

# РЕЗЮМЕТА НА НАУЧНИТЕ ПУБЛИКАЦИИ

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- 3.1. Серафимов, Пл., Г. Тончев, 2000. Възможности за химична борба с плевелите при соята. *Растениевъдни науки*, 37(8):650 – 653.

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ХЕРБОЛОГИЯ

## ВЪЗМОЖНОСТИ ЗА ХИМИЧНА БОРБА С ПЛЕВЕЛИТЕ ПРИ СОЯТА

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### ВОЗМОЖНОСТИ ХИМИЧЕСКОЙ БОРЬБЫ С СОРНЯКАМИ СОИ

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(Резюме)

В 1996-1998 гг. на опытном поле Института сои в Павликени на подтипе почвы средневещелочном черноземе изучали возможности химической и механической борьбы с сорняками в посевах сои.

Установлено, что прибавку урожая в 15% обеспечивает применение двух почвенных и двух вегетационных гербицидов к двукратной механизированной междурядной обработки.

Перспективным вариантом для практики оказывается применение почвенных и вегетационных гербицидов без механизированных обработок почвы. В этом варианте урожай зерна снижается на 1-2%, но проявляется эффект контролирования плотности сорняков в посевах.

- 3.2. Пеев Б., К. Кузмова, Пл. Серафимов, 2000. Неблагоприятни изменения в климата на Северна България. *Растениевъдни науки*, 37(8):558 – 561.

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## НЕБЛАГОПРИЯТНИ ИЗМЕНЕНИЯ В КЛИМАТА НА СЕВЕРНА БЪЛГАРИЯ

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### НЕБЛАГОПРИЯТНЫЕ ИЗМЕНЕНИЯ В КЛИМАТЕ СЕВЕРНОЙ БОЛГАРИИ

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(Резюме)

Установлены устойчивые тенденции к потеплению и повышению сухости климата Северной Болгарии. По сравнению с Южной Болгарией изменения температуры здесь более резкие, а влажность изменяется слабее.

Разработаны данные многолетних климатических наблюдений 40 метеорологических станций за период 1980-2000 гг. Различия в элементах климата устанавливали путем сравнения с постоянными климатическими нормами за период до 1970 г.

Установлено, что последние десятилетия текущего века рекордно сухими являются 1992, 1993 и 1994 годы, а 2000 год по прогнозам окажется самым жарким.

- 3.3 Маринов-Серафимов Пл., В. Събев, И. Голубинова, Г. Тончев, 2001. Определяне икономическите прагове на вредност на едногодишни плевели при соя сорт S-1346. Юбилейна научна сесия “80 години висше агрономическо образование в България”. Научни трудове на АУ-Пловдив, т. XLVI, кн. 2, с. 367 – 372.



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Agricultural University-Plovdiv, Bulgaria, Scientific Works, vol. XLVI, book 2, 2001.  
Jubilee Scientific Session “80<sup>th</sup> Anniversary of the Higher Agricultural Education in Bulgaria”

### **Определяне икономическите прагове на вредност на едногодишни плевели при соя сорт S-1346**

**Пламен Маринов-Серафимов, Васил Събев,  
Ирена Голубинова, Георги Тончев  
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### **Determination of the degrees of damage of one-years-old weed at a sort soya S- 1346**

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#### **Summary**

An important link in the struggle with the weeds at the soya is the establishment to the economic degree of damage at the one-years-old weeds. For the conditions of the experiment it was found that the application to the so-called shield of the weed killers of the two soil.

Anti-broad-leaved weed-killers and two vegetation anti-weed weed-killers reduce the economic degree with a negative value. It has not a justifiable economic effect.

The covering with weeds of the soybean crop in the concrete experiment has to keep the degree of the economic degree of damage from 19.4 to 63.3 pieces/m<sup>2</sup>. At the present-day stage the economic degree of damage has a tentative character by reason of the consumption realizable prices of the raw materials produced by agriculture.

- 3.4 Маринов-Серафимов Пл., В. Събев, И. Голубинова, Г. Тончев, 2002. Проучване на смесена плевелна ценоза при интегрирана борба с плевелите при соята. Сборник от доклади на Юбилейна научна сесия “110 години Въздухоплаване в България”. ВВУ “Г. Бенковски” 25-26 април, с. 471 – 478.

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### **ПРОУЧВАНЕ НА СМЕСЕНА ПЛЕВЕЛНА ЦЕНОЗА ПРИ ИНТЕГРИРАНА БОРБА С ПЛЕВЕЛИТЕ ПРИ СОЯТА**

**Пл. А. Маринов - Серафимов, В. М. Събев, И. А. Голубинова, Г. Тончев**

### **STUDY OF A MIXED WEED CENOSIS UNDER INTEGRATED WEED CONTROL IN SOYBEAN**

**P. A. Marinov-Serafimov, V. M. Sabev, I. A. Golubanova**

#### **(summary)**

During the period 1996 — 1998 a field trial was carried out in the experimental field of the soybean Institute, Pavlikeni on soybean variety S — 1346. A mixed weed cenosis in a soybean stand after integrated control conducted in the trial plats was studied.

Despite the efficiency proven of the weed control conducted and the increase of soybean grain yield by 143% to 149% compensation processes in weed density were registred.

Statistical and mathematico-statistical method of analysis were used to establish interrelations between soybean grain yield kg/da and fresh mass g/m<sup>2</sup> (R=0.96), (R=0.97) weed fresh mass g/m<sup>2</sup> (R=0.94) that were in a strong correlation.

- 3.5. Kuzmova, K., Pl. Seraphimov, 2003. The effect of agrometeorological conditions on natural weed cover formation in a soybean field. Timisoara's Academic days VIII<sup>th</sup> edition, Timisoara, 22 – 23 may 2003, *Scientific papers Faculty of Agriculture*, XXXV, p. 67–72.

### THE EFFECT OF AGROMETEOROLOGICAL CONDITIONS ON NATURAL WEED COVER FORMATION IN A SOYBEAN FIELD

### EFFECTUL CONDIȚIILOR AGRO-METEOROLOGICE ASUPRA FORMĂRII COVORULUI NATURAL DE BURUIENI ÎNTR-O CULTURĂ DE FASOLE

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**Abstract.** *In the period 1999-2001, an experiment was conducted in the Experimental field of the Institute of Forage Crops, branch Pavlikeni, with the soybean cultivar Pavlikeni 121. The natural weed population dynamics during the vegetation period of the main crop was monitored. At the same time, the changes in the main agrometeorological parameters were registered. There were established some correlation and regression relationships, determining rainfalls as a limiting factor in the formation of weed cenosis. The degree of the weed infestation in the soybean field grown on a medium leached chernozem was determined as moderate.*

**Key words:** soybean, weed population dynamics, degree of weed infestation, species composition of population, meteorological factors, and agro-meteorological conditions

- 3.6. Seraphimov, Pl., V. Sabev, D. Ivanova, I. Golubinova, 2004. Influence of meteorological factors on the dynamics of biomass accumulation by *Solanum nigrum* L. at different degrees of weed infestation of soybean stands of analysis. *Journal of Environmental Protection and Ecology*, 5(1):84 – 89.

*Journal of Environmental Protection and Ecology* 5, No 1, 84–89 (2004)

*Ecology*

### INFLUENCE OF METEOROLOGICAL FACTORS ON THE DYNAMICS OF BIOMASS ACCUMULATION BY *Solana nigrum* L. AT DIFFERENT DEGREES OF WEED INFESTATION OF SOYBEAN STANDS OF ANALYSIS

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**Abstract.** During the period 2000-2002 a randomised field trial was carried out at the Institute of Forage Crops, Pleven, branch Pavlikeni. The study was conducted on moderately leached chernozem with pH 6-6.5 on soybean variety Pavlikeni 121. The weeds were distributed in the randomised field trial in a configuration of the square metre of 0.7/1.43 m. The duration and degree of weed infestation of soybean were observed by phenological stages. Some of the main meteorological data were recorded for each of the phenological stages of soybean. The data obtained were processed using mathematical and statistical methods.

**Keywords:** meteorological faktors, biomass accumulation, *Solanum nigrum* L., soybean.

- 3.7. Sabev, V., Pl. Serafimov, 2004. Efficiency of soybean production depending on the system of weed vegetation control. *Journal of Environmental Protection and Ecology*, 5(1):90 – 94.

*Journal of Environmental Protection and Ecology* 5, No 1, 90–94 (2004)

*Ecology*

## EFFICIENCY OF SOYBEAN PRODUCTION DEPENDING ON THE SYSTEM OF WEED VEGETATION CONTROL

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**Abstract.** At the Institute of Forage Crops, Pleven – branch Pavlikeni during the period 2000-2002 the efficiency of systems of weed control in soybean was determined by economic analysis. The mass of net yield was highest for the chemical and integrated system –23.74 and 23.47 levs/da and lowest for the ecological system of weed control – 17.70 levs/da. The economic estimation has shown that the integrated and chemical systems were characterised by the lowest prime cost and highest rate of profitability, i.e. 296 and 302 levs/ton and 38.6 and 36.0%, respectively. The ecological system showed higher prime cost (316 levs/ton) and lower rate of profitability (29.7%) which was explained by the higher weed infestation of the soybean during yield formation.

**Keywords:** weed control, soybean production, economic estimation.

- 3.8. Серафимов, Пл., Цв. Димитрова, В. Събев, 2006. Динамика на натрупване на свежа биомаса от соя (*Glycine max* (L.) Merrill) и черно куче грозде (*Solanum nigrum* L.) в зависимост от степента и продължителността на заплевеляване на посева. *Растениевъдни науки*, 43(2):153 – 158.

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## ДИНАМИКА НА НАТРУПВАНЕ НА СВЕЖА БИОМАСА ОТ СОЯ (*Glycine max* (L.) Merrill.) И ЧЕРНО КУЧЕ ГРОЗДЕ (*Solanum nigrum* L.) В ЗАВИСИМОСТ ОТ СТЕПЕНТА И ПРОДЪЛЖИТЕЛНОСТТА НА ЗАПЛЕВЕЛЯВАНЕ НА ПОСЕВА

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**Резюме:** През периода 2000–2002 г. в Института по фуражни култури, Плевен, филиал Павликени е изведен двуфакторен полски опит с рандомизирана плътност на заплевеляване на соя сорт Павликени 121 с черно куче грозде (*Solanum nigrum* L.).

Въз основа на получените данни беше установено, че динамиката на натрупването на свежа биомаса в проучваната агрофитоценоза при конкретните почвено-климатични условия може да се опише сравнително точно посредством уравнението:  $y = x(t + 1)^a$ , S/D варира от –0,02 до +9,5 g/m<sup>2</sup>. Процентът на намаление на свежата биомаса при соята е най-висок във фенофаза цъфтеж и варира от –27 до –49%, което се обяснява с високия балансов индекс на конкуренция, както и със скоростта на натрупване на плевелна биомаса от 0,8 до 1,1. Агресивността на черното куче грозде в соевия посев се определя от способността му да формира повече биомаса на единица площ за единица време.

От експерименталните и теоретичните данни е видно, че критичния период на заплевеляване на соята настъпва най-късно до фенофаза цъфтеж на културата, съвпадаща с фенофаза цъфтеж на плевела при конкретните условия на проучване.

**Ключови думи:** соя, черно куче грозде, конкурентни взаимоотношения, критичен период на заплевеляване.

- 3.9. Стоименова, Ив., С. Стратиева, С. Алексиева, А. Микова, Г. Баева, Р. Накова, Цв. Димитрова, Т. Кертиков, В. Събев, Пл. Серафимов, 2006. Проучвания върху степента на заплевеляване с балур (*Sorghum halepensis* (L.) Pers) в обработваемите земи. Доклади Национална конференция „Повишаването конкурентноспособността на българското земеделие – приоритет на научните изследвания”, София 12 септември 2006 г., с. 104 – 109.

## ПРОУЧВАНИЯ ВЪРХУ СТЕПЕНТА НА ЗАПЛЕВЕЛЯВАНЕ С БАЛУР (*Sorghum halepensis* (L.) Pers.) В ОБРАБОТВАЕМИ ЗЕМИ

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ИП "Н. Пушкарров"; ст. н. с. д-р Ганка Баева, ст. н. с. д-р Ралица Накова,  
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н.с. I ст. д-р Васил Събев, н.с. I ст. д-р Пламен Серафимов, ИФК, Плевен

• От обследваните общо 12 013 da, 70% са силно заплевелени с балур; в останалите 30% от картираните площи е установена по-слаба степента на заплевеляване, дължаща се на изведена механична и химична борба с балура при окопните култури; при житните култури слабото заплевеляване е резултат на късия период между жътвата и отчитането степента на заплевеляване в стърнищата - от една страна, а от друга - на силното лятно засушаване;

• Царевицата и слънчогледът се отглеждат в двуполка със зимни житни култури, което дава възможност на селскостопанските производители да водят борбата срещу балура след прибиране на предшествениците чрез извършване на лятна дълбока обработка; при поникване на нови издънки, последните трябва да бъдат унищожени навреме с извършване на допълнителни почвени обработки или чрез използване на подходящи хербициди, но не по-късно от 2 до 3 седмици след поникването им. Тези допълнителни обработки в повечето случаи не се извършват, поради което заплевеляването с балур е твърде високо (биологичният праг на вредност за царевица е 1 брой/ $m^2$ , а икономическият праг на вредност за същата култура е 2 броя/ $m^2$ ); заменянето на лятната дълбока обработка на почвата (по обективни и субективни причини) с пролетна, води до нарушаване на основните принципи за механична борба с балура - изсушаване коренищата на плевела;

• Интегрираната борба с балура при окопните култури и химичната борба при житните със слята повърхност дава добри резултати, подпомагайки конкурентноспособността на културните растения в началните етапи от развитието им, когато те са най-уязвими; заплевеляването с балур по пътищата и каналите крие голям риск от нова, още по-силна инвазия на плевела; особено внимание трябва да се обърне на ивиците и петната в самите обработваеми площи, постоянен източник на заплевеляване чрез коренища и семена;

• Продължителното наводняване на площите (от август 2005 г. до май 2006 г.) води до заплевеляване на обработваемите земи с балур от семе;

• При сегашното икономическо положение, нито една област в страната ни не е в състояние да реши успешно борбата с коренищните плевели, поради необходимостта от големи инвестиции, чиито възвръщане става през следващите 2 - 3 г.; радикалното решаване на проблема с балура е възможно само, ако се обърне нужното внимание на земята като основно и възпроизводимо средство на енергия и суровини от страна на държавата и тя продължи финансово да осигурява изследователската и внедрителската дейност; по този начин ще се постигне устойчиво развитие на селското стопанство, което да задоволява нуждите на сегашните и бъдещите поколения.

- 3.10. Маринов-Серафимов, Пл., Цв. Димитрова, 2007. Динамика и разпределение на основните заплевелители в плевелните асоциации при някой зърнено-бобови култури. *Растениевъдни науки*, 44(2):167 – 172.

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### ДИНАМИКА И РАЗПРЕДЕЛЕНИЕ НА ОСНОВНИТЕ ЗАПЛЕВЕЛИТЕЛИ В ПЛЕВЕЛНИТЕ АСОЦИИ ПРИ НЯКОИ ЗЪРНЕНО-БОБОВИ КУЛТУРИ

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**Резюме:** Изследването е проведено през периода 2003–2005 г. в Института по фуражни култури, Плевен. Проучено е видовото разнообразие, равномерността на разпределение и количественото съотношение на основните заплевелители в посеви от соя (*Glycine max* (L.) Merrill), пролетен фуражен грах (*Pisum sativum* L.) и фий (*Vicia sativa* L.). Установени са 11 вида основни заплевелители от които 10 се отнасят към групата на късните пролетни плевели (*Amaranthus blitoides* S. Wats., *Amaranthus retroflexus* L., *Abutilon theophrasti* Medic., *Chenopodium album* L., *Datura stramonium* L., *Echinochloa crus-galli* L., *Hibiscus trionum* L., *Setaria* spp., *Sinapis arvensis* L., *Solanum nigrum* L.) и един към групата на коренищните плевели (*Sorghum halepense* (L.) Pers.) при проучваните зърнено-бобови култури. Вътрепопуляционното разпределение на плевелите видове в плевелните асоциации в посевите от соя, грах и фий варира от равномерно  $S^2/\bar{x} = 1$  до групово  $S^2/\bar{x} > 1$ . Установени са количествени зависимости между изследваните показатели, които са много добре статистически доказани при  $P < 5\%$ .

**Ключови думи:** соя (*Glycine max* (L.) Merrill), пролетен фуражен грах (*Pisum sativum* L.) и фий (*Vicia sativa* L.), основни заплевелители, индекс на разнообразие, равномерност на разпределение, плевелни асоциации.

- 3.11. Marinov-Serafimov, Pl., Ts. Dimitrova, I. Golubinova, A. Ilieva, 2007. Study of suitability of some solutions in allelopathic researches. *Herbologia*, 8(1):1 – 10.

Herbologia Vol.8, No. 1, 2007.

#### STUDY OF SUITABILITY OF SOME SOLUTIONS IN ALLELOPATHIC RESEARCHES

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#### Abstract

The influence of eight aqueous solutions (distilled water; physiological solution; mannitol; Ringer; distilled water + 1 g/l<sup>-1</sup> sodium benzoate; physiological solution + 1 g/l<sup>-1</sup> sodium benzoate; distilled water + 1 g/l<sup>-1</sup> thymol and physiological solution + 1 g/l<sup>-1</sup> thymol) under in vitro conditions on germination, dynamics of growth and accumulation of fresh biomass in g per germ was studied with the following test plants: soybean (*Glycine max* (L.) Merr.) variety Srebrina; peas (*Pisum sativum* L.) variety Plevna 4 vetch (*Vicia sativa* L.) variety Obrazets 666; alfalfa (*Medicago sativa* L.) variety Plevna 6; Sudan Grass (*Sorghum sudanense* (Piper) Stapf.) variety Targovishte and *Sorghum bicolor* (L.) variety Verdon. It was found that the tested solutions – mannitol, physiological solution and Ringer exerted an inhibitory effect on the germination, growth and accumulation of fresh biomass in g per germ at the initial development stages of the test plants on average of 6 to 37%, 4.8 to 7.9 cm and 0.058 to 0.098 g, respectively, as compared to the control variant. Sodium benzoate at 0.1% concentration exerted a strong inhibitory effect of 70 to 100% on the studied biometric characteristics, whereas the addition of thymol to distilled water at 0.1% concentration exerted no inhibitory influence on the germination and initial development of the test plants. That allows adding the preserving agent when preparing water extracts to find the toxic or allelopathic effect in the weed – cultivated plant system under in vitro conditions.

**Keywords:** aqueous extracts, solutions, preserving agents, inhibition, allelopathy.

- 3.12. Marinov-Serafimov, Pl., Ts. Dimitrova, 2007. Effect of weed extracts on the seed germination in some grain legumes. *Herbologia*, 8(1):11-20.

Herbologia Vol. 8, No.1, 2007.

## EFFECT OF WEED EXTRACTS ON THE SEED GERMINATION IN SOME GRAIN LEGUMES

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### Abstract

Inhibitory effect of extracts from *Amaranthus retroflexus* (L.), *Chenopodium album* (L.), *Erigeron canadensis* (L.) and *Solanum nigrum* (L.) on the germination of seeds of *Glycine max* (L.) Merrill, *Pisum sativum* (L.) and *Vicia sativa* (L.) was studied. All tested weed extracts inhibited the seed germination of tested species by 26.7 to 100%.

Aqueous extracts from *Solanum nigrum* and *Chenopodium album* had the greatest inhibitory effect (87.1%), whereas *Amaranthus retroflexus* and *Erigeron canadensis* inhibited seed germination on average by 74.0%.

*Pisum sativum* was the most susceptible to the effect of the different extracts, LC<sub>50</sub> varying from 6.5 to 25.3 g/l, followed by *V. sativa*, LC<sub>50</sub> - 8.3 to 36.7 g/l and *G. max* had relatively the lowest susceptibility, LC<sub>50</sub> was within the range of 13.1 to 59.7 g/l dry weed biomass.

**Key words:** inhibition, weed extracts, seed germination.

- 3.13. Marinov-Serafimov, Pl., Ts. Dimitrova, I. Golubinova, 2007. Study of water imbibing capacity of some legume crop under in vitro conditions in allelopathic researches. *Herbologia*, 8(2):29-39.

Herbologia Vol. 8, No. 2, 2007.

## STUDY OF WATER IMBIBING CAPACITY OF SOME LEGUME CROP UNDER *IN VITRO* CONDITIONS IN ALLELOPATHIC RESEARCHES

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### Abstract

The dynamics and rate of water imbibition by seeds of *Glycine max* (L.) Merr. variety "Srebrina", *Pisum sativum* (L.) variety "Pleven 4", *Vicia sativa* (L.) variety "Obrazets 666" and *Medicago sativa* (L.) variety "Pleven 6" were studied at 10, 20 and 30°C under laboratory conditions in 2006 at the Institute of Forage Crops of Pleven, Pavlikeni Branch. Effect of seed soaking with constant water doses on germination and initial development of test plants was studied.

It was found that hydration capacity (%Ws) and water imbibition rate (g imbibed H<sub>2</sub>O/g seeds) of the test accession seeds depended on their species belonging and temperature at which the process took place.

When comparing the water imbibition dynamics, the studied species could be arranged in the following ascending order: *V. sativa* Ws<sub>96</sub> - 91.0 < *P. sativum* Ws<sub>96</sub> - 108.3 < *G. max* Ws<sub>96</sub> - 137.3 < *M. sativa* Ws<sub>96</sub> - 147.8. The rate of water imbibition by the seeds was the highest at t<sub>abs</sub> from 1 to 6 h, then it decreased and stopped at the 24<sup>th</sup> h.

In allelopathic studies under *in vitro* conditions, in order to obtain optimum development of the studied accessions, the water quantity should be in the following ratio to the seed weight: *G. max* - 1:6; *P. sativum* - 1:6; *V. sativa* - 1:6 and *M. sativa* - 1:20.

**Keywords:** water imbibition, germination, soaking, seeds, legumes

- 3.14. Dimitrova, Ts., Pl., Serafimov, 2007. Ecological approach against invasion of jonsongrass (*Sorghum halepense* (L.) Pers.) through mixed stands of Lucerne with perennial grasses. *Herbologia*, 8(2):13-19.

ECOLOGICAL APPROACH AGAINST INVASION OF  
JOHNSONGRASS (*SORGHUM HALEPENSE* (L.) PERS.)  
THROUGH MIXED STANDS OF LUCERNE WITH PERENNIAL  
GRASSES

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**Abstract**

During the 2001–2004 period in the experimental field of the Institute of Forage Crops in Pleven, under nonirrigated conditions, on slightly leached chernozem, a study was conducted with the purpose of determining the weed suppressive capacity of lucerne (*Medicago sativa* L.) in mixed stands with some perennial grasses towards *Sorghum halepense* (L.) Pers.

It was found that: The perennial herbaceous mixtures of *Medicago sativa* L. with *Dactylis glomerata* L., *Bromus inermis* L., *Agropyron desertorum* Fisch Schult. reduced density and formation of aboveground biomass of *Sorghum halepense* (L.) Pers. Therefore they were an ecologically friendly alternative of limiting weed invasion; In the fourth year after growing and using the mixed stands, *S. halepense* was on a controllable level, suppressed in the lowest sward layer and did not reach to the seed formation stage; The mixed stands, besides strong weed suppressive capacity, also possessed significantly higher productivity of dry biomass by 6.9 to 24.3 %, as compared to pure lucerne.

**Keywords:** Johnsongrass, perennial herbaceous mixtures, control, productivity

- 3.15. Dimitrova, Ts., Pl., Serafimov, 2007. Weed suppressive of some perennial herbaceous mixtures – a possibility for nonchemical control of Canada thistle (*Cirsium arvense* L.). Permanent and Temporary Grassland Plant, Environment and Economy. Proceedings of the 14<sup>th</sup> Symposium of the European Grassland Federation, Ghent, Belgium 3 – 5 September 2007, Vol. 12, p. 134-137.

**Weed suppressive capacity of some perennial herbaceous mixtures – a possibility for nonchemical control of Canada thistle (*Cirsium arvense* L.)**

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**Abstract**

The objective of the study was to investigate the weed suppressive capacity of some perennial herbaceous species to reduce the degree of infestation with Canada thistle (*Cirsium arvense* L.) as a possibility for nonchemical control. A four-year study (2001 - 2004) was carried out under field nonirrigated conditions on slightly leached chernozem with the following variants: V<sub>1</sub> – lucerne (*Medicago sativa* L.); V<sub>2</sub> – lucerne + cocksfoot (*Dactylis glomerata* L.); V<sub>3</sub> – lucerne + tall fescue (*Festuca arundinacea* Schreb.); V<sub>4</sub> – lucerne + smooth brome grass (*Bromus inermis* L.); V<sub>5</sub> – lucerne + wheatgrass (*Agropyron desertorum* Fisch Schult.).

In this study the perennial herbaceous mixtures (lucerne + cocksfoot; lucerne+smooth brome grass; lucerne + wheatgrass) grown as a wedge in crop rotation had a high weed suppressive capacity and contributed to reduce the infestation with *Cirsium arvense* L. The phytosanitary role of the perennial herbaceous mixtures have a considerable share in the strategies of controlling *Cirsium arvense* L. in an ecological aspect, meeting the requirements of contemporary systems of organic farming.

**Keywords:** Canada thistle (*Cirsium arvense* L.), lucerne (*Medicago sativa* L.), perennial grasses, mixed stands, nonchemical control



- 3.16. Стоименова, И., А. Микова, С. Алексиева, С. Стратиева, Цв. Димитрова, Пл. Серафимов, 2008. Балур и борбата срещу него. *Почвознание, агрохимия и екология*, 42(1):38-43.

ПОЧВОЗНАНИЕ АГРОХИМИЯ И ЕКОЛОГИЯ, ГОД. XLII, № 1  
SOIL SCIENCE AGROCHEMISTRY AND ECOLOGY, VOL. XLII, № 1  
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ИВАНКА СТОИМЕНОВА, АНГЕЛИНА МИКОВА, СТЕФКА АЛЕКСИЕВА,  
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## Балур и борбата срещу него

### *Sorghum halepensis* (L.) Pers. and Weed Control

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#### Abstract

With the purpose of determining the influence of different methods for direct weed control against *Sorghum halepense* a trial was conducted on stubble field (76 da, natural background of weed infestation). Chemical, mechanical, integrated and conventional *Sorghum halepense* control were performed.

The main conclusions on *Sorghum halepense* control after wheat harvesting were:

The density of infestation by *Sorghum halepense* did not decrease in the variants with conventional tillage (one deep ploughing in the end of summer or ploughing in the stubble).

The herbicidal effect of Leopard 5 EK and Tiger platinum in dose of 200 ml/da as well as Pantera 40 EK in dose of 250 ml/da was weak. On the 30<sup>th</sup> day after application these herbicides destroyed only the above ground biomass of the weed and they were not appropriate for stubble field treatment. Sanglifo in dose of 600-800 ml/da in the beginning of *Sorghum halepense* tasseling caused 100% dying of the *Sorghum halepense* above ground biomass on the 25<sup>th</sup> day after treatment and purple colouring and maceration of the roots up to 15 cm.

The most appropriate was applying of integrated *Sorghum halepense* control after harvesting of predecessor – a treatment by the system-total herbicide Sanglifo (600-800 ml/da) during the stage "beginning of tasseling" of the weed. On the 30<sup>th</sup> day after treatment ploughing should be done.

In the year after integrated weed control (ploughing in the stubble and treatment by Leopard 5 EK -200 ml/da) the restoration ability of *Sorghum halepense* roots was very high and the weed stems varied between 22 and 72 number/m<sup>2</sup>. This fact suggested that for a radical weed control 3-4 years with non stop *Sorghum halepense* control were needed.

**Key words:** *Sorghum halepense*, chemical, mechanical, integrated and conventional control

- 3.17. Калоянова, Н., Е. Джонова, И. Стоименова, Пл. Серафимов, 2008. Оценка на промените в количеството и състава на почвената микрофлора в зависимост от приложените хербициди за химична борба срещу балура (*Sorghum halepensis* (L.) Pers.). *Почвознание, агрохимия и екология*, 42(3):41-48.

ПОЧВОЗНАНИЕ АГРОХИМИЯ И ЕКОЛОГИЯ, ГОД. XLII, № 3  
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НАДЯ КАЛОЯНОВА, ЕФРОСИНА ДЖОНОВА, ИВАНКА СТОИМЕНОВА  
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## Оценка на промените в количеството и състава на почвената микрофлора в зависимост от приложените хербициди за химична борба срещу балура *Sorghum halepensis* (L.) Pers

### Evaluation of the Changes in the Quantity and Structure of the Soil Microflora Depending on the Applied Herbicides for Chemical Combating *Sorghum halepensis* (L.) Pers

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#### Abstract

A field experiment for chemical combating *Sorghum halepensis* (L.) Pers has been carried out in an area with a natural background of weed infestation on Luvic phaeozem (FAO) in the experimental field of the Pavlikeni branch of the Institute of Forage Crops, Pleven. The following herbicides were tested: the total life system herbicide Sanglifo (360 g/l glyphosate) in quantities 400, 600 and 800 ml/da as well as the Tiger Platinum 5 EC (50 g/l quizalofop-P-etil) - 200 ml/da, Pantera EC (40 g/l quizalofop-P-tefuryl) - 250 ml/da and Leopard 5 EC (50 g/l quizalofop-P-etil) - 200 ml/da. The treatment period has been chosen depending on the used herbicides in the phenophase of *Sorghum halepensis*. The changes in the quantity and structure of some basic groups of soil microorganisms were studied in dynamics (15<sup>th</sup>, 30<sup>th</sup>, 45<sup>th</sup> day after treatment) in two depths (0-10 and 10-20 cm).

The herbicides have had a strong, but relatively short effect on the soil microflora, whereas these changes have had a temporary character and a negative influence on the diversity of the microbial population. The 45-day period of the microbiological study has shown that the process of biological detoxication of the studied herbicides and the products of their decomposition has not been completed and the state of equilibrium between the quantity and diversity of the microbial population has not been achieved.

The Leopard 5 EC preparation from the group of the studied selective herbicides with systematic effect has the strongest influence on the microbial population in the soil.

Out of the tested doses the total leaf herbicide - Sanglifo applied in a quantity of 600 ml/da has the strongest effect on the dynamics of the microbial population.

**Key words:** soil microflora, bacteria, fungi, actinomycetes, herbicides, *Sorghum halepensis*

- 3.18. Marinov-Serafimov, Pl., Ts. Dimitrova, K. Kusmova, 2008. A study of weed spread and density in a soybean stand on leached chernozem. *Herbologia*, 9(1):1-10.

## A STUDY OF WEED SPREAD AND DENSITY IN A SOYBEAN STAND ON LEACHED CHERNOZEM

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### Abstract

The study was conducted during the 1999-2006 period at the Institute of Forage Crops, Pleven, Pavlikeni branch, Bulgaria. Under the weather conditions during the period of study, the weed infestation of the studied agrophytocenosis was of a mixed type with the following quantitative ratio: annuals – 67% (including: monocotyledonous 7% and dicotyledonous – 60%); perennials – 33% (including: monocotyledonous 32% and dicotyledonous – 1%).

The change in the weed community in the studied agrophytocenosis was due to the increase in percentage participation of *Solanum nigrum* (L.) – from 4 to 54%, *Sorghum halepense* (L.) Pers. – 0 to 71% and *Amaranthus spp.* – 4 to 58%, as well as *Setaria spp.* – 0 to 19%, whereas *Abutilon theophrasti* Medic, *Chenopodium album* (L.), *Datura stramonium* (L.), *Hibiscus trionum* (L.) and *Convolvulus arvensis* (L.) varied from 0 to 3%.

Weed species diversity ( $D$ ), intraspecific distribution - ( $E_{II}$ ) and evenness ( $E_p$ ) of the weeds in the soybean agrophytocenosis were influenced slightly by dynamics of weather conditions. That allows using them for elaboration and application of more efficient systems for weed control defined by the environmental conditions.

**Keywords:** soybean, diversity index, distribution evenness, weeds, weather conditions

- 3.19. Dimitrova, Ts., Pl. Serafimov, 2008. Chemical control of Curled Dock (*Rumex crispus* L.) and other weeds in noncropped areas. *Pesticidi i fitomedicina*, 23(2):123-126.

Pestic. Phytomed. (Belgrade), 23 (2008) 123-126  
Pestic. fitomed. (Beograd), 23 (2008) 123-126

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Preliminary Communication • Prethodno saopštenje

## Chemical Control of Curled Dock (*Rumex crispus* L.) and Other Weeds in Noncropped Areas

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### SUMMARY

*Rumex crispus* L. is an invasive species widespread in our country and in particular in the region of North Bulgaria. It is characterized by high biological and ecological plasticity. Owing to its great reproductive potential, the weed has been assigned to the list of economically most important weeds in the country.

With the purpose of studying the possibility of chemical weed control in noncropped areas with heavy natural background infestation with *R. crispus* L. and other dicotyledonous weeds, two field trials were carried out. A ready-to-use herbicide mixture 2,4-D 140.2 g/l<sup>-1</sup> + Triclopyr 144 g/l<sup>-1</sup>, trade product Genoxon 3X (X0050), was tested at two doses of active ingredient, 3552 and 2842 ml/ha<sup>-1</sup>. It was found that: (1) population density of *Rumex crispus* L. can be successfully reduced by treatment at the stage of early stem formation; herbicide efficacy with 3552 and 2882 ml/ha<sup>-1</sup> doses on the 21<sup>st</sup> day after treatment was 100% and 90.5%, respectively, at the end of vegetation 94.4 and 85.7%, respectively; (2) herbicidal efficacy was lower when *R. crispus* L. was treated at the 5 - 6 leaf stage, being 100 - 94.1% and 80 - 76.5% respectively for the indicated doses and time of recording; (3) at the studied doses the herbicide controlled both annual dicotyledonous weeds (*Amaranthus spp.*, *Chenopodium album* L., *Portulaca oleracea* L.) and perennial dicotyledonous ones (*Cirsium arvense* L., *Sonchus arvensis* L., *Convolvulus arvensis* L., *Carduus acanthoides* L.), but it was not toxic to monocotyledonous weeds.

**Keywords:** *Rumex crispus* L.; Genoxon 3X (X0050); Chemical control; Noncropped areas

- 3.20. Dimitrova, Ts., Pl. Serafimov, 2008. Chemical weed control in stands of red clover (*Trifolium repens* L.) in the year of their establishment. *Herbologia*, 9(2):95-100.

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CHEMICAL WEED CONTROL IN STANDS OF RED CLOVER  
(*Trifolium repens* L.) IN THE YEAR OF THEIR ESTABLISHMENT

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**Abstract**

The possibility for chemical weed control in stands of red clover (*Trifolium repens* L.) in the year of their establishment was studied in the experimental field of the Institute of Forage Crops, Plevna, Bulgaria during the 2006-2007 period. For that purpose a field trial was carried out on slightly leached chernozem with prevailing participation of annual mono- and dicotyledonous weeds.

As a result of the study it was found that: The chemical weed control in the red clover stands in the year of their establishment was successful through application of the herbicides: Imazethapyr 100 a.i.l<sup>-1</sup> – 100 ml a.i. ha<sup>-1</sup>; Imazamox 40 a.i.l<sup>-1</sup> – 48 ml a.i. ha<sup>-1</sup>; Imazamox 40 a.i.l<sup>-1</sup> – 40 ml a.i. ha<sup>-1</sup> + DESH – 1000 ml ha<sup>-1</sup>; Bentazone 600 a.i. l<sup>-1</sup> – 900 ml a.i. ha<sup>-1</sup>; Fluazifop-P-butyl 150 a.i.l<sup>-1</sup> – 225 ml a.i. ha<sup>-1</sup> applied at the two to four true leaf stage of the crop. The treatment with herbicides resulted in establishment of uniform stands with red clover participation of 85 to 94% in the sward and an increase of their dry biomass productivity by 44 to 66%.

**Key words:** red clover, weeds, herbicides, productivity.

- 3.21. Aleksieva, A., Pl. Serafimov, 2008. A study of allelopathic effect of *Amaranthus retroflexus* (L.) and *Solanum nigrum* (L.) in different soybean genotypes. *Herbologia*, 9(2):47-58.

Herbologia Vol. 9, No. 2, 2008.

A STUDY OF ALLELOPATHIC EFFECT OF *Amaranthus retroflexus* (L.) AND *Solanum nigrum* (L.) IN DIFFERENT SOYBEAN GENOTYPES

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**Abstract**

Allelopathic effect of cold aqueous extracts from *Solanum nigrum* (L.) and *Amaranthus retroflexus* (L.) on seed germination and primary seedling growth and development was studied in different soybean genotypes with the purpose of finding accessions with an allelopathic potential and their inclusion as components in future breeding programmes. The aqueous extracts from *S. nigrum* and *A. retroflexus* suppressed the seed germination of the studied soybean genotypes by 41 to 78%, but this effect was statistically significant only in the variety Srebrina and line No. 5<sup>a</sup>. The aqueous extract from *A. retroflexus* showed a more pronounced allelopathic effect on the studied soybean genotypes, as compared to those from *S. nigrum*. The studied varieties showed different susceptibility to the allelopathic effect of the *S. nigrum* and *A. retroflexus* extracts, which was due to their genetic differences. The varieties Mira and Divna possess allelopathic potential, because no significant allelopathic effect of the used extracts on them was found. These varieties can be used as components in future breeding programmes.

**Keywords:** inhibition, weed extracts, allelopathic potential, soybean genotypes

- 3.22. Dimitrova, Ts., Pl. Serafimov, 2008. Effects of Shepherd`s Purse (*Capsella bursa pastoris* (L.) Medic.) on the chemical composition of Lucerne (*Medicago sativa* L.). *Pesticidi i fitomedicina*, 23(2):243-249.

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Scientific paper \* Naučni rad

## Effects of Shepherd`s Purse (*Capsella bursa pastoris* (L.) Medic.) on the Chemical Composition of Lucerne (*Medicago sativa* L.)

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### SUMMARY

A study was conducted in a pure stand of lucerne (variety Viktoria) under natural weed infestation with shepherd's purse (*Capsella bursa pastoris* (L.) Medic.) on a slightly leached chernozem soil under nonirrigated conditions in the experimental field of the Institute of Forage Crops – Plevan during the 2006-2007 period.

The effect of shepherd's purse *Capsella bursa pastoris* (L.) Medic. on the chemical composition of lucerne *Medicago sativa* (L.) was analyzed.

Statistically significant ( $P < 0.05$ ) functional relations were found between the chemical characteristics and percentage of *Capsella bursa pastoris* (L.) Medic. participation in the lucerne sward, and forage quality. These relations indicated a multiple practical relevance and a necessity to control *Capsella bursa pastoris* (L.) Medic. in lucerne stands in order to decrease weed density and improve forage quality.

**Keywords:** *Medicago sativa* (L.); *Capsella bursa pastoris* (L.) Medic.; Chemical composition; Forage quality

- 3.23. Marinov-Serafimov, Pl., Ts. Dimitrova, L. Mihajlov, 2009. Determination of survival and restoration ability of a soybean stand on a natural background of weed infestation. Yearbook Goce Delchev University – Stip, Faculty of Agriculture, 8(8):75-86.

Годишен зборник 2008  
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Оригинален научен труд  
Original research paper

### DETERMINATION OF SURVIVAL AND RESTORATION ABILITY OF A SOYBEAN STAND ON A NATURAL BACKGROUND OF WEED INFESTATION

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Ljupco Mihajlov\*\*

#### Abstract

The study was carried out during the 2002–2004 period in the Institute of Forage Crops – Plevan, branch Pavlikeni. The objective of the study was to determine survival and reproductive ability of soybean under a mixed type of weed infestation depending on environmental agro-climatic conditions. The weed infestation in the studied agrophytocenosis varied of 61.5 to 122.6 plants/m<sup>2</sup>, with predominance: *Amaranthus* spp., *Solanum nigrum* (L.) and *Sorghum halepense* (L.) Pers. Survival ability ( $I_s$ ) of soybean plants grown on a natural background of weed infestation till technical ripeness of the crop was within the range of 0.76 to 0.96 and depended on the degree of weed infestation of the stand and rainfall amount. Soybean grown on a natural background of weed infestation under the conditions of the study had relatively good restoration ability ( $R$ ) varying from 1.16 to 5.09.

**Key words:** soybean (*Glycine max* (L.) Merril.), Survival ability, restoration ability

- 3.24. Dimitrova, Ts., Pl. Serafimov, 2009. Effect of lucerne growing under cover of maize on the degree of weed infestation and productivity of dry biomass and seeds. *Herbologia*, 10(1):13-21.

EFFECT OF LUCERNE GROWING UNDER COVER OF MAIZE ON THE DEGREE OF WEED INFESTATION AND PRODUCTIVITY OF DRY BIOMASS AND SEEDS

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**Abstract**

During the 2005–2007 period, under field nonirrigated conditions on slightly leached chernozem, a study was conducted with the purpose of determining the effect of lucerne (*Medicago sativa* L.) growing under cover of maize (*Zea mays* L.) on the degree of weed infestation and productivity of dry biomass and seeds. A trial was carried out with the following variants:  $V_1$  – lucerne, pure stand – check, zero;  $V_2$  – lucerne, pure stand – with chemical control;  $V_3$  – lucerne + cover of maize – check, zero;  $V_4$  – lucerne + cover of maize – with chemical control.

As a result of the study, the following conclusions were made:

Sowing of lucerne with cover crop of maize in the year of stand establishment under favourable weather conditions was a successful alternative to the conventional technology. It was found that the cover crop had weed suppressive capacity with a degree of weed infestation of 49% and when using also chemical control, it was 25%, as compared with the check of the pure stand.

The sowing of lucerne with cover crop of maize allowed more efficient use of the area in the first year when it had slower rate of growth and development. The productivity of dry biomass from the stands of lucerne with cover crop of maize was higher by 68 to 92% (in three-year average) and that of seeds by 5 to 19% (two-year average), as compared with the pure stand check. In the pure lucerne stand with chemical control the values of these characteristics were higher by 48% for dry biomass yield and by 37% for seed yield.

**Keywords:** lucerne, maize, weed, cover crop, chemical control

- 3.25. Marinov-Serafimov, Pl., 2009. A preliminary study of soybean genotype responses to glyphosate. *Pesticidi i fitomedicina*, 24(3):211-219.

## A Preliminary Study of Soybean Genotype Responses to Glyphosate

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### SUMMARY

The effect of four application rates of glyphosate (Roundup, 360 g a.i./l) – 180; 360; 720 and 1440 g a.i./ha on the survival, dynamics of growth, and accumulation of fresh biomass in g per plant was studied on eight newly-developed Bulgarian lines, varieties and candidate varieties of soybean bred by different methods under greenhouse conditions. The objective of this study was to determine and compare the sensitivities of different soybean genotypes to glyphosate. The studied soybean genotypes showed different levels of glyphosate sensitivity due to their genetic differences. Glyphosate rates of 180, 360, 720 and 1440 g a.i./ha, applied at the stage of three trifoliate leaves ( $V_4$ ) of soybean had effect on the survival of the studied genotypes and can be presented conditionally in the following order: H (40.6%) < G (40.7%) < D (51.3%) < C (52.6%) < F (58.9%) < E (60.5%) < B (62.0%) < A (65.3%). The depression coefficients (B) of the studied characteristics depended mainly on soybean genotypes and the applied herbicide rates. The tested glyphosate rates showed a high (GI 26.5-51.6%) to relatively low degree of toxicity (GI 16.0-18.7%) in the studied soybean genotypes.

**Keywords:** Genotype; Soybean; Glyphosate; Response

- 3.26. Маринов-Серафимов Пл., 2009. Биологично проучване на хербицида Пеликан 50СК (Дифлуфеникан – 500 г/л) при соя (*Glycine max* [L.] Merr.). *Селскостопанска наука*, 42(5):30-37.

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AGRICULTURAL SCIENCE, VOL. XLII, No. 5

София, 2009. Sofia

СЕЛСКОСТОПАНСКА АКАДЕМИЯ • AGRICULTURAL ACADEMY

**БИОЛОГИЧНО ПРОУЧВАНЕ НА ХЕРБИЦИДА  
ДИФЛУФЕНИКАН – 500 G/L (ПЕЛИКАН 50СК)  
ПРИ СОЯ (GLYCINE MAX [L.] MERR.)**

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**BIOLOGICAL STUDY OF THE HERBICIDE  
DIFLUFENIKAN - 500 G/L (PELICAN 50SK)  
IN SOYBEAN (GLYCINE MAX [L.] MERR.)**

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**Abstract**

During the period 2006-2008 in the experimental field of the Experimental station of soybean - Pavlikeni is displayed field trial in non-irrigated conditions for establishing the efficacy and selectivity of the herbicide Diflufenikan - 500 g/l (Pelican 50 KS) in soybean agroecosystem background in natural mixed type weediness. Results obtained may be generalized in the following more important conclusions: Herbicides Diflufenikan - 500 g/l (Pelican 50SC) has relatively high selectivity (EWRS 2-3 ball) and is suitable for treatment of soybean crops after germination before sowing at a dose of culture 125 ml /ha.

Herbicide effectiveness Diflufenikan - 500 g/l (Pelican 50 KS) varies from 73 to 89% on annual dicotyledonous weeds (*S. nigrum*; *Amaranthus* spp.). Less herbicide effect (from 25 to 50%) is established under *Ch. album* and the least (from 8 to 52%) in the group of weeds annual Monocotyledon (*Setaria* spp., *Eh. crus-galli*).

The increase in grain yield of soybean varies from 11.3 to 106.0% compared to the control variant (control - zero) and is in direct relation to the effect achieved in the fight against weeds.

**Key words:** soybean, selectivity, phytotoxicity, weeds, herbicides, productivity.

- 3.27. Marinov-Serafimov, Pl., 2010. Determination of Allelopathic effect of some invasive weed species on germination and initial development of grain legume crops. *Pesticidi i fitomedicina*, 25(3):251-259.

Pestic. Phytomed. (Belgrade), 25(3), 2010, 251-259  
Pestic. fitomed. (Beograd), 25(3), 2010, 251-259

UDC: 581:524.13:632.51:635.65  
Scientific paper • Naučni rad  
DOI: 10.2298/PIF1003251M

## **Determination of Allelopathic Effect of Some Invasive Weed Species on Germination and Initial Development of Grain Legume Crops**

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*Received: March 16, 2010  
Accepted: September 20, 2010*

### **SUMMARY**

During the 2006-2007 period, the allelopathic effect of cold water extracts from *Amaranthus retroflexus* L., *Chenopodium album* L., *Erigeron canadensis* L. and *Solanum nigrum* L. on seed germination and initial development of *Glycine max* L., *Pisum sativum* L. and *Vicia sativa* L. was studied under laboratory conditions in the Institute of Forage Crops, Pleven. It was found that: water extracts from fresh and dry biomass of *A. retroflexus*, *Ch. album*, *E. canadensis* and *S. nigrum* had an inhibitory effect on seed germination of *G. max*, *P. sativum* and *V. sativa*, the inhibition rate for the extracts from fresh biomass varying from 28.8 to 81.5% and for the extracts from dry weed biomass it was from 26.8 to 89.2%. The values of  $LC_{50}$  varied from 13.5 to 72.2 g l<sup>-1</sup> for the extracts from fresh biomass and from 7.0 to 84.1 g l<sup>-1</sup> for the extracts from dry weed biomass and they could be conditionally grouped in the following ascending order: *A. retroflexus* < *S. nigrum* < *E. canadensis* < *Ch. album* and for extracts from dry biomass: *A. retroflexus* < *E. canadensis* < *Ch. album* < *S. nigrum*; *P. sativum* was the most sensitive to the allelopathic effect of the extracts from fresh and dry weed biomass -  $LC_{50}$  varied from 13.5 to 21.6 g l<sup>-1</sup>, followed by *V. sativa* -  $LC_{50}$  from 26.0 to 11.7 g l<sup>-1</sup> and *G. max* had relatively the lowest sensitivity -  $LC_{50}$  was from 46.6 to 56.7 g l<sup>-1</sup>.

**Keywords:** Allelopathic effect; Weed; Extracts; Inhibition; Seed germination

- 3.28. Маринов-Серафимов Пл., 2010. Проучване възможностите за алтернативна борба срещу плевелите при соя (*Glycine max* [L.] Merr.) I. Соя (*Glycine max* [L.] Merr.) – алелопатично-мулчираща култура овес (*Avena sativa* L.) *Селскостопанска наука* 43(2):26-36.

СЕЛСКОСТОПАНСКА НАУКА, ГОД. XLIII, No. 2

AGRICULTURAL SCIENCE, VOL. XLIII, No. 2

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СЕЛСКОСТОПАНСКА АКАДЕМИЯ • AGRICULTURAL ACADEMY

## ПРОУЧВАНЕ НА ВЪЗМОЖНОСТИ ЗА АЛТЕРНАТИВНА БОРБА СРЕЩУ ПЛЕВЕЛИТЕ ПРИ СОЯ (*Glycine max* [L.] Merr.)

### I. Соя (*Glycine max* [L.] Merr.) - алелопатично-мулчираща култура овес (*Avena sativa* L.)

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## STUDI OF OPPORTUNITIES FOR ALTERNATIVE WEED CONTROL IN SOYBEANS (*GLYCINE MAX* [L.] MERR.)

### I. Soybeans (*Glycine max* [L.] Merr.) - allelopathic-mulching culture oats (*Avena sativa* L.)

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#### Abstract

The study was conducted during 2005 - 2007 at the experimental field of Experimental stations in soybeans - Pavlikeni without irrigated conditions in secondary leaching on black earth in order to establish the possibility of an alternative control against weeds in soybean (*Glycine max* [L.] Merr.) using allelopathic-mulching crop - oats. Relations between the two plant species, soybean - barley were followed in two factors: Factor A - the quantity of oats in the rate of propagation rate:  $a_1$  - (Control manual removal of weeds, soybean monoculture)  $a_2$  - (Control without manual removal of weeds, soybean monoculture)  $a_3$  - 12%;  $a_4$  - 25% and  $a_5$  - 50%. Factor B - duration of the development of soybeans to emergence (VE):  $b_1$  - flowering ( $R_2$ ),  $b_2$  - pod formation ( $R_4$ ) and  $b_3$  - technical ripeness ( $R_8$ ). It was found that the use of oats as allelopathic-mulching culture in soy reduces the rate of sowing weed infestans from 33.0 to 66.0% and the cumulative amount of fresh and dry biomass (from 12.0 to 68.0%) of the group of late spring weeds, a disproportionate amount of the increased propagation norm; Weed suppression resolution allelopathic-mulching culture agrophytocenosa study is the result of limiting the density of some dicotyledonous annual weeds *Amaranthus* ssp., *Abutilon theophrasti* Medik. and *Chenopodium album* (L.), despite being down compensation processes in population density of *Convolvulus arvensis* L. uniformity in distribution of (J) - from -4.2 to -10.2; species composition (S) of weed communities is from 4 to 8 species, but in terms of their diversity (H) - from -5.9 to -21.2; complex effect of weed infestans and extent of the propagation rules of oats have a negative impact on yield of soybeans - kg/ha from 25.3 to 63.0 percent, the height of soybean flour (RCI varies from 0.11 to 0.35) and formed on fresh and dry biomass (RCI is in the range of 0.44 to 0.83) on the soybean, which can be offset by the reduced level of weed infestans in soybean agrophytotensosis.

**Key words:** soybean (*Glycine max* (L.) Merr.), Oats (*Avena sativa* L.), weed suppression, allelopathy, alternative combat weeds.



- 3.29. Маринов-Серафимов, Пл., И. Голубинова, Цв. Димитрова, 2010. Проучване на възможности за алтернативна борба срещу плевелите при соя (*Glycine max* [L.] Merr.). II. Соя (*Glycine max* [L.] Merr.) – алелопатично-мулчираща култура ръж (*Secale cereale* L.). Сборник с доклади от научнопрактическа конференция „Селекционни и технологични аспекти при производството, преработката и използването на соята и други зърнено-бобови култури”, стр. 57-68.

Пламен Маринов-Серафимов, Ирена Голубинова, Цветанка Димитрова

ПРОУЧВАНЕ НА ВЪЗМОЖНОСТИ ЗА АЛТЕРНАТИВНА БОРБА  
СРЕЩУ ПЛЕВЕЛИТЕ ПРИ СОЯ (*GLYCINE MAX* [L.] MERR.)  
II. СОЯ (*GLYCINE MAX* [L.] MERR.) - АЛЕЛОПАТИЧНО-  
МУЛЧИРАЩА КУЛТУРА РЪЖ (*SECALE CEREALE* L.)

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*Резюме: Изследването е проведено през периода 2005 – 2007 година в опитното поле на Опитна станция по соята – Павликени при неполивни условия върху средно излужен чернозем с цел да се установи възможността за алтернативна борба срещу плевелите при соя (*Glycine max* [L.] Merr.) чрез използването на алелопатично-мулчираща култура - ръж. Взаимоотношенията между двата растителни вида соя - ръж са проследявани при два фактора: Фактор А – количество на ръжта в процент от посевиата норма: а1– (Контрола – плевена, соя самостоятелен посев); а2 – (Контрола – неплевена, соя самостоятелен посев) а3–12%; а4–25% и а5–50%. Фактор В – продължителност на развитие на соята от VE до: b1– R2, b2 – R4 и b3–R8. Използването на ръж, като алелопатично-мулчиращата култура в соевия посев редуцира степента на заплевеляване от 15.8 до 78.4%, както и количеството на натрупаната суха биомаса (от 8.7 до 77.3%) на късните пролетни плевели, непропорционално на увеличеното количество посевна норма на ръжта през годините на проучване. При условията на изследването и характера на заплевеляването използването на ръжта, като алелопатично-мулчиращата култура в соев посев е нецелесъобразно, поради силния негативен ефект който тя оказва върху височината на соевите растения (от 9.7 до 46.7%), както и върху формираната свежа и суха биомаса (от 45.2 до 86.8%), което е свързано със силното понижаване на добива от соево зърно от 11.7 до 88.9% през годините на проучване.*

*Ключови думи: соя (*Glycine max* (L.) Merr.), ръж (*Secale cereale* L.), плевелоподтискане, алелопатия, алтернативна борба срещу плевели.*

- 3.30. Маринов-Серафимов, Пл., Д. Кертикова, 2011. Проучване селективността на флумиоксазин 500 g/kg (ПЛЕДЖ 50 ВП) при образци люцерна с оглед на селекцията. *Почвознание, Агрехимия и Екология*, 45(4):65-73.

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SOIL SCIENCE AGROCHEMISTRY AND ECOLOGY, VOL. XLV, № 4  
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АГРОХИМИЯ И ТОРЕНЕ

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**Проучване на селективността на Флумиоксазин  
(ПЛЕДЖ 50 ВП) при образци люцерна с оглед на селекцията**

***Study of Flumioxazine (PLEDGE 50 VP) Selectivity in Alfalfa  
Accessions with View of Breeding***

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**Abstract**

The selectivity of herbicides Flumioxazine 500 g/kg (50 PLEDGE HR) in seven alfalfa accessions, inclusive varieties Plevan 6, Dara, Prista 2, Lodi and selection numbers - № 2A, № 3AS and № 4H was studied. Treatment of plant material is done with herbicides in 2009, after germination before sowing in three doses: 50%, 100% and 150% of the recommended dose of the manufacturer.

In all alfalfa accessions with increasing dose of herbicide, survival decreased on average by 23.0% to 42.3%. In the period from germination until the seventh day, alfalfa accessions are relatively high selectivity (score 1) to the herbicide than the highest dose studied. With increasing vegetation within 45 day of emergence, herbicide phytotoxic manifestations is intensified (score 5-7) in the greatest in variety Prista 2 and № 4H. It was found that in plants of the variety Lodi and № 3AS, even at the highest dose, the observed symptomatic failures are weak (score 2 and 3) and the new leaves have emerged unchanged.

Flumioxazine has an inhibitory effect on the formation fresh biomass per stem in № 2A, № 4H, Prista 2 and Dara where differences are statistically proven at all doses, while Plevan 6 and № 3AS only at higher. An exception was found in a variety Lodi, where the differences are statistically unproven.

**Key words:** alfalfa accessions, selectivity, phytotoxicity, herbicides

- 3.31. Marinov-Serafimov, Pl., Ts. Dimitrova, I. Golubinova, 2013. Allelopathy - element of an overall strategy. *Acta Agriculturae Serbica*, 18(35):23-37.

UDC 632.937:632.51 : 581.524.13

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Review paper

*Acta Agriculturae Serbica, Vol. XVIII, 35 (2013) 23-37*



**Allelopathy – an element of the overall strategy for  
weed control**

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**Abstract:** Changes in weed associations under the influence of a number of factors require the exploration of new options for weed control. This article summarizes the main technologies in experimental methods used to study allelopathic relationships in the weed – crop system. Problems associated with methodical productions are discussed. The paper provides an overview of the results of our and foreign studies related to the practical application of weed control by using: allelopathic protector, suffocation, or rotary allelopathic companion plants, toxic extracts of allelopathic plants, mulching or burial of crop residues etc. In allelopathic relationships, the total destruction of all weed species in agrophytocenoses cannot be expected. Allelopathy should be seen as an element of the overall strategy for weed control. Profound theoretical studies on the methods for the practical application of allelopathy in modern agriculture are required.

**Key words:** allelopathy, weeds, alternative weed control.

- 3.32. Georgieva, N., I. Nikolova, Pl. Marinov-Serafimov, 2015. Comparative characteristics of *Lupinus albus* L. and *Lupinus luteus* L. under allelopathic effect of *Sorghum halepense* L. (Pers.). *Pesticidi I fitomedicina*, (Belgrade), 30(1):41–50.

Pestic. Phytomed. (Belgrade), 30(1), 2015, 41–50.  
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UDC 581.524.13:633.367:632.5  
Original scientific paper

## Comparative characteristics of *Lupinus albus* L. and *Lupinus luteus* L. under allelopathic effect of *Sorghum halepense* L. (Pers.)

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### SUMMARY

Allelopathic effects of aqueous extracts of *Sorghum halepense* L. (Pers.) on seed germination and primary seedling growth and development of two lupine species was studied. *Lupinus albus* and *Lupinus luteus* showed different levels of susceptibility to the allelopathic effect of weed extracts. Increasing concentrations (1.25, 2.50, 5.00 and 10.00%) of extracts from aboveground and belowground biomass suppressed seed germination of *L. luteus* from 53.2 to 74.7%. The germination of *L. albus* seeds was unaffected, except by the highest concentration of 10.00%. Fresh biomass accumulation in the initial germ of *L. luteus* was inhibited by 3.8–40.3% under the effect of concentrations of 2.50, 5.00 and 10.00%, which made the species susceptible to *S. halepense* extracts. *L. albus* was tolerant as it was not found to sustain a significant allelopathic effect of the extracts.

**Keywords:** *Sorghum halepense*; Lupines; Allelopathy

- 3.33. Маринов-Серафимов, Пл., И. Голубинова. 2015. Селективност на хербицида Пледж 50СК (Флумиоксазин – 500 g/kg) при соя (*Glicine max* [L.] Merr.) Сборник от юбилейна научна конференция във връзка с 90 годишнината от създаването на ОПИТНА СТАНЦИЯ ПО СОЯТА – Павликени 09-10 септември 2015, pp. 127-134.

### **СЕЛЕКТИВНОСТ НА ХЕРБИЦИДА ПЛЕДЖ 50ВП (ФЛУМИОКСАЗИН - 500 g/l) при соя (*Glycine max* [L.] Merr.)**

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#### **Резюме:**

С цел установяване селективността на хербицида Флумиоксазин - 500 g/kg (Пледж 50ВП) в опитното поле на Опитна станция по соята - Павликени е изведен полски опит със соя сорт „Сребрина“. Изследването е проведено на средно излужен чернозем и включва следните варианти:  $V_1$  - Контрола - плевена;  $V_2$  - Флумиоксазин - 500 g/kg (Пледж 50ВП) в дози 8 и 12 g/da приложен след сеитба, преди поникване на културата и еталон - Метрибузин - 700 g/kg (Зино 70ВП) - в доза - 50 g/da;  $V_3$  - Флумиоксазин - 500 g/kg (Пледж 50ВП) в дози 8 и 12 g/da приложен ВВСН 13 на културата и еталон – Имазамокс 40 g/l (Пулсар 40) - в доза - 50 ml/da + ДЕС аджувант в доза 100 ml/da. Въз основа на изведените опити и от анализа на получените резултати могат да се направят следните изводи: Хербицидът Пледж 50 ВП (500 g/kg флумиоксазин) при проучваните дози 8 и 12 g/da притежава висока селективност (бал 1) и не оказва отрицателно влияние върху структурните елементи на добива при тествания сорт соя - "Сребрина", като разликите са статистически недоказани ( $P=0.05$ ), спрямо еталона Зино 70ВП. Хербицидът Пледж 50 ВП (500 g/kg флумиоксазин) е подходящ за третиране на соя след сеитба, преди поникване на културата. Прилагането на Пледж 50 ВП (500 g/kg флумиоксазин) в доза 8 g/da във фенофаза ВВСН 13 културата предизвиква скъсяване, удебеляване на нерватурата, плисирание и дорзално завиване в основата на листната петура с хлоротичен венец по перифрията ѝ.

Установява се слабо изоставяне в растежа на растенията - стеблото е скъсено и леко удебелено. С увеличаване на дозата на хербицида 12 g/da наблюдаваните симптоматични повреди се засилват - бал. 4-5. Ограничената селективност на Пледж 50ВП приложен във фенофаза ВВСН 13 се изразява в намаляване хабитуса на соевите растения, докато структурните елементи на добива са практически близки (от -2.5 до +9.5%) в сравнение с тези отчетени при двата еталона Пулсар 40.

**Ключови думи:** соя, селективност, фитотоксичност, хербицид

- 3.34. Marinov-Serafimov, Pl., I. Golubinova, 2015. The efficiency of organic herbicide Segador in controlling growth and regrowth of Curly Dock (*Rumex crispus* L.) in non-cropped areas. *International Journal Of Pharmacy & Life Sciences*, 6(10-11):4760-4767.

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**The efficiency of organic herbicide Segador in controlling growth and regrowth of Curly Dock (*Rumex crispus* L.) in non-cropped areas**

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**Abstract**

*Rumex crispus* L. is an invasive weed species, widespread in Republic of Bulgaria. Owing to its great reproductive potential and high biological and ecological plasticity, the weed has been assigned to the list of economically most important weeds in the country. With the purpose of studying the possibility of weed control in non-cropped areas with heavy natural background infestation with *R. crispus* a field trials were carried out. Organic herbicide trade product Segador was tested at two doses 5.0 and 8.0% with the addition of the surfactant Silwet L-77 at a dose 0.1 l/ha. It was found that: (1) The degree of infestation with *R. crispus* in non-cropped areas can be successfully reduced by treatment with Segador (organic fertilizer with a contact herbicide against weeds effect); (2) treatment of *R. crispus* with trade product Segador must be carried with a 8.0% solution at early growth stages (BBCH 12-14) by the development of weeds; (3) twenty-one days after application with Segador (applied as 8.0% solution) efficacy of the product ranges from 97.5 to 100% and there was only 7.8 – 9.1% regeneration of *R. crispus*. The addition of a surfactant Silwet L-77 at a dose of 0.1 l/ha increases the efficiency of trade product Segador.

**Key-Words:** *Rumex crispus* L., Organic herbicide, Segador, Non-cropped areas

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- 3.35. Marinov-Serafimov, Pl., I. Golubinova, 2015. A study of suitability of some conventional chemical preservatives and natural antimicrobial compounds in allelopathic research. *Pesticidi I fitomedicina*, 30(4): 233–241.

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Original scientific paper

## A study of suitability of some conventional chemical preservatives and natural antimicrobial compounds in allelopathic research

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### SUMMARY

The impact of three conventional chemical preservatives (sodium benzoate, potassium sorbate and salicylic acid) and a natural antimicrobial compound (thymol) on germination, dynamics of growth and accumulation of fresh biomass (g per seedling) of *Lactuca sativa* L. cultivar Great Lakes, was studied under laboratory conditions. The tested conventional chemical preservatives demonstrated strong inhibitory effects (*GI* 27.1-0.0%) on germination and initial development of *L. sativa*, and they cannot be used in allelopathic studies in the laboratory.

An addition of thymol at 0.5-1.0 ‰ concentration showed no inhibitory effect (*GI* varied 81.7-84.6%) on germination and initial development of *L. sativa*. Thymol can therefore be used as a natural antimicrobial compound in allelopathic studies in the laboratory.

**Keywords:** Allelopathy; Plants; Lettuce; Chemical preservatives; Thymol

- 3.36. Marinov-Serafimov, Pl., I. Golubinova, 2016. Selectivity of herbicide Kleranda in alfalfa (*Medicago sativa* L.). *Journal of Mountain Agriculture on the Balkans*, 19(3):71–84 (in Bulgarian).

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Research Institute of Mountain Stockbreeding and Agriculture, Troyan*

## **Селективност на хербицида Клеранда при люцерна (*Medicago sativa* L.)**

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## **Selectivity of herbicide Kleranda in alfalfa (*Medicago sativa* L.)**

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### **РЕЗЮМЕ**

С цел установяване селективността на двукомпонентния хербицид 375 g/l метазахлор + 17.5 g/l имазамокс (Клеранда) в опитното поле на Институт по фуражните култури-Плевен е изведен полски опит с люцерна сорт „Дара“. Установено е, че хербицидът Клеранда (375 g/l метазахлор + 17.5 g/l имазамокс) приложен в доза – 150 ml/da + аджувант Деш ХЦ в доза 200 ml/da притежава висока селективност (бал - 1÷ 1.5) и не оказва отрицателно влияние върху добива и химичния състав, формираната свежа и суха биомаса kg/da при тествания сорт люцерна „Дара“, като разликите са статистически недоказани (при P=0.05), спрямо еталона Листего 40 (40 g/l имазамокс) приложен в доза 50 ml/da (еталон) + аджувант Деш ХЦ в доза 100 ml/da. Хербицидът Клеранда може да се използва в „стари“ люцернови посеви във фаза трети троен лист на културата в доза 150 ml/da + адювант Деш ХЦ в доза 200 ml/da.

**Ключови думи:** люцерна, селективност, фитотоксичност, хербицид

### **SUMMARY**

In order to establish the selectivity of the two-component herbicide 375 g/l metazachlor + 17.5 g/l imazamox (Kleranda) in the experimental field of the Institute of Forage Crops-Pleven was conducted field experience with alfalfa variety "Dara". It was found that herbicide Kleranda (375 g/l metazachlor + 17.5 g/l imazamox) applied at the dose - 150 ml/da + adjuvant Dash HC at 200 ml/da has a high selectivity (score 1 ÷ 1.5), no negative effect on yield, chemical composition of the formed fresh and dry biomass kg/da in the tested alfalfa cultivar "Dara", the differences are not statistically proven significant difference (at P = 0.05) compared to the standard Listego 40 (40 g/l imazamox) applied at a dose of 50 ml/da + adjuvant Dash HC at 100 ml/da.

Kleranda herbicide can be used in „old“ crop at the third trifoliate leaf of alfalfa at a dose of 150 ml/da + adjuvant Dash HC at 200 ml/da

**Key words:** alfalfa, selectivity, phytotoxicity, herbicide

- 3.37. Marinov-Serafimov, Pl., A. Aleksieva, I. Golubanova, 2016. Sensitivity of non-genetically modified soybean genotypes (*Glycine max* (L.) Merrill) to glyphosate: I. Phytotoxicity and regrowing ability. *Journal of Mountain Agriculture on the Balkans*, 19(3):85–98 (in Bulgarian).

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*Research Institute of Mountain Stockbreeding and Agriculture, Troyan*

## **Чувствителност на не генно модифицирани генотипове соя (*Glycine max* (L.) Merrill) към глифозат I. Фитотоксичност и възстановителна способност**

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## **Sensitivity of non-genetically modified soybean genotypes (*Glycine max* (L.) Merrill) to glyphosate I. Phytotoxicity and regrowing ability**

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### **РЕЗЮМЕ**

През периода 2009-2010 година в Опитна станция по соята, Павликени, България при полски условия беше проучена чувствителността, преживяемостта и възстановителната способност на осем генотипа соя (*Glycine max* (L.) merrill) към три дози 0.720, 1.440 и 2.160 g a. v., ha глифозат.

Установено е, че приложените дози глифозат оказват потискащо въздействие върху височината и приживяемостта на растенията до 45 ден след извършване на пръскането (45 DAT).

Изпитаните генотипове соя проявяват различна чувствителност и възстановителна способност към глифозат. Във фенофаза цъфтеж (BBCH – 63-65) възстановителната способност на сорта Сребрина и линия Rr е добра и варира в границите от 1.0 до 2.5 бала, докато при сортовете Авигея, Дивна и Карина е лоша и е в интервала от 2.5 до 3.0 бала.

**Ключови думи:** соя генотипи, глифозат, фитотоксичност, възстановяване

### **SUMMARY**

The effect of three application doses of glyphosate 0.720, 1.440 and 2.160 g a. i., ha on the sensitive, survival and regrowing on eight soybean genotypes (*Glycine max* (L.) Merrill) were determined in field conditions at Soybean experimental station, Pavlikeni, Bulgaria within 2009-2010.

It was found that the applied doses of the glyphosate had a inhibitory effect on the plant height and regrowing ability by 45 days after treatment (45 DAT).

The studied soybean genotypes showed different levels of glyphosate sensitivity, survival and regrowing.

In growing stage (BBCH – 61-65) Srebrina cultivar and Rr line showed good survival and regrowing score from 1.0 to 2.5 and varieties Avigea, Divna and Karina had bad scores (2.5-3.0).

**Key words:** soybean genotype, glyphosate, phytotoxicity, regrowing ability