Списък
с резюмета от научните публикации на доц. д-р Иванка Г. Митова, за участие в конкурс, за придобиване на научното звание „професор”

1. Stancheva I. and **I. Mitova**, 2002. Effects of Different sources and Fertilizer Rates the Lettuce Yield and Quality under Controlled Conditions. Bul. J.of Agricultural Science, 8,157-160.

Lettuce plants (Lactuca saliva L.) were grown in a controlled environmental chamber in 1 kg plastic pots contained glasshouse soil substrate until technical maturity stage. Plants were grown at three fertilizer sources: mineral fertilizes farmyard manure and foliar fertilization. Mineral and organic fertilizers were applied at three fertilizer rates. The most favorable effect on the plant biomass accumulation showed fertilizer rates of 100 mg/kg mineral nitrogen and 4.2 g/kg farmyard manure. A beneficial effect of foliar fertilizer Agroleaf on the lettuce development and produce quality was observed: high values of fresh and dry biomass and reduced nitrate content.

2. Станчева И., **И. Митова**, 2003. Влияние на различни форми на торене и източници на азот върху добива и съдържанието на нитрати при градински фасул. Екология и бъдеще, год. II, № 3, 70- 72.

Stancheva I. and I. Mitova. Effect of different fertilizer forms and nitrogen sources on the yield and nitrate content in garden beans.

The experiment with garden beans cv. Xera was carried out under glasshouse conditions at nondeficient water regime. The plants were grown at optimal nitrogen rates, determined in model pot experiment. The following fertilizer forms were applied: ammonium nitrate, natural fertilizer and foliar fertilizer Agroleaf. A favorable effect of foliar fertilizer on the garden beans fresh produce and nitrate content was established.

3. Stoikov Ch.,I. Stancheva, **I. Mitova**, 2003. Growth of Spring Vegetable Plant Seedings in a Phytochamber with a Low Energy Consumption. Bul. J.of Agricultural Science № 9, 651-657.

Lettuce (Lactuca sativa L.) and spinach (Spinacia oleracea L.) were grown subsequently in the phytochamber with low energy consumption in 1 kg plastic pots at two varieties of the soil substrate. Supporting of needed temperatures in the working regime is realized on the account of the heat evolved from the illuminative bodies and refrigeration is achieved through the heat transfer with the ambient air. Light was supplied by 6 cool white fluorescent lamps (Philips) L = 36W that ensure irradiance 12 klux at a photosynthetic photon flux density of 144 μmol.m-2.s-1 at the leaf level. The total energy consumption was 153 kWh during the experiment with spinach and 142 kWh during the experiment with lettuce. The conditions created in the phytochamber allow normal germination and growth of spinach and lettuce plants during the early stages of plant development when outside average diurnal temperatures as well as minimal temperatures are unfavorable. The plastid pigment content values are close to those measured in the same plant species grown under glasshouse conditions which show applicability of the chamber for growing early spring vegetable seedlings. The peat reached soil substratum is more appropriate for growing early spring vegetables.

4. **Mitova I**., I. Stancheva, 2003. Far- Reaching Effects of Increasing rates of the Organic and Mineral Nitrogen Fertilizer on the yield and Some Quality Parameters in Spinach. Ecology and future. Vol. II, № 3- 4, 99- 100.

Increased equivalent nitrogen quantities applied in organic (farmyard manure) and mineral form (NH_4NO_3) did not influence in similar way spinach yield and quality. Nitrogen rates from 100 to 500 mg/kg soil given in mineral form showed a depressive effect on the spinach fresh and dry biomass as a

second crop while the same quantities applied in organic form have a stimulative effect on the plant growth and development. Treatments with foliar fertilizer Agroleaf leaded to the good results regarding spinach development balanced mineral nutrition, without accumulation of harmful mineral N quantities in the soil as well as high quality fresh production free of nitrates and nitrites.

5. Кънчева Р., Цв., Недева, **Ив. Митова**,2003. Многокритериална оптимизация на качеството на оранжерийни домати в зависимост от торенето. Научни трудове- АУ-Пловдив, т. XLVIII , 253- 258.

Kancheva R., Z. Nedeva, Iv. Mitova. Multi - criteria problem for property of grown under glass tomatoes depending on the fertilizing

On basis at right fertilizing have for an object to beneficial effect on biochemical components determing taste and food qualities of tomatoes. An optimization mathematical method have applied of determination the fertilize mixture, influencing some characteristics of the ground under glass tomatoes, cultivating with a minimum prime cast.

For that purpose has been composed an object function give out the result to decision for a specifically fertilizing, helping one and other applying in the production tomatoes.

6. Stancheva I., **I. Mitova**, Z. Petkova, 2004. Effects of different nitrogen fertilizer sources on theEffects of different nitrogen fertilizer sources on the yield, nitrate content and other physiological parameters in garden beans. Environmental and Experimental Botany. 52, 277- 282. IF-за 5 години- 3.64, за 2011- 2.578; IF- за 2004-1,65

Garden bean plants (Phaseolus vulgaris (L.) Savi.) cv. Xera were grown under glasshouse conditions at optimal fertilizer rates using mineral, organic, and foliar fertilizers previously established in a model pot experiment. It was shown the favorable effect of the foliar feeding on the biomass accumulation in the different vegetative organs and formation of fresh products with low levels of nitrates and nitrites. In the leaves of the plants with foliar feeding higher levels of nitrate reductase enzyme activity are observed which contributes to more intensive nitrogen uptake. No differences are established among the variants with different fertilizer sources regarding plastid pigment content.

7. **Митова Ив**., Р. Кънчева, 2004. Влияние на азотната форма и почвения тип върху добива и някои растежни показатели при домати. Екология и индустрия.т. 6. N- 2.,164-165.

При условия на съдов опит с три почвени типа, е изследвано влиянието на азотната форма върху някои от показателите на растежа и формирането на добива на домати. Установи се неднопосочно отношение на доматеното растение към формата на азотния източник, в зависимост от почвената реакция. При оптимална азотна норма – 800 mgN/kg почва най-висок добив от плодове и биомаса върху излужен и карбонатен чернозем са формирали растенията торени с $(NH_4)_2SO_4$. Върху почви с неутрална и слабо алкална реакция торенето с карбамид + инхибитор е неефективно. При канелено-подзолиста почва голям ефект върху добива е оказало торенето с NH_4NO_3, NH_4NO_3+Mo и $CO(NH_2)_2$. Най-нисък добив е получен след внасяне на $(NH_4)_2SO_4$. Получена е силна корелационна зависимост (при P= 0.01) между величината на получените добиви от плодове и вегетативната маса, показателите на растежа (като височина на растенията, брой листа) и височината на залагане на I-во съцветие от друга, и при трите почвени типа.

8. Станчева И., **Ив. Митова**, Е. Атанасова, Р. Тончева. 2004. Влияние на източниците и и нормите на азотно торене върху добива и качеството на маруля. Екология и индустрия. т. 6. N- 1. 82- 83.

При вегетационни условия е изведен съдов опит с нарастващи норми минерален и ораничен тор внесени в еквивалентни количества. В изследването е включен и вариант с листно тоене. Целта на изследването е да се установи концентрацията и източника на азот, оказващи най-добър ефект върху добива и качеството на марулите. На базата на получените резултати като

оптимални торови варианти за отглеждане на маруля с добри вкусови качества се препоръчват минерално торене под 300mgN/kg почва, торене с оборски тор до 21g/kg почва и листното торене, което по показатели не отстъпва на останалите форми на торене - минерално и органично.

9. Kancheva R., C. Nedeva, Iv. Mitova, 2005. Multi- objective optimization of several biological parameters concerning the quality of hot- house tomatoes. Annuaire de l Universite de Sofia St. Kl. Ohridski , Livre 4- 10 Session scientifique, Sofia, 03, Partie II, Tome 96, 59- 62.

The main purpose of the paper is the positive effect on the biochemical contents of the tomatoes, concerning taste and food quality, by proper fertilizing. The tomatoes are produced at the lowest coast. An optimization method is used in order to choose the combination of the fertilizers, which influences the quality of the production. An purpose function is created as the mathematical tool to establish the proper fertilizing depending on the future utilization (use) of the tomatoes.

10. **Митова Ив**., И. Станчева,Е. Атанасова, Р. Тончева. 2005.Влияние на органичното, минералното и листното торене върху добива при спанак и почвеното плодородие.Почвознание, агрохимия и екология. XL. N- 2. 32- 37.

Mitova I., I. Stancheva, E. Atanasova, R. Toncheva. Effects of Different Sources and Rates of Nitrogen Fertilization on the Lettuce Yieid and Quality

Spinach plants (Spinacia oleracea L.) cv. Matador were grown under conditions of pot experiment on the alluvial meadow soil pH (H_2O) at increased rates of mineral and organic fertilization as well as at foliar fertilizer application. The highest spinach yield (g/plant) was obtained at soil mineral nitrogen fertilization (300 mg N/plant). Relative lower yields are obtained from the variants of organic and foliar fertilization. The organic fertilization as well as foliar feeding have a favourable influence on the dry biomass accumulation and on the other quality parameters as vitamin C, soluble sugars, cellulose and plastid pigments. In the variants with foliar fertilization minimal nitrate content was observed. On the base of the obtained results about growing spinach with good gustatory characteristics and minimal mineral nitrogen residua in the soil we could recommend the following fertilizer variants: mineral fertilization up to 300 mg N/kg soli, organic matter fertilization up to 12.6 g/kg soil and foliar fertilization which is appear to be competitive to the other variants despite of relatively low fresh biomass accumulation.

11. Стойков Хр., И. Станчева, **И. Митова**, М. Келифарска. 2005. Отглеждане на разсад от зеле във фитокамера с нисък енергиен разход. .Почвознание, агрохимия и екология. XL. N- 2, 37- 41.

Stoykov H., I. Stancheva, I. Mitova, M. Kilifarska. Growth of Cabbage Plant Seedlings in a Phytochamber with a Low Energy Consumption

Cabbage plants (Brassica oleracea, var. capitata) were grown in the phytochamber with low energy consumption in 1 kg plastic pots at two varieties of the soil substrate. Light was supplied by 6 fluorescent lamps (type “daylight” - Tungsram) that ensure irradiance 12 000 lx at a photosynthetic photon flux density of 144 mmol.m-2.s-1 at the leaf level. The total energy consumption was 116 kWh during the experiment. The conditions created in the phytochamber allow normal germination and growth of cabbage seedlings with a good chlorophyll content especially for the plants grown on the peat reached substratum.

12. **Митова Ив**., Е. Атанасова, И. Станчева. 2005. Торенето като фактор за формиране добива и качеството при главестото зеле Екология и индустрия. т. 7., N- 182- 185.

При вегетационни условия върху алувиално ливадна почва е изведен съдов опит с нарастващи норми минерален и ораничен тор внесени в еквивалентни количества. В изследването е включен и вариант с листно тоене. Целта на изследването е да се установи влиянието на концентрацията и източника на азот върху добива и качеството на главесто зеле. Получените резултати показват, че свежото тегло на главестото зеле сорт "Pructor" във фаза начало на завиване

на зелката се повлиява най-добре от минерално торене в концентрация 300 mgN/kg почва, в сравнение с листното торене и торенето с оборски тор. Получените показатели за качество при главестото зеле позволяват да се препоръчат следните торови норми: минерално торене 100 mgN/kg почва, органично торене 12.6 g/kg почва и листно торене в комбинация с ниски концентрации минерален или органичен тор.

13**. Mitova** I., Simeonov K., V. Todorova., 2005. Dinamic of blooming and formation of knots in tomatoes grown over haplic luvisol and in dependence of the form of nitrogen source. Екология и индустрия. т.. 7., N-209- 212.

В условия на съдов опит е направено изследване за влиянието на формата на азотния източник върху динамиката в развитието на доматени растения.. Направеното изследване позволява в резултат на експериментално получените зависимости да се правят прогнозни препоръки за азотно подхранване на доматите по фази на развитие с най-подходящ азотен източник, с цел оптимално развитие и плододаване на растенията.

През всички изследвани фази на развитие NH_4NO_3 се оказа най-ефикасен азотен тор по отношение брой формирани цветове и завързи в съцветията.

Положителното действие на $CO(NH_2)_2$ и $CO(NH_2)_2$ + инхибитор върху изследваните показатели отслабва в посока от I-во към III-то съцветие.

Във фази I-во и II-ро съцветие прибавянето на Mo към NH_4NO_3 и $Ca(NO_3)_2$ има стимулиращо действие върху ранното формиране на цветове и общия брой цветове и завързи.

Амониевият сулфат се оказа неподходящ азотен тор за подхранване на домати върху канелено-подзолиста почва, с явно изразен депресиращ ефект върху формирането и нарастването на цветовете и завързите в изследваните съцветия.

14. **Митова Ив**., Р. Кънчева, К. Симеонов. 2005., Качество на домати (Licopersicon esculentum Mill.) в зависимост от формата на азотния източник и почвения тип. Научни доклади. Национална конференция с международно участие. “Управление, използване и опазване на почвените ресурси”.15- 19. 05.2005.София, 286- 289

Mitova I., R.Kuncheva, K.Simeonov. Quality of Tomato (Lycropersicon Eseulentum Mill.) as a Result of Forms of N-mineral Fertilizers and Soil type

The influence of different forms of N-mineral fertilizers, in quantity 800 mg N kg-1 soil (background of P and K fertilization applied), over some parameters of growth and production indexes concerning tomatoes “sort - № 10 X Bizon”, was determined using vessel-vegetation experiments over three soil types with different pH. In some of the variants as a correctional fertilization, there are imported Ca, S and microelements. It has been determined that the biological quality of fruits cannot be taken apart from the general growth and productivity of plants. The highest measured values of growth indexes of tomato plants – Vitamin C in Chromic Luvisol and Vitamin C, dry substance and reduced sugars in Haplic- and Calcis Chernozem – are gained when Carbamide (800 mg N.kg-1) + inhibitor were improved. The usage of NO_3^- as N-source in soils with acidic reaction is connected to augmentation of the quality of biochemical indexes. When the soil has alkaline reaction more appropriate are NH_4^+ and mixed N-source.

15. **Mitova Iv.,** B. Kolev, N. Miteva. 2005.Simple study on solar radiation and greenhouse tomatoes yield relationship. Matematics and Natural Sciences . Proceedings of the International scientific conference, 8- 11.06.2005, Faculty of Mathematics and Natural Sciences-FMNS, Blagoevgrad, Volume2, p. 484- 489.

The experiments with tomatoes (Marone variety) are carried out in metal-glass greenhouse in Sofia district. The production situation was not typical early planting (in November) and several harvests during to the beginning of June. The total amount of nitrogen 600 kg/ha were given from 100% of organic fertilizer (manure) in first variant to 100 % NH_4NO_3 fertilizer in variant six and by different proportion of these two types of fertilizers as follow (80, 60, 40 and 20 percents of both). The variant seven is without fertilization.

The total solar radiations (out and into the greenhouse) and PHAR are measured during the whole vegetation period.
The aims of the present article were to study and to analyze the relationships between three measured solar radiations and tomatoes plant production during the vegetation period.

16. Dinev N. **Iv. Mitova**, V. Netcheva, 2006. Bio- indication of cadmium phytotoxicity on tomato plants depending on soil acidity. Plant science, 43, 377- 382.

Динев Н., Ив. Митова, В. Нечева. Биоиндикация на кадмиева токсичност при растежа на домати в зависимост от почвената киселинност

Изследвани са промените в доматови растения (Lycopersicon esculentum Mill, сорт Балка), отглеждани в различни почви с pH 7.9, 5.9 и 4.9 след внасяне на кадмий в нарастващи концентрации. Началната концентрация на кадмий с изявен инхибиращ ефект се отчита при дози от 30 до 60 тд/кд почва в зависимост от почвеното pH. При най-киселата почва се наб-людава най-изразен процес на потискане на развитието и висока негативна корелация между нивото на кадмия и надземната биомаса. Слабо изразени са корелациите между надземната биомаса и концентрациите на внесения кадмий при слабо алкалната почва. Комбинацията между кисела (pH 4.9) и алкална (pH 7.5) почвена реакция и високо ниво на кадмий се отразява на формирането на цветове. Изследвани са и промените в някои биохимични показатели. Активността на нитрат-редуктазата, (in vivo и in vitro) и глутамин-синтетазата, измервани през вегетацията, отразяват комбинирания ефект на неблагоприятна почвена киселинност и високо ниво на кадмия върху усвояването на нитрати. Изчислени са корелационните коефициенти между съдържанието на нитрати в листната маса и ензимната активност. Установено е, че концентрациите на кадмия, внесен в почвата, корелират позитивно с акумулираните количества от кадмий и калий в растителната биомаса. Разработката дава ранни физиологични и биохимични индикатори за токсичност на кадмия при отглеждане на доматови растения.

17. Dimitrov I., I. Stancheva, **I. Mitova**, E. Atanasova.,2005. Quality and Yield of Lettuce in Dependence of Different Fertilizer Sources. Bul. Journal of Agricultural Science, 11, 589- 594..

The influence of different fertilizer sources on lettuce yield and quality was studied. The field experiment was carried out on alluvial meadow soil in Isalapitsa experimental station. The experiment included three fertilizer sources: mineral fertilizer, farmyard manure and foliar fertilization. The highest yield values from lettuce were obtained in the variants with mineral fertilization. A beneficial effect of the lettuce quality was observed: high values of soluble sugars and vitamin C content, low level of cellulose and reduced nitrate content.

18. Стойков Хр., **Ив. Митова**, 2006. Възможности на фитокамерата КНЕР- 2 за отглеждане на светлолюбива култура / Licopersicum esculentum / Екология и индустрия, том- 8, №1- 2, 219- 221.

В условия на фитокамера (КНЕР-2) върху алувиално-ливадна почва е установено влиянието на нарастващи норми азотно торене, при контролирани условия върху някои от показателите на растежа- маса на растенията, листна площ, съдържание на общ азот и пластидни пигменти в листа от доматени растения. Полученото съдържание на общ азот в надземната маса на доматени растения е 5.36% и съотношение на внесените в почвата N: K = 1:1, най- високи показатели (с повече от два пъти, в сравнение с контролния вариант) за свежа маса и листна площ са получени при торене с 400 mg/ N kg почва. Най- високо съдържание на пластидни пигменти имат растенията торени с азотна норма N_{300}.

19. Stoykov H., **Iv. Mitova**, 2006. The light and potassium limits as factors by growing of winter tomatoes seedling. Proceedings of I^{-st}.international symposium " Ecological approaches towards the production of safety food ", 19- 20. X. 2006. House of science and technology- Plovdiv. 263- 268.

In this study, in spite of the fact that most of the studied properties have optimal values at K450, in one of the experimented variants was not observed symptoms of potassium deficiency, with characteristic necrotic mottles on the leaves. This is due not only to the good initial soil reserve of available potassium, but also to the constant illumination of 20000 lx in the camera, which is completely sufficient for growing of quality tomato seedlings. This optimal norm of potassium fertilization on alluvial meadow soil for young tomato plants (5th-6th leaf) in relation with the studied indexes: total plant length, fresh and air dry biomass, leaf area and content of plastid pigments was reseived at fertilization $N_{300}P_{200}K_{450}$.

20. **Mitova Iv**., R. Kancheva, 2006. The influence of N fertilizer and its soil response on the growth and yield of tomatoes. Proceedings of I-st.international symposium " Ecological approaches towards the production of safety food ", 19- 20. X. 2006. House of science and technology- Plovdiv. 185- 189.

On the base of pot experiment the influence of different N-fertilizers on the tomatoes growth and yield was investigated. The soil types were 3 with different pH and N was 800 mg/kg soil. The highest yield and total biomass from leached and calcareons chernozems was with $(NH_4)_2 S0_4$ added. The addition of NH_4N0_3; NH_4N0_3 + Mo and $CO(NH_2)_2$ are the best for getting the highest yield. The relationship between the yield and the growth parameters are investigated.

21. Стойков Хр., **Ив. Митова**, 2006. Азотната норма, температурата и светлината, като фактори определящи качеството на разсад от домати. Почвознание, агрохимия и екология, № - 1, 51. 56.

Stoykov H., I. Mitova. Nitrogen Limits, Temperature and Light as Factors Determining the Quality of Tomato Seedling

We discuss the influence of nitrogen limits from 100 to 600 mg N/kg soil having basic P, K - fertilization on the development of tomato plants in phase up to 6-7 leaves. The plants are grown in a phytochamber with low energy consumption at controlled temperature, illumination and photoperiod. The best development of the plants in the above phase is obtained in fertilization limits corresponding to 300 - 400 mg N/kg soil. It is defined that the phytochamber KHEP-2 is appropriate for tests with luminophilc cultures at a low consumption of electricity (472 kWh for the entire test).

22. Dimitrov I., I. Stancheva, I. Mitova, E. Atanasova. 2006. Compararative studi of some quality parameters of lettuce in dependence on way of cultivation. Bul. Journal of Agricultural Science, 12, 421- 427.

The influence of different way of cultivation on lettuce yield and quality was studied. Two field experiments were carried out on alluvial meadow soil in Tsalapitsa experimental station. The experiments were performed with lettuce, grown as a spring crop and winter crop with application of three fertilizer sources: mineral fertilizer, farmyard manure and foliar fertilization.

Significantly higher yield values from lettuce were obtained when lettuce was grown both at spring and winter lettuce crop in the variants with mineral fertilization. The best quality parameters: high values of soluble sugars and vitamin C content, low level of cellulose and reduced nitrate content were observed in the variants with foliar fertilization.

23. Мицулов Н., Л. Петрова, **Ив. Митова**, К. Пенев, Ц. Цонев. 2007. Влияние на постъпващата ФАР в култивационните съоръжения върху синтетичната продуктивност на домати. Научни доклади от международна конференция "Почвознанието- основа на устойчиво земеделие и опазване на околната среда", 13- 17.05.2007, София, т. II, 364- 367.

Mitsulov Nencho , Lidia Petrova , Ivanka Mitova, Krassiinir Penev, Tsonko Tsonev. Influence of the incoming PhAR in cultivation equipments on the photosynthetic productivity of tomatoes

From the environmental factors which influence the microclimate in the Cultivation Equipments (CE) the intensity of the incoming solar radiation is accidental and uncontrollable quantity that determines the intensity of plant photosynthesis.

The aim of this study was on the basis of data, collected during long period of time, to determine the penetration of PhAR in different foliar zones of plant canopy at Cultivation Equipment, and its influence on the photosynthetic productivity on the cultivated tomato plants.

With the study was determined the extent of PhAR penetration at three zones (lowest zone 1 to 7 leaf, middle zone 8 to 14 leaf, and upper zone 15 to 21 leaf) of the cultivated tomato plants in the greenhouse. The main contribution of the photosynthetic productivity of 72 % was due to the folia from the third zone, those assimilating 55 to 72 % of the CCU during the day. The results obtained from this study can be used in calculation of the net photosynthetic productivity in different foliar zones, on the basis of the daily values of PhAR intensity' (IPAR) and on CO: concentrations, measured at the plant canopy.

24. **Митова Ив**., 2007. Динамика на цъфтеж, образуване на завръзи и плодообразуване на домати върху излужен чернозем в зависимост от формата на азотния тор. Почвознание, агрохимия и екология, Vol. XLI, N- 1, 44- 51.

Mitova I. Dynamic of Blooming and Formation of Knots in Tomatoes Grown Over Luvic Chernozem and in Dependence of the Form of Nitrogen Source

The influence of N-source over dynamic of blooming and formation of knots in tomatoes grown over medium Luvic Chernozem was established in experiment, with tomato "N-10 x Bizon" sort in vessel experiment. The N-source norm from 800 mg N kg-1 soil and background of P and K fertilization was imported as a NH_4NO_3, $(NH_4)_2SO_4$, $Ca(NO_3)_2$, $Ca(NO_3)_2$+ Mo, $CO(NH_2)_2$, $CO(NH_2)_2$+ inhibitor, $CO(NH_2)_2$+ inhibitor + Zn. As a correcting fertilization in some cases was added Mo- and Zn- fertilizer and inhibitor of nitrification. As a result of this study we find out:

The earliest ripe fruits and the highest ripe fruits-yield are reported in plants fertilized with $CO(NH_2)_2$ + inhibitor + Zn.

The plants fertilized with $(NH_4)_2SO_4$ ripe later but they produce higher yield (ripe and unripe fruits). The biggest fruits are found in this variant of fertilization. The latest blooming and ripening and the smallest fruits are produced in the variant with $Ca(N0_3)_2$ + Mo.

25. Стойков Хр., **Ив. Митова**, 2007. Сравнение на контролирани условия във фитокамера и вегетационна къща при отглеждане на разсад от домати. Почвознание, агрохимия и екология, Vol. XLI, N- 1, 52-56.

Stoykov Hr., I. Mitova. Comparison of Controled Conditions in Phytochamber and Greenhouse During Tomato Seedlings Cultivation

Two pot experiments with tomatoes, sort "Jar- F1" were conducted in chamber "KHEP2", under artificial climate conditions, and in the greenhouse of Nikola Poushkarov Institute of Soil Science, Sofia. Experimental scheme included seven different phosphorus fertilizer treatments: norms from 100 to 600 mg P/kg of soil.

During the experiment were compared the lengths of the whole plants, lengths of their over ground parts, and of their roots; the thickness of plant stems and the leaves surface. Also was compared the content of chlorophyll in leaves. The best results were obtained at norms of fertilization $N_{300}P_{300}K_{450}$ and $N_{300}P_{400}K_{450}$.

The plants, grown at controlled conditions in the Chamber "KHEP2" as compared to those, grown in the Greenhouse, form better quality of seedlings, with commensurable amount of chlorophyll in the leaves, with optimal ratio of their height and the maximal diameter of the stems - 30.3, and with more favorable relation between the length of the over ground parts of the plants and their root system.

26. **Митова Ив**.,2007. Влияние на азотната норма и почвения тип върху съдържанието на хранителни елементи в доматени растения. Манганова токсичност. Международна научна конференция "Растителния геофонд- основа на съвременното земеделие" 13- 14.06.2007. ИРГР, Садово, 515- 518.

The influence of N-source 800 mg.N.kg-1, imported in different form, over synthesis and accumulation of main macro- and microelements is established in experiment with tomato in vessel experiment over chaplic luvisoil.
It was established that in all tasted form of N-fertilization the norm of N_{800}, P_{300}, K_{378} is optimal for yield formation but make the accumulation and assimilation of main macro- and microelements worse. The positive effect of Mo-fertilization over the contents of N, P, K and Ca in tissue are well expressed in cases with mixed of NH_4NO_3 and $Ca(NO_3)_2$. The depressive action of NH4+-N in case with ammonium sulphates decrease with CaCO3 adding and simultaneously increase the amount of N, K, P and Ca in plants. Assimilation of Mg^{2+} is stimulating in cases with NH_4NO_3, $(NH_4)_2SO_4$ and $Ca(NO_3)_2$ and depressed in cases with $CO(NH_2)_2$ and $CO(NH_2)_2$ + inhibitor.

27. Стойков Хр., **Ив. Митова**, 2007. Определяне на листна площ на соя в посев. Международна научна конференция "Растителния геофонд- основа на съвременното земеделие" 13- 14.06.2007. ИРГР, Садово, 519- 522.

Stovkov Hristo, Ivanka Mitova. Leaf area determination of soybean canopy

The method for leaf area of soybean canopy was presented, where do not used special measurement equipment. The determination was realized non-destruction of plant. The study was conducted during two growth stages of soybean - budding and grain filling. The calculated and real lamina area of 40 decompounds threefold pinnate leaves (120 leaves partitions) were compared. Real areas were determined by planimetric method and calculated were on the base of measured lengths and width of the studied leaves. Suggested method, was easy and guaranteed 95 % accuracy when the lamina sizes of 15 decompounds threefold pinnate leaves.

28. Кънчева Р., **Ив. Митова**, 2007. Относно износа на фосфор при доматени оранжерийни растения. Сборник. II-ри международен симпозиум "Екологични подходи при производството на безопасни храни", 18- 19.11.2007, ДНТ, Пловдив .173- 176.

Във връзка с промените в климата е направена оценка на физичните свойства на почвите в община Ивайловград и пригодността им за селскостопанска дейност. Като заключение може да се каже от наличните пълнопрофилни почви, които възлизат на 16.8% от територията на община Ивайловград, най-подходящи за отглеждане на селскостонаски култури са смолниците, черноземовидните почви, канелените горски и алувиални почви. Върху тях с успех могат да се произвеждат зърнено-житни, зеленчукови и овощни култури. От овощните култури най-подходящи са прасковите, следвани от череши и ябълки. Лозовите насаждения също намират добри условия за развитие.

Неподходящи за отглеждане в региона са малините, картофите, лена, слънчогледа и захарното цвекло, както и соята.

29. Кънчева Р., **Ив. Митова**, В. Кръстева, 2007. Относно влиянието на засушаването и деградацията на земите върху селско- стопанското производство в община Ивайловград. Осма научно практ. конф. с междунар. участие " Екологични проблеми на Българското земеделие в Европейския съюз ", Научни трудове, т. LII, 67- 72, АУ-Пловдив.

Comparative study of phosphoric export in tomato plants under different greenhouse conditions was made. Regression equations determining the influence of fertilization over the exported with production phosphorus were drown. These equations describe the curve of phosphoric export by years, since through them it is possible to specify the optimal variations in relationship with other tested variants. Comparison between phosphorus exnorted with production on greenhouse and field tomato plants was done as well.

30. Atanasova,E., **Mitova,I.,** Dimitrov,I., Stancheva,I.,2007. Effect of different fertilizer sources on the quality of head cabbage. Journal of Applied Horticulture, 9 /1/ :74-76

The influence of different fertilizer sources on head cabbage (Brassica oleracea var. capitata, cv. Pructor) yield and quality was studied. The field experiment was carried out on alluvial - meadow soil (Jluvisol -FAQ) pH 6.5. The trial included mineral fertilizer, farmyard manure and foliar fertilizer. The highest yield values were obtained with mineral fertilization. The best quality parameters in the cabbage leaves - dry weight, total soluble sugars, cellulose, vitamin C and nitrates content were obtained in the treatments with foliar fertilization followed by the treatments with organic fertilization. The observed decrease of N and K residuals after the harvest of head cabbage crop in comparison with the initial soil reserves indicated complete absorption of fertilizers supplied and this is a very important result from ecological point of view.

31. Tzenova V., **Iv. Mitova,** 2010. Influence of the soil moisure regime on the nitrogen and plastid pigments content in wheat varieties. Journal of envitonmental and ecology. Volume: 11 Issue: 2 Pages: 540-546, **IF -0,178**

Field experiment with 12 wheat varieties was conducted on meadow-cinnamonic soil in experimental station of the ISS "N. Poushkarov" in Tzalapitza, Plovdiv region. The realised variants of the soil moisture regime were: non-irrigated and optimum irrigated in 3 replications. The contents of $NH_4^{+,}$ NO_3^- in mg/100 g soil, were determined in soil samples. The content of N in % in the wheat straw and wheat - ears, and the content of chlorophyll a and chlorophyll b in the wheat biomass for different wheat varieties of the non-irrigated and optimum irrigated variants were evaluated. As it was expected, the results showed significant higher N-concentration in the wheat - ears than in the straw. On the basis of the results can be concluded that under non-irrigated conditions the N-content varied more for the different varieties than that under optimum irrigation. The results for nutrient elements in the accumulated biomass and ears were similar to those reported by other authors. It was found that the content of the two studied pigments chlorophyll a and chlorophyll b was higher for the more of varieties under non-irrigated conditions than under irrigation conditions. Probably the reason for this was the so-called dilute effect, observed from some authors at other crops.

32. **Митова Ив**., Хр. Стойков, 2008. Светлината и почвената влажност като фактори определящи растежните процеси и някои от качествените показатели при китайско зеле Brassica pekinensis (Lour.) Седми международен симпозиум "Екология- устойчиво развитие", 23- 25. 10. 2008, Враца, Научни трудове, 291- 294.

Mitova Ivanka, Hristo Stoykov. The light and soil humidity as factors of growth, and some quality indexes in Chinese cabbage Brassica pekinensis /Lour./

An experiment with Chinese cabbage was carried out in phytochambers type (KLEC) filled with low-humus-containing Fluvisoil, neutral pHKCl - 6.0 and average mineral N storage of 25.05 mg/1000 g. The experimental goal was to determine the influence of sun radiation continuance and soil humidity in artificial climate conditions over some of the growth factors and quality of Chinese cabbage.

The collected results show that the plants react differently depending on the monitoring parameters. In the case of 80 % field capacity and 12 hours lightening the number of germinated seeds is 29.56% higher than those under 50 % field capacity and 8 hours lightening.

33. **Митова Ив**., Хр. Стойков, 2008. Климатичните условия и фосфорната норма като фактори за усвояване на основните хранителни елементи от доматени растения. Седми международен симпозиум "Екология- устойчиво развитие", 23- 25. 10. 2008, Враца, Научни трудове, 287- 290.

Mitova Ivanka, Hristo Stoykov. Climate conditions and phosphorus norm as assimilation factors of basic nutritive elements in tomato plants

Two experiments with tomatoes sort „Jar-F1" were carried out in phytochamber type KNEP-2 with artificial climate and in a greenhouse.

The experimental goal was to determine the assimilation of basic nutritive elements in tomato seedling plants in case of increased norm of phosphorus fertilizer by different conditions in artificial climate camera and in a greenhouse.

The results show that the misbalance in the growth, development and assimilation of nutritive elements in tomato seedling plants is basically caused by disturbance in temperature and illumination regime during the vegetation rather than the lower degree of phosphorus nutrition.

34. Ценова В., С. Манолова, **Ив. Митова**, 2008. Влияние на водния дефицит върху развитието на сортове рапица. II Влияние на въздушно- водния дефицит. Седми международен симпозиум "Екология- устойчиво развитие", 23- 25. 10. 2008, Враца, Научни трудове, 314- 318.

Изведен е съдов опит със сортове рапица – Remy, Rasmus, Elvis 1, Mantiba, Robust 1592-200, Elvis 2 и сортови линии Rodeo 1018-1A и H902077 Tractor в климатична камера, с почва карбонатен чернозем от КОС Лом, с поддържане на почвени влажности 40 % и 70% от ППВ. Като сухоустойчиви /на въздушен и почвен воден дефицит/се очертават 1018- 1A, 902077 с най-високи стойности на тегло зърно и сухо тегло биомаса. Отношението тегло зърно/ тегло биомаса е по-високо при всички изследвани сортове при 40% ППВ в сравнение с режим 70% ППВ. Като отзивчиви на напояване се очертават Remi и Robusta.

35. Кънчева Р., **Ив. Митова,** 2008. Сравнително изследване на износа на азот при доматени оранжерийни растения. Научна конференция С международно участие " Науката в условията на глобализация", Кърджали, 1- 2.10.2008.,т III,част II,стр.155- 159.

Kancheva R., Iv. Mitova. Comparative study of nitrogen export in greenhouse tomatoes plants

Comparative study of nitrogen export in tomato plants under different greenhouse conditions was made. Regression equations determining the influence of fertilization over the exported with production nitrogen were drown. These equations describe the curve of nitrogen export by years, since through them it is possible to specify the optimal variations in relationship with other tested variants. Comparison between nitrogen exported with production on greenhouse and field tomato plants was done as well.

36. **Mitova I**., I. Dimitrov, E. Atanasova, I. Stancheva 2008. Effects of fore- crop fertilization on the yield and quality of kidney beans under vegetable crop rotation conditions . Acta Agronomica Hungarica 56(4) pp. 67.

Kidney beans (Phaseolus vulgaris (L.) Savi.) ssp Nanus cv. Lodi were grown as a mid-early second crop after lettuce on an alluvial meadow soil with pH(H2O) = 6.4 and a plant density of 22 plants per m2. The bean crop was grown without fertilization, but the lettuce crop was treated with mineral, organic or foliar fertilization. The application of different fertilizer sources to the lore-crop resulted in high yields of the subsequent bean crop, with good quality parameters and without polluting the arable soil layer with fertilizer residues. Foliar fertilization applied to the fore-crop resulted in a lower accumulation of nitrates in fresh beans in comparison with the other fertilizer sources. Organic fertilization supplied during the cultivation of the previous crop had a stronger effect than mineral fertilization on certain quality parameters of the kidney bean plants, such as dry matter, vitamin C content, and the accumulation of nitrates.

37. Atanasova E., **I. Mitova**, D. Stoicheva, 2009. Assessment of biochemical and morphological parameters of procesaing tomatoes in dependence on nitrogen fertilization. Seminar of ecology. Proceedings, 23- 24.04.2009, Sofia, 198- 202.

Field experiment was conducted on alluvial-meadow soil (Fluvisol FAO) to evaluate biochemical and morphological characteristics of processing tomatoes (Licopersicon esculentum Mill. Rio Fuego cult.) in dependence on different rates of nitrogen fertilization. Following parameters of fruits were determined, dry matter content, vitamin C, nitrates, weight of a fruit, number of fruits per plant, availability of cavities in fruit, color, number of locules. The highest values of dry matter content, weight of a fruit and number of fruits per plant were obtained in the variant with the highest rate of nitrogen fertilization. Content of vitamin C was higher in controls. The absence of nitrates in tomato fruits was a very important result from ecological point of view.

38. **Митова Ив**., Р. Кънчева, 2009. Динамика на плододаване и структура на добива при полски домати в зависимост от сорта и приложеното торене. IX научно- практическа конференция с международно участие "Екология, земеделие, животновъдство", АГРОЕКО , Научни трудове, том LIV, АУ, Пловдив, 165- 170.

Mitova Ivanka, Radka Kancheva. Dynamics of fertility and structure of yield of tomatoes in depending on cultivar and fertilization

An experiment with tomatoes (Licopersicon esculentum) - middle-early production was performed on an Alluvial-meadow soil (Fluvisol FAO) in Tsalapilsa, Plovdiv district.
The investigation was done with three tomato cultivars: Precos-F1, Bakini and Pink Charm. The influence of fertilization with equivalent quantities organic and mineral fertilizer on reproduction and structure of yields was examined. The structure of the yields varies between 42.4% and 56.5% for vegetative yield and between 43.5% and 57.6% for the fruit. According to the highest obtained yield of fruit, the Bakini cultivar fertilized with mineral fertilizer formed the biggest fresh and air-dry vegetative yield.

39. **Митова Ив**., Р. Кънчева, Н. Динев, Хр. Ботева,2009. Растежни и репродуктивни прояви при домати- средно ранно производство на открито, в зависимост от сорта и приложеното торене. Сборник с доклади от трети международен симпозиум: "Екологични подходи при производството на безопасни храни" 15- 16.10. 2009, гр. Пловдив.177- 182

Mitova Ivanka, Radka Kancheva, Nikolai Dinev, Hriska Boteva. Growth and reproductive show in tomatoes - average production on the field, depending on variety and applied fertilizer

The filed experiment with three varieties of tomatoes: Prekos-F1, Bakini and Pink Charm. Study the influence of the equivalent rate of fertilization (N30), filed with manure and mineral fertilizer. For leaf feeding for vegetation have been applied by spraying "Humusil"and"Masterblend". Testing varieties differ significantly in their vegetative and reproductive results. Variety, Bakini and Pink Charm are with more leafs and they are higher compared with the control standards Prekos-F1. Mineral fertilization variants in the three varieties were formed higher plants, but on the other fertilizing with manure have thicker stems. The indexes of clusters in the indices and numbers tied Bakini variety shows highest values in both types of manure, compared to the Prekos-F1 and Pink Charm. In Bakini variety has been received highest value of vegetative mass, which corresponds to the highest yields of fruit obtained in the experiment .The smallest value of vegetative mass is the Prekos-F1, and the lowest yields of fruit of all tests is Pink Charm.

40. Кънчева Р., **Ив. Митова**, 2009. Относно износа на калий при доматени оранжерийни растения. Трети международен симпозиум: "Екологични подходи при производството на безопасни храни" 15- 16. 10. 2009, гр. Пловдив, 183- 188.
Kancheva Radka, Ivanka Mitova. About potassium export in greenhouse tomatoes plants

Comparative study of potassium export in tomato plants under different greenhouse conditions was made. Regression equations determining the influence of fertilization over the exported with production potassium were drown. These equations describe the curve of nitrogen export by years, since through them it is possible to specify the optimal variations in relationship with other tested variants. Comparison between nitrogen exported with production on greenhouse and field tomato plants was done as well.

41. Динев Н., **Ив. Митова**, 2009. Агроекологичен мониторинг и разработване на технологични решения за тежкометално натоварени почви. Избор на индикатори, Международна конференция "Обработка на почвата", 1-5.09.09. Албена, България., 259- 267.

Dinev Nikolai and Ivanka Mitova. Agroecological monitoring and development of technological decisions for heavy metal polluted soils. I. Selection of indicators

Monitoring of agricultural lands is a modem and perspective topic for valuation of soil quality. The main goal of agricultural monitoring is to receive adequate information for expressing the knowledge

and planning of activities tend to good agricultural practices. In the paper, a short review of agricultural indicators was made. The selection of proper ones is a complex and important decision. The relevant indicators have to be easy for measurement and in the same time enough —informative for the situation, to be adequate to current status and human activities, to be complex for different processes, to be easy for implementation, etc. The information received from indicators, would be incorporated in development of programs for sustainable land use in contaminated areas. Short description of TRIAD strategy was done. Proposed by USEPA system for management of the process of decision making of evaluation and remediation of contaminated sites If was discussed. Three specific tools form the TRIAD - system planning, dynamical strategies, and real time decisions. Partially, the team has good experience in implementation of segments from TRIAD in Bulgaria - for contaminated sites of Kremikovtzi, KCM-Plovdiv, Chelopech, Pirdop. The further application of an L adopted arid specific version of TRIAD in Bulgaria should support development IE of National Remediation Program.

42. **Митова Ив**., и Н. Динев, 2010. Влияние на температурата върху някои показатели на растежа, добива и качеството на домати при полско производство. Почвознание, агрохимия и екология, vol. XLIV, 1, 45-51

Mitova I., N. Dinev. Temperature's Impact on Growth Parameters, Yield and Quality of Tomatoes from Field Production

A field experiment on Alluvial meadow soil (Arenic Fluvisols, WRBSR, 2006) with three cultivars of tomato (Prekos F1, Bakini and Pink Charm) was carried out. Different kinds of fertilizers - mineral and organic (farmyard manure) were applied. The nitrogen dose is equal for both fertilizers - 300 kg/ha. Effect of temperature specific conditions (as air as soil) on growth's, reproductive's and quality's parameters was shown. The cultivar Pink Charm had low adaptivity to higher summer temperatures and low humidity, expressed by minimal number of sets and flowers in stage 2nd cluster. The cultivar Prekos F1 had the highest number of sets in the same stage of growing. The culticar Bakini expressed the highest number of sets in next stage - 5th clusters. In resume, the temperature affected slowly the cultivar Bakini. The form of fertilizers did not affect growing process excepting the cultivar Pink Charm. The yield and quality of production supported the good choice selected norm of fertilizers.

43**. Митова Ив**., Ив. Димитров, Хр. Ботева, 2010. Качество на домати в зависимост от приложеното торене и сорта. Почвознание, агрохимия и екология, vol.XLIV, 2, 47-53.

Mitova I., I. Dimitrov, Hr. Boteva. Tomato Quality in Accordance with Compost Introducing and Varieties

A field experiment on an Arenic Fluvisoi (WRBSR, 2006) with a three different type of tomato plants - Prekos F1, Bakini and Pink Charm is made. The influence of specific nitrogen norm 30 kg N da-1 in form of mineral and organic compost, on a PK-basis over quality characteristics of the production from the chosen variety was traced. The experiment proof that in the most cases the fruits of organic compost plants were richer on absolute dry matter compare to these from plants treated with fertilizer. The higher quantity of dry matter after the first analyse was found in variety Pink Charm treated with organic compost - 6.8%, and after the second analyse in the analogical experiment with variety Bakini - 7.74%. The fruits from the plants treated with organic compost are in general larger, with higher vitamin C quantity and mutual sugar compare to those treated with fertilizer. The coefficient of determination (R2) from the equilibration describing the dependence of fruit weight and fruit number, and fruit weight and absolute dry matter, mutual sugar, lycopene and carotene are high reliable numbers.

44**. Митова Ив.,** Р. Кънчева, 2010. Върху някои биохимични показатели за качеството при оранжерийно производство на домати. VIII нац. н. тех. конф. с международно участие «Екология и здраве», 19.05.2010, Пловдив, 159- 164.

Mitova Ivanka, Radka Kancheva. Biochemistry index for quality of glasshouse tomatoes production

Three - year - long experiments were conducted in a glasshouse for the purpose of comparing the effect of the 60 kg N/dka rate applied in the form of single organic fertilized (manure) mineral (N, P, K)

fertilizer and a mixture of organic and mineral fertilizer in various(80, 60, 40 and 20%) on tomato fruit yield and biochemistry index for quality.
Application of manure singly or its predomination in the combination ensured higher yields, greater and higher quality fruits then the equivalent quantities of mineral fertilizers applied singly or as predominating compounds in mixed fertilizers.

45. Кънчева Р., **Ив. Митова**, Б. Христов. 2010. Многокритериална ортимизация на биофизични показатели на оранжерийни домати в зависимост от органичното и минералното торене. VIII нац. н. тех. конф. С международно участие «Екология и здраве», 19.05.2010, Пловдив. 165- 168

Kancheva Radka, Ivanka Mitova, Biser Hristov. Multi-criteria problem on biophysical index of glasshouse tomatoes for effect of organic and mineral fertilizer

The main purpose of the paper is the positive effect on the biophysical contents of the tomatoes, concerning taste and food quality, by proper fertilizing. An optimization method is used in order to choose the combination of the fertilizers, which influences the quality of the production.

46. Динев Н., **Ив. Митова**, 2011. Ефекти на минералното и органичното торене върху акумулацията на замърсители в растения от спанак. Почвознание, агрохимия и екология, год. XLV, приложение №1- 4, 104-110.

Dinev N., I. Mifova. Effects of Mineral and Organic Fertilization on the Accumulation of Heavy Metals in Spinach Plants

The problem with food safety of plant production is an actual problem especially at heavy metal polluted soils. The goal of investigation was to study transfer and accumulation of heavy metals - Cd, Zn, and Pb, in spinach plants in respect to application of organic and mineral fertilizers. A greenhouse experiment with soil around a nonferrous plant with different levels of contamination was carried out. For growing of spinach plants mineral and organic (Amalgerol) treatments were applied. Maximal positive effect on the growing parameters were determined at mineral treatment $N_{200}P_{200}K_{200}$ combined with low concentration of Amalgerol - 0.05%. The photosynthetic activity by plastid pigment content was discussed. The quality parameters- nitrate content, Vit. C and total sugar, showed that optimal variants are $N_{200}P_{200}K_{200}$ and $N_{200}P_{200}K_{200}$ + Amalgerol (as leaf application). The plants grown at mineral fertilizers expressed higher concentration of nitrate Vit. C and sugar than these ones growing at organic fertilizers.
The risk assessment of production showed that spinach accumulated the highest concentrations of Cd - 49 mg/ kg, Pb - 83 mg/kg and Zn - 663 mg/kg in treatments of soil with Amalgerol - 500 ml/da and Amalgerol 1000 ml/da, and could be characterized as toxic.

47**. Митова Ив.,** Н. Динев, 2011. Сравнително изпитване на органичото и минералното торене върху растежните и репродуктивни прояви на домати. Почвознание, агрохимия и екология, год. XLV, приложение 1- 4, 158- 163.

Mitova I., N. Dinev. Comparison between organic and mineral fertilization at tomatoes growth and reproduction

A green house experiment with tomatoes variety Rio Fuego on weakly eroded Cmnamonic forest soil was carried out. Soil parameters are pH in KCI- 6.5, low content of mineral nitrogen 11.3 mg/kg, very well stocked with available forms of phosphorus and potassium respectively 26.0 and 26.5 mg/100 g. The fertilization dose ot $N_{400}P_{536}K_{68}$ was used as mineral as organic forms as parallel with leaf application (cristalon- mineral and humusil- organic).
The high effect on growth parameters and yield forming expressed variants with 100% mineral fertilization, following the combination of 50% farmyard manure plus 50% mineral forms and 50% mineral fertilizers plus humusil. Plants, cultivated with bio-humus and bio-humus plus cristalon had poor growth..

High decree of determination between weight of tomatoes and number of tomatoes was calculated- R^2- 0.782. Relatively low coefficients between diameter of plants and weight- R2 - 0.507 and diameter of stems and number of flowers in plantn- R^2 - 0.449 were shown.

48. **Митова Ив**., Н. Динев, 2011. Сравнително изпитване на органичното и минералното торене върху усвояването на хранителните елементи и качеството на плодове от домати. Почвознани е, агрохимия и екология, год. XLV, приложение 1- 4, 164-169.

Mitova I., N. Dinev. Comparative investigation of Organic and Mineral Fertilization on Nutrient Uptake and Tomatoes Quality

A greenhouse experiment on tomatoes growth (cultivar Rio Fuego) on Leached cinnamonic forest soil was carried out. The soil pH was 6.5, low concentration of mineral nitrogen -11.3 mg/kg and very good storage of phosphorus and potassium - 26 mg and 26.5 mg/kg respectively, was determined. The effects of organic and organo-mineral fertilization, as well as leaf treatments with both fertilizers, on uptake of nutrients and fruits quality were studied.

The dose of $N_{400}P_{536}K_{68}$ (ration N:P:K = 1:1.34:0.17) based on former authors investigations and calculated on organic farmyard composition, was not optimal for plant growth- growing was weak, fruits were small and quality was low. Maximal nitrate content, but also the maximal dry biomass content and sugar concentrations were determined in variants with mineral fertilizers. Among combinations of fertilizers the most suitable are 50% farmyard manure + 50% mineral fertilizer, 50% bio-humus + humusil. The plants, treated with 100% bio-humus, as 50% bio-humus + cristallon expressed low nitrate content and relatively high concentration of dry matter accumulation and Vit. C. The leaf application of humusil and cristallon supported plant growth and improved the quality and quantite of grow and leaded to low nitrate accumulation in tomato fruits.

49. **Митова Ив.,** Н. Динев, Хр. Стойков. 2011. Влияние на температурата, почвената влажност и азотната форма върху проявите на растежа и физиологични показатели при пекинско зеле (Brassika pekinensis Lour.). Почвознание, агрохимия и екология, год. XLV, приложение 1- 4, 170- 175.

Mitova I., N. Dinev, Ch. Stoikov. The Influence of Temperature, Soil Humidity and N-form over Growth Parameters and Some Physiological Parameters in Case of Pekinensis Cabbage (Brassica pekinensis Lour.)

The experiment is performed with Pekinensis cabbage in phitocamaras KHEP-2 and KHEP-3. The type of soil is Alluvial-meadow soil (Fluvisol, FAO) with a neutral reaction pH(KCl) - 6.2. In case of 8000 lx illumination and 8 h daily duration, the influence of the air temperature - 15 и 21 °C, the soil humidity - 50 и 80%, as well the two different N-forms over the growth, development and some physiological parameters in case Chinese cabbage is proofed. The N is applied during the vegetation period in form of NH_4N0_3 and $CO(NH_2)_2$ in dose of 200 mg N/kg in soil at background of $P_{100}K_{100}$. In the phase of 4-5th leaf the plants are removed from the cameras to the level atmosphere temperature.

The obtained results show that all plants after fertilization of soil with ammonium nitrate are higher, looks much better and straight, with more leafs and vegetation mass, with much more chlorophyll amount compared to those ones fertilized with carbamide. In case of 80% soil humidity the plants of the two different fertilizer are with higher mass compare to those with 50%, but in case of root mass it another way around. No relation was found between both, number of leafs and plants high and the parameter soil humidity.

50. **Митова Ив**., П. Александрова, Д. Стойчева, 2011. Влияние на минералното торене върху износа на азот с късно полско производство на патладжан. Научни доклади от междунар. конф.”100 години почвена наука в България”, 16- 20.05.2011.С., част II, 582-585.

Mitova Ivanka, Petra Alexandrova, Dimitranka Stoicheva. Influence of mineral fertilization on the nitrogen uptake with late field production of eggplant

A field experiment with eggplant, (Solatium melongena L.) on Alluvial-meadow soil have been done. On potassium and phosphorus background (P18K18), the influence of the increasing nitrogen norm, 0.9, 18 and 27 kgN.da-1 was studied. The aim of this study is to found the influence of nitrogen

fertilization norms on the amount and exported nitrogen into the production, as well as the accumulation and the uptake rate of fertilization nitrogen from the eggplants.
The results show highest intensity of nitrogen insertion into the plants at the stage of the beginning of bloom. The main part introduced nitrogen is concentrated in the leaves, followed by fruits and the smaller one in the stems. In the phases beginning and end of fruit building, the export/accumulation of nitrogen with the main biomass is the highest. In the variant $N_{27}P_{18}K_{18}$ nitrogen export with the general biomass is the highest in all phenophases of plants development and lie between 9.87 and 19.3 kgN.da-1.

51. **Митова Ив**., И. Кънчева, Р. Кънчева, 2011. Многокритериална оптимизация на показатели на качеството на домати полско производство в зависимост от торенето. Научни доклади от междунар. конф.”100 години почвена наука в България”, 16-20.05.2011.С., част II, 586- 590.

Mitova Ivanka, Ina Kancheva, Radka Kancheva Multiobjective optimization of quality indicators of tomato field production depending on fertilization

To meet the diverse needs of the consumer demand, it is necessary to widen the variety and technological diversity in the production of tomatoes. The paper aims at developing a methodology for making selection between different fertilization rates and the varieties of tomatoes to be grown with a particular purpose and quality. For this purpose two different approaches, namely of the weighting coefficients and of the strict dominance, are proposed for multiobjective optimization in choosing the optimal combination varicty/level of fertilization. It has been used such a combination of performance, yielding an overall assessment of nutritional quality and profitability of tomato production, which indicate the optimal version of variety/fertilization.

52. Стойчева Д., П. Александрова, В. Колева, Ц. Симеонова, **Ив. Митова**, Е. Атанасова, 2011. Баланс на азота при отглеждане на различни зеленчукови култури на алувиално- ливадна почва в Южна България. Научни доклади от междунар. конф.”100 години почвена наука в България”, 16- 20.05.2011.С., част II, 654- 658.

Stoicheva Dimitranka, Petra Alexandrova, Venelina Koleva, Tsetska Simeonova, Ivanka Mitova and Emilia Atanasova. Nitrogen balance in different vegetable crops grown on fluvisol in Southern Bulgaria

The purpose of this study is to focus on the nitrogen balance and losses in agricultural system. The influence of precipitation, irrigation and fertilizer application on some soil parameters, N-uptake by plant production and N-output by lysimetric water are evaluated in this paper.
The study is carried out on Fluvisol (Tsalapitsa, Plovdiv region) under the conditions of field experiments with different vegetable crops over the period 2003-2007. The experimental design includes 3 treatments with nitrogen application - N_0, N_{80}, N_{160}. The field plots are equipped with modification of Ebermayer type of lysimeters, which collect water from 100 cm depth of soil profile.
According the received data it was observed that compensation between the amounts of N input and output was achieved in two variants (N_{80}, N_{160}) for all crops growing. Reducing the nitrogen input to the amount applied by precipitation and irrigation waters is the most ecological-friendly technological decision and very important factor for environment protection.

53. Никова И., Н. Динев, **Ив. Митова**, 2011. Съдържание на водоразторими и обменни катиони и тежки метали в растителната тъкан на домати в зависимост от замърсяване на почвите. Научни доклади от междунар. конф.”100 години почвена наука в България”, 16- 20.05.2011.С., част II, 930- 933.

Nikova Ivona, Nikolai Dinev and Ivanka Mitova. Content of water-soluble and exchangeable adsorbed cations and heavy metals in plant tissue of tomatoes, depending on soil contamination

The soil contamination with heavy metal is an important degradation process. Particular attention is paid to risk assessment for quality and safe production. In greenhouse vegetation experiment was traced the influence of soil contamination on the changes in cation exchange capacity of plants and their organs, which largely manages receipt of bases and the formation of organic production. The soils are from

KCM-Plovdiv area, anthropogenicly overloaded (extreme-contaminated with lead-2000 mg/kg and 40mg/kg cadmium at pH 6.8); control-containing metals below the acceptable levels and variations imitated lead contamination (450 mg/kg) and cadmium (35 mg/kg) of unpolluted soil. High levels of pollution trigger protective mechanisms of plants. Tomatoes absorb above ground mass cadmium and lead, despite existing safeguards and the aspiration of the plant organism to maintain constant metabolic parameters. The results can be used in assessing risk and developing strategies for sustainable land management.

54. **Митова Ив**., Н. Динев, 2011. Влияние на почвеното замърсяване и температурните режими върху растежни прояви на домати в разсадна фаза. Н. конф. с междунар. участие »Хранителна наука, техника и технологии- 2011»,14- 15.10.2011, Пловдив, 421- 427.

В условията на вегетационен опит е изследваната промяната, дължаща се на почвено замърсяване и температурния режим, в биометрични и физиологични параметри на четири сорта домати. В разсадна фаза сортове Николина, Елена и Дора проявяват слаби изяви на токсичност, което може да ги характеризира като по-толерантни към множествено тежкометално замърсяване. Най-чувствителен към температурния режим и почвеното замърсяване е сорт Трапезица, като това е особено забележимо при по-ниската температура на отглеждане.

55. Динев Н., **Ив. Митова**, 2011. Качество и безопасност на салата (Lactuca sativa) в зависимост от поливните води. Н. конф. с междунар. участие »Хранителна наука, техника и технологии- 2011»,14- 15.10.2011, Пловдив, 415- 420.

Нитратите в поливните води представлява изключително важен, но сравнително слабо коментиран фактор, влияещ върху околната среда и човешкото здраве. В условията на вегетационен моделен експеримент е изпитано влиянието на нарастващи концентрации на нитрати върху качеството и безопасността на продукцията. Установено е паралелно нарастване на нитратите. Коментирани са данни от биоморфологични показатели, съдържанието на нитрати, захари и пластидни пигменти.

56. Динев Н., **Ив. Митова**, Р. Кънчева, 2011. Ефективност на производството от средно ранни домати и показатели, свързани с него. IV международен симпозиум “Екологични подходи при производството на безопасни храни”. ДНТ- Пловдив, 63- 68

Dinev Nikolai, Ivanka Mitova, Radka Kancheva. Efficiency of production of middle early tomatoes and indicators related to it

A field experiment with three cultivars of tomatoes (Prekos F1, Bakini and Pink Charm) at the region of Plovdiv (Central South Bulgaria) was carried out. The quality and quantity of the yield production were previously discussed. The calculation to income and coefficient of economic efficiency shown that the most perspective cultivar was Bakini, fertilized with mineral compounds. All variants with mineral fertilizers surpassed the variants with farmyard manure excluding Pink Charm. The quantity, quality and economic valuation shown that the last cultivar was not suitable for growing in investigated area.

57. **Митова Ив**., Хр. Стойков. 2011. Влияние на почвената влажност и интензивността на светлината върху растежните процеси и някои от качествените показатели при китайско зеле. Юбилейна научна конференция с международно участие *“инженерната наука за устойчиво развитие на земеделието”* по случай 60-годишнината на ИММ, 5 – 7 ноември 2009 год. Селскостопанска техника, №3, 4- 7.

Опитът е изведен върху алувиално ливадна почва с китайско зеле сорт Yuki, във фитокамери КНЕР-2 и КНЕР-3, при осветеност 8 000 lx и 16 000 lx и почвена влажност 50 % и 80 % от ППВ. Отчетени са масата и дължината на целите растенията, масата и дължината на корените, общото съдържание на захари, съдържанието на нитрати и хлорофил в листата. Най-висока маса на растенията е отчетена при осветеност 8 000 lx и 80 % ППВ. При този вариант е

получено най-ниско съдържание на нитрати (23 mg/kg) и най-високо съдържание на захари (8,1 brix). Най-високо съдържание на хлорофил е установено при растенията отгледани при осветеност 8 000 lx и 80 % ППВ.

58. **Митова Ив.,** С. Маринова, 2012. Влияние на обогатен вермикулит върху формирането на добива и качестото при маруля. Почвознание, агрохимия и екология, год. XLVI , № 2, 21- 27.

Mitova I., S. Marinova. Effects of enriched vermiculite on the formation of yield and quality of lettuce

On Fluvisol (WRBSR) was tested the influence of nutrient enriched vermiculite introduced in concentrations 2, 5, 10 and 15% occur on the growth and quality of lettuce, respectively, its suitability for use in agricultural production. Experience includes control variant, without addition of vermiculite.
It is estimated the impact of testing product on the development and quality of lettuce. The obtained results, from lettuce at different concentrations of the material in the soil indicate that plants have the best growth and yields in variants with 5% imported enriched vermiculite. The addition of enriched vermiculite in to study soil used in the different variants decreases the iron content in plant tissue by 22.2 to 53.7 percent, manganese of 12.59 to 34.07% and zinc with 11.34 to 40.21%. A significant proportion of the nitrogen introduced with the test product is actively involved in metabolic processes of plants at the end of the study, which found reduced by nitrate in options 2 and 5% enriched vermiculite.

59. Динев Н., **Ив. Митова**, 2012. Качество на гавестото зеле, късно полско производство, при наластващи норми на минерално торене. Почвознание, агрохимия и екология, год. XLVI , № 2, 28- 32.

Dinev N., I. Mitova. Quality of Cabbage in Field Production at Increasing Rates of Mineral Fertilizers

Scientific assessment of fertilization of vegetable production is among the conditions of sustainable agriculture and reduction of health risk. The aim of this work is to establish the impact of increasing rates NPK-fertilization on the indicators characterizing the quaiity of cabbage - late field production. In terms of experience on the Alluvial-Meadow Soil in the Experimental Station - Tcalapica (Plovdiv) is planted cabbage. Tested are 4 combinations of nitrogen, phosphorus and potassium fertilizer. It was found that with increased fertilizer application rate of T1 ($N_{12}P_0K_0$) to T4 ($N_{24}P_{12}K_{12}$) the content of dry matter in cabbage falls of 13.27 to 10.95%. Maximum values of total sugars in the cabbage (9.3%) and internal cobs (7.6%) are measured in plants with the most high yield version of T2 (N18P9K9). Plants with combined fertilization T2 ($N_{12}P_6K_6$) have higher sugar content - 8.9%, of these self-contained nitrogen fertilization T1 - 8.5%. In the case of mineral fertilizer, ensured the highest yield (T3) is obtained and output with the high content of vitamin “C” - 269.5 mg%. With the increase in fertilizer rate quantity of nitrogen, in the form of nitrates rises of 17.52 mg/kg fresh mass at variant T1 to 72.66 mg/kg fresh mass at T4. In phase “marketing maturity” plants with $N_{24}P_{12}K_{12}$ have in their production 321.8 mg NO_3/kg fresh weight, compared to 77.6 mg NO3/kg fresh weight in cabbage at $N_{12}P_0K_0$.

60. **Митова Ив**., Н. Динев, 2012. Съдържание на хранителни елементи и износ на калий с добива на полски домати. Почвознание, агрохимия и екология, год. XLVI , № 2, 33- 41.

Mitova I., N. Dinev. Content of Nutritional Elements and Output of Potassium with Tomatoes

The quality of vegetable production is a complex expression of the impact of multiple factors. The purpose of this study is to examine the impact of potassium applied on tomatoes fruit and exports it to the biological yield. A field experiment on Pseudopodzolic Cinnamic Soil in Experimental Station of Primorsko was carried out. Four variety tomatoes - Trapezitsa, Elena F1, Nikolina F1 and Dora were planted as an early production. Tested had four levels of potassium fertilization at nitrogen and phosphor background. Most high potassium content in fruit - 5.9%, have plants of hybrid Nikolina F1 at N20P18K24. In other varieties, most high potassium content has been measured in the fertilizer rate

N20P18K16. With the increase of potassium rate as the trend is growing and nitrogen content in fruit and biomass. The ratios K/Ca + Mg in terms of outputted experience vary in range 8.96 to 22.0. K/Mg ratios in fruits of experimental variants are between 20.0 and 32.35. Differences in averages of exported with potassium in fruit varieties in the common structure of the yield is negligible and vary in very narrow limits - from 65.26% to 66.68%.

61. **Митова Ив**., Н. Динев, 2012. Ефект на калиевото тореневърху динамиката на плододаване и добива от детерминантни сортове и хибриди домати. Почвознание, агрохимия и екология, год. XLVI , № 2, 42- 49.

Mitova I., N. Dinev. Effect of Potassium Fertilization on Dynamic of Fruit Forming and Yield of Determinant Cuitivar and Hybrids Tomatoes

On Cinnamonic Podzolic Soil is carried out an experience with 4 variety tomatoes - early medium production. Tested have 4 levels of potassium and nitrogen fertilisation of nitrogen and phosphorus background fertilisation. In the early yield norm $N_{20}P_{18}K_8$ is most indicative in respect of the intervention yields for all experimental varieties. Hybridy Nikolina F1 in fertiliser rate $N_{20}P_{18}K_8$ form firstly fruits. With the lowest maturity and yield observable variety Trapezitsa. Most high total yield of all yields is recorded in the fertiliser norm $N_{20}P_{18}K_{24}$ of variety Dora - 7843.4 kg/da. Stronger is the impact of manure - from 30.05% to 74.03% in various yeild, as compared with the variety influence of which fall between 5.87 and 28.43%. With the highest percentage participation of fruit in the structure of formation-biological yield is variety Dora - 55.36% and with the most little - Elena F1 - 44.58%. With the exception of variety Dora, in which there are no consequential differences, in other varieties with increased fertiliser application rate of potassium percentage contribution of fruits in the structure of yields increased.

62. Kancheva R., L. Nenova, **Iv. Mitova**, 2012. Risk management in the field produktion of cabage. Ecology and health. Proceedings of ninth scientific- technical conference with international participation, 17.05.2012, 175- 178.

Eased on an experiment with-field-grown head cabbages, variety “Kyose” set on alluvial-meadow soii, this paper aims to optimize the management of risk for this crop production through mathematical optimization. This method involves combination of different competing factors and their mutual influence, and it has proven its useful practical application.

63. Динев Н., **И. Митова,** Л. Ненова, 2012. Оценка на риска за производството на безопасна продукция в района на Кремиковци, София. Научни трудове на УХТ, „ Хранителна наука, техника и технологии”, том LIX, 99- 101.

Dinev N., I. Mitova and L. Nenova. Risk assessment for food safety production in the area of Kremikovtzi, Sofia

Heavy metal contaminated soils in Bulgaria despite are below 1% cover the area with high density of population. The aim of present study was to evaluate the risk for production of food safety in critical zone around Kremikovtzi, Sofia. Growth of pepper, lettuce and radish is normal and supported of sewage sludge implemented in one of soil samples. Analyses of heavy metal in plant did not express contamination above permissible levels. For foot protection is the area washing of foods is recommended because of a potential dust emissions of the smelter of Kremikovtzi and rested materials from production.

64. Kancheva R., **I. Mitova**, L. Nenova, 2012. Cost- effectiveness of Potassium Fertilization under Various Deterministic Tomato Varieties and Hybrids . Proceedings international conference „Ecology – interdisciplinary science and practice”, 25- 26.10.2012, Sofia, 491- 492.

In terms of average field production early on Cinnamonic pseudopodsolic (podsolic) soil was the influence of increasing rates of potassium fertilization on yield of various deterministic tomato varieties and hybrids. Analyze the cost effectiveness of different fertilization schemes and their suitability to the free market. At relatively the same cost level of fertilization was analyzed variants with the best results in yields of tested experimental varieties.

65. Marinova S., E. Zlatareva, **I. Mitova,** S. Stratieva, 2012. Evaluation of Humus Preparation and Possibility of Its Use as Soil Enhance. Proceedings international conference „Ecology – interdisciplinary science and practice", 25- 26.10.2012, Sofia, 508- 511.

We have tested an organic enhancer over soil, which has low humus, is poor in nutrients and is high chloride - sulphates of the State of Kuwait. By the complication in the green-house experiment we have tested different ways of treatment using the proposed enhancer - utilization of the preparation by the seed soaking, spray the soil with the preparation and processing plants during the growing season. Every of these over named ways of treatment with the chosen preparation were tested in three increasing amounts of the following vegetables - tomatoes, zucchini, green beans and cucumbers. Greenhouse experiments have given no idea of the effect of humus preparation of the various modes of treatment and different cultures. The presence of many water-soluble chlorides and sulfates in the soil of Kuwait, suppress the sprouting of plants. For determination of the fertilization and economic impact of the use of humus we have made field experiments over various crops grown on leached from vertisols in Bozhurishte-village.

66**. Митова Ив**., 2012. Фактори, обуславящи появата и развитието на магнезиевата хлороза при доматите. Почвознание, агрохимия и екология, год. XLVI , № 3, 50- 54.

Mitova I.. Factors Defining Appearance and Development of Magnesium Chlorosa in Tomatoes

On the base of results obtained from vessel- and greenhouse-fertilization experiments with tomatoes, conclusions about the causes and possible mechanisms of appearance and development of magnesium chlorosa have been made. The factors determining the development of this physiological condition most often have a complex character. As reasons provoking the development of magnesium chlorosa have been found to be the soil acidity and temperature conditions as well as the high concentrations of ammonium, sulfate, potassium and calcium ions in the fertilization medium.

67. Динев Н., **И. Митова**, М. Христова, 2012. Качество и безопасност на селскостопански култури от района на с. Куклен, Пловдивска област. Сборник доклади, 50 години ИИРХ, Международна научно- практическа конференция „ Хран, технологии и здраве", Пловдив, 84- 88.

Настоящата статия третира въпроса за качеството на селскостопанските култури, отглеждани върху почви с тежко метално натоварване. На нарочно избрани частни дворове в гр. Куклен, Пловдивска област в 5 условни зони са изследвани качествата на почвата по отношение на основни почвени параметри - pH във вода, хумус, основни хранителни елементи - N, P, K и наличие на вредни вещества - Pb, Zn, Cd. Изследвани са и сезонните култури отглеждани върху тези почви - домати - зелени и червени, пипер и краставици. Анализът на почвите показва, че са техногенно натоварвани и нивото на замърсителите е близко до максимално допустимата концентрация (МДК) - средно 103±16,3 mg/kg Pb, 275±56 mg/kg Zn и 2,2±0,3 mg kg Cd. Този факт заедно с благоприятното неутралното до слабо алкално pH на почвите 7,22±0,3 позволява ограничителното използването на тези земи за селскостопански цели. Въпреки,че изследваните селскостопански култури - домати и краставици не са замърсени с Pb, Zn и са с концентрации под МДК спрямо Наредба 31/2004 за замърсители в храните, повишено съдържание на РЬ от 0,336 до 0,439 mg/kg при пипера показва, че резултата не може да се тълкува еднозначно.

68. **Митова Ив.,** Н. Динев, 2012. Морфологична оценка и добив при късно полско производство на главесто зеле. Почвознание, агрохимия и екология, XLVI , № 4, 86- 90

Mitova I., N. Dinev. Morphological Evaluation and Yield of Cabbage at Late Field Production

Field experiment with cabbage aimed to establish effect of fertilization on morphological status and yield was carried out. Results showed that balanced NPK-fertilization favorably affect the growth and development of headed cabbage. In the initial phase of the plant - 14-16th leaf plants fertilized with $N_{12}P_6K_6$ have greater total mass, number of leaves and leaf rosette diameter, and higher plants compared with plants receiving only nitrogen fertilization ($N_{12}P_0K_0$). In later stages with vegetation, disturbance in

the general growth and development in the T1 option intensified in all measured parameters was shown. Yields received in the study ranged from 547 kg/ha. Difference in T1 - $N_{12}P_0K_0$ and 1092.3 kg/ha in plants by option T3 - fertilized with $N_{18}P_9K_9$. The structure of the obtained yields the percentage participation of cabbage heads is between 67.75 and 70.51 percent; with the largest share of economic output is an important option for reporting T4 ($N_{24}P_{12}K_{12}$).

69. **Митова Ив.,** Н. Динев, 2012. Износ на хранителни елементи с добива на главесто зеле - късно полско производство. Почвознание, агрохимия и екология, XLVI , № 4, 91- 95 .

Mitova I., N. Dinev. Plant Uptake and Export of Nutritional Elements by Cabbage Yield

Filed experiment on Arenic Fluvisol (WRBSR, 2006) in Tzalapitza Experimental Station was carried out. Advancing vegetation the quantity of nutrients increases as "economic maturity" of the total N was between 10.29 and 3.558 kg/ha, for P_20_5 between 0.651 and 0.961 kg/ha and K_20 between 3.892 and 3.148 kg/ha. In accordance with the obtained yields the largest export of total N and P_20_5 in a variant of the T3 - plants fertilized with $N_{18}P_9K_9$, and the K_20 variant T2 - $N_{12}P_6K_6$. In the structure of biological production phase "mature business" share of food items in extracting valuable, cabbage, rose to 69.25% of the total N, 68.31% to 69.18% P_20_5 and K_20 respectively. A general trend in the percentage share of exported production with organic nutrients and in all three phases of the cabbage was shown. While Phase 14-16th piece has only a slight excess the potassium nutrition of plants it in phases "squeeze cabbage" and "economic maturity" the greatest stake in the total export of nutrient extraction from cabbage has K_20 followed by total N. At least it exported quantity of P_20_5.

70. Stefanov D., K. Ananieva, K. Georgieva, N. Dinev, **I. Mitova**, S. Doncheva, 2012. Rapid Screening of Soil Contamination by using Tomato Plants as Bioindicators. A Pulse Amplitude Modulation Fluorescence Study. Comptes rendus de l' Academie bulgare des Sciences, Tome 65, № 10, 1461- 1466. IF-0,211

Tomato plants sensitive to heavy metals were used as bioindicators to monitor the level of contamination of soils collected from the region of Plovdiv. The rate of oxygen evolution and several chlorophyll a fluorescence parameters measured with a pulse amplitude modulation fluorometer were used for rapid screening of the changes in photosynthetic performance of the plants tested. A decrease in photosystem I (PSI) and photosystern II (PSII) activity was recorded in plants grown in soils contaminated with high concentrations of Pb, Zn and Cd estimated by the changes in the maximal PSII quantum yield as well as the Fv/Fm and Afast/Aslow ratios. This was accompanied with a decrease in the photosynthetic rate estimated by the decline in CF evolution. It is suggested that fluorescence parameters reflecting the activity of both photosystems can be used as indices in a rapid screening study for assessment of the level of soil contamination with heavy metals.

71. **Mitova, I**. and I. Stancheva, 2013. Effect of fertilizer source on the nutrients biological uptake with garden beans production. *Bulg. J. Agric. Sci., vol.*19: № 5, 947-951. IF-0.189

Garden bean pants (Phaseolus vulgaris (L.) Savi.) ssp. Nanus cv. Xera were grown under glasshouse conditions at optimal fertilizer rates using mineral, organic and foliar fertilizers previously established in a model pot experiments. The favorable effect of the foliar feeding on the yields of garden bean pods was shown. Total amounts of the biological uptake of nutrients with the vegetative biomass and pods production were observed to be maximal both in the organic and foliar fertilized plants. The percentage of nitrogen, phosphorus and potassium uptake in the plants with mineral and organic fertilization was equal. In foliar fed plants percentage of P and K increased in comparison in the other treatments on the account of nitrogen level. The amounts of nutrients required for the formation of obtained yield were determined on the base of its biological uptake.

72. **Митова Ив**., Р. Тончева, Св. Маринова, 2013. Обогатеният вермикулит-източник на хранителни елементи за селскостопанските култури. Почвознание, агрохимия и екология, XLVII, № 2, 29- 35.

Mitova I., R. Toncheva, S. Marinova. The Enriched Vermiculite - Source of Nutrients for Crops

A pot experiment with tomatoes was carried out on Alluvial-Meadow soil. The influence of increasing concentrations of enriched nutrient vermiculite on biometric characteristics and content of nutrients in tomato plants were tested. It was found a positive impact from the application of the tested product on the growth and development of tomato. With increasing participation rates of vermiculite in the experiment and increase the value of the included parameters: plant height, number of leaves, stem diameter, number of blooms, stem mass, leaf mass, mass fruit.

The measured content of total N, P, Mg, Fe, Cu, Zn, Mn in vegetative mass of tomatoes increased by increasing the percentage of vermiculite in the experiment.

73. Stancheva I., M. Geneva, Y. Markovska, N. Tzvetkova, **Iv. Mitova**, M. Todorova, P. Petrov. 2013. A comparative study on plant morphology, gas exchange parameters and antioxidant response of Ocimum basilicum L. and Origanum vulgare L., grown on industrially polluted soil. TURKISH JOURNAL OF BIOLOGY. *Available online 21 September 2013* PDF Last modified on 20 September 2013, 05:49:37,DOI:10.3906/biy-1304-94 IF- 0.914

The effects of Cd, Pb, and Zn uptake on plant morphology, photosynthetic parameters, antioxidant potential, and essential oil yield and quality in Ocimum basilicum L. and Origanum vulgare L. plants were evaluated, 'lhe plants were grown as a pot experiment in soil heavily polluted with Cd and Pb and on unpolluted soil. Both plants accumulated Cd, mainly in the roots, while Pb occurred in the oregano shoots only. The leaf blade thickness of both plants increased when grown in polluted soil. Basil plants responded to the action of heavy metals with increases in gas exchange stomatal conductivity, and transpiration, but water-use efficiency declined. Gas exchange and transpiration were reduced in treated oregano plants, but stomatal conductivity and water-use efficiency increased significantly. In basil, the increased levels of low molecular weight antioxidants such as phenols and flavonoids were observed, while in oregano, ascorbate, glutathione, and phenols were enhanced. Enzymatic antioxidant defense was observed in both plants when grown in contaminated soil, mainly with glutathione peroxidase, quaiacol peroxidase, glutathione S-transferase, and glutathione reductase. Accumulated levels of Cd, Pb, and Zn in plant organs resulted in a reduction in essential oil yield in basil only.

74. **Митова Ив.,** В. Христова, Н. Динев, 2013. Динамика на плододаване при ранно и средно- ранно полско производство на домати. Почвознание, агрохимия и екология, XLVII, № 4, 43- 53.

Mitova I., V. Vasileva, N. Dinev. Dynamics of Fruiting in the Early and Mid-Early Field Production of Tomatoes

Under field conditions on Arenic Fluvisols (WRBSR, 2006) an experience with two tomato cultivars - Milyana and Nikolina F1 was carried out. Impact of the manufacturing type, the ways of potassium fertilization and variety on some of the indicators forming the yield and quality of production were shown. The highest reported total yield in the early field production in both varieties has variants with double potassium fertilization. The greatest production of tomatoes in mid-early production in both experimental varieties gives threefold introduction of potassium norm. The variety has key importance in the formation of the yields in the early fruiting, but during the vegetation increases the influence of the manufacturing division.

75. Василева В., **Ив. Митова**, Н. Динев, Л. Димова, 2013.Вегетативни и репродуктивни прояви на домати в зависимост от сорта и условията на отглеждане. Почвознание, агрохимия и екология, XLVII, № 4, 30- 36.

Vasileva V., I. Mitova, N. Dinev, L. Nenova. Vegetative and Reproductive Expression of Tomatoes Depending on Variety and Growing Conditions

A Greenhouse experiment under controlled conditions with 10 varieties/lines tomatoes was carried out. Two ways of submitting the potassium level (single and double implementations) at background nitrogen and phosphorus fertilization were tested. The after-effect of two starting temperatures - 17°C and 27°C, where it is grown seedlings until planting in the Greenhouse was studied.
The influence of different factors: the variety/line, effect of temperatures to seedling stage and the manner of potassium fertilization on the vegetative and reproductive forms of tomato plants was discussed.
Regardless of type of fertilization averaged vegetative mass of varieties and lines started development at 17°C are higher than from the 27°C. No statistically proven link between temperature and mode of fertilization (single and double K-fertilization).

76. Василева В., **Ив. Митова**, Н. Динев, 2014. Сортови особености в поникването и развитието на домати в зависимост от температурата на отглеждане. Растениевъдни науки, год. LI, № 4- 5, 62- 64.

При контролирани условия, върху алувиално-ливадна почва е изведен опит с 10 хибрида и линии домати. Направена е фенологична оценка и са определени темпа на поникване на различни хибриди и линии домати, в зависимост от зададените температури. Установи се, че и при двете изпитвани температури най-рано поникват семената на хибрид Addalyn F1, а най-късно семената на хибрид Николина F1, което се компенсира в края на отчетния период. При температура 17оС най-голям брой поникнали семена в края на отчитането има отново хибрид Addalyn F1, докато при високата температура най-голям брой поникнали растения имат хибрид Миляна-VF, следвана от Николина F1 и E27.32927. В края на изследването при повечето хибриди и линии броя на поникналите растения при температура 27оС е повече, от тези поникнали и развили се при температура 17оС, но с изключение на сорт Миляна-VF и линия 3093, разликите при ($P \geq 95\%$, LSD=0,983) и при ($P \geq 99\%$, LSD=1,303) са статистически недоказани.

77. Василева В., Н. Динев**, Ив. Митова**, 2013. Качествени показатели при различни генотипове домати. Растениевъдни науки, год. LI, № 4- 5, 65- 72.

В условия на полски опит са отгледани различни хибриди и сортове домати. С цел проследяване влиянието на оцветеността на доматите върху качеството им са изследвани оранжево („Алтайски оранжев“), розово („Биволско сърце“), червено („Николина F1“ и „Атак“) и черно („Черен принц“) оцветени домати. Определени са биохимични параметри на качеството (витамин С, обща киселинност, ликопен, захари и сухо вещество).
Доказано е, че сорт „Черен принц“ има значително по-високо съдържание на сухо вещество, захари, витамин С и ликопен, в сравнение с останалите изследвани сортове и хибриди. Резултатите от изследването позволяват да се предложи насока на селекцията с черен домат, за повишаване на коментираните биохимични показатели.
Установено е, че хибрид „Николина F1“ превъзхожда хибрид „Atak“ особено видимо при първото отчитане. „Николина F1“ дава по-високи стойности на съдържанието на витамин С, ликопен, захари и сухо вещество при първата дата и ликопен и захари при втората.

78. **Митова Ив.,** 2014.Торенето и сорта като фактори определящи съдържанието и износа на хранителни елементи с добива на среднорани домати- полско производство, Растениевъдни науки, под печат

Върху алувиално-ливадна почва е изведен опит с домати - средно ранно производство. Проучването включва сортовете- Прекос-F_1, Bakini и PinkCharm. Изследвано е влиянието на торенето с еквивалентни количества органичен и минерални торове върху съдържанието и износа на хранителни елементи с добива на доматите. Изследването установи, че най- високо съдържание на общ N и P_2O_5 в растенията при Прекос-F_1 и Bakini имат вариантите с минерално торене. При сорт Pink Charm съдържанието на общ N, P_2O_5 и K_2O, с изключение на K_2O в плодовете, е най-високо при растенията с органично торене. С биологичния добив от опита се изнасят средно 249.1 kg .ha-1 N, 66.8 kg.ha-1 P_2O_5 и 355.1 kg .ha-1 K_2O. С най- голям износ на хранителни елементи с

1000 kg продукция е варианта с органично торене на Pink Charm- 4.17 kg N, 1.23 kg P_2O_5 и 6.56 kg K_2O.

79. Dinev N, **Mitova I.**, 2014. Yield and quality of parsley depend on water quality. Bul. Journal of Agricultural Science. 20. № 2, 111- 115. IF- 0.189

Food safety crop production depends largely on soil characteristics. Relatively little has studied the problem of the quality of irrigation water. The purpose of this paper is to establish the influence of nitrate contaminated irrigation water on production of parsley. In a greenhouse pot growing experiment with soil (Chernozem-smolnitza) it was investigated the effect of irrigation water taken from natural wells. Four increasing levels of nitrate 16.4, 77.1, 184.3 and 320.5 $mg.L^{-1}$ (at permissible level of 50 $mg.L^{-1}$) were used Changes in nitrate content (ranging from the first cut from 20.1 to 1970 $mg.kg^{-1}$), adequate to the concentrations of nitrates of water and declining over time were found. Content of sugars and solids in three cuttings are discussed. Parallel trend of nitrate concentration and pigment content in leaves is shown. The results provide specific recommendations for the safety of products of parsley and control of soil quality at nitrate-enriched water, used for irrigation.

80. **Mitova Iv**., M. Banov, L. Nenova, 2013. Grower and reproduced behavior of tomatoes on substrates for soil reclamation ., Bul. Journal of Agricultural Science (in the press).. IF- 0.189

The experiment is based on four reclamation substrates, taken from technically and biologically reclaimed dumps built during the extraction of iron ore (Lokorsko) and coal (p. Moshino). The purpose of this study was to determine the effects of fertilization and elevated levels of heavy metals on the growth, development and fruiting of tomatoes on the researched substrates and terrains. It was found that the surveyed areas are suitable for agricultural production. The positive effect of the application of N, P and K fertilization on the tested reclamation substrates is convincingly proved by the increment of tomato plants. In the early stages of tomato vegetation, the height and mass of plants fertilized with $(NH_4)_2SO_4$ are greater than those of plants with NH_4NO_3 in all three Samples. As vegetation advances and reaches fruiting phase, plants fertilized with NH_4NO_3 achieve greater vegetative mass than those fertilized with $(NH_4)_2S0_4$. In all three reclamation substrates, plants fertilized with NH_4NO_3 formed more and larger fruits than those fertilized with $(NH_4)_2S0_4$. The total yield of fruit from plants fertilized with ammonium sulfate and ammonium nitrate was highest from the reclamation substrate of organically reclaimed dump built during iron ore extraction, horizon 0-30 cm.

81. Stancheva I., M. Geneva, M. Boychinova, **Iv. Mitova**, Yu. Markovska, 2014. Physiological Response of Matricaria recutita L. foliar fertilized and Grown on Industrially Polluted Soil. Journal of Plant Nutrition. (in the press).. IF- 0.640

Essential oils quality and quantity, antioxidant capacity of foliar fertilized Matricaria recutita L., grown on industrially polluted with Cd and Pb soil were studied. The polluted field is near waste depository of ferrous metallurgical combine “Kremikovci”. Content of Cd and Pb in the soil exceeded permissible concentrations 4.6 and 2.0 times respectively. The presence of high levels of heavy metals in the soil resulted in retained plant growth. In Matricaria recutita grown on industrially polluted soil a decrease of root and shoot dry biomass and reduction of number of lateral steams was observed. Otherwise the number and biomass of flowers per plant increase. Antioxidant defense in the foliar fertilized plants, grown on industrially polluted soil could due mainly to increased levels of peroxidases with substrates ascorbate, glutathione, guaiacol and hydrogen peroxide. Enhanced levels of Cd and Pb in soil did not influence essential oil yield and quality of chamomile.

82. Mitova Iv., N. Dinev, V. Vasileva, 2013. Effects of Mineral and Organic Fertilization on Early Potato Production.(in the press).. IF- 0.189

The objective of the study was to establish the influence of organic, mineral and organic-mineral fertilization on the growth, development, yield and some quality indicators for early potatoes. A field experiment in crop rotation with early potatoes of the sort Agata was staged on alluvial-meadow soil in

2011-2012. The scenario included a regime without fertilizer, a regime with mineral fertilizer, organic fertilizer (manure) and mixed organic and mineral fertilizer. The highest yield in the conducted experiment (32.42 t.ha-1) was obtained under the mixed fertilization regime. The plants under the regime with organic fertilizer showed lower biometric indicators as compared to those fertilized with mineral or organic- mineral fertilizers. As regards quality indicators, the biggest tubers (101.42 g/tuber) were obtained under the mixed fertilization regime with high content of total sugars - 5.1% and low content of nitrates - 49.79 mg.kg-1.

83. Mitova Iv, V. Petrova, E. Zlatareva 2013. Possibility for using digestate to produce a quality plant production. ., Bul. Journal of Agricultural Science (in the press).. IF- 0.189

The experiment was conducted on two soil types in the greenhouse of ISSAPP "N. Poushkarov" under controlled conditions. In two harvested of parsley were determinate the influence of mineral and organic fertilizer (digestate) on biomass development, absorption of nutrients and some indicators characterizing the quality of the experimental culture. It was found that parsley plants developed on Fluvisol and Vertisols, in both mows, the biggest biomass is forming in variant fertilized with 25% digestate, in this variant also is measured the highest chlorophyll content. The biggest vegetative mass, dry matter, total sugars and nitrate is established on Fluvisols compared to Vertisols. The export of nutrients, dry matter and total sugar content in first mow is biggest in Fluvisols with mineral fertilization, but these plants in both mows as with biggest nitrates accumulation. In Vertisols biggest export of macro elements is reported in versions with 25% digestate. In the second mow in Fluvisols with the highest content of total sugars outlines options with 25% digestate and leaching on Vertisols one with 15% digestate.