4%, IVDMD – 3.9%.

99. **Naydenova Y.**, A. Katova, 2014. Forage quality evaluation of diploid perennial ryegrass (*Lolium perenne* L.) in competitive variety trial, *Journal of Mountain Agriculture on the Balkans,* ISNN 1311-0489*; 17, 6, 1665-1677.* **Найденова Й.,** А. Кътова, 2014. Оценка качеството на фураж от диплоиден пасищен райграс (*Lolium perenne* L.) в конкурсен сортов опит.

Forage quality of diploid perennial ryegrass accessions: three Bulgarian breeding populations *Harmoniya, Sredetz, Targovishte* and Belgium variety *Vigor* as a reference are estimated in competitive variety trial conditions during the period 2000-2003 in Institute of Forage Crops, Pleven. For seven growths in total, principal composition (Weende analysis), plant cell walls fiber components content (Van Soest), enzyme digestibility *in vitro* of dry and organic matter (method Aufrere), potential energy and protein feeding value by different systems. Biomass from the first growth is differentiate –aboveground part of plants, leaves and stems. The highest values of crude protein content and lowest for crude fiber are presented in third growth, followed by first and second. *Harmoniya* is distinguished for CP highest values average for the period – at third growth 19.25 % in comparison with Vigor 17.83 % and at second 12.23 % towards 9.42 %, respectively. Exceeding in comparison with the other two populations by 2-3 %-units. Forage digestibility is high at first and second growth – up to 70 % as maximum value belongs to *Harmoniya* 72.90 and 72,58 %, respectively. The highest variability is mentioned for crude protein contents CV: 25.3 %, followed by ADL – CV: 21.6 %. The most digestible part of plants are leaves 77.27% average for all populations and stems digestibility is by 10-11 %-units lower. *Harmoniya* is characterized by higher digestibility in comparison with other populations and the lowest degree of lignification of leaves as well as stems. Digestible dry matter and RFV are significantly higher in third growth. Energy feeding value is the highest in the first and the third growths for *Harmoniya* UFL 0,833 and 0,800, respectively. Total digestible protein TDP/PBD, PDIN and PDIE followed the same tendency and the highest values obtained for *Harmoniya* in third growth towards mean values 149/104; 121/92; 102/97g kg^{-1} respectively. Breeding population *Harmoniya,* according complex evaluation belongs the highest forage quality.

100. Nikolova I., N. Georgieva, **Y. Naydenova**, 2015. Feeding value estimation of spring forage pea (*Pisum sativum* L.) in organic cultivation, *Agricultural Science and Technology, International Journal Published by Faculty of Agriculture, Trakia University, Stara Zagora, Bulgaria,* ISSN 1313-8820, 7, 1, 71-76. Николова И., Н. Георгиева, **Й. Найденова,** 2015. Хранителна стойност на пролетен фуражен грах (*Pisum sativum* L.) при различни методи на биологично отглеждане.

The isolated and combined action of organic products Biofa (foliar fertilizer), Polyversum (growth regulator), NeemAzal and Pyrethrum (biological insecticides) on energy and protein feeding value of the dry mass of spring forage pea grown in the conditions of organic farming is studied. As a standard of comparison the synthetic products Flordimeks (plant growth regulator) and Nurele E (insecticide) are used alone or in combination. The field experiment is conducted in the period 2011-2013 at the Institute of Forage Crops, Pleven, Bulgaria. Treatments are performed once in budding and twice in budding and flowering vegetative stages for control of economically important pests. It is found that treatment with organic products in the budding stage influences the energy feeding value positively, increasing it from 0.6 to 5.2% for UFL and from 0.7 to 7.1% for UFV. The highest energy feeding value distinguished combined introduction of Nimazal and Polyverzum (UFL - 0.850 and UFV - 0.768). Double use of biological preparations is associated with a pronounced increase in forage energy feeding value from 1.1 to 9.2% for UFL and from 0.9 to 11.9% for UFV. Compared to a single treatment, an average five and a fourfold increase is established, respectively for UFL and UFV. The treatment with biological regulator Polyverzum has the greatest impact (0.864 and 0.783 for the UFL and UFV), followed by Polyverzum+NeemAzal (0.856 and

0.773 for the UFL and UFV). Protein feeding value in a single treatment is decreased averagely by 5.6%. Only Biofa treatment leads to an increase of 15.3% (PBD - 117.6). Double-application is associated with an increase of the forage protein feeding value from 0.2 to 14.4% for the PBD, from 0.1 to 9.8% for PDIN and from 1.8 to 6.4% for PDIE. The highest values distinguished the treatment with NeemAzal (PBD - 99.1; PDIN - 82.3; PDIE - 91.0), followed by NeemAzal+Biofa (PBD - 99.8; PDIN - 89.7; PDIE - 89.2) and Pyrethrum + Polyverzum (PBD - 97.1; PDIN - 88.1; PDIE - 89.0). Synthetic products, irrespective of the vegetative stage of submission, lead to an increase of parameters which characterize the forage energy feeding value and protein feeding value, but in a relatively lower degree.

101. Найденова Г., **Й. Найденова,** Ц. Миховски, М. Илиев, 2014. Фуражен потенциал на едногодишни бобови треви в България, *Селскостопанска наука*, ISSN 1311-3534, 47, 2-3, 28-34. Naydenova G., **Y. Naydenova**, Tsv. Mihovsky, M. Iliev, 2014. Forage potential of annual forage legumes in Bulgaria.

С цел оценка на фуражните качества при изкуствено тревозасяване в три опитни години в опитното поле на Опитната станция по соята Павликени (430 24' N; 250 32' E; 144m н.в.; pH 7.1) е проведено сравнително изпитване на растителна генплазма от следните пет вида едногодишни бобови треви: херлерова детелина (*Tr. cherleri* L.); мишелова детелина (*Tr. Michelianum* Savi), хмелна люцерна (*M. lupulina* L.); александрийска детелина (*Tr. alexandrinum* L.) и четинеста детелина (*Tr. vesiculosum* Savi). Установено е, че четинестата детелина и хмелната люцерна са едногодишните бобови треви с потенциал за отглеждане във временни тревостои при условията на Централна Северна България. Четинестата детелина се характеризира с висока лятна продуктивност на зелена маса и сухо вещество (съответно 17930 и 5820 kg ha^{-1}), като фуражът от нея се отличава с балансиран основен химичен състав, с високо съдържание на хемицелилоза (8.23%), с ниска степен на лигнификация (3.44% КДЛ) и много висока смилаемост на сухото и органичното вещество (съответно 77.82 и 77.24%). Хмелната люцерна може да се определи като вид с пригодност за използване като компонент на пасищни тревостои, заради проявени характеристики като висока плътност на тревостоя, способност за подрастване и високи стойности на сухото тегловно съотношение листа/стъбла (1.22). Сухото вещество от този вид е с най-високо съдържание на влакнинни компонети на клетъчните стени (НДВ 39.76%). Най-висока е и протеиновата и хранителна стойност - смилаем протеин в тънките черва в зависимост от азота (PDIN 132.0 g kg^{-1} DM) и в зависимост от енергията (PDIE 102.6 g kg^{-1} DM) и съответно с най-висок общ смилаем протеин (TDP/PBD 165.3 g kg^{-1} DM).

102. Nikolova I., N. Georgieva, **Y. Naydenova**, 2014. Development and reproduction of spider mites ***Tetranychus turkestani* (Acari: Tetranychidae)** under water deficit condition in soybeans, *Pesticidi i fitomedicina, ISSN 1820-3949, 29, 3, 187-195.* Николова И., Н. Георгиева, **Й. Найденова,** 2014. Развитие и репродукция на акари при соята в условия на воден дефицит. **IF 0,590**

One of the major pests in soybeans in Bulgaria is spider mite *Tetranychus turkestani* Ug et Nik (Acari: Tetranychidae) as they are reported different results about the impact of water stress on their development and reproduction. During the period 2011 - 2012 at the Institute of Forage Crops, Pleven, Bulgaria in the greenhouse condition were tested soybean plants exposed to natural infestation by spider mite, water deficit and treatment with imidacloprid. It was found that the development of mites and their eggs was performed in shorter time when plants exposed to water deficit, which created favorable conditions for the density and reproduction of *T. turkestani*. There was a vertical distribution of the mites as its numbers and eggs were significantly higher in conditions of water deficit on newly formed leaves of the upper and middle part compared with the bottom part and the imidacloprid treatment had stronger and more prolonged activity on mites compared to its influence on them at well-watered plants. Spider mites on water stress plants caused a reduction of plastid pigments content based on chlorophyll A, B and carotenoids by 24.8%, and on well-watered plants - by 21.5%.

103. **Naydenova Y.,** 2015. Protein feeding value estimation of forage perennial grasses by Near Infrared Reflectance Spectroscopy (NIRS), *Agricultural Science and Technology, International Journal Published by Faculty of Agriculture, Trakia University, Stara Zagora, Bulgaria,* ISSN 1313-8820, 7, 3 (*in press*). **Найденова Й.,** 2015. Оценка на протеиновата хранителна стойност на многогодишни фуражни житни треви чрез спектрален анализ в близката инфрачервена област (NIRS)

The protein feeding value of forage perennial grasses orchardgrass (*Dactylis glomerata* L.), tal fescue (*Festuca arudinacea* Schreb.), smooth bromegrass (*Bromus inermis* Leyss.) in the real breeding process is estimated by Near Infrared Reflectance Spectroscopy (NIRS). The global - for the three perennial grasses and specific – for each perennial grass species calibration models are developed on the basis of experimental values of protein feeding value, estimated by French system. The spectra are obtained as Log 1/R in the region 1100-2498 nm by scanning monochromator 6500 NIRSystem Inc.Silver Spring, MD, USA; spectral mathematical treatment – by ISI NIRS 3, ver.4 Softwere /Infrasoft

International, Port Matilda, PA/. The Principal component analysis is applied for determination of spectral limits; the previous math treatment: Detrend, SNV, MSC, WMSC; math correction – by math differentiation and segment-gape method. Regression model is Modified partial least squares regression. Evaluation of regression models is as the highest R2C and R2CV; the lowest SEC and SECV; the highest SD/SECV. The accuracy of prediction is very high R2CV 0.96-0.99; SD/SECV is >4.0.The stability of models is high (very low differences between SEC and SECV). The accuracy and stability of models are better for PDIN than PDIE. The scatter of global models is always NSVD but for the specific models is different. The differences between SEP and SECV are very low, and that's why the global models may be applied for estimation of protein feeding value for each one of the three perennial grass species as well as the specific models.

104. **Naydenova Y.**, V. Kosev, 2015. Composition, digestibility, feeding value estimation of forage pea (*Pisum sativum* L.) varieties and hybrids in breeding process and genetic advance evaluation, *Agricultural Science and Technology, Int. Journal Published by Faculty of Agriculture, Trakia University, St. Zagora, Bulgaria,* ISSN 1313-8820, *7, 2, (in press*). **Найденова Й.,** В. Косев, 2015. Състав, смилаемост, оценка хранителната стойност на сортове и хибриди фуражен грах (*Pisum sativum* L.) при селекционен процес и генетичен прогрес.

Composition and digestibility are studied and potential forage feeding value is estimated of eight breeding spring and winter forms – two Bulgarian and two Russian varieties and their four hybrids, presented as Component A - winter forms and Component B – spring forms. Forage quality is evaluated in three vegetative stages of plants, grown in Competitive variety trial (2011-2013) on the Second Experimental Field of the Insttute of Forage Crops – Pleven: budding stage; beginning of flowering of stage and full pod formation stage. The parameters of principal composition (Weende analysis), plant cell walls fiber components content (Van Soest detergent analysis), enzyme *in vitro* digestibility of dry and organic matter (method Aufrere), potential energy and protein feeding value by different systems are analyzed, determined and estimated. The correlation relations between parameters are established. The highest values for the crude protein content breeding forms demonstrate in budding stage: CP 23,55 ± 7,75% and the highest average digestibility in the full pod formation stage, which is a stage of technological maturity of varieties and hybrids: Digestibility of dry matter (IVDMD) 70,00 ± 3,32% and Digestibility of organic matter (IVOMD 71,28 ± 3,06%). Potential energy feeding value of the forage biomass average for all breeding accessions is the highest at full pod formation stage and protein feeding value at budding stage. Genetic advance is evaluated by Principal Component Analysis, Cluster analysis and heritability (broad sense) is established.

105. **Naydenova Y.,** E. Vasilev, A. Kirilov, 2015. Plant cell walls fiber component content and digestibility of orchardgrass (*Dactylis glomerata* L.) and legume forage species in pure stands and mixtures, *Journal of Mountain Agriculture on the Balkans,* ISNN 1311-0489, 18, 1 (*in press*). Влакнинни компоненти на клетъчните стени и смилаемост на ежова главица (*Dactylis glomerata* L.) и бобови фуражни видове в самостоятелни посеви и тревни смески.

Establishment of pastures for animals is related to the choice of suitable grass and legume species to the environmental soil and climatic conditions of the regions to possessing high nutritive forage for ruminants. The aim of this study is to compare cell wall fiber components content and digestibility of orchardgrassq some legume crops in pure stands and mixtures. The changes in plant cell wall fiber components content and digestibility of orchardgrass *(Dactylis glomerata* L.) and perennial legume forage species birdsfoot trefoil (*Lotus corniculatus* L.), sainfoin (*Onobrychis* Adans.), white clover (*Trifolium pretense* L.) in pure stands and their two, three or multi component mixtures were evaluated in field plot trial (9 variants) in the Institute of Forage Crops - Pleven (2004-2006). The ratio of legume:grass species in mixtures was equal, as well as participation in grass or legumes quotes. The fiber components content was determined and evaluated by Goering and Van Soest detergent analysis and *in vitro* enzyme digestibility by method of Aufrère. It was established that: 1.The mixtures of orchardgrass with perennial legume species demonstrate fiber components content higher than those of legumes – birdsfoot trefoil, sainfoin, white clover, grown in pure stands and lower than those of orchardgrass; 2. The relationships of plant cell walls fiber components in pure stands of orchardgrass and legume monocultures cause higher forage digestibility of dry and organic matter of legumes (69%), lower of orchardgrass (63%) and medium (over 64%), but sufficient for obtaining high quality forage for ruminants in mixed growing in bi-, three- and milti-component mixtures; 3. The bicomponent mixture of orchardgrass and white clover is established as high quality forage; 4.The multi-component mixtures of orchardgrass and perennial legumes showed medium forage quality and digestibility between those of contained components.

II. НАУЧНИ ПУБЛИКАЦИИ В СБОРНИЦИ ОТ МЕЖДУНАРОДНИ НАУЧНИ ФОРУМИ

106. **Найденова Й.,** Р. Тодорова, К. Горанова, Д. Павлов, 2005. СОЯ (*Glycine max* (L.) Merr.) за фураж при сортове от различни групи на зрялост – влакнинни компоненти на клетъчните стени, смилаемост и предвиждането им, *Сб. Научни доклади, Юбил. научна конф. с междунар. участие "Селекционни и технологични аспекти при производството и преработката на соя и други бобови култури", 08-09 септември 2005, Павликени, Ред. Георги Георгиев, 207-219.* ***Naydenova Y.,*** *R. Todorova, K. Goranova, G. Georgiev, D. Pavlov, 2005. SOYBEAN (Glycine max* (L.) Merr.) *for forage of varieties from different groups of maturity – plant cell wall fiber components content, digestibility and their prediction (First results)*

Проучени са сортове и линии соя (*Glycine max* (L.) Merr.) от три групи на зрялост: Olimpia и Korada от ранна група на зрялост; Павликени 121 и Bachka и пет линии от среднoранна група на зрялост; Beeson и Wayne от среднокъсна група на зрялост, отглеждани в полски селекционен експеримент през 2004 г във филиал Павликени, ИФК-Плевен. Всички (R5), наливане на зърната (R6) по съдържание на влакнинни компоненти на клетъчните стени сортове и линии са проучени във фазите на развитие: начало на цъфтеж (R3), цъфтеж (R4), край на цъфтеж-бобообразуване НДВ, НДВ, КДЛ по детергентен анализ на Goering and Van Soest (1970) и in vitro смилаемост на сухото вещество (Aufrere, 1982). Сортовете и линии соя, независимо от вариабилността в съдържанието на влакнинните компоненти, показват висока смилаемост и хранителна стойност като зелен фураж през различни фази на развитие R3, R4, R5, R6. Най-висока смилаемост и хранителна стойност на фуража се наблюдава във фаза наливане на зърната (R6) 72-78% при сортовете Beeson и Wayne от среднокъсната група; Korada 76% и Olimpia 69% от ранната група. Сортовете Bachka 70% и Павликени 121 - 71% от среднoранната група във фаза наливане на зърната (R6) и още по-висока 73-74% във фаза край на цъфтеж-бобообразуване (R5). Високата степен на вариабилност на лигнина CV 21-23% при всички фази на развитие и всички групи на зрялост доказват, че лигнинът може да бъде специфичен селекционен критерий за отбор и оценка при селекция на соя. Смилаемостта (IVDMD) се предвижда чрез съдържанието на влакнинните компоненти с висока точност: R 0,634-0,845 при висока статистическа достоверност $p<0.0001$ и по-слабо чрез дните от началото на вегетация: R 0,508 - 0,568 поради неравномерен растителен растеж.

107. Пачев И., **Й. Найденова**, 2005. Влияние на листното третиране с ванадий върху качеството на фураж от някои житни и бобови треви, *Сб. Научни доклади, Юбил. научна конф. с междунар. участие "Селекционни и технологични аспекти при производството и преработката на соя и други бобови култури", 08-09 септември 2005, Павликени, Ред. Георги Георгиев, 220-226. Pachev I.,* ***Y. Naydenova,*** *2005. Influence of foliar treatment with vanadium on forage quality of some perennial grasses and legumes.*

За установяване влиянието на листното торене с ванадий върху основния хранителен състав на фуража и смилаемостта му при някои бобови и житни фуражни треви, отглеждани в условията на излужен чернозем е изведен съдов опит с фуражните култури люцерна (*Medicago sativa* L.), пасищен райграс (*Lolium perenne* L.) и ежова главица (*Dactylis glomerata* L.) при почвен тип типичен чернозем и следните варианти: 1) неторена почва; 2) NPK според технологиите за отглеждане на културите; 3) NPK+V(0,01% р-р); 4) NPK+V(0,05% р-р); 5) NPK+V(0,1% р-р); 6) NPK+V(0,5% р-р). При люцерната най-удачно е листното третиране с 0,01% и 0,05% Ванадий, като съдържанието на суров протеин се повишава с 0,5 до 1,1 %-ни ед., последвано от 0,1% Ванадий, който понижава съдържанието на суровите влакнини спрямо контролата. При житните пасищен райграс и ежова главица най-удачното третиране е 0,01% Ванадий като съдържанието на протеин е повишено при пасищния райграс с 1,4 %-ни ед., а при ежовата главица с 0,8 %-ни ед. При ежовата главица 0,5% Ванадий понижава съодържанието на влакнини с 1,6 %-ни ед, а най ниската 0,01% Ванадиева концентрация понижава суровите влакнини с 4,7 %-ни ед. При житните култури най-удачни са концентрациите 0,05% и 0,01%, ванадий когато Калцият е повишен от 0,306 до 0,152 %-ни единици. Листното третиране с Ванадий при всички изследвани концентрации предизвиква повишение в съдържанието на Фосфор и при двете житни култури. За пасищния райграс най-удачното третиране е 0,05%, а за ежовата главица, дори и най-ниската 0,01% Ванадиева повишава съдържанието на Фосфор с 0,20 %-ни единици. Третирането с 0,01% Ванадий подобрява смилаемостта на сухото вещество при ежова главица с 1 %; при концентрации от 0,1% и 0,5% - с 0,48 %-ни единици при пасищен райграс и при концентрация 0,1% - с 0,57 %-ни единици при люцерната.

108. **Naydenova Y.,** A. Kyuchukova, 2006. Composition, digestibility and feeding value for forage quality evaluation of sainfoin (*Onobryhis* Adans.), *In: Sheep production in Europe: State and perspectives, Ed. A. Kirilov, Proc. workshop, Pleven, Bulgaria, 7-8 Sept. 2006,* ISBN 978-954-9373-48-6, *Eniovche Publ., 159-164.* **Найденова Й.,** А. Кючукова 2006. Състав, смилаемост и хранителна стойност при оценка качеството на фураж от еспарзета (*Onobryhis* Adans.)

The changes in protein and cell wall fiber components content by classical chemical Weende and Van Soest analyses and enzymatic *in vitro* organic matter digestibility of sainfoin (*Onobryhis* Adans.) plant breeding materials are presented in order to elucidate the most promising entries to be involved in the breeding process. The study was carried out under experiment field conditions (2002-2004) at the Institute of Forage Crops, Pleven as a part of its breeding program. Based on chemical composition and *in vitro* organic matter digestibility, determined experimentally, the potential energy and protein feeding value of in total twenty-two assessions – 10 lines, 2 varieties, 8 local populations and two standard varieties – Peschanii 1251 and Jubileina were estimated using the following systems for feeding value evaluation: French (INRA 1988), Bulgarian (Todorov 1997) and Dutch (Van Es 1978). In comparative analyses of forage quality between accessions during the harvesting in first spring and second summer growth at the stage of budding-early flowering were determined and individual, referent values and degree of parameters variation were established. Significant for the breeding process and valuable as potential genetic materials were selected. This estimation is a part of final breeding evaluation by biochemical composition, digestibility and forage feeding energy and protein feeding value and agricultural value.

109. Todorova P., **Y. Naydenova**, 2006. Changes in productivity and forage *in vitro* digestibility of smooth bromegrass (*Bromus inermis* Leyss.) grown in pure stands and in mixture with lucerne, *In: Sheep production in Europe: State and perspectives, Ed. A. Kirilov, Proc. workshop, Pleven, Bulgaria, 7-8 Sept. 2006,* ISBN 978-954-9373-48-6, *Eniovche Publ., 165-171.* Тодорова П., **Найденова Й.,** 2006. Промени в продуктивността и смилаемостта *in vitro* на фураж от безосилеста овсига (*Bromus inermis* Leyss.), отглеждана в самостоятелни посеви и в смес с люцерна.

The study was conducted in the experimental field of the Institute of Mountain Stockbreeding and Agriculture in Troyan. Field trials were carried out at 400 m altitude on light gray pseudopodzolic soil. The objective was to study variation in productivity, composition and in vitro digestibility of smooth bromegrass (*Bromus inermis* Leyss.) sown in a pure stand and in mixture with lucerne (*Medicago sativa* L.). The effect of mineral fertilizing with increasing nitrogen doses (N_{40} and N_{80}) on a phosphorus-potassium background of $P_{80}K_{80}$ under non irrigated conditions was studied. The fertilizing increased productivity of smooth bromegrass sward from5750 kg ha^{-1} dry mass (unfertilized variant) to 7530 kg ha^{-1} (fertilizing with $P_{80}K_{80}N_{80}$), on average for the period of study. In the mixed stand of smooth bromegrass and lucerne the dry mass yield in the unfertilized variant was 9690 kg ha^{-1} and in var. 5 ($P_{80}K_{80}N_{40}$) and var. 6 ($P_{80}K_{80}N_{80}$) it reached to 7410 kg ha^{-1} and 10880 kg ha^{-1}, respectively on average for the period (2002-2003). Weed infestation of smooth bromegrass sward was higher in the second year of study, which was due to smaller rainfall amount in June, July and August, as compared to the previous year. The percentage weed participation in the herbaceous biomass was much lower in the mixed stand. The chemical composition, digestibility and feeding value were established in point of view of botanical composition and fertilizing.

110. **Naydenova Y.,** 2008. Forage feeding value evaluation of perennial grass and legume species in pure stands and mixtures, Proc. *7-th Int. Sym. Anim. Biol. Nutr., IBNA Balotesti, ROMANIA, 25-27 Sept. 2008, 1-6, CD.* **Найденова Й.,** 2008. Оценка хранителната стойност на фураж от многогодишни житни и бобови видове в самостоятел ни и смесени посеви.

The energy feeding value and protein feeding value of perennial legume (*Lotus corniculatus* L., *Onobrychis* Adans., *Trifilium pretense* L.) and grass *(Agropyron cristatum* L., *Dactylis glomerata* L.) forage species in pure stands and their two, three or multi component mixtures were evaluated in field plot trial (22 variants) in the IFC-Pleven (2003-2006). The ratio of legume/grass species in mixtures was equal, as well as participation in grass or legumes quotes. The net energy feeding value was estimated by the New French system (UFL-UFV) and recalculated in the New Bulgarian system (FUM-FUG) by coefficient of digestibility of organic matter dMO_{invivo} obtained by relation, using *in vitro* digestibility of organic matter experimentally determined. It was established: 1.The mixtures of crested wheatgrass and orchardgrass with legume crops showed that energy feeding value was higher than those of grasses in pure stands and lower than those of legume crops. 2. The higher energy feeding value of legume pure stands, the lower energy feeding value of grasses, were expressed clearly in second and third growths and medium energy feeding value, but sufficiently high for ensuring high quality forage for ruminants at mixed growing of two, three and multi component mixtures. 3. The mixtures of crested wheatgrass with white clover and orchardgrass with white clover were established as high nutritive. 4. The multi component mixtures of perennial forage legumes and grasses showed medium forage quality and nutritive value between those of contained components. 5.

The parameters of energy and protein feeding value were predicted by chemical composition with regression equations - high statistical significance (R: 0,550-0,999; p<00001).

111. **Naydenova Y.,** 2008. Spectral NIR approaches in forage perennial grass breeding, *Proc. Int. Conf. "Conventional and molecular breeding of field and vegetable crops" Breeding 08, Inst. Field and Vegetable Crops, Novi Sad, R.SERBIA, 24-27 November 2008,* ISBN 978-86-80417-20-2, *499-503.* **Найденова Й.** 2008. Спектрални подходи при отражателна спектроскопия в инфрачервената област NIR при селекцията на фуражни многогодишни житни треви.

The scanning Near Infrared Reflectance Spectroscopy (NIRS) approaches and its spectral applications for forage quality evaluation in perennial grass breeding were demonstrated. The global and specific NIR calibrative models on the basis of broad range of parameters of composition, enzyme digestibility, energy and protein feeding value allow quick determination and prediction the parameters with high statistical significance through direct scanning. The different regression types (SML and MPLS), terms and mathematical treatments of spectra to increase accuracy of prediction were investigated. The spectral data base developed make possible establish referent values, their inter population variation and statistical significance of parameters in early stages of real breeding process of perennial grasses *Dactylis glomerata* L., *Festuca arundinacea* Schreb., *Bromus inermis* Leyss., *Lolium perenne* L., *Agropyron ssp.* The quality applications of computerized NIR spectra in evaluation of some specific components were characterized. The NIR spectral systematical analysis in breeding of perennial ryegrass was developed. The Mahalanobis distance of spectral data through analysis of the main components in PCA serves as a method to find similarities and differences between genotypes of the same species and between different plant species. These approaches and statistical application of the regression, rang correlation and principal component analyses evaluate and select elite genotypes, the best in genetic and biologic potential which were involved in the following stages of breeding process.

112. **Naydenova Y.,** A. Katova, 2008. Effect of the environments on *in vitro* dry matter digestibility evaluation for perennial ryegrass (*Lolium perenne* L.), *Proc. Int. Conf. "Conventional and molecular breeding of field and vegetable crops" Breeding 08, Inst. Field and Vegetable Crops, Novi Sad, R.SERBIA, 24-27 November 2008,* ISBN 978-86-80417-20-2, *504-508.* **Найденова Й.,** А. Кътова. 2008. Влияние на околната среда върху оценката на *in vitro* смилаемостта на сухото вещество на пасищен райграс (*Lolium perenne* L.).

Four comparative field variety trials, each of which included fourty-six varieties and populations perennial ryegrass *(Lolium perenne* L.) differing by origin, ploidy and group of maturity at different environment limits – two levels of density, with and without irrigation were carried out during the period 2002-2004 in the Institute of Forage Crops, Pleven, Bulgaria. The enzymatic *in vitro* dry matter digestibility by Aufrere (1982) method was the main characteristic for forage quality evaluation. Three maturity groups (MG): Early MG – 20 strains; Intermediate MG – 21 strains and Late MG – 6 strains and two levels of ploidy - diploids – 28 strains and tetraploids – 18 strains were studied. The varieties and populations in each MG were ranged and compared at different environment limits and mean arithmetic, minimum and maximum values, standard deviation and coefficient of variation were calculated. Comparing coefficients of variation of all groups at different environment conditions was established that the Early MG under without irrigation and high density had the largest range of variation 5,0 – 22,8 %. In the same environment and group the highest mean and the highest maximum values of digestibility were evaluated (variety *Marta* 69,20%).

113. Kirilov A., E. Vasilev, **Y. Naydenova**, 2009. Nutritive characteristics of grasses and legumes, *Proc."Chalanges of the Balkan animal industry and the role of science and cooperation", IV Int. Sci. Conf. BALNIMALCON 2009, Trakia University, Stara Zagora, Bulgaria, 14-16 May 2009, 291-293.* Кирилов. А., Е. Василев, **Й. Найденова**, 2009. Хранителни характеристики на многогодишни житни и бобови треви.

Establishment of pastures for animals is related to the choice of suitable grass and legume species to the soil and climatic conditions of a given region and processing high nutritive value. The objective of this study was to compare composition and palatability or preference of weathers for cocksfoot (*Dactilis glomerata* L.) and the legumes: sainfoin (*Onobrychis* Adans.), white clover (*Trifolium repens* L.) and birdsfoot trefoil (*Lotus corniculatus* L.), cultivated in pure stand or in mixtures between them. Trial plots of 12 m^2 each with four replications were used consisting of pure stands of cocksfoot, sainfoin, white clover, birdsfoot trefoil and mixtures of the three legumes and of cocksfoot + the three legumes. Chemical composition of each variant and cut was determined in each of the four/three experimental years. Palatability was determined by visual observation of 16 weathers and recording of grazing time during 1 hour for each pure species and their mixtures. Crude protein content was the lowest and that of crude fiber was the highest in cocksfoot, as compared to sainfoin, birdsfoot trefoil and white clover. The crude protein content decreased and the crude fiber content increased in second and third cut of the studied species, as compared to first and fourth cut. The palatability measured by relative

grazing time was higher for legumes in pure stands and in their mixture, as compared to cocksfoot and its mixture with the three legumes.

114. **Naydenova Y.**, D. Pavlov, 2009. Near infrared spectroscopy analysis and prediction of amino acids in Orchardgrass (*Dactylis glomerata* L.), *Proc."Chalanges of the Balkan animal industry and the role of science and cooperation", IV Int. Sci. Conf. BALNIMALCON 2009, Trakia University, Stara Zagora, Bulgaria, 14-16 May 2009; 296-301.* **Найденова Й.**, 2009. Анализ в близката инфрачервена област на спектъра и предвиждане на аминокиселинния състав на ежова главица (*Dactylis glomerata* L.).

Near Infrared Reflectance Spectroscopy as a physico-chemical technology for analysis of biological products, with scanning NIRSystems 6500 monochromator was applied to develop and evaluate accuracy of predictive models for forage quality evaluation of orchardgrass (*Dactylis glomerata* L.) vegetation at six levels of nitrogen and sulphur fertilization. The calibration models and internal validations for each parameter of protein and amino acids components were performed by Modified Partial Least Squares (MPLS) regression method at different mathematical treatments of spectra by Standard Normal Variate and Detrend (NSVD), second derivative of spectra and PLS regression factors – 4-6 terms. For amino acids component content high predictive accuracy was established: coefficients of determination (R^2) ranged from 0,90 to 0,95 and standard errors of validation SECV (%DM) ranged from 1,47 to 1,04 for amino acids: Glycine, Alanine, Asparagine, Lysin, Hystidine; R^2 0,81-0,89 and SECV 0,63-1,34 for amino acids Treonine, Serine, Glutamine, Proline, Valine, Metionine, Isoleucine, Phenalanin, Lysine; R^2 0,70-0,80 and SECV 0,31-0,81 for amino acids Arginine, Tirosine. The Linear Regression Models for prediction of amino acids component content by protein were developed.

115. **Naydenova Y.,** I. Pachev, D. Pavlov. 2010. Fiber composition, digestibility and energy feeding value estimation of Ukrainian varieties of forage pea (*Pisum sativum* L.), *Сб. Доклади от Юбилейна научна конференция "България и българите в Европа", СУБ-В. Търново, ВТУ "Св.Св. Кирил и Методий", 17 октомври 2009; Отг.Ред.: Доц.д-р Петко Ст. Петков, Изд."Фабер", Велико Търново 2010;* ISBN 978-954-400-301-2, *532-538 (in En).* **Найденова Й.,** I. Pachev, D. Pavlov, 2010. Влакнинен състав, смилаемост и оценка на енергийната хранителна стойност на Украински сортове фуражен грах (*Pisum sativum* L.).

The objective of this study was to establish plant cell walls fiber components content and to estimate energy feeding value of spring forage pea (*Pisum sativum* L.) Ukrainian varieties introduced in Bulgaria compared to standard Bulgarian variety Pleven 4. The Ukrainian varieties of spring forage pea (*Pisum sativum* L.), grown in competitive variety field trial of IFC, Pleven (2005-2007) in comparison to standard variety Pleven 4 show higher fiber component content mean for NDF by 5 % units, for ADF by 3-5 % units and lower in lignin content and therefore were more digestible by ruminants. The variability in plant cell wall fiber components content and lignification degree of pea plants ranged 7-10 % CV, that's why they may be applied as a selection criterion in spring forage pea breeding. The digestibility of dry matter of forage pea varieties were high, mean 72 % and 78% of the varieties exceeded the value and reached maximal digestibility of 76% Var. Harkovskii 302 differed in low plant cell walls fiber components content, low lignification and highest digestibility 75,90%. The var. Harkovskii 302, Harkivjanin and Usatii 90 were evaluated as highest net energy feeding value, estimated by French, Bulgarian and Dutch systems. The polynomial function predicted forage quality parameters by the days of vegetation with high signification NDF, hemicellulose and lignification degree. The lignification was predicted better by NDF, ADL and hemicellulose (R > 0,800) and by ADF and cellulose.

116. Petkova M., S. Grigorova, **Y. Naydenova**, L. Danova, J. Levic, S. Sredanovic, O. Djuragic, 2011. Composition and nutritive value of total mixed rations with DDG for rabbits, *Proc. Sci. Symp. with Int. participation "Achievements and perspectives in Animal Husbandry, biotechnology and veterinary medicine", Academy of Sciences of Moldova, 6-8 Oct 2011, Maximovca, MOLDOVA, 214-220.* Петкова М., С. Григорова, **Й. Найденова,** Л. Данова, J. Levic, S. Sredanovic, O. Djuragic, 2011. Състав и хранителна стойност на целодажбени смески за растящи зайци с участието на *DDG.*

The shortage and continuous price enhancement of traditional nutritive substances in the animals diets calls for search of their alternative. In Bulgaria investigations in this area are insufficiently. There aren't investigations for rabbits. In this respect is interesting to study the dry distillers grain from wheat (DDGw), produced by Geo Milev Ltd, Iskar Station, Sofia as a source of crude protein (CP) and crude fiber (CF) in combination with meadow hay or wheat straw as main sources in CF in the growing rabbits diets. Three total mixed rations (TMR) were prepeared. All rations contained 70% compound feed and 30 % different sources of crude fibers. All compound feed was one and the same in all three TMRs and was composed by: 20% oats, 15% barley, 16,40% wheat bran, 10% soybean meal, 5% sunflower meal. The main sources of CF for the TMRs were: 30% Alfalfa dehydrated (meal) (control group); 20% meadow hay + 10% DDGw (Experimental group I, EG I) and 15% wheat straw + 15% DDGw (Experimental group II, EG II). The objective of our study was to establish

the composition and determine the nutritive value of all three TMRs with DDG. The chemical composition was determined by the conventional Weende analysis. The chemical composition of carbohydrates was determined by Van Soest detergent analysis. The assessment was completed by the enzymatic *in vitro* dry matter digestibility estimated by method of Aufrere. The mineral composition was performed by spectrophotometers. The compound feeds with roughages and DDG as total mixed rations were granulated with a pellets mill, die 4, pellets length 2 cm. The measurement of particle size of the compound feeds was made. The ingredients mill was average to fine, which warrant good mixtures homogeneity and make easier processes of granulate and hydro thermal. Pellet durability index (PDI) was determined by test. The nutritional assessment of all TMRs included calculation of energetic and protein values by total or particular chemical composition. It is concluded that our choice of DDG in combine with meadow hay or straw had been suitable as alternative sources of crude fibers for growing rabbits and their processing had been also suitable. On the base of these results we could go on to evaluate their effect on digestion, utilization of nutrients, biochemical parameters, also meat quality and quantity.

117. **Naydenova Y.**, I. Pachev, M. Petkova, 2012. Feeding value estimation of new introduced forage pea (*Pisun sativum* L.) varieties, *Proc. 6-ths Central European Congress on Food, Novi Sad, R. SERBIA, 23-26 May 2012,* ISBN 978-86-7994-029-1(2), *1654-1659.* **Найденова Й.**, И. Пачев, М. Петкова, 2012. Оценка на хранителната стойност на нови интродуцирани сортове пролетен фуражен грах (*Pisun sativum* L.).

The general composition, plant cell walls fiber components content, *in vitro* digestibility and general feeding characteristics in forage quality evaluation of green mass of forage pea (*Pisum sativum* L.) spring forms in field trial – competitive variety testing, carried out at the Institute of Forage Crops – Pleven, Bulgaria (2009-2011) were studied. Four new introduced Ukrainian high productive varieties *Kamerton, Glyans, Modus, Svit* and Bulgarian standard variety *Pleven 4* were harvested at the three vegetative stages – budding, flowering and full pod formation. Forage quality of the whole pea plants was evaluated by the parameters of general composition, plant cell walls fiber components content, digestibility, protein and energy feeding value. The standard variety *Pleven 4* characterized by highest forage quality – highest protein content 18,0%, highest digestibility 74,9% and lowest plant cell walls fiber components content: NDF 36,4%, ADF 29,02%, ADL 4,57%. The new introduced Ukrainian varieties, *Glyans and Kamerton* show higher forage quality: higher protein content 13,3% , lower fiber content: crude fiber 23%, NDF 42-41%; ADF 30-31,5%; ADL 5,2-5,4%, respectively and digestibility 71% in comparison with varieties *Svit* and *Modus.* Energy feeding value of standard variety *Pleven 4* is highest but in the group of Ukrainian varieties the highest energy value characterized *Modus* and *Kamerton.* The standard *Pleven 4* distinguish highest protein feeding value: mean values for three stages – TDP 135 g kg^{-1}, PDIN 113,2 g kg^{-1}, PDIE 101,2 g kg^{-1}, and for Ukrainian varieties – variety *Kamerton*: TDP 89,4 g kg^{-1}, PDIN 83,4 g kg^{-1}, PDIE 89,6 g kg^{-1}, followed by variety *Glyans* and variety *Svit.*

118. Kosev V., **Y. Naydenova,** 2014. Heritability of qualititative traits in forage pea (*Pisum sativum* L.), *Int. Jubil. Sci. Conf."70 years TTPInstitute", Plovdiv, 13-14 November 2014.* ISBN: 978-954-702-103-7. Косев В., **Й. Найденова,** 2014. Унаследяемост на качествени характеристики при фуражен грах (*Pisum sativum* L.).

In breeding process of forage pea (*Pisum sativum* L.) inter variety crosses between two Bulgarian: *Pleven 4* (spring form) and *Pleven 10* (winter form) and two Russian: *Rosacrono* (spring form) and *Shtambovyi* (winter form) varieties are effectuated in field crop experiment during 2011-2013 on the Second experimental field of the IFC, Pleven, Bulgaria. Populations of P_1, P_2, F_2 and F_1 of the crosses *Shtambovyi x Pleven 10* and *Rosacrono x Pleven 4* are investigated. The aim of this study is to establish the inheritance type of some forage quality parameters as protein, fiber components and digestibility between inter variety hybrids of forage pea. For the hybrids of F1 are estimated changes of heterosis effect. The cross: *Shtambovyi x Pleven 10* is characterized with the highest positive real heterosis effect for CP content and the cross: *Rosacrono x Pleven 4* have the highest rate for CF, ADF and ADL. The parameters CP and CF for the both crosses are inherited positively overdominantly. Digestibility *in vitro* dry matter (IVDMD) is inherited negatively overdominantly as the qualities of varieties *Pleven 10* and *Rosacrono* are predominated. In the second generation F2 for almost all parameters for *Shtambovyi x Pleven 10* a negative depression is estimated. According to the estimated values for the parameter CP content the plants of the two hybrids are depressed most strongly. Because of parameters CF, NDF, ADF and IVDMD for the cross *Shtambovyi x Pleven 10* a greather percentage of transgressive plants could be anticipated as it counts for CP for the cross *Rosacrono x Pleven 4.* As a result of predominating negative epistatic interaction of cross *Shtambovyi x Pleven 10* for CP, NDF and ADL a regression of the degree phenotype exhibition of these signs in comparison with the full additive inheritance is anticipated. It is established that there is a high inheritance coefficient in both crosses for the parameters CP, CF, NDF and IVDMD.

119. Nikolova I., N. Georgieva, **Y. Naydenova**, 2014. Chemical composition and digestibility of spring forage pea treated by biological and synthetic active compounds, *Int. Jubil. Sci. Conf."70 years TTPInstitute", Plovdiv, 13-14 November 2014.* ISBN: 978-954-702-103-7. Николова И., Н. Георгиева, **Й. Найденова,** 2014. Химичен състав и смилаемост на пролетен фуражен грах, третиран с биологични и синтетични препарати.

The influence of single and combined biological active compounds of three insecticides NeemAzal, Pyrethrum (biological insecticides) and Nurelle D (synthetic pyretroid), two growth regulators – Polyversum (biological regulator) and Flordimex (synthetic regulator) and organic foliar fertilizer Biofa on the chemical composition and enzyme *in vitro* digestibility of dry matter of spring forage pea (*Pisum sativum* L.) are established (2011-2013) at the IFC, Pleven, Bulgaria. The results demonstrate that single and combined application of studied biological and synthetic active compounds have a positive impact on composition and digestibility of spring forage pea. A single treatment in budding stage increase CP, CF and hemicellulose content and decrease plant cell walls fiber components content - NDF, ADF, ADL and hemicallulose. Significant increase of CP is established at Polyversum and Flordimex (by 10.1 and 11.9%), while increase of CF is slightly expressed. Optimal combination of expressed decrease in plant cell walls fiber components content with significant increase of digestibility is established after applying of Biofa and combination Pyrethrum+Biofa. Digestibility reaches 71.0 and 70.4%, respectively with increase from 12.5 and 11.5%.Double application of biological active compounds in budding and flowering stages have significant influence on the composition and digestibility, but the influence is expressed in lower degree.

120. **Naydenova Y.,** N. Georgieva, I. Nikolova, 2014. Feeding value estimation of introduced forage pea (*Pisum sativum* L.) varieties and lupine (*Lupinus albus* L., *Lupinus luteus* L.) in organic cultivation, *Natl.Sci. Conf.with Int. Particip." Biological Plant Sci, Biological Anim. Sci and nuriture, Agricultural Academy of Bulgaria, Institute of Stockbreeding and agriculture, Troyan, 27-28 November 20014.* E-copy CD: **Найденова Й.,** Н. Георгиева, И. Николова, 2014. Хранителна стойност на интродуцирани сортове фуражен грах (*Pisum sativum* L.) и лупина (*Lupinus albus* L., *Lupinus luteus* L.) отглеждани при органично земеделие.

The composition, plant cell walls fiber components content, *in vitro* enzyme degradability of dry and organic matter and feeding characteristics in forage quality evaluation of pea forage dry mass (*Pisum sativum* L.) and lupine (*Lupinus albus* L., *Lupinus luteus* L.) in organic cultivation are studied. The field experiment is carried out at the Institute of Forage Crops, Pleven, Bulgaria (2012-2014). Four introduced Ukrainian high productive varieties *Glyans, Svit, Kamerton, Modus* and Bulgarian standard variety *Pleven 4* as well as lupines were harvested at vegetative stage of full flowering. Forage pea varieties, grown in the conditions of biological agriculture, are characterized by high protein content (mean value 16.10%), near but not exceeding those of standard variety *Pleven 4* (16.80%). The variety *Kamerton* is distinguished highest forage quality – high protein and low fiber components content: CP16.56%, CF 24.07%; NDF 40.36%, ADF 30.31%, ADL 5.40% and protein values are near to those of standard. The highest *in vitro* degradability of dry and organic matter belongs to variety *Svit,* exceeding mean value for species and standard. *Lupinus albus* L. and *Lupinus luteus* L. are distinguished lower protein content (12.05-12.93%) and plant cell walls fiber components content which cause their high degradability (72.76-78.42%). Protein feeding value estimated of introduced pea varieties *Glyans, Svit, Kamerton* vary in close limits (PBD 106.0-121.6; PDIN 93.5-104.0; PDIE 89.5-95.3 g kg^{-1} dry matter) and exceeded mean value for the species *Pisum sativum* but not those of Bulgarian standard variety *Pleven 4.* Two species *Lupinus spp.* show lower protein feeding value in comparison to pea varieties, but the differences between them are significant in gain of *Lupinus luteus.* Protein feeding value estimated of introduced pea varieties *Glyans, Svit, Kamerton* vary in short limits and exceeded mean value for the species *Pisum sativum* but not those of Bulgarian standard variety *Pleven 4.* The energy feeding value estimated by French, Bulgarian and Dutch systems determine as highest energy forage *Lupinus luteus* (UFL-UFV 0,795-0703; FUM-FUG 0,659-0,575; VEM-VEVI 906-961), exceeding energy feeding value of *Lupinus albus* and forage pea varieties.

121. Katova A., **Y. Naydenova,** 2014. Forage quality evaluation of tetraploid perennial ryegrass (*Lolium perenne* L.) in competitive variety trial, *Natl.Sci.Conf.with Int. Particip." Biological Plant Sci, Biological Anim. Sci and nuriture, Agricultural Academy of Bulgaria, Institute of Stockbreeding and agriculture, Troyan, 27-28 November 20014.* E-copy CD: Кътова А., **Й. Найденова,** 2014. Оценка качеството на фураж от тетраплоиден пасищен райграс (*Lolium perenne* L.) в конкурсен сортов опит.

Forage quality of tetraploid perennial ryegrass accessions: two Bulgarian breeding populations *NBG, SBG* and two Belgium varieties *Roy, Pandora* as a reference are estimated in competitive variety trial conditions during the period 2007-2009 in the Institute of Forage Crops, Pleven, Bulgaria. For seven growths for the Bulgarian and five for the Belgian in total, principal composition (Weende analysis), plant cell walls fiber components content (Van Soest), enzyme digestibility *in vitro* of dry and organic matter (method Aufrere), potential energy and protein feeding value by different systems. Biomass from the first growth is differentiate – aboveground part of plants, leaves and stems. The highest values of crude protein content and lowest for crude fiber are presented in third authumn growth, followed by first spring and second summer. *NBG* and *SBG*

are distinguished for CP highest values average for the period – at third growth 20.84 % and 21.68% respectively. The variation for CP is high mean for the second and third year of growing: CV 22.5 and 27.6% respectively. The lowest values in the three years for ADL and lignification are the lowest in the first growth for *NBG*. Forage digestibility is high at first and third growths – up to 85.19% as maximum value belongs to *Roy* and for *NBG* 84.30%. The highest variability is mentioned for ADL – CV 48.98% followed by those for protein. The most digestible parts of plants are leaves 78.65% average for all accessions and stems digestibility is 76.96 %. *NBG and SBG* is characterized by higher digestibility in comparison with other populations and the lowest degree of lignification of leaves as well as stems. Digestible dry matter and RFV are significantly higher in third growth. Energy feeding value is the highest in the first and the third growths for *NBG*: UFL 0.823 and 0.828, respectively *SBG*: UFL 0.812 and 0.814, respectively. Total digestible protein TDP/PBD, PDIN and PDIE followed the same tendency and the highest values obtained for *NBG* in third growth towards mean values 145/92; 131/94 (*SBG* 136/94); 109/96 (*SBG* 112/96) g kg^{-1}, respectively. Bulgarian breeding population *NBG* and *SBG* according complex evaluation have the highest forage quality.

25 март 2015 г. Плевен

Подпис:.....

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