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1.	Agrarian-Economic Science and Technologies. – 2017. – #1(34), #2(35); 2016. – #4(33)
2.	New Agrarian Georgia. – 2017. – #2(70), #5(73), #6(74)
3.	The New Economist. – 2016. – #4(43)
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5.	Mathematical modeling and application of biosystems in the integrated citrus protection. /G. Aleksidze, E. Orjonikidze, A. Murvanidze, L. Nozadze, T. Epitashvili, I. Geguchadze/. Monograph. - 2015. – 152 p.
6.	Goni. 2017. – #5; 2016. – #4
7.	Modern technologies to produce ecologically pure products for sustainable development of agriculture. Int. Sci. Conf. Materials. Tbilisi. – 28-30 September. – 2016
8.	Economics and Business. – 2017. – v. X. – #1; 2016. – v. IX. – #2, #4
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13.	Plant protection. /G. Aleksidze/. Monograph. – 2014. – 312 p.
14.	Materials of a scientific conference dedicated to the World Soil Day. – Tbilisi. – 2016
15.	Novation. – 2016. – #18
16.	Mining Journal. – 2017. – #1(38); 2016. – #2(37)
17.	Wood Bulletin. – 2017. – #12
18.	Georgia's silk breeding - problems, rehabilitation, restoration. /G. Nikoleishvili, E. Shapakidze/. Georgian Academy of Agricultural Sciences. Monograph. – 2016. – 259 p.
19.	Bulletin of Georgian Academy of Agricultural Sciences. – 2017. – v. 11. – #1; 2016. – v. 10. – #3, #4
20.	Bulletin of the Georgian National Academy of Sciences. – 2017. – #1(37); 2016. – #2(36)
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24.	Annals of Agrarian Science – 2017. – v. 15. – #2
25.	GEN. – 2017 – #1; 2016. – #1, 2, 3, 4.

b4.0. Agricultural sciences

b18.4.0.1. The fundamanetals of agrarian sciences in Georgia: development and future vision. /G. Aleksidze, G. Japaridze, O. Keshelashvili/. Bulletin of the Academy of Agricultural Sciences of Georgia. – 2016. – #2(36). – pp. 4-14. – geo.; abs.: geo., eng.

The history of higher education development in Georgia goes back to the third and the fourth centuries AD when a School of Rhetoric, a popular education centre in the Mediterranean region was established in which many foreigners came to get higher education. In the beginning of the 12th century, the first Georgian Academy was established as a logical continuation of the antic period traditions and as a centre for development of renaissance ideology. It has become known that agrarian sciences were also taught in those centres. The existed lifestyle urged Georgians to develop both theory and practice of agriculture. Educational centres functioning in different parts of Georgia became a solid foundation for opening Tbilisi State University in 1918. In 1929, a Department of Agronomy was detached from Tbilisi State University and was established as an

independent Georgian Institute of Agriculture – a study and research centre. Such wide-range activities prepared a solid foundation for establishment of the Academy of Agricultural Sciences of Georgia which was staffed by the representatives of Georgian Agrarian Institute and scientific-research organizations. A long, important and eminent progress of Georgian agricultural sciences played a decisive role in development of agrarian field, defined its structure, technology, production and resource potential, and gradually raised the level of agricultural product. Since the 1930s till present, the role of the agrarian sciences in successful expansion of agrarian industry has become evident and it has been defined as a necessary pre-condition for sustainable development of the field. Georgian Scientists contribution in the growth of agriculture is huge, namely they worked on: new hybrid breeds of animals, progressive methods of agriculture zone technologies; soil treatment, fertilizing, development of agrochemical maps, pest management, fight against plant diseases, development of modern technologies and machinery, effective utilization of water resources, drying of Kolkheti lowlands and its utilization for agriculture, which, ultimately became a foundation for development of the scientifically proven unified system of directing and management of agriculture in this area. The article focuses on the new perspectives and challenges the Academy faces in the 21st century. The researchers should concentrate on theoretical as well as applied researches considering new technological approaches; scientifically proven recommendations addressed towards sustainable development of agro biodiversity. The directions worked out by the researchers should be based on zone differential approaches supported by the information technology schemes applicable in different scenarios. The article stresses a significance of creation of ecologically pure product; for this purpose it is necessary to work on technological and economic-organizational problems the effective solution of which will make the ecologically pure production safe and will be in correspondence with local as well as international market demands. The article defines scientific priorities according to the major fields of Georgian agriculture. Ref. 6.

Auth.

b18.4.0.2. Cooperation of ICARDA for production of pulse plants in Georgia. /P. Vacheishvili, L. Tkemaladze, N. Kakabadze/. Bulletin of the Academy of Agricultural Sciences of Georgia. – 2016. – #2(36). – pp. 29-32. – geo.; abs.: geo., eng.

The article discusses the importance of leguminous plants. They are rich in proteins and amino acids. They are used in cattle breeding both as a feed and as human food. The article discusses the variety of products produced from pulses, outlines their wholesome qualities, as well as their profitability in raising soil fertility. The author presents a table showing when, how many samples and which crops were introduced by the International Center for Agricultural Research in the Dry Areas (ICARDA). As a result of close cooperation with them, a new variety of chickpea “Eleksiri” and a new variety of lentil “Pablo” were registered in 2005. In 2011, another new variety of chickpea “Aragvi” and a variety of lentil “Tsilkani” were registered. The varieties, which differ by their bio-morphological and agricultural characteristics from the previous varieties, have been received by the individual selection method. Nowadays, new forms and hybrids have been produced and are under study at the Scientific Research Center for Agriculture in Tsilkani. Tab. 1, Fig. 2, Ref. 4.

Auth.

b18.4.0.3. Requirements of the European Union and challenges of Georgian farms. /T. Chkheidze/. Metsniereba da Tskhovreba. – 2017. – #1(15). – pp. 52-57. – geo.; abs.: geo., eng., rus.

The issues of agriculture and rural development occupy a significant part in the European Neighbourhood Programme for Agriculture and Rural Development – ENPARD Georgia. The government welcomes the EU's proposed initiatives and tries to achieve coherence of activities. For harmonizing local farms with the EU recommendations the author considers it appropriate to approve the status of Georgia's farmers and to introduce a law on farmers in order differentiate between an entrepreneurial farmer, or agro-entrepreneur, and an individual entrepreneur, or urban entrepreneur. Ref. 8.

Auth.

18.4.0.4. Land market in Georgia and world experience. /L. Zivzivadze/. Business-Engineering. – 2017. – #1-2. – pp. 140-141. – geo.; abs.: geo., eng.

This paper shows the land market development tendencies in Georgia. Furthermore, the paper focuses on the world experience in land market development. The key challenges in Georgia highlighted in the paper are – highly fragmented land, registration of fragmented land and using the land for business purposes. Agricultural cooperation is the way out to solve the key challenges in Georgia. Ref. 5.

Auth.

b18.4.0.5. Urbanization and agrarian revolution. /K. Salukvadze, T. Bidzinashvili, N. Kopaliani/. Business-Engineering. – 2016. – #1-2. – pp. 200-203. – geo.; abs.: geo., eng.

The article deals with the distribution of the urban population factors that are associated with the demographic ratio and represented by a simple equation, which indicates how the two components cause a change in the speed of growth of the population to participate in urban and rural areas and other geographical areas. Urbanization is taking place in today's developing countries with high natural growth. The natural increase in

the urban population is the principal cause of migration from villages to cities and still plays an important role. While natural growth in rural as well as urban population growth has contributed to the industrialization of the domestic migration was clearly directed towards the urban. From village to city migration has become a major driving force, resulting in the city's population growth rate to accelerate in the village of comparison. We discuss the conceptual model, with the aim of the developed regions of the urban population concentration of the deciding factors to determine and compare it to the present situation, which takes place in the less developed regions where the urbanization pace being. Ref. 3.

Auth.

b18.4.0.6. The basic tendencies and challenges of agriculture in Georgia. /L. Zivzivadze/. Business-Engineering. – 2016. – #4. – pp. 59-61. – geo.; abs.: eng.

This study shows the key agricultural tendencies and challenges in Georgia. Initially, it is concentrated on the 2015-2020 strategy agriculture development of Georgia and its key strategy directions. Secondly, it is focuses on trade regimes, agro export/import/trade balance and its analysis. Fig. 2, Ref. 2.

Auth.

b4.1 Agriculture, forestry and fisheries

Agriculture

b18.4.1.1. The wheat production strategy and its role in the state independence of Georgia. /L. Ujmajuridze, Ts. Samadashvili, G. Chkhutiashvili/. Bulletin of Georgian Academy of Agricultural Sciences. – 2017. – #1(37). – pp. 10-13. – geo.; abs.: geo., eng.

In Georgia, which among other countries of the world differs in a high specific endemism and polymorphism were developed numerous variety-populations of soft wheat, hard wheat and Dika. From the point of view of practical breeding they are characterized by valuable and unique signs and properties: 1. Short and stable stem; 2. Resistance to diseases; 3. Quick development of a plant; 4. Recovery (regeneration) of fertility; 5. Falling resistance of matured grains; 6. Easy threshing of grains; 7. The increased content of proteins and irreplaceable amino acids in grains; 8. Large grains; 9. High quality of grain grinding and bread baking; 10. Long ears; 11. Wide leaves of a plant; 12. Big ears; 13. Early ripeness; 14. The gene causing long-term storage of the baked bread. In Georgia it is necessary to develop strategy of providing the country with grain and to increase wheat acreage for as much as possible to raise a grain yield. The carried-out analysis shows that in order to make grain production profitable for our farmers, along with the healthy, certified and zoned seeding material, it is necessary to use intensive technologies everywhere. Strong sides of production of wheat in Georgia are: 1. Climatic conditions; 2. Market/requirement availability; 3. Free areas; 4. Tradition of wheat cultivation. Unfortunately today production of wheat has also weak sides: 1. Deficit of high-quality seeding material; 2. Lack of system of selection seed farming; 3. Low productivity; 4. The scattered sites; 5. Inaccessibility of modern technologies; 6. Non-compliance with agroterms; 7. Inaccessibility of postharvest technologies and infrastructure; 8. Disorder of preliminary contacts system between farmers and buyers. The correct strategy of production of grain will provide: partial import substitution; increase in productivity; production of high-quality products; increase in acreage; increase in consciousness and level of knowledge of farmers. Ref. 11.

Auth.

b18.4.1.2. Importance of engineering support of agricultural technological processes in realization of normative results. /B. Basilashvili, I. Lagvilava, R. Khazhomia/. Bulletin of Georgian Academy of Agricultural Sciences. – 2017. – #1(37). – pp. 82-85. – geo.; abs.: geo., eng.

Practical experience of the world's agricultural production indicates that to increase and maintain in the industry the level of mechanization the full realization of modern achievements of science and technology that improve the production operation of the machine and tractor units is necessary. In connection with the increased role of machines in agricultural production and the complication of the tasks facing the rural engineering service it is becoming increasingly clear that further progress in the organization of production would only be achieved on the basis of comprehensive application by the engineering and technical personnel of agricultural departments of modern scientific achievements. Ref. 7.

Auth.

b18.4.1.3. The importance of agricultural machinery maintenance in the common service systems of its application. /B. Basilashvili, I. Lagvilava, R. Khazhomia/. Bulletin of Georgian Academy of Agricultural Sciences. – 2017. – #1(37). – pp. 86-89. – geo.; abs.: geo., eng.

The agricultural machinery maintenance, its types and methods, also the principal elements of the engine yard and vehicle platform are considered. The characteristic feature of agricultural machinery maintenance is its application seasonality, the impact upon it of atmospheric factors and aggressive environment (fertilizers,

pesticide, etc.). The maintenance of agricultural machinery enables to reduce the adverse impact of atmospheric precipitates and aggressive environmental substances and increase the service life of machinery. Ref. 3.

Auth.

b18.4.1.4. Definition of nomenclature and number of machinery necessary for production of agricultural crops based on the energy consumption of technological processes. /E. Shapakidze, G. Chitaia, G. Mosashvili, R. Japaridze/. Bulletin of Georgian Academy of Agricultural Sciences. – 2017. – #1(37). – pp. 90-97. – geo.; abs.: geo., eng.

The article deals with the definition of and number agricultural machinery necessary for growing agricultural production, taking into account the specific land area, its slope, type of operation, annual or perennial crops and other parameters given their energy consumption. Tab. 3, Ref. 4.

Auth.

b18.4.1.5. Increase of the export potential of strategic crops' harvest by optimizing the irrigation technology. /V. Nanitashvili/. Bulletin of Georgian Academy of Agricultural Sciences. – 2017. – #1(37). – pp. 98-104. – geo.; abs.: geo., eng.

The question of irrigation of tea and citrus crops is discussed as a significant guarantee for achieving high and quality harvest oriented targeted to export production growth. Diagrams, main units and principles of operation of the tea and citrus plantations irrigation water-sprinklers, as well as the engineering data and irrigation technology are given. Fig. 5, Ref. 4.

Auth.

b18.4.1.6. Underground waters for irrigation (after the example of Marneuli region and Gareji desert). /N. Rcheulishvili, N. Erukidze, D. Melashvili/. Bulletin of the Academy of Agricultural Sciences of Georgia. – 2016. – #2(36). – pp. 68-75. – geo.; abs.: geo., eng.

It is possible to create autonomous irrigation systems on the basis of demineralization of high-mineralized underground waters. In Marneuli region, which is an intensively developed agro-industrial area, intensification of producing agro-cultural products is mainly impeded by unirrigated territories. On the basis of the hydro geology surveys carried out in the region there were found areas, in which points of water supply are located. By development of their resources using reverse osmosis method of water treatment, after demineralization-conditioning, it is possible to create autonomous irrigation systems. Productivity of an individual irrigation system will be defined by the exploitation resource of a concrete point of water supply. Water management will be achieved by implementing of modern, economic technologies of irrigation. By the analogous approach on the basis of the points of high-mineralized water supply of Gareji desert it is planned to implement irrigation systems of limited productivity on the practically unirrigated territories. Practical realization of the project is connected with solving of certain contradictory issues. Among them there should be noted specific complexity of hydro-geologic field researches, optimization of financial expenditures while implementing the irrigation systems and a problem of returning of the high-mineralized concentrate produced from desalination of water into the geological environment. Tab. 4, Fig. 4, Ref. 8.

Auth.

b18.4.1.7. Basic technical and economic indicators of agriculture processes and their management methods. /B. Basilashvili, I. Lagvilava, R. Khazhomia/. Bulletin of the Academy of Agricultural Sciences of Georgia. – 2016. – #2(36). – pp. 76-79. – geo.; abs.: geo., eng.

Scientific and technical progress in agriculture determines the level of technical improvement of applied technological processes of machines and installations, as well as their effectiveness under specific production conditions that is mainly estimated by expenditure costs per unit of production. The main costs are those direct operating costs that are conditioned by the performed work. These are the depreciation costs, cost for the repair of equipment, their maintenance, and storage, cost of fuel and lubricants and similar materials, wages of the maintenance personnel and compensation of auxiliary works. The theoretically justified, technically proven, professional, efficient and profit-targeted management determines the final positive results of labor. Ref. 4.

Auth.

b18.4.1.8. Theoretical analysis of angular velocity of mountain self-propelled chassis upon movement on slope. /B. Basilashvili, A. Kobakhidze, I. Lagvilava, R. Khazhomia/. Bulletin of the Academy of Agricultural Sciences of Georgia. – 2016. – #2(36). – pp. 80-84. – geo.; abs.: geo., eng.

A specific method of determining the maximum angle of inclination upon movement on a slope of a mountain self-propelled chassis is presented. When the speed of movement of the self-propelled mountain chassis, slope inclination and chassis track are constant values and only the angle of running the slope is changed, then an increase in the angle of run causes a decrease in the chassis inclination and an increase in the angular velocity of inclination. The permissible values of the angular velocities of chassis inclination on slopes with

various inclinations are defined. When the chassis movement speed and the slope inclination, that is equal to the chassis inclination, remain the same and only the chassis radius of turn is changed, then an increase in the radius of turn causes a decrease in the chassis angular velocity of inclination, and vice versa. Tab. 3, Fig. 2, Ref. 3.

Auth.

b18.4.1.9. Quantity of small-scale mechanization machinery in Adjara and its forecasting by the least-squares method. /J. Katsitadze, I. Abuladze, G. Beridze/. Bulletin of the Academy of Agricultural Sciences of Georgia. – 2016. – #2(36). – pp. 85-88. – geo.; abs.: geo., eng. Adjara is one of the specific mountain regions of Georgia, where the mechanization of cropping is characterized by peculiarities. The utilization of mobile agricultural machinery is complicated here and therefore the technical means of small-scale mechanization, such as tillers, mini-tractors, cultivators, etc. are widely used. Their number is permanently increasing and an important task is to provide scientific advice for the prediction of this technology in the future. By using the least-squares method, the authors have developed a special methodology and obtained the adequate mathematical model, which allows, on the basis of statistical information, to calculate the number of small-scale mechanization machinery for any year as well as in the long run. Through the usage of the above-mentioned mathematical model, appropriate calculations have been made and the respective forecasts for the future have been obtained. Tab. 3, Ref. 2.

Auth.

b18.4.1.10. The use of economic and power criteria in evaluating performance of agricultural hardware. /R. Makharoblidze, E. Shapakidze, G. Chitai, G. Mosashvil/. Bulletin of the Academy of Agricultural Sciences of Georgia. – 2016. – #2(36). – pp. 89-93. – geo.; abs.: geo., eng. The article describes the evaluation methods for agricultural hardware performance on the basis of calculation of economic and power criteria. This method is not dependent on the market conjuncture and makes it possible to carry out an objective assessment of the work performed. Ref. 4.

Auth.

b18.4.1.11. Accounting for joint action of rain and wind in construction and agriculture. /L. Kartvelishvili, L. Megrelidze, N. Dekanozishvili, K. Rokva/. Science and Technologies. – 2017. – #1(724). – pp. 70-75. – geo.; abs.: geo., eng., rus. The regularities of distribution of the joint action of rain and wind (so-called slanting rain) in time and space was calculated for some points of Georgia; the average number of perennial slanting rains and the warm period of the year and their distribution through months were determined. Based on the obtained data, the territorial average monthly distribution of slanting rains was mapped. Given the slanting rain action intensity, average, moderate and intensive zones were identified. Tab. 1, Fig. 1, Ref. 3.

Auth.

b18.4.1.12. Accounting for complex climatic parameters of air temperature and humidity in agriculture and structural design. /L. Kartvelishvili, L. Megrelidze, K. Rokva/. Science and Technologies. – 2016. – #2(722). – pp. 53-58. – geo.; abs.: geo., eng., rus. A complex temperature and humidity parameter has been identified for points located in various climatic zones of Georgia. These data should be considered for assessing the moisture conditions and agro climatic zoning in agriculture. The accounting for the temperature and humidity values is also necessary in thermo technical calculations of protecting structures for residential and public buildings. These findings are particularly relevant under today's conditions against the background of global warming. Ref. 3.

Auth.

b18.4.1.13. Determination of loads generated by knives in the vegetable raw stock leaf crusher-cutter-roller. /T. Megrelidze, G. Pirveli, G. Gugulashvili, G. Beruashvili/. Science and Technologies. – 2016. – #2(722). – pp. 78-82. – geo.; abs.: geo., eng., rus. The loads arising from the operation of knives in a food and medical vegetable raw stock leaves crusher-cutter-roller are described. The design formulas of the axle load, the bending and twisting moments, and longitudinal loads generated by operation of tandem knives are derived. All the above-mentioned loads should be taken into account when designing such a machine. Fig. 1, Ref. 5.

Auth.

b18.4.1.14. Restoring the drying efficiency of a working agent of a new drying unit by an innovative method. /T. Megrelidze, G. Pirveli, G. Gugulashvili, G. Beruashvili, T. Isakadze/. Science and Technologies. – 2016. – #1(721). – pp. 67-72. – geo.; abs.: geo., eng., rus. The problem of moistening of air (working agent) in the process of drying is considered. It is shown that by reducing the working agent's moisture content the drying process intensification and improvement of the dried

product's quality are possible. A new device ensuring the working agent's moisture reduction by the refrigerating plant before supply to the drying chamber is presented. Fig. 1, Ref. 4.

Auth.

b18.4.1.15. Natural grazing lands of Tana valley subalpine zone and activities for their improvement. /I. Sarjveladze, T. Katcharava, M. Ghirsiashvili/. Science and Technologies. – 2016. – #1(721). – pp. 103-106. – geo.; abs.: geo., eng., rus.

The extensive system of overgrazing leads to the degradation of herbage. As a result, biodiversity of the grazing land is being logically impoverished from year to year, originate low-harvest and low-quality secondary groups appear, where greensward and low-grasses resistant to tramping dominate. The organizational problem of overgrazing needs to be coped with in the shortest time for the long-term usage of natural grazing lands. Ref. 4.

Auth.

b18.4.1.16. Georgia's silkworm breeding - problems, rehabilitation, restoration. /G. Nikoleishvili, E. Shapakidze/. Georgian Academy of Agricultural Sciences. Monograph. – 2016. – p. 259. – geo.

The work presents a complex investigation of the state of the Georgian silkworm breeding sector beginning from the 50s of the 19th century up to this day. The authors set a goal to elaborate measures necessary for rehabilitation of the sector and to define prerequisites for its implementation. The development of the educational and research activities in the silkworm breeding sector of Georgia has been considered since the foundation of the Caucasian Sericulture Station (1887) to be further transformed into the Georgian Sericulture Scientific-Research Institute. A brief survey of the world silkworm breeding as well as of the state of mulberry-tree growing in Georgia up to the present is given. Also considered are the issues of sericulture and mulberry-tree growing mechanization and multipurpose use of mulberry-tree plantations. Fig. 56, Tab. 28, Ref. 34.

Auth.

b18.4.1.17. The features of calculating hydrological characteristics upon design of reclamation systems and constructions on the territory of Belarus. /O. Meshik, T. Zubristkaia/. Collected papers of Institute of Water Management. – 2016. – #71. – pp. 94-104. – rus.; abs.: geo., eng., rus.

The article discusses some difficulties in hydrological computations necessary for designing reclamation structures and systems. The hydrometric observation data are the main computation method applied throughout Belarus. It involves such hydrographic characteristics of watersheds as woodiness, swampiness, lakes, etc. The reliability of the hydrographic characteristics is questionable because they have a changeable nature for the recent decades. Taking into account different variants of changes in hydrographic characteristics, the corresponding forecast of runoff modules was received. Maps of runoff modules were developed to design melioration projects. They include maps for spring freshets and rain floods, pre-sowing and mean base flow runoffs. Tab.5, Fig. 6, Ref. 8.

Auth.

b18.4.1.18. Irrigation furrow cutting by a furrower of the latest desing. /V. Samkharadze/. Collected papers of Institute of Water Management. – 2016. – #71. – pp. 114-116. – geo.; abs.: geo., eng., rus.

90% of the irrigated lands of Georgia are watered by strip irrigation despite the fact that it is less efficient than the sprinkler irrigation. The irrigation furrow is cut by plough furrowers. The furrow is shaped by digging and dragging which leads to rupture of the furrow wall and bottom. Soil filtration is at maximum in the ruptured furrow, resulting in the subsequent soil flooding over 5-10 meters. In addition, even the slightest motion of water flow sets in motion small torn off soil particles, contributing thus water erosion. The proposed new roller furrower relies on a new technology in furrow-cutting and compacting. The furrower will go far into the soil by gravity and under tractor hydraulics pressure, leaving behind triangular compacted furrows. The degree of soil compaction is so small that no impervious screen is formed. The furrow walls are stable with no ruptures, increasing thus the furrow length and ruling out flooding, with ensuring decrease in water erosion and prolongation of furrow service life. Fig. 1, Ref. 7.

Auth.

b18.4.1.19. Derivation of atmospheric precipitation from the soil surface by a combined drainage. /V. Shurghaia, L. Kekelishvili, Kh. Kiknadze/. Collected papers of institute of water management. – 2016. – #71. – pp. 128-132. – geo.; abs.: geo., eng., rus.

The article deals with the calculation procedure of practical filtration for the upper tier of combined drainage, which is water-proof. This type of drainage may be used for protecting productive soils from waterlogging by atmospheric precipitation. To increase the drainage efficiency, the conduct of measures for rising water permeability in the upper half-meter soil layer is required. Tab. 1, Fig. 1, Ref. 10.

Auth.

b18.4.1.20. Biogas plants designed for individual farms. /Z. Megrelishvili, M. Loria, D. Chkhaidze, L. Gobadze, B. Khutsishvili/. Georgian Engineering News (GEN). – 2017. – #1. – pp. 109-114. – geo.; abs.: geo., eng.

The paper deals with biogas plants for application in agriculture. It makes possible to produce a high-quality organic fertilizer along with biogas. The fertilizer can also be used on individual farms. The recommendations on building of individual biogas plants are given. Tab. 4, Fig. 3, Ref. 6.

Auth.

b18.4.1.21. On the development of an analytical device for measuring nitrates in agricultural products. /N. Iashvili, K. Makhashvili, G. Tkemaladze, G. Kvartskhava, V. Padiurashvili, Z. Jokharidze/. Georgian Engineering News (GEN). – 2017. – #1. – pp. 121-124. – geo.; abs.: geo., eng.

The paper deals with the issues of development of an analytical device for measuring nitrates in agricultural products. The device is designed not only for detection of nitrates in agricultural products, but also for express analysis of the concentration of nitrates in potable water and soil. The measurement range is from 10 to 999 mg/kg; relative error - no more than 3%. Power supply: mains or battery. Tab. 1, Fig. 3, Ref. 5.

Auth.

b18.4.1.22. A furrowing cultivator and fertilizer. /T. Modebadze, A. Samadalashvili, A. Lomidze/. Goni. – 2016. – #4. – pp. 69-74. – geo.; abs.: geo., eng.

The paper describes a new design of a furrowing cultivator and fertilizer. It makes possible to cut mini furrows at the edges of ploughed strips with the application of liquid fertilizer into the soil. The machine cultivates the soil between strips by means of arrow-type wings. The formulas presented in this paper allow for calculating the total amount of consumed liquid fertilizers and yearly norms of ambient temperatures and amount of precipitations. Fig. 3, Ref. 5.

Auth.

b18.4.1.23. The potato planting machine with the use of bridging mechanism. /G. Purtskhvanidze, R. Chabukiani, T. Uriadmokpeli, I. Danelia/. Goni. – 2016. – #4. – pp. 82-85. – geo.; abs.: geo., eng.

The paper deals with the agrotechnical requirements of potato planting and growing, as well as the aggregation scheme of potato planter with a bridging mechanism, its operating principle and detailed description. Fig. 3, Ref. 2.

Auth.

b18.4.1.24. Potato harvester's design elements. /G. Purtskhvanidze, R. Chabukiani, T. Uriadmokpeli, I. Danelia/. Goni. – 2016. – #4. – pp. 86-88. – geo.; abs.: geo., eng.

The paper deals with the aggregation scheme of a potato harvester with a bridging mechanism, its design elements, operation principle and detailed description. Fig. 2, Ref. 3.

Auth.

b18.4.1.25. The effect of a side-slip of a tractor on slope. /R. Makharoblidze, I. Lagvilava, B. Basilashvili, R. Khazhomia/. Annals of Agrarian Science. – 2017. – v. 15. – #2. – pp. 201-203. – eng.; abs: eng.

The theoretical analysis of the effect of deviation of wheels during a side-slip of a tractor on a slope is given. A calculating formula of the lateral downhill movement of the tractor on the slope, given the slow angle, the tractor's weight, the coefficient, the deviation of wheels; the speed of movement, is derived. Accordingly, some traction and exploitation indices of the tractor aggregates when operating on the slope are specified. The research results can be used in designing new mountain tractors. Fig. 1, Ref. 8.

Auth.

b18.4.1.26. Water resources and ecological problems of Kakheti. /Z. Lomsadze, K. Makharadze, M. Tsitskishvili, R. Pirtskhalava/. Annals of Agrarian Science. – 2017. – v. 15. – #2. – pp. 204-208. – eng.; abs: eng.

The article provides an overview of the present-day condition of Kakheti water resources, one of the important regions of Georgia, and highlights all the related negative aspects and issues. Tab. 3, Fig. 2, Ref. 24.

Auth.

Forestry

b18.4.1.27. Recommendations for renewal-restoration and management of pine forest plantations in Tbilisi and its environs. /A. Shainidze, A. Dzirkvadze, R. Davitadze/. Bulletin of Georgian Academy of Agricultural Sciences. – 2017. – #1(37). – pp. 140-144. – geo.; abs.: geo., eng.

The results of registration of dead-wood, withering and diseased trees in pinewoods planted artificially in Tbilisi and its environs, as well as causes of disease, sanitary-hygienic condition of pinewood, natural renewal of wood, have been reviewed and the relevant conclusions are discussed. Tab. 1, Fig. 1, Ref. 6.

Auth.

b18.4.1.28. Specifics of agro technics of cultivation of cypress (*Cupressus sempervirens* L). /R. Rukhadze, Z. Giorgaia/. Bulletin of the Academy of Agricultural Sciences of Georgia. – 2016. – #2(36). – pp. 139-141. – geo.; abs.: geo., eng.

The work presents agro technics of cultivation of evergreen cypress (*Cupressus sempervirens* L.) taking into account versatile environment of Georgia. Its dendrological forestry and economic characteristics are described in detail. Producing of seeds of the indicated species is also defined as well as specifics of its use and cultivation agro technics. The terms of maturing and gathering of fruit and seeds of cypress are: blossoming time – April, May, fruit maturing time – September, October, and harvesting time – winter. Its seeds maintain the cropping up ability for two years, the yield of seeds from cone is 120-140%, the net amount of seeds per 1 kg – 250 000 seeds, and absolute weight – 3-5 g. Seeding norm of this species on 1 longitudinal meter is 10 g. It is monoecious plant. The work also considers significance of the wood of the studied species in ship construction, furniture and turnery works, the goals, places and designation of the evergreen cypress cultivation are widely discussed. Ref. 6.

Auth.

b18.4.1.29. Windbreaks importance and schemes for their cultivation in Georgia. /N. Goginashvili, N. Kobakhidze/. Bulletin of the Academy of Agricultural Sciences of Georgia. – 2016. – #2(36). – pp. 142-145. – geo.; abs.: geo., eng.

The article presents modern and traditional methods of arranging windbreaks, their significance, structure and composition. It also discusses functions of windbreaks, as well as species and varieties of plants selected for different conditions of eastern and western Georgia. Fig. 1, Ref. 10.

Auth.

b18.4.1.30. Urban forests and green spaces of Tbilisi and ecological problems of the city. /T. Patarkalashvili/. Annals of Agrarian Science. – 2017. – v. 15. – #2. – pp. 187-191. – eng.; abs: eng.

The historical development of Tbilisi urban forests and green areas as well as some challenges and prospects for the city's environmental state are considered. Tab. 5, Fig. 12, Ref. 34.

Auth.

b18.4.1.31. The planning of urban green areas and importance of their protection in resort cities (case of Georgian resorts). /T. Khoshtaria, N. Chachava/. Annals of Agrarian Science. – 2017. – v. 15. – #2. – pp. 217-223. – eng.; abs: eng.

The article discusses the problem of green areas reduction and degradation in Southern Georgia after the example of three resort cities located in Samtskhe-Javakheti region. These cities (Akhaltikhe, Borjomi and Abastumani) are well known balneological and climatic resorts of Georgia. Within the frames of this study, the actual conditions of urban green areas and forests adjoining the tourism and recreational zones are considered by comparing these three resorts. There cases of the latests natural disasters - heavy rain flows are analyzed. The protective role of green areas planting for this case is estimated. For each city concepts of green area planning are worked out together with the recommendations for sustainable development of urban landscapes. Tab. 1, Fig. 4, Ref. 21.

Auth.

Fisheries

b18.4.1.32. Potency of some drugs against diseases of fishes. /G. Basiladze, Sh. Potskhveria, E. Kashia, M. Tsetskhladze/. Bulletin of the Academy of Agricultural Sciences of Georgia. – 2016. – #2(36). – pp. 118-123. – geo.; abs.: geo., eng.

Mass mortality of fish, especially of fry, is generally caused by infectious and fungous diseases, such as fibrosis, flavobacteriosis, saprolegniasis, yersiniosis and nematodosis. In April 2015, in one of the trout farms, where 1.5- and 2.5-month old fry were dying, two comprehensive treatment tests were carried out. For the treatment of two experimental groups of fry were used: Diatri-aqua - 50%, Seabit, Florfish - 50%, Aziks plus and Med Liquid (a complex of vitamins A, D₃, E, C), which were given to the fry (whitebaits) together with a forage during 10 days. The control group of fry was not given the medication. The fry of all the three groups were under the same conditions. At the end of the experiment the efficiency of the medications made 96.1-97.9%. The physiological condition of the treated fry improved and their biomass increased by 0.4-0.6 grams. Tab. 2, Ref. 5.

Auth.

Soil science

b18.4.1.33. Restoration and improvement of soil fertility as a basic condition for food security. /G. Margvelashvili, R. Lolishvili/. Bulletin of Georgian Academy of Agricultural Sciences. – 2017. – #1(37). – pp. 65-71. – geo.; abs.: geo., eng.

The article deals with the problem of soil degradation in the world and particularly in Georgia, the main reason of which is its uncontrolled consumption and anti-scientific approach. The authors present examples of the negative results caused by number of reasons, such as: uncontrolled plowing, insufficiency in application of organic and mineral fertilizers, soil erosion caused by water and wind, soil contamination by plant protection and other chemicals. Tab. 3, Fig. 4, Ref. 4.

Auth.

b18.4.1.34. Theoretical bases for enhancing perennial crop farming. /J. Oniani/. Bulletin of Georgian Academy of Agricultural Sciences. – 2017. – #1(37). – pp. 72-75. – geo.; abs.: geo., eng.

Based on analysis of the sixty-year long field, vegetation, miniature, lysimetric and laboratory research, completely new theories for recovery, improvement and regulation of the degraded soil under perennial crops are developed. The optimal planting depth of soil is defined by: the humus layer thickness, its fertility, the properties of lower layers of soil and the characteristics of the root system arrangement of the perennial crops; given the perennial crops' cultivation specifics under conditions of present-day machinery and technologies, the conduct of land treatment ascribes the major role among soil-forming factors to the man-made one. The article lists the recommendations to be introduced in production that are to be estimated based on crop capacity, quality characteristics of the obtained product and changes in the soil characteristics. Ref. 4.

Auth.

b18.4.1.35. A comparative economic analysis of intensive tillage and mini-till technologies of soil under wheat. /O. Karchava, M. Benashvili, Sh. Tsukoshvili/. Bulletin of Georgian Academy of Agricultural Sciences. – 2017. – #1(37). – pp. 76-81. – geo.; abs.: geo., eng.

The article establishes the basic priorities for mini-till of wheat production compared with intensive technologies on the basis of economic analysis conducted by the chronometry of observations in different regions of wheat production. On the selected demo plots in Dedoplistskaro, Marneuli and Akhalkalaki regions the mini-till and intensive tillage technologies were popular, their technological adapters were developed; the energy and production costs for the production of wheat by both technologies were calculated. The results show that the yield is not significantly changed. At that, the specific energy and production costs as well as the period of vegetation, soil compaction and erosion phenomena are significantly reduced, Tab. 3, Ref. 3.

Auth.

b18.4.1.36. Soil fertility control systems for increasing fruit crop soil fertility. /J. Oniani/. Bulletin of the Academy of Agricultural Sciences of Georgia. – 2016. – #2(36). – pp. 59-63. – geo.; abs.: geo., eng.

As a result of a sixty-year vegetative, miniature, field and laboratory research – control systems for increasing fertility of a degraded fruit crop soil were developed. Realization of these systems and rotations as described continue until the rooting out of plants. Their thorough realization results in: increased soil fertility, increased harvest, balancing humus composition, substituting crop rotation, replacement of nitrogen fertilizers by biogenic nitrogen, reduction in the use of organic fertilizers and decrease of chlorotic diseases, procreation of fruit crops without rest of the soil. Ref. 3.

Auth.

b18.4.1.37. Soil fertility control systems. /J. Oniani/. Bulletin of the Academy of Agricultural Sciences of Georgia. – 2016. – #2(36). – pp. 64-67. – geo.; abs.: geo., eng.

A sixty-year field, lysimetric, vegetation, miniature and laboratory research has shown: 1. The rational use of grape tolerant grass restores the fertility of the amortized vineyard soil to the level of uncultivated soil; 2. Plantation of the restored fertility and all types of soil is carried out in accordance to the properties of the soil, subsoil and the development characteristics of the root system of the seedlings at the depths of 40-50-60-70-90 and 100cm, in the phase of physical maturity; 3. Deep tillage at 20-40cm distance from the vineyard lanes in 12-year intervals, clean cutting of the roots and introduction of PK resources during the tillage along the whole depth of the plantation, boosts root regeneration, growth and development of the vine, improves the properties of soil and increases yield; 4. A thorough implementation of the given systems of degraded fertility and degraded soils improves soil fertility, quality of the obtained product, increases yield, successfully replaces the use of the nitrogen fertilizers with biogenic nitrogen, limits the spread of chlorotic diseases and rot and guarantees the vineyard restoration without rest of soil. Ref. 4.

Auth.

b18.4.1.38. Poti waterlogged soil fertility research for chemical reclamation purpose. /M. Shavlakadze, K. Dadiani, L. Maisaia, T. Supatashvili/. Collected papers of institute of water management. – 2016. – #71. – pp. 126-127. – geo.; abs.: geo., eng., rus.

The paper considers an agrochemical analysis of waterlogged soils of the Kolkheti (Poti, Georgia) Agricultural-Ecological Experimental Station. The results suggest that soils need to be chemically reclaimed so that their fertility is enhanced. Tab. 2, Fig. 2, Ref. 5.

Auth.

b18.4.1.39. Calculation of the cost-effectiveness of restoration of eroded mountain slopes by using the geo-mat “Luffaeromat”. /G. Chakhaia, M. Vartanov, L. Tsulukidze, N. Kvashilava, E. Kechkhoshvili, I. Khubulava, S. Gogilava, I. Kvirkevelia/. Collected papers of institute of water management. – 2016. – #71. – pp. 133-136. – geo.; abs.: geo., eng., rus.

The cost-effectiveness of a modern anti-soil erosion method for restoring eroded slopes and cultivating a perennial crop (hazelnut plantation) on them – by using the geo-mat “Luffaeromat” is determined. The costs of the work to be carried out and the income to be gained from using the geo-mat “Luffaeromat” are calculated for a 20-year period (2017-2036). In this case, the income per ha discounted for 2036 makes GEL 117 610. Tab. 1, Fig. 1, Ref. 6.

Auth.

b18.4.1.40. The nutrient substances withdrawn from soil by kernels, straw and total biomass of “Ajameti Tetri” maize variety under conditions of Shida Kartli (Mukhrani) irrigation system. /O. Kharashvili, N. Mebonia, Q. Rokva, L. Baidauri, M. Lomishvili, M. Kikabidze/. Collected papers of institute of water management. – 2016. – #71. – pp. 145-150. – geo.; abs.: geo., eng., rus.

It has been established that different irrigation regimes and fertilizer rates render a definite impact on the withdrawal of nutrient substance by plant from soil. The amount of nitrogen withdrawn by each centner (100 kg) of the kernels, straw and total mass of “Ajameti Tetri” maize is almost the same under every soil humidity conditions and the sum of the nutrient substances of phosphorus and potassium gradually increases with an increase in the soil moisture regime. It has been justified that the percentage of nitrogen gradually decreases by an increase in soil moisture, while that of phosphorus and potassium increases. The actual and formula-determined values, differing by no more than 10% are proposed. Tab. 3, Ref. 3.

Auth.

b18.4.1.41. Laboratory examination of modern anti-soil erosion geo mat made of natural material. /I. Khubulava/. Collected papers of Institute of Water Management. – 2016. – #71. – pp. 154-159. – geo.; abs.: geo., eng., rus.

The work presents a laboratory examination of a modern anti-soil erosion geo-mat “Luffaeromat” made of a natural material, which aims at determining efficiency of the mentioned geo-mat. In the framework of the examinations, observations on the air temperature and humidity in the laboratory, also on the temperature, humidity, pH and the light wavelength of the soil placed in a test box were carried out. Watering took place taking into account the water requirement of the plant. The plant’s apical growth was measured by a two-day interval. The time dependence of the average values of the above data was also identified. The laboratory examination of the geo-mat “Luffaeromat” showed it to be effective and real measure for stabilizing and restoring biodiversity of the vulnerable slopes. Tab. 1, Fig. 9, Ref. 3.

Auth.

b18.4.1.42. Study of a long-term toxic impact of Ni on the thermo stability of soil bacterial cell culture *Arthrobacter oxydans* /V. Sokhadze, E. Namchevadze, E. Kiziria, L. Tabatadze, L. Lejava, Sh. Gogichaishvili, G. Tvauro, M. Abuladze/. Annals of Agrarian Science. – 2017. – v. 15. – #2. – pp. 169-176. – eng.; abs: eng.

The study aims to analyze the time-dependent development of Ni toxic effect on the bacterial cell culture *Arthrobacter oxydans*, supposed to have high potential for heavy metals detoxification. The differential scanning calorimetry (DSC) method was applied for the rapid assessment of toxic impacts on bacterial cells on the basis of the changes of their thermo stability. The total melting specific heat of bacterial cells altered in accordance with the growth phases of the culture. We propose to use the bacterial cell culture at the stationary growth phase, characterized by high reproducibility of the melting profile, for rapid and correct detection of the toxic effect. The implementation of the differential scanning calorimetry method to the study of Ni toxic effect demonstrated the concentration and time-dependent development of cell stress response and detected the early initial changes of the thermo grams, especially in the temperature region of DNA-protein melting. The major changes of the thermo grams have been developed during the first two hours of Ni administration to the growth medium, possibly reflecting the stress-response alterations in gene expression and protein activity. The classical viability assays were not able to determine the toxic effect for the studied bacterial cells at that time point. The similar character of the metal toxic impact on the thermo stability of the *Staphylococcus epidermidis* cell culture had been detected as well, despite the different general melting profile. The obtained data contribute to a better understanding of bacteria-metal interaction and could be applied to the bacteria stress-response studies. Tab. 1, Fig. 6, Ref. 42.

Auth.

b18.4.1.43. Physical properties of soils in Georgia. /L. Jorbenadze, Teo Urushadze, T. Urushadze, I. Kunchulia/. Annals of Agrarian Science. – 2017. – v. 15. – #2. – pp. 224-234. – eng.; abs: eng.

The article generalizes such properties of Georgian soils as water permeability, bulk density, particle density, total porosity, capillary porosity, non-capillary porosity, capillary water capacity, saturation water content, field capacity, permanent wilting point, hygroscopic water content, productive water, and pores with air. These properties were determined in main types of soil of Georgia: red (*Ferralic Nitisols*, *Haplic Nitisols*), yellow (*Ferric Luvisols*), boggy (*Dystric Gleysols*, *Eutric Gleysols*, *Histosols*), Yellow Yellow podzolic (Stagnic Acrisols, Ferric Acrisols), yellow brown forest (*Stagnic Luvisols*, *Mollic Luvisols*, *Humic Luvisols*, *Ferric Luvisols*), brown forest (*Humic Cambisols*, *Ferric Cambisols*, *Eutric Cambisols*, *Dystric Cambisols*), raw carbonate (*Rendzic Leptosols*), grey cinnamonic (*Calcic Kastanozems*, *Vertic Kastanozems*), meadow grey cinnamonic (*Haplic Kastanozems*, *Gleyic Kastanozems*, *Vertic Kastanozems*), cinnamonic (*Chromic Cambisols*, *Calcaric Cambisols*, *Humic Cambisols*, *Eutric Cambisols*), meadow cinnamonic (*Chromic Cambisols*, *Calcaric Cambisols*, *Gleyic Cambisols*, *Eutric Cambisols*), black (*Haplic Vertisols*), chernozems (*Voronic Chernozems*, *Calcaric Chernozems*), mountain meadow (*Hyperdystic Umbrisols*), saline soils (*Vetric Solonchaks*, *Mollic Solonetz*), alluvial (*Gleyic Fluvisols*, *Eutric Fluvisols*, *Dystric Fluvisols*). Tab. 1, Ref. 75.

Auth.

b18.4.1.44. Determination of Cu, Zn and Cd in soil, water and food products in the vicinity of RMG Gold and Copper Mine, Kazreti, Georgia. /G. Avkopashvili, M. Avkopashvili, Al. Gongadze, M. Tsulukidze, E. Shengelia/. Annals of Agrarian Science. – 2017. – v. 15. – #2. – pp. 269-272. – eng.; abs: eng.

The functioning of polymetallic factories considerably damages the environment. The operation of RMG Gold and Copper Mine in the SE part of Georgia causes severe ecological problems in the region. It is vital that monitoring near the areas where industrial activities are underway is to be conducted. The study is aimed at eco-monitoring of Bolnisi municipality, Georgia. The conducted monitoring concerned the content of heavy metals (Cu, Zn, Cd) in the "water-soil-plant" system in the Kazreti (Madneuli) villages (Balichi, Ratevani, Nakhiduri, Khidiskuri). According to the obtained results, the content of heavy metals in soil is much higher than the permissible concentration. In spite of this, the content of Cu and Zn in the plants grown on this soil does not exceed the allowed concentration limit; the content of Cd content was not identified. The following plants were studied: green bean, mushrooms, green walnut, green pepper, cucumber, cherry, potato, tomato, walnut, garlic, dry bean and maize. The water of the Kazretula and Mashavera Rivers was analyzed. Tab. 3, Fig. 3, Ref. 16.

Auth.

Horticulture, viticulture

b18.4.1.45. Dog rose /*Rosa canina* L/ farming peculiarities and its medical properties. /R. Rukhadze, Z. Giorgaia/. Bulletin of Georgian Academy of Agricultural Sciences. – 2017. – #1(37). – pp. 39-41. – geo.; abs.: geo., eng.

The peculiarities of cultivation of the studied species – dog rose /*Rosa canina* L./ are presented together with its dendrological, forest, economic and medical properties. Ref. 8.

Auth.

b18.4.1.46. Condition and rehabilitation prospects of citrus plantations. /N. Khalvashi, A. Meskhidze, D. Baratashvili, N. Kedelidze/. Agrarian-economic Science and Technologies. – 2017. – #1(34). – pp. 26-38. – geo.; abs.: geo., eng.

The article deals with the analysis of the current condition of citrus breeding which used to be one of the most leading sectors of agriculture. The research also presents the prospects of citrus breeding development as well as highlights the advantages of the technologies and actions that are deemed to be necessary to implement the rehabilitation measures for depreciated citrus plantations. Fig. 5, Ref. 8.

Auth.

b18.4.1.47. Efficacy of entomopathogenic nematodes *Steinernema feltiae* and *Heterorhabditis bacteriophora* against the melon aphid (*Aphis gossypii* glow., Hemiptera, aphididae). /N. Mikaila/. Bulletin of the Georgian National Academy of Sciences. – 2017. – v. 11. – #1. – pp. 96-101. – eng.; abs: eng., geo.

This study was aimed to determine the efficiency of biological control of entomopathogenic nematodes *Steinernema feltiae* and *Heterorhabditis bacteriophora* against the melon aphid (*Aphis gossypii*) under laboratory conditions. Prior to conducting a trial on entomopathogenic nematodes, their cultivation occurred in an incubator at 24-25°C on last-instar large wax moth (*Galleria mellonella*) larvae according to a procedure described by Kaya and Stock (1997). The suspensions obtained as a result of cultivation were kept in a refrigerator at 4-6°C. Acclimation of nematodes proceeded at room temperature 24-25°C. The application of the obtained biomass was possible after 6-10 hours. For determination of the efficiency of *S.feltiae* and *H.bacteriophora* under room temperature at 24-25°C and 75% humidity, last instar-imago of the pest was used

for trial. Mortality rate of individuals was determined by Abbott formula. The trials were conducted on 10 cm Petri dishes. The obtained results have shown that the nematode *S.feltiae* is more effective against *A.gossypii* than *H.bacteriophora* and 500 nematode/ml suspensions mortality depended on time, nematode variety and concentration. Pest mortality was tested for treatment after 3, 5, 7 days. On the 7th day after treatment with a nematode suspension 500, 1000, 1500 infective juveniles/ml of *S.feltiae* in the given trial reveal 20, 58 and 78% mortality rate whereas *H.bacteriophora* 15, 28, and 46% respectively. The obtained results show that under laboratory conditions the efficiency of *S.feltiae* and *H.bacteriophora* against *A.gossypii* can be controlled by *S.feltiae* rather than *H.bacteriophora* and therefore, future study is to be conducted under greenhouse and field conditions. Fig. 6, Ref. 8.

Auth.

b18.4.1.48. Evaluation of promising forms of orange in accordance with fruiting and fruit qualitative indicators. /V. Kobalia/. Novation. – 2016. – #18. – pp. 9-14. – geo.; abs.: geo., rus., eng.

The fruiting and fruit qualitative indicators of various forms of orange under comparatively strict climate conditions of the subtropical zone were studied. The manifestation parameters of these signs were identified. The work studied the periods of phenological phases, growing dynamics of vegetative organs, productivity, fruits mechanical and biochemical composition of the plants under study. The positive economic signs of some distinguished forms were established. Two forms are recommended for broad introduction. Tab. 4, Ref. 4.

Auth.

b18.4.1.49. Study of leaves and fruit of cultivated in Georgia gleditschia (*Gleditschia* L) for quantification of extractive substances. /M. jincharadze, M.Gelovani, Kh.Tsikarishvili, I.Metreveli/. Business-Engineering. – 2017. – #1-2. – pp. 146-151. – geo.; abs.: geo., eng.

The paper deals with the study of leaves and fruit of growing in Georgia gleditschia (*Gleditschia triacanthas* L) for quantification of extractive substances. The quantitative figures of leaves of the plant, namely: humidity, total ash, changed color of the raw materials (0.5 mm sieve outgoing particles), crushed leaves, leaves and the quantity of organic impurities were established. The extractive substances were quantified: a) in the young leaves of the samples of the plant taken in Tbilisi Botanical Garden in May; b) in the leaves of the plant taken in Tbilisi Botanical Garden in June; c) in the flowers of the samples of the plant taken in Tbilisi Botanical Garden in May; d) in the fruit of the samples of the plant taken in Tbilisi Botanical Garden in November; e) in the seeds of the samples of the plant taken in Tbilisi Botanical Garden in November; f) in the young leaves of the samples of the plant taken in Chokhatauri district in May; g) in the leaves of the samples of the plant taken in Chokhatauri district in June; h) in the flowers of the samples of the plant taken in Chokhatauri district in May; i) in the fruit of the samples of the plant taken in Chokhatauri district in October; j) in the seeds of the samples of the plant taken in Chokhatauri district in November. Tab. 2, Fig. 3, Ref. 12.

Auth.

b18.4.1.50. Integrated protection of orchard trees for producing ecologically safe fruits (practical recommendations). /G. Aleksidze/. Modern technologies to produce ecologically pure products for sustainable development of agriculture. Int. Sci. Conf. Materials. Tbilisi. – 28-30 September. – 2016. – pp. 104-110. – geo.; abs.: geo., eng.

Some main agrotechnical, mechanical, microbiological, biological, chemical, biotechnical methods to control pests and diseases in different times of the year are discussed. Integrated control methods ensuring the production of ecologically safe fruit are recommended. Ref. 4.

Auth.

b18.4.1.51. Agro-climatic characterization of freezing in Kakheti viticulture region. /G. Aleksidze, G. Japaridze, V. Gogitidze, D. Magradze, T. Epatashvili/. Bulletin of Georgian Academy of Agricultural Sciences. – 2017. – #1(37). – pp. 42-44. – geo.; abs.: geo., eng.

The paper focuses on the impact of global warming, the ongoing processes in the early spring season and the late frosts, also it discusses the changes of temperature conditions as a result of global warming; late ending of autumn vegetation period; acceleration of the falling of the fractured leaves. Ref. 2.

Auth.

b18.4.1.52. Frost resistant vine varieties and damage reduction activities in Kakheti region. /G. Aleksidze, G. Japaridze, V. Gogitidze, D. Magradze, T. Epatashvili/. Bulletin of Georgian Academy of Agricultural Sciences. – 2017. – #1(37). – pp. 45-48. – geo.; abs.: geo., eng.

The paper presents viticulture in Kakheti region, highlighting comparative frost resistance of some aboriginal and introduced vine varieties; change in the air temperature indicators according to years and seasons under global warming conditions. Some farming activities for reducing the percentage probability of winter frost damages in vineyards are considered. Ref. 3.

Auth.

b18.4.1.53. Results of ampelographic study of grapevine varieties in the Skra germplasm repository.

/I. Mdinardze, E. Abashidze, M. Baratashvili, M. Vibliani, D. Maghradze/. Bulletin of Georgian Academy of Agricultural Sciences. – 2017. – #1(37). – pp. 49-52. – geo.; abs.: geo., eng.

The results of ampelographic study for 128 Georgian varieties are presented in this article. The studied varieties are preserved in the Skra germplasm repository (the FAO code for the collection is GEO015) and their investigation was done in the period of 2014-2017. The varieties originated from various regions of Georgia were described by using 45 OIV descriptors. The ampelographic descriptions were used by preparing of illustrated "Ampelographic catalogues of grape varieties from Skra collection", in which 152 varieties are presented. Fig. 3, Ref. 6.

Auth.

b18.4.1.54. Morphology and structure of grapevine's hairs - trichomes. /L. Kharitonashvili, N. Shakarishvili, M. Baratashvili, R. Chipashvili, D. Maghradze/. Bulletin of Georgian Academy of Agricultural Sciences. – 2017. – #1(37). – pp. 53-56. – geo.; abs.: geo., eng.

The article deals with the results of study of grapevine's hairs - the trichomes: the morphology and the structure of the 13 Georgian native varieties were investigated. The diversity of the shapes of trichomes is established; they are simple unicellular, multicellular, conic, ascending, flat and spiral. The sizes of trichomes and distances between them are established in the studied varieties. The research demonstrated varietal differences among the trichomes' parameters. Tab. 1, Fig. 2, Ref. 14.

Auth.

b18.4.1.55. Eno-carpological study of Georgian grapevine varieties from Skra germplasm repository.

/E. Abashidze, M. Vibliani, Sh. Kikilashvili, R. Chipashvili, I. Mdinardze/. Bulletin of Georgian Academy of Agricultural Sciences. – 2017. – #1(37). – pp. 57-64. – geo.; abs.: geo., eng.

Eno-carpological traits were evaluated in thirty-three Georgian autochthonous grapevine varieties preserved at the Skra Germplasm repository. The standard phenotyping method proposed by the COST action FA1003 "East-West Collaboration for Grapevine Diversity Exploration and Mobilization of Adaptive Traits for Breeding" has been adopted for analyses. The obtained results showed a significant variability in the carpological and biochemical characteristics of Georgian grapevine varieties. The total phenolics for studied varieties varied from 427,7 mg/kg (Mirzaanuli Tetri (2015)) to 3378.0 mg/kg (Shonuri (2016)). The total antocyanins contents in colored grapevine varieties varied from 50.0 mg/kg to 2861.2 mg/kg, were the highest content was found in the variety Shonuri, and the lowest - in the variety Ghrubela Kartlis. Tab. 2, Fig. 2, Ref. 10.

Auth.

b18.4.1.56. Expanding areas of viticulture in Georgia – shifting vine species in Kakheti region. /G.

Aleksidze, G. Japaridze, V. Gogitidze, D. Maghradze, T. Epitashvili/. Bulletin of the Academy of Agricultural Sciences of Georgia. – 2016. – #2(36). – pp. 53-58. – geo.; abs.: geo., eng.

The currently ongoing and future process of climate change and warming will alter to some extent the growth and development of vine species in Georgia. It will effect shifting of the borders of vine species spreading and of the quality and direction of the finished product. In accordance with vine demands regarding climate parameters, the micro-zones are selected for growing of middle and late ripening vine varieties in the region, which will be used for production of quality wine, brandy, table grapes and raisins. Ref. 3.

Auth.

b18.4.1.57. Comparative study of Georgian native varieties of grapevine (*Vitis vinifera L.*) to downy mildew. /N. Bitsadze, R. Chipashvili, K. Pavliashvili, R. Khazaradze, D. Maghradze/. Bulletin of the Academy of Agricultural Sciences of Georgia. – 2016. – #2(36). – pp. 102-107. – geo.; abs.: geo., eng.

Different varieties of European grapevine (*Vitis vinifera L.*) are characterized with different resistance to downy mildew (*Plasmopara viticola*). The aim of the work was to study resistance of 42 Georgian grapevine varieties to disease causing agent. The assessment of cultivars was made by observation of disease development in natural conditions (at vineyard) and in the Lab by using leaf disc artificial inoculation method according OIV descriptor.(OIV452-1) Study of grapevine varieties shown that the results obtained by both methods were similar despite minor differences. High resistance under both conditions was demonstrated by the cultivars: Budeshuri tritely, Tsitsk, Chkhikoura, Kakhis tetri, Muradouli, Ockhanuri sapere, Klioni, Kesi, Tskobila; very high resistance was shown by the cultivars: Ojaleshi, Rkatsiteli vardisperi, Tsirkvalis tetri. Detailed studies of those varieties will continue. Tab. 1, Fig. 2, Ref. 3.

Auth.

b18.4.1.58. Peculiarity of determination of vine's water requirement. /T. Odilavadze, K. Bziava, I. Inashvili, A. Davitashvili/. Hydroengineering. – 2016. – #1-2(21-22). – pp. 63-68. – eng.; abs.: eng., geo., rus.

Among the many natural and climatic factors affecting the dynamic processes of agricultural crop development a special significance acquires such climate index, as evapotranspiration (ET). Determining factors of evapotranspiration for the different climatic conditions are key indicators of water requirement and its optimal

productivity for agricultural crops. For determination of the vine evapotranspiration was used Blaney-Criddle method according to which with high accuracy were determined Regulated Deficient Irrigation (RDI) of vine's crop. On the basis of the 2013 experiment using the method of L. Williams at the experimental plot of the Georgian Agrarian University for the vine breed "Rkatsiteli" we identified the crop coefficient (Kc) and respectively its water requirement during the crop growing season. Ref. 2.

Auth.

b18.4.1.59. Autonomous antihail transformable system for vineyards. /E. Medzmariashvili, M. Sanikidze, N. Tsignadze, N. Medzmariashvili/. Works of Technical University of Georgia. – 2016. – #2(500). – pp. 102-110. – geo.; abs.: geo., eng., rus.

The article considers an antihail system that can be used to protect plants, for example vines from hail, as well as to arrange simple greenhouses. A demonstration pilot model designed and tested under field conditions is presented in this work. The proposed design makes it possible to unload the device with less time, to better protect plants against adverse conditions and to reduce the loss that may result from hailing. Fig. 5, Ref. 3.

Auth.

b18.4.1.60. Integrated protection of grape against pests and diseases in Georgia. /G. Aleksidze/. Modern technologies to produce ecologically pure products for sustainable development of agriculture. Int. Sci. Conf. Materials. Tbilisi. – 28-30 September. – 2016. – pp. 101-104. – geo.; abs.: geo., eng.

To protect grape from different pests and diseases, it is necessary to use chemical, biological, biotechnical, agro technical and other methods. The article considers integrated pest management system methods as the main direction in combating different pests and diseases of vine and grape. Ref. 4.

Auth.

b18.4.1.61. Anthocyanins in colored grapes. /E. Gamkrelidze/. Modern technologies to produce ecologically pure products for sustainable development of agriculture. Int. Sci. Conf. Materials. Tbilisi. – 28-30 September. – 2016. – pp. 123-126. – geo.; abs.: geo., eng.

Despite fact that grape raw materials of colored vine clones and hybrids are rarely used in natural wine production made by using the red-winemaking technology, the must obtained from it can be used in the production of special wines, but the grape-seed and grape skin concentrated extracts with ethanol can be used for producing preventive and treatment food additives and medications, especially as the raw material of colored grapes (American and hybrid varieties) contains much more amount of both mono-glucoside and diglucoside forms of anthocyanins than the raw material of white and colored grape cultural vine. Tab. 1, Fig. 2, Ref. 4.

Auth.

b18.4.1.62. Resistance of grapevine varieties of Kvemo (Lower) Kartli of Georgia to abiotic factors. /T. Ortoidze/. Annals of Agrarian Science. – 2017. – v. 15. – #2. – pp. 192-194. – eng.; abs: eng.

The paper analyzes relative resistance to abiotic factors of Kvemo (Lower) Kartli, Georgia grape varieties such as *Rkatsiteli*, *Saperavi*, *Asuretuli shavi* and *Tavkveri* (*Vitis vinifera* L.) with chlorophyll fluorescence method. It is shown that *Rkatsiteli* and *Asuretuli shavi* are distinguished by the highest frost resistance, followed by *Saperavi* and *Tavkveri*. However, *Asuretuli shavi* is more resistant to spring frosts. *Rkatsiteli* reveals more resistance to high temperatures, followed by *Saperavi*, *Asuretuli shavi* and *Tavkveri*. As for droughts, the most resistant is *Asuretuli shavi*, followed by *Rkatsiteli*, *Saperavi* and *Tavkveri*. Tab. 1, Fig. 2, Ref. 9.

Auth.

Agronomy

b18.4.1.63. The dynamics of population of the fall webworm (*Hyphantria cunea* Dr.) in West Georgia.

/A. Maisuradze, L. Gvartsiteli, T. Gogishvili, E. Abashidze/. Bulletin of Georgian Academy of Agricultural Sciences. – 2017. – #1(37). – pp. 105-107. – geo.; abs.: geo., eng.

The fall webworm was first registered in West Georgia in 1976 and soon became one of the most harmful pests there. It is a polyphage pest attacking more than 600 species of forest, fruit trees and ornamental plants. As a result of the carried out observation and research, the dynamic features of its population and the areas of its nuisance intensity are established. Biological agents, insects and entomopathogenic fungi of the fall webworm are identified. Fig. 2, Ref. 4.

Auth.

b18.4.1.64. Identification of forms resistant to mulberry phytoplasma disease by the coefficient of resistance. /N. Stepanishvili, I. Megrelishvili, L. Tsigriashvili, I. Chargeishvili/. Bulletin of Georgian Academy of Agricultural Sciences. – 2017. – #1(37). – pp. 108-113. – geo.; abs.: geo., eng.

A direct correlation between the quantity of phloem cells in a leaf stake and the number of the reaction in cell has been established; on its basis the resistant forms were identified by means of the coefficient of resistance - K, which is calculated by the interaction of quantity of abundant phloem in the mesopetiol of a leaf stake to

the indicator of reaction of cell environment. The mulberry form is considered resistant if the coefficient of resistance K is more than 1.0. If K is less than 1.0, then the form is considered susceptible. Tab. 1, Fig. 1, Ref. 5.

Auth.

b18.4.1.65. Ways of increasing the number of entomophages in nature. /T. Gogishvili/. Bulletin of Georgian Academy of Agricultural Sciences. – 2017. – #1(37). – pp. 114-116. – geo.; abs.: geo., eng.

One of the most effective and ecologically safe means of decreasing the number of pests and the harm they do to agricultural plants is to increase the number of entomophages. The ways of increasing the role of entomophages are given in the work. One of them is sowing of nectariferous plants (buckwheat, fennel, mustard, rapeseed, parsley, sunflower, sainfoin, etc.) near crops and plants. The closeness of a forest has a favorable effect on the number of entomophages. Spraying of chemicals is known to significantly decrease the number of entomophages. Where pesticides need to be applied, it shall be carried out in reasonable periods; in particular, pests should be in sensitive phases (worm, mature phase), while entomophages - in endurable phases (egg, pupa). Tab. 3, Ref. 4.

Auth.

b18.4.1.66. Study of the bark beetles fauna (*coleoptera, ipidae*) of the southern slopes of the Greater Caucasus. /K. Isayeva/. Bulletin of Georgian Academy of Agricultural Sciences. – 2017. – #1(37). – pp. 155-159. – rus.; abs.: rus., eng.

The results of investigation of the beetles fauna of southern slopes of the Greater Caucasus is given in the article. The author provides a checklist of 20 species of bark beetles for this territory. Two species (*Hylesinus oleiperda* Fabricius 1792; *Taphrorychus bicolor* Herbst 1793) were recorded firstly for the fauna of Azerbaijan. Fig. 1, Ref. 7.

Auth.

b18.4.1.67. Influence of a location on productivity of the Austrian wheat varieties. /L. Ujmajuridze, Ts. Samadashvili, G. Chkhutiashvili, Z. Sikharulidze/. Bulletin of Georgian Academy of Agricultural Sciences. – 2017. – #1(37). – pp. 19-26. – geo.; abs.: geo., eng.

According to 2014-2016 data, economic and biological indicators of Austrian wheat varieties are characterized by high variability depending on a location. The productive tillering in Dedoplistskaro exceeds the same indicator in Akhaltsikhe almost twice, the average indices were received in Khashuri and Telavi. Ear length indicators on regions almost didn't differ from each other. The same results are received on the number of spikelets in an ear. By the number of grains in an ear differ Dedoplistskaro and Akhaltsikhe regions. By the mass of grains in one ear the difference between the regions is insignificant. The high rate of mass of 1000 grains was received in Telavi region. The analysis of indicators shows that the climatic conditions of Dedoplistskaro and Akhaltsikhe regions suit the Austrian wheat varieties much better than the conditions of Khashuri and Telavi regions. In Dedoplistskaro, yield on 1 m² fluctuates within 535.0-888.5 g, yield of 50 ears - 88.0-124.0 g, average yield - 5.4-8.9 tons. All varieties exceed the standard in yield. Respectively in Telavi, these indicators are: 630.0-724.0, 101.0-124.0 and 6.1 -7.2 tons; in Khashuri - 475.5-639.0, 93.0-105.0 g and 4.8-6.4 tons; in Akhaltsikhe - 531.5-783.5, 110.0-130.0 and 5.3-7.8 tons. In Dedoplistskaro the varieties Amandus (8.9 t/hectare), Amikus (8.1t/hectare) and Fidelius (8.1 t/hectare) differ by high yield; in Telavi - Galus (7.2 t/hectare) and Lukulus (7.0 t/hectare); in Khashuri - Amandus (6.4 t/hectare); in Akhaltsikhe - Amikus (7.8t/hectare), Urbanus (7.7t/hectare) and Amandus (7.0 t/hectare); in Telavi and Akhaltsikhe regions the difference between varieties is insignificant. Influence of a location is even more obvious on the indicators of separate varieties. Plant height of variety Amandus on regions fluctuates within 70.6-81.3 cm, productive tillering 2.2-8.2, ear length - 8.5-10.6 cm, number of spikelets in one ear 15.3-20.9, number of grains in one ear 38.7-52.2, the mass of grains in one ear of 1.9-2.8 g, the mass of 1000 grains - 48.6-53.4. The same difference is observed in indicators of other varieties. On productivity the studied 8 varieties absolutely differ from each other. In Dedoplistskaro a variety Amandus yields the most big crop - 8.9 t/hectare, in Telavi - 6.6 t/hectare, in Khashuri - 6.4 t/hectare. Even more different results were received in case of variety Urbanus - in Akhaltsikhe - 7.8 t/hectare, in Dedoplistskaro - 6.6 t/hectare, in Telavi - 6.3 t/hectare and in Khashuri 4.8 t/hectare. On the basis of two-year researches for distribution in Georgia of the Austrian wheat varieties it can be recommended: in Dedoplistskaro - varieties Amandus, Amikus and Fidelus, in Telavi - Galus and Lukulus, in Khashuri - Amandus and in Akhaltsikhe - Amandus, Amikus and Urbanus. The Austrian wheat varieties are the varieties of intensive type and for receiving of a big crop is required a high technology of cultivation. In the conditions of Georgia by the highest productivity differ the variety Amandus (7.2 t/hectare) and Amikus (7.1t/hectare). Tab. 2, Ref. 7.

Auth.

b18.4.1.68. Biological activity and hybridization results of the pollen of citrange and *Poncirus trifoliata*. /Z. Bukia/. Bulletin of Georgian Academy of Agricultural Sciences. – 2017. – #1(37). – pp. 27-29. – geo.; abs.: geo., eng.

The work deals with the results of hybridization obtained by inclusion in the crossing of the paternal form of citrange and the trifoliate orange or *Poncirus trifoliata*. The results of crossing showed a great biological activity of the pollen of ichangelo, trifoliate orange and citrange to increase fruit node of small mandarins. All experienced pollinator is of great farming importance (fruit node growth), while some (ichangensis, pompelmus) are important to rise the seed production ability. Tab. 1, Ref. 2.

Auth.

b18.4.1.69. Seasonal rhythm of the development of selected nucellar seedlings of mandarin (*Citrus reticulata* B.) and its connection with harvest. /Z. Bukia/. Bulletin of Georgian Academy of Agricultural Sciences. – 2017. – #1(37). – pp. 30-33. – geo.; abs.: geo., eng.

The important role of nucellar selection in the intensive citrus technology development is grounded. The experimental material is given to prove that the rational seasonal rhythm passing serves as a basis for high crop yield. Moreover, a detailed study of the phenological changes of plants is the prerequisite for estimating the species according to its potential to adapt to the changed environment. The right placement of crops and purposeful conduct of farming techniques ensure for normal going through the phenological stages and serves as a basis for productivity growth. Tab. 2, Ref. 2.

Auth.

b18.4.1.70. Establishment of sowing dates for flax of intermediate type. /L. Alpaidze, N. Chkhaidze/. Bulletin of the Academy of Agricultural Sciences of Georgia. – 2016. – #2(36). – pp. 15-18. – geo.; abs.: geo., eng.

The sowing date of the intermediate form of L-3 flax has been studied. Sowings were carried out in 4 periods: option I - March, 20-30; option II - April, 1-10; option III - April, 10-20; option IV - April, 20-30. As we deal with the intermediate form of flax according to sowing time, we studied both harvest of seeds and a fiber output. The fiber output was established according to anatomic cuts. It has been established that by indicators of productivity of seeds the earliest period - the third decade of March was best, and by the fiber output the best results are received in the second period. As by test results the markers are more on the side of oil-spinning flax, the first period - the last decade of March should be considered as the best sowing date. Tab. 4, Fig. 1, Ref. 8.

Auth.

b18.4.1.71. Study and protection of agricultural biodiversity of garlic in Georgia. /E. Motiashvili-Sitchinava, N. Kakabadze/. Bulletin of the Academy of Agricultural Sciences of Georgia. – 2016. – #2(36). – pp. 19-22. – geo.; abs.: geo., eng.

The garlic species and populations within Shua (Middle) Kartli, Kakheti and Svaneti were identified and studied (26 forms in total). The study was carried out on both local and introduced forms on the basis of Tsilkani Research Center and in regions (Ambrolauri, Akhaltsikhe, Gulgula, Dedoplistskaro). The existing forms were studied according to biological, agricultural and quality signs. The focus was made on the taste properties, piquancy, shelf-life and resistance to pests and diseases. In 2014-2015 the breeding nursery-based material was studied, assessed and selected. The selected forms were planted in a breeding nursery. Tab. 1, Ref. 4.

Auth.

b18.4.1.72. Potato tubers from sprouts of explants *in vitro* creation of plants. /D. Antonova, A. Gogichaishvili, N. Kakabadze, L. Khokrishvili, D. Tsiklauri/. Bulletin of the Academy of Agricultural Sciences of Georgia. – 2016. – #2(36). – pp. 23-28. – geo.; abs.: geo., eng.

The high sensitivity of potato towards viral, bacterial and fungal diseases caused a decrease in productivity and the degradation/disappearance of popular varieties. Using the virus-free potato culture's method - *in vitro* cultivation - allows to get the elite potato's seed material (high-quality, disease-free), which is a prerequisite to get a rich harvest. The aim of the research was to obtain the introduced Belarusian varieties "Uladar" and "Briz", disease-free, test-tube plants from the sprout of explants of super elite tubers. For this purpose there were selected visually healthy super elite generation tubers – "Uladar" and "Briz". After a special regime of thermotherapy, the received sprouts were sterilized. The sterilized explants' growth and development were being conducted on the food areas of basal MS (Murashige end skoog medium) and modified MSI (MS + (NAA-0,1mg/l + K-0,01mg/l). After ELISA testing micro-clonal reproduction of the virus-free, test-tube plants selected with enzyme-multiplied immunoassay was successfully launched. The results of the research have shown that it is possible to receive from the super elite potato material by means of simplified, biotechnological process disease-free *in vitro* test-tube plants. Fig. 4, Ref. 11.

Auth.

b18.4.1.73. Selection of maize in Georgia and its results. /L. Liparteliani, P. Begoidze, L. Kirikashvili/. Bulletin of the Academy of Agricultural Sciences of Georgia. – 2016. – #2(36). – pp. 33-36. – geo.; abs.: geo., eng.

Wheat ranks second after corn in Georgian grain crops and first among cereals. Out of 27 globally known wheat species, 14 are found in Georgia, of which 5 are endemic. These are: *Makha*, *Zanduri*, *Chelta*, *Kartuli Asli* and *Dika*. This evidences that Georgia is the primary home of wheat culture origin. Selection of wheat, maize and oats in Georgia was initiated by professor L. Dekaprevich, under whose leadership 33 species of wheat, 14 species of barley, 8 species and 14 hybrids of maize were selected at the former Mtskheta Selection Station. At present, new species and hybrids of the above-mentioned crops are being selected on the basis of local and foreign primary material. Ref. 4.

Auth.

b16.4.1.74. Dynamics of morphological and biological characteristics of some selective wheat and barley breeds according to their growth and development. /Z. Bukia, N. Gogia, Ts. Atamasvili/. Bulletin of the Academy of Agricultural Sciences of Georgia. – 2016. – #2(36). – pp. 37-42. – geo.; abs.: geo., eng.

Dynamics of morphological characteristics of the selective breeds of some representatives of *Poacea* (grass family) according to grow-development of cereal family is presented. The study of the growth and development dynamics of three selective breeds („Bezostaia“, „Mirleben“, „Vardzia“) and hexastichous barley (*Hordeum hexastrichum*) participating in the test was aimed at extracting bioactive compounds therefrom and identifying the anti-oxidant activities of these substances, as well as studying the bioactive substances' accumulation dynamics during the development period. The study outcomes have created a precondition to establish the optimum of bioactive compounds accumulation in plants. Tab. 3, Ref. 11.

Auth.

b18.4.1.75. Characterization of biological and morphological parameters and medical value of common jujube (*Ziziphus jujuba*). /Z. Bukia, N. Gogia, Ts. Atamasvili/. Bulletin of the Academy of Agricultural Sciences of Georgia. – 2016. – #2(36). – pp. 43-46. – geo.; abs.: geo., eng.

The characterization of biological and morphological parameters and medical value of common jujube (Chinese date) is presented. The plant's fruit is greatly valued for its content of phenol compounds and anti-oxidant activity. The work focuses on the need of its selection from the medical point of view and its wide introduction in the human health care service. Tab. 1, Ref. 4.

Auth.

b18.4.1.76. Phenological study of early ripening sweet cherry (*Prunus avium* L.) cultivars in Shida Kartli region of Georgia. /E. Maghlakelidze, Z. Bobokasvili, V. Kakashvili, L. Tsigriashvili/. Bulletin of the Academy of Agricultural Sciences of Georgia. – 2016. – #2(36). – pp. 47-49. – geo.; abs.: geo., eng.

The article presents the results of phenological study of properties of nine Georgia-introduced foreign cultivars of sweet cherry with early ripening period. The research has been carried out in collection orchard located in one of the leading regions of fruit-growing of Georgia - Shida (Inner) Kartli (vil. Jighaura, Saguramo Mtskheta municipality) and belonging to LEPL Scientific-Research Center of Agriculture (SRCA) in 2014-2016. The research aims at studying sweet cherry cultivars with early ripening period and selection of the best cultivars for the purpose of further propagation in Shida Kartli. Tab. 1, Ref. 4.

Auth.

b18.4.1.77. Results of nut (hazelnut) germplasm research in Georgia. /N. Mirotadze, Z. Bobokashvili, K. Dzeria/. Bulletin of the Academy of Agricultural Sciences of Georgia. – 2016. – #2(36). – pp. 50-52. – geo.; abs.: geo., eng.

Georgian hazelnuts has high economic-technological characteristics and this is the most important export agricultural product of Georgia. It is also one of the oldest traditional nut crops of Georgia. The unique climate conditions and topography of Georgia condition a great diversity in different ecological zones of endemic hazelnut varieties. According to a long-term study conducted in four regions (Samegrelo, Racha and Kakheti) the following new prospective cultivars were identified: "Form #7" (Rach), "Pitsa" (Samegrelo), "Pshavuri 1", "Pshavuri 5", "Jvara" (Kakheti). The local genotypes have distinguished properties: large size of nuts, high yield, resistance to pests and diseases and high nutritional value. Ref. 9.

Auth.

b18.4.1.78. Root pests of vegetable crops and their control. /T. Gogishvili/. Bulletin of the Academy of Agricultural Sciences of Georgia. – 2016. – #2(36). – pp. 94-97. – geo.; abs.: geo., eng.

Vegetable crops can be significantly damaged by harmful organisms, among which notable for their harmfulness are: wireworms, faux wireworms, fall armyworm, mole cricket, cicadas, root-knot nematodes. The wireworms (*Coleoptera*, *Elateridae*) invade plant roots and tubers; they eat the inside of them, which often results in the decay of roots and tubers. The fall armyworms (*Spodoptera frugiperda*) damage leaves and stems, gnawing them at root necks. Mole cricket (*Gryllotalpa gryllotalpa*) generally gnaws plant roots, causing its desiccation. Cicadas (*Cicadidae*) gnaw the plant stems, sometimes fruits too. Root-knot nematode (*Meloidogyne incognita*) led to the formation on the roots of knots, affecting thus their normal functioning. The agro technical and chemical agents are generally recommended to control root pests of vegetable crops.

Among chemicals the following agents are efficient: Actara (granules), Marshal (granules), Methabrom (gas). The use of these chemicals allows reduce the quantity of pests to the minimum. Ref. 8.

Auth.

b18.4.1.79. Fight against cherry fruit fly (*Rhagoletis cerasi*) by environmentally friendly measures. /E. Orjonikidze, M. Matchavariani, T. Gogishvili/. Bulletin of the Academy of Agricultural Sciences of Georgia. – 2016. – #2(36). – pp. 98-101. – geo.; abs.: geo., eng.

The Cherry Fruit Fly is widely spread in Georgia and causes a lot of damage. The loss of harvest caused by the cherry fruit amounts to 40-45% annually; the gained harvest is of low quality and does not comply with the requirements of the standard. The aim of the study is to specify biological characteristic features of the cherry fruit fly under conditions of Georgia and to elaborate environmentally friendly measures against it. We have developed the preventive measures which are mainly based on agro technical and biotechnical methods. In particular, from agro technical measures we chose the digging and flooding of the area under the tree branches; we determined the optimal depth of digging and the duration of flooding. As for the biotechnical methods, we studied attractants and efficiency of visual traps. As attractants we used ammonium carbonate and protein hydrolyzate, and as visual traps -yellow-painted cardboards with special glue. We also studied the efficiency of their joint usage. As the observations revealed, in case of necessity we can also use a small amount of labile (Group IV toxicity) chemical insecticides against the cherry fruit fly, but only once during the whole vegetation period. The biological efficiency system developed by us against the cherry fruit fly is 96-98%. In addition, we get environmentally friendly harvest which will be free from highly toxic chemical pesticides remains. The results will be interesting for the researchers, farmers and population working in the field of plant protection. Tab. 1, Ref. 7.

Auth.

b18.4.1.80. Dryness of mulberry branches and measures of struggle against it. /Sh. Kanchaveli, Z. Khidesheli/. Bulletin of the Academy of Agricultural Sciences of Georgia. – 2016. – #2(36). – pp. 108-110. – geo.; abs.: geo., eng.

Research has determined that dryness of mulberry branches is caused by following fungi: *Scherotinia libertiana* Fuck., *Thyrococcum sirakofii* Bub and *Fusarium lateritium* Nees., which penetrate the plant from the mechanically damaged places, infect crust and timber of the branch and cause their dryness in the end. Ecological factors affect the spread and development of the disease, as a result of this one and the same species of mulberry related to different ecological environment show different durability. The system of integral guard that involves the joint use of sanhygienic, agro technical and chemical methods against the disease is necessary. From chemical measures 3% bureaus mixture treatment is necessary before blowing the buds; then treatment should be held with working solution of systematic phyngicid 0,1-0,2% Val sat or 0,25-0,3% indasol. When fungi spores are spread on the surface of the plant it is needed to spray with working solution of 1% bureaus mixture or 0,5% chlorocoper oxide. The first treatment should be held in the phase of newly opened 3-4 leaves, the second – twenty days later and the third one 25 days later after the second treatment. Ref. 4.

Auth.

b18.4.1.81. Harm of weeds in cereal plots and the results of appliance a new herbicide “Ballerina” against them. /L. Tsvilashvili, Z. Tkebuchava/. Bulletin of the Academy of Agricultural Sciences of Georgia. – 2016. – #2(36). – pp. 111-113. – geo.; abs.: geo., eng. Phytosanitary monitoring was conducted to study weed frequency on the grain plot in Kareli Municipality. Weed amount, % and dominant varieties per ha were defined. Accordingly, it was defined that in the grain plots there are monocotyledon and polycotyledon cereal weeds. Out of cotyledons the following are spread: *Galium tricorne* Stokes, *Matricaria inodora* L., *Cirsium arvense* (L). Scoop, *Sonchus arvensis* L, *Convolvulus arvensis* L, *Centaurea depressa* Bieb, *Sinapis arvensis* L, *Capsella bursa-pastoris* (L) Medik, *Thlaspi arvense* L, *Rapistrum rugosum* L, *Chenopodium album* L, *Amaranthus retroflexus* L, *Polygonum aviculare* L, *Ambrosia artemisiifolia* L, *Descurainia sofia* (L) Schur, *Taraxacum officinale* Wigg. Out of cereal weeds: *Avena fatua* L, *Agropyron repens* L.P.B. Dominant weeds are *Galium tricorne* Stokes, % of coverage - 85; *Rapistrum rugosum* (L) All - 80%; *Chenopodium album* L.- 75%; *Avena fatua* L- 60%; *Ambrosia artemisiifolia* L. - 65 %. A new herbicide Ballerina 0.3-0.5 l/ha was applied against the weeds in the cereal crops. The double action of the herbicide decreases weed resistance. In 3-4 days after applying the herbicides weed leaves become yellow and die in 2-3 weeks. The biological effectiveness of the tested herbicide was 70-85%. Tab. 2, Ref. 5.

Auth.

b18.4.1.82. Development of potato brown rot in Georgia in 2015. /G. Meparishvili, M. Muradashvili, Z. Sikharulidze, S. Meparishvili, N. Aptsiauri/. Bulletin of the Academy of Agricultural Sciences of Georgia. – 2016. – #2(36). – pp. 114-117. – geo.; abs.: geo., eng.

Potato brown rot (causal agent *Ralstonia solanacearum*) is the most serious disease of potato. The results of conducted researches showed that its incidence and severity level in lowland and mountain areas of Georgia is moderate and a morph type of pathogen with 1-2 polar flagella is mainly developed. Tab. 1, Ref. 5.

Auth.

b18.4.1.83. The influence of the lemon plant tending and growing techniques on the composition and compound of the essential oil in it. /N. Baghaturia, N. Begiashvili, L. Kotorashvili, M. Ormotsadze/. Science and Technologies. – 2016. – #3(723). – pp. 74-79. – geo.; abs.: geo., eng., rus.

The research results of the tending and growing techniques, in particular trimming (cutting, pruning the sprout, shoots), of lemon cultivated in the Black Sea subtropical regions of Georgia are presented. The influence of trimming on the productivity, chemical and essential oil composition of lemon is studied. In the lemon oil the limonene is in the interconnection with the citral: the more is d-limonene in oil the less is citral compound and *vice versa* the reduction of the limonene compound in oil (test without trimming) is followed by the enrichment of the oil by citral. Tab. 3, Fig. 2, Ref. 5.

Auth.

b18.4.1.84. Impact of nitrates content on potato tubers in the storage process. /T. Shamatava, L. Zviadadze/. Science and Technologies. – 2016. – #1(721). – pp. 94-98. – geo.; abs.: geo., eng., rus.

The content of nitrates in potato tubers in the storage process was studied. Tests were carried out under lab and field conditions. Various doses of NPK fertilizers were applied. The tests established that during long-term storage of potato tubers the content of nitrates gradually decreases against the background of nitric fertilizers dosing. In mid-winter period dose is halved, while in spring it reduces to minimum. Tab. 2, Ref. 5.

Auth.

b18.4.1.85. Change of chemical composition in different varieties of apples during storage. /G. Dvali, N. Lomtadze, T. Chipashvili/. Science and Technologies. – 2016. – #1(721). – pp. 99-102. – geo.; abs.: geo., eng., rus.

A change in the chemical composition of different apple varieties, such as “Starkrimson” and “Goruli sinapi” was studied in order to increase their shelf life. The pectin substance was found to greatly influence the shelf life of apples. The apple softening and structural changes of the pectin substance depend on the biochemical process going in the fruit, which allows control the shelf life of apples. Tab. 2, Ref. 6.

Auth.

b18.4.1.86. Report of recombinant strains of potato virus Y (PVY) in Georgian potato seeds. /V. Baramidze, I. Schubert, N. Aleksidze, E. Shubladze, L. Ushanov/. Bulletin of the Georgian National Academy of Sciences. – 2016. – v. 10. – #4. – pp. 64-70. – eng.; abs: eng., geo.

This is a report of recombinant variants of potato virus Y (PVY) from the potato cultivating regions of Georgia: Akhaltsikhe, Akhalkalaki, Marneuli. The most prevalent strains were PVY^{NWi} - 89%, followed by PVY^N - 11%. We could not detect any infection with PVY^{NTN}, PVY^{NA-NTN} and PVY^O. This finding is congruent with research papers stating that PVY^{NWi} is found to be most prevalent in Europe. Total PVY infection of potato seeds accounted 63%, which exceeds any certification limits in the world. The highest incidence of PVY was observed for Akhaltsikhe - 78%, followed by Marneuli - 61% and Akhalkalaki - 50%. According to chi-squared analyses, Akhalkalaki region had a significantly lower number of PVY infection ($P < 0.05$) compared to both other regions. This might be attributed to the higher altitude of the growing area. The rate of infection in Georgia is significantly higher than the certification standard of EU (9% with high PVY infection). Furthermore, there was no significant difference ($P > 0.05$) of PVY infection between cultivars rated as PVY-resistant and non-resistant, demonstrating the cultivars in the country are not recombinant strain resistant. Widely used varieties Desiree and Spunta formerly were reputed to be well resistant to PVY, but, today these cultivars are counted as sensitive to new recombinant strains such as PVY^{NTN} or PVY^{NWi}. Tab. 3, Fig. 1, Ref. 25.

Auth.

b18.4.1.87. Results of study some questions in of agro technical event feijoa conditions of in Imereti. /R. Kopaliani, Sh. Kapanadze/. Novation. – 2016. – #18. – pp. 80-83. – geo.; abs.: geo., rus., eng.

The article presents the results of a study of some issues in the cultivation of feijoa plantation under conditions of Imereti. Studies have shown that under conditions and in areas of Geguti and Baghdati, the inter-row sowing of green manure definitely influence the activity of vegetative and generative plant processes of feijoa, its productivity and quality and significantly increases the efficiency of mineral fertilizer consumed. Tab. 2, Fig. 2, Ref. 3.

Auth.

b18.4.1.88. Chemical composition of lipidic fraction of the Georgian tea and prospects of application of biologically active vitamin food additives. /N. Tsutskiridze, K. Sirbiladze/. Novation. – 2016. – #18. – pp. 90-95. – geo.; abs.: geo., rus., eng.

The liposoluble lipidic fraction of the Georgian tea contains many physiologically active and necessary for the organism components. The article shows their dynamics of change and prospect of application of biologically active vitamin additives in foodstuff. A research of the tea lipidic fraction for acute toxicity showed that it belongs

to practically non-toxic substances. The lipidic fraction of tea is free from any local irritating, allergenic, teratogenic and embryotoxic activity. The chemical composition of the tea lipidic fraction give all grounds for using it as biologically active vitamin additive for treatment and prevention of diseases of skin, stomach ulcer and a duodenum and for treatment of other diseases. Tab. 3, Ref. 3.

Auth.

b18.4.1.89. Regeneration of bushes during rehabilitation groomed tea plantations. /N. Jincharadze/. Novation. – 2016. – #18. – pp. 105-109. – geo.; abs.: geo., rus., eng.

The peculiarities of restoration of the vegetative part of plants against the background of different pruning and interrow mulching in the abandoned tea plantations are considered. According to the research data (tea bush crown development, yield, leaf quality), comparatively promising look to be half-heavy (35cm) and heavy (15 cm) pruning options. Black polyethylene film was used as inter-row mulching. Tab. 3, Ref. 2.

Auth.

b18.4.1.90. Modern means of agricultural pest control. /I. Shvangiradze, M. Chkhartishvili/. Mining Journal. – 2016. – #2(37). – pp. 78-80. – geo.; abs.: geo., rus., eng.

The paper discusses pesticides used against harmful diseases in agriculture. One of the tasks of modern ecology is the research of threat of using agricultural chemicals and development of preventive measures. Some pesticides, apart from their designated function, affect in many negative ways the biosphere. The application of each fertilizer requires knowledge to avoid its accumulation in products, damage to the local ecosystem and damage to the cattle and human health. Ref. 3.

Auth.

b18.4.1.91. Plant protection. /G. Aleksidze/. Georgian National Academy of Sciences. Monograph. – 2014. – p. 312. – Geo., abs.: Eng.

The book consists of two parts. The first part concerns pests and diseases of agricultural crops, their spread, plant damages, biology and control activities. The second part deals with contemporary methods of control, conditions of their optimal application, prognosis of the spread of major pests and diseases, etc. The book is richly illustrated. Ref. 32.

Auth.

b18.4.1.92. Prospects of application of a huminic-organic fertilizer AGROVITA in bio-production. /Kh.

Kachniashvili/. Modern technologies to produce ecologically pure products for sustainable development of agriculture. Int. Sci. Conf. Materials. Tbilisi. – 28-30 September. – 2016. – pp. 173-176. – geo.; abs.: geo., eng. Natural lignitic materials contain all those elements that are necessary for plants' growth, but they are insoluble in water and are not absorbed by plant cells. So, usage of lignitic materials as an organic fertilizer cannot give desired results. The article deals with a new technology of obtaining ecologically safe, natural organic mineral fertilizer from raw material containing natural lignitic materials (peat and leonardite). The production has been patented - patent #3977, 29.11.05 (1). The fertilizer is registered by Food Safety National Service of the Ministry of Agriculture of Georgia, trade name - Agrovital. Results of long-term research showed that the application of the fertilizer is effective for feeding all kind of plants in all the stages of plant development and for any climate-soil region. Fig. 2, Ref. 9.

Auth.

b18.4.1.93. Obtaining ecologically flexible new hybrid plants by crossing triticale with soft wheat. /Q.

Mchedlishvili, T. Epitashvili/. Modern technologies to produce ecologically safe products for sustainable development of agriculture. Int. Sci. Conf. Materials. Tbilisi. – 28-30 September. – 2016. – pp. 258-259. – geo.; abs.: geo., eng.

The research of the strength of crossing soft wheat with triticale clearly demonstrated that the crossing of these two crops does not require any additional activity. During the reciprocal crossing definite regularities were revealed being manifested as follows: the strength of hybridization between these two crops is higher when soft wheat is pollinated with the triticale dust; the seeding ability is significantly lower when triticale is pollinated with wheat. At the same time, it is proved that the crossing of the two crops significantly depends on the genotype capacity. The crossing level is higher when the pollinated wheat is of a hybrid origin. Ref. 3.

Auth.

b18.4.1.94. The excretory function of plants. /G. Sanadze, A. Davituliani, S. Pkhachiashvili/. Annals of Agrarian Science. – 2017. – v. 15. – #2. – pp. 181-183. – eng.; abs: eng.

The property of living cells to excrete part of energy in the form of heat and products of metabolism into the environment is one of the most significant functions of a living organism. The living cell is an open nonequilibrium thermodynamic system, dissipating entropy of different kinds into the environment by means of dissipative structures without fail. The sum of emitted energy is determined by maximum entropy production (MEP). The excretory function of a living cell is the direct consequence of dissipativity of open thermodynamic

systems and represents constant constituent of cellular metabolism. Systematic excretion of metabolic products into the environment should be considered as a result of the excretory activity of a cell. Dissipation of energy completes the stable flow of thermodynamic currents and regulates stability of steady state of the cell as a whole. The present work considers these issues from the point of view of modern thermodynamics. It is concluded that the thermodynamic dissipation of entropy accompanying irreversible processes and ensuring the stability and ontogenetic steadiness of a living organism is the basis of the excretory ability of a living organism. Fig. 2, Ref. 11.

Auth.

b18.4.1.95. New records and some interesting findings of oribatid mites (*Acari: Oribatida*) from Georgia. /M. Murvanidze, T. Arabuli/. Annals of Agrarian Science. – 2017. – v. 15. – #2. – pp. 195-197. – eng.; abs: eng.

Six species of oribatid mites have been found for the first time in Georgian fauna: *Eobrachychthonius latior* (Berlese, 1910), *Graptoppia paraanalis* (Subias & Rodrigues, 1985), *Mongaillardia grandjeani* (Calugar & Vasiliu 1984), *Tritegeus bisulcatus* (Grandjean 1953), *Podoribates longipes* (Berlese, 1887), *Chamobates birulai* (Kuiczinsky, 1092) and *Oribatula (Zygoribatula) skrjabini* (Bulanova-Zachvatkina 1967). *M. grandjeani* is a new finding for the Caucasus region. New locations for some rare oribatid species are also registered. Ref. 15.

Auth.

b18.4.1.96. Brazilian vervain (*Verbena brasiliensis* Vell.) in Kolkheti flora. /I. Mikeladze, G. Bolkvadze, M. Metreveli, R. Chagalidze, M. Davitadze, A. Sharabidze/. Annals of Agrarian Science. – 2017. – v. 15. – #2. – pp. 198-200. – eng.; abs: eng.

The appearance of foreign plants in the seashore of West Georgia began in the distant past and continues today. The current condition, invasive indicators, bio-morphological characteristics and growth development properties of the new invasive species of South American origin *Verbena brasiliensis* spread in Kolkheti flora (Western Georgia's seaside part) is given. In Kolkheti it is mainly spread in the seaside, along the roads, along the railroad, on the ruderal places, near channels and rivers, deserted building sites, landfills, and non-agricultural lands. The Brazilian vervain is a perennial, erect, branched, 50-210 cm in height plant. The plant starts flowering in April-May and lasts till November. It is distinguished by high reproductivity. A fully grown plant develops about 90,000-100,000 seeds in the second year. Consequently, the spread area of the plant is gradually growing. Fig. 3, Ref. 7.

Auth.

b18.4.1.97. Using *in vitro* strengthened test-tube potato plants for bio-production. /M. Kukhaleishvili, I. Megrelishvili, T. Shamatava/. The phylogenetic resources of Georgia and innovative technologies for their improvement. Materials of a Scientific Conference. Tbilisi - 21 September. – 2016. – pp. 7-9. – geo.; abs.: geo., eng.

To supply farmers with elite quality seed, the elite seed producing full cycle was modified in Georgia, In particular, the cycle laboratory-greenhouse-open field was replaced by the cycle laboratory (phytotrone)-laboratory(plants strengthening)-open field. Thanks to this technology, Georgian farmers received elite seed of local production, which will ensure the production of quality seeding material and growth of harvest in Georgia. Fig. 2, Ref. 3.

Auth.

b18.4.1.98. The quiet crisis of the planet – threat of food shortage. /G. Margvelashvili, R. Lolishvili/. Materials of a scientific conference dedicated to the World Soil Day. Tbilisi. – 2016. – pp. 3-11. – geo.; abs.: geo., eng.

The article deals with the problem of soil degradation in the world and particularly in Georgia, the main reason of which is its uncontrolled consumption and anti-scientific approach. The authors present a few examples of the negative results caused by number of reasons, such as: uncontrolled plowing, insufficiency in application of organic and mineral fertilizers, soil erosion caused by water and wind, soil contamination with plant protecting chemicals, and other. Fig. 4, Tab. 3, Ref. 3.

Auth.

b18.4.1.99. Some soil degradation problems in Georgia. /N. Machavariani, N. Kakabadze, M. Mosashvili/. New Agrarian Georgia. – 2017. – #2(70). – pp. 13-15. – geo.; abs.: eng.

Soil degradation processes are still ongoing in the country due to natural and anthropogenic impacts. Despite the fact that desertification is a natural phenomenon caused by the impact of several climatic factors, the impact of the anthropogenic (man-made) factors in this process is also quite impressive. In particular, these include unsustainable agricultural practices, uncontrolled forest felling, overgrazing, improper irrigation, artificial fires, failure of irrigation systems, soil pollution, erosion, soil damage, swamping of lands, etc. Ref. 3.

Auth.

b18.4.1.100. Local stone-fruit varieties for horticulture. /Z. Bobokashvili, K. Dzeria, N. Mirotadze, V. Kakashvili, E. Maghlakelidze/. *New Agrarian Georgia*. – 2017. – #6(74). – pp.14-15. – geo.; abs.: geo., eng. Locally bred fruit varieties are rather few in the country. Unfortunately, commercial orchards are basically planted with introduced varieties. However, rather adaptive and distinguished forms can be selected among local landraces and varieties, which are characterized by good potential for improving the composition of available drupes. For this purpose an initial research of local varieties was carried out in 2015-2016. As a result, several local drupe varieties were that can be promising for the industrial sector were selected. These include the peach “Konela” and wild plum “Guldedava”. These varieties are characterized by high economic performance and can be considered as a valuable source for species improvement. Tab. 1, Ref. 3.

Auth.

b4.2 Animal and dairy science

Animal science

b18.4.2.1. Lactoserum processing by membrane technology. /B. Tuganova/. *Business-Engineering*. – 2016. – #4. – pp. 144-145. – rus.; abs.: eng., rus.

The article considers the use of membrane technology for processing secondary dairy raw materials, including lactoserum, as well as the aspects of its rational use and ecology. Ref. 3.

Auth.

b18.4.2.2. Development of a new aerated sour milk beverage technology. /M. Temerbaeva, Z. Baitemirova/. *Business-Engineering*. – 2016. – #1-2. – pp. 208-210. – rus.; abs.: eng.

Development of new probiotic micro flora containing sour milk (koumiss) beverages for industrial production is of great medical importance, since their application presents broad perspectives for using them as an effective adjuvant for treating the antibiotic resistant forms of tuberculosis. Tab. 2, Fig. 1, Ref. 7.

Auth.

b18.4.2.3. Ear-lid nerve peculiarities of Caucasian shepherd's dog. /V. Kvachrelishvili, N. Omarashvili, N. Milashvili/. *Modern technologies to produce ecologically pure products for sustainable development of agriculture. Int. Sci. Conf. Materials. Tbilisi*. – 28-30 September. – 2016. – pp. 481-483. – geo.; abs.: geo., eng. Ear-lid morphology, topography, zones of branching and their interconnection with the trigeminal nerve branches is presented in this article based on 20 samples of the Caucasian shepherd dog. It has been determined that the zones of the direction and branching of the facial nerve from the beginning of the starting point to the end of the branching of the nerve are divided into the initial or starting part of the facial nerve, the part of the jaw-ear gland of the facial nerve and the part of the facial-peripheral nerve or the final part of the nerve. The ear-lid nerve in the temporal fossa on the sample of Caucasian shepherd dog are more often divided (60,0%) as on the right as well on the left into superficial temporal and eye-socket nerves. The last one is divided into supraorbital and infraorbital nerves. Ref. 4.

Auth.

Husbandry

b18.4.2.4. The livestock development prospects in Georgia. /M. Tsintsadze, N. Natroshvili, G. Natroshvili, G. Tskvitinidze/. *Metsniereba da Tskhovreba*. – 2017. – #1(15). – pp. 91-93. – geo.; abs.: geo., eng., rus.

The article considers the state of modern animal husbandry. The latest statistical data of FAO as well as the state of relevant recording in Georgia are presented. The activities to help animal husbandry to become in the near future economically profitable branch and to provide population with ecologically safe and healthy products are established. Ref. 2.

Auth.

b18.4.2.5. Ways of development of rabbit-breeding - usage of reserves in feeding. /M. Tsintsadze, N. Orjaneli, N. Natroshvili, G. Natroshvili/. *Metsniereba da Tskhovreba*. – 2017. – #1(15). – pp. 93-96. – geo.; abs.: geo., eng., rus.

The article reviews the importance of animal husbandry and ways of development of one of its branches - rabbit-breeding. A variety of nutrients used in the combined food for the last 20 years in developed states of the world is studied. The science-based recommendations for restoring the rabbit-breeding branch in Georgia are given. Ref. 2.

Auth.

b18.4.2.6. Anti-stress agents in poultry farming. /M.Kobakhidze, D.Basiladze/. Metsniereba da Tskhovreba. – 2017. – #1(15). – pp. 97-99. – geo.; abs.: geo., eng., rus.

The effect of *Katozal* was studied for the first time as anti-stress agent in broiler chickens of different ages in Georgia in case of the irritating action of temperature. The optimal dose of its use in chickens is 20 ml per 1 liter of water. Ref. 4.

Auth.

b18.4.2.7. Using an ozone generator "Samani-2" in livestock. /L. Tabatadze, I. Abuladze, V. Shvelidze, R. Gakhokidze/. Works of Technical University of Georgia. – 2017. – #1(503). – pp. 11-15. – geo.; abs.: geo., eng., rus.

The paper considers ozone that is becoming more widely used in various fields of national economy and medicine as a means of disinfection and sterilization. The research team of the Georgian Technical University, Iv. Javakhishvili Tbilisi State University and company "Velimisioni" developed the ozone generator "Samani-2" to be used in livestock for the production and storage of animal-derived products. Ozone disinfection in livestock is a sustainable support for the well-being of the national economy against infectious diseases. Ozonizing livestock buildings allows the reduction of some toxic gases by 80-85% (NH₃, H₂S, SO₂, etc.) and fungus and microbial contamination - by 80-90%. Developed ozone generator provides purification of air in livestock buildings (administrative, farm, etc.), sanitizing procedures related to food processing, sterilization of instruments and laboratory equipment cleaning. Tab. 1, Ref. 5.

Auth.

b18.4.2.8. The aeroionized background effects on the clinical-physiological condition of pigs. /K. Miqadze, V. Kvachrelishvili, N. Milashvili/. Modern technologies to produce ecologically pure products for sustainable development of agriculture. Int. Sci. Conf. Materials. Tbilisi. – 28-30 September. – 2016. – pp. 418-421. – geo.; abs.: geo., eng.

The work concerns definition of the aeroionization background within different climate zones of Georgia. The received results prove that aeroions composition depends not only on natural-climatic but also on seasonal features and atmosphere's ecological condition. Under conditions of high aerionic background there regulation of the physiological state of the organism was observed. The clinical-physiological index of the pig's organism increased by about 10-12.4%. Tab. 1, Ref. 3.

Auth.

b18.4.2.9. Soil–animal health. /T. Kurashvili, M. Kereselidze, E. Ghvaladze/. Materials of a scientific conference dedicated to the World Soil Day. – Tbilisi. – 2016. – pp. 23-26. – geo.; abs.: geo., eng.

The development the cattle-breeding, animal health and productivity depend on soil productivity. Soil is very convenient area for many patholog microorganisms. It also inhibits also larvas – carriers of helminthiasis. Therefore, everyone should take care of soil cleanness and less contaminate it by biological discharges, first of all by manure. In order to sanitare soil sanitation it should be given resrt, which means introduction of successive grazing. Ref. 4.

Auth.

b4.3. Veterinary

b18.4.3.1. Veterinary-sanitary examination of fresh meat displaced in the Georgian market segment. /G. Danelia, T. Palavandishvili, M. Cincadze, N. Natroshvili, G. Natroshvili/. Bulletin of Georgian Academy of Agricultural Sciences. – 2017. – #1(37). – pp. 117-122. – geo.; abs.: geo., eng.

The results of a veterinary-sanitary examination of fresh meat were studied. As a result of organoleptic and chemical analysis it was established that after 2 hours from the purchase of the product all these qualities complied with the standard; as for the period after 48-72 hours, the quality properties of the meat product significantly deteriorate under the action of amminofication bacteria; also a negative outcome results from the reaction for CuSO₄ and formalin, because of which fresh meat should be subjected to regular monitoring. Tab. 2, Fig. 2, Ref. 3.

Auth.

b18.4.3.2. Next generation sequencing method of avian influenza virus, optimised research protocol. /M. Murtskhvaladze, A. Kotorashvili/. Bulletin of the Georgian National Academy of Sciences. – 2016. – v. 10. – #4. – pp. 71-77. – eng.; abs: eng., geo.

Avian influenza is caused by specified viruses belonging to the family *Orthomyxo viridae* and the genus *Influenza virus A*. 16 haemagglutinin (HA) and 9 neuramidase (NA) subtypes have been isolated from birds. Most avian influenza viruses (AIVs) are of low pathogenicity and cause mild or subclinical infections in aquatic birds. Domestic poultry, particularly gallinaceous birds, in which clinical signs may be more obvious, is of key

importance when evaluating the risk of emergence of influenza viruses from the natural host reservoir. The most devastating poultry disease scenario is highly pathogenic avian influenza (HPAI), which is characterized by high morbidity and mortality and occurs only among H5 and H7. Georgia is important for migration and over-wintering of wild water birds. Thus, it might act as a migratory bridge for influenza virus transmission during migration. In 2009-11 AIV prevalence of 6.3% was observed in ducks and 9% in large gulls during the autumn post-moult aggregations, wintering and migration stop-over period. The molecular characteristics of viruses that exhibit an expanded host range are, to date, poorly understood. Characterization of the virus population in the natural host reservoir, mechanisms of transmissions to other individuals requires full-genome sequencing of each infection cases. Tab. 1, Fig. 1, Ref. 17.

Auth.

b4.4 Agricultural biotechnology

Agriculture and food biotechnologies

b18.4.4.1. Management of the technological quality of winter wheat grain. /B. Bolghashvili/. Bulletin of Georgian Academy of Agricultural Sciences. – 2017. – #1(37). – pp. 14-18. – geo.; abs.: geo., eng.

The impact of fore crops, mineral fertilizers, climatic and meteorological condition on winter wheat under conditions of main cereal production zones of Outer Kakheti Plateau, as well as activities regulating them are given. The issue is considered according to arid insufficiently humid, stable humid and sufficiently humid zones. Tab. 2, Ref. 4.

Auth.

b18.4.4.2. Fruit drying process options. /I. Gaprindashvili, L. Bolkvadze, N. Asanidze/. Bulletin of Georgian Academy of Agricultural Sciences. – 2017. – #1(37). – pp. 34-36. – geo.; abs.: geo., eng.

The drying process options of the existing in Georgia fruit dryers are discussed. High air temperature and drying potential may cause undesirable chemical and mechanical changes in products, so it is sometimes necessary to use different options in order to establish a soft and equal regime of drying process. Fig. 5, Ref. 2.

Auth.

b18.4.4.3. Importance of engineering support of agricultural technological processes in realization of normative results. /B. Basilashvili, I. Lagvilava, R. Khazhomia/. Bulletin of Georgian Academy of Agricultural Sciences. – 2017. – #1(37). – pp. 82-85. – geo.; abs.: geo., eng.

The work concerns the raising of the efficiency and introduction of perfect complex mechanization of agricultural production. Through the example of engineering support of a specific technological process the principal problems for their comprehensive implementation are developed: technical means and agro technical requirements for sowing cereals; daily and hourly rates of the work; calculation of power loading into sowing machines; logistical support of sowing technological complex. Ref. 7.

Auth.

b18.4.4.4. Importance of agricultural machinery maintenance in the common service system of its usage. /B. Basilashvili, I. Lagvilava, R. Khazhomia/. Bulletin of Georgian Academy of Agricultural Sciences. – 2017. – #1(37). – pp. 86-89. – geo.; abs.: geo., eng.

The characterizing feature of agricultural machinery represents the seasonality of its usage, the impact of atmospheric factors and the aggressive environment (fertilizers, pesticide, etc.) thereon. The majority of agricultural machinery is used annually from 10...15 up to 55...60 days, the remaining time they are idle and subject to storage. The proper storage of machinery is of particular importance. It gives the possibility to reduce the destructive impact of precipitation and aggressive environment and increase its the service life. The issue of maintenance of agricultural machinery mainly includes the types and methods of its storage, as well as the basic elements of machinery yards and machinery arrangement platforms. Ref. 3.

Auth.

b18.4.4.5. Identification of nomenclature and number of machinery necessary for production of agricultural crops on the basis of energy consumption of the technological processes. /E. Shapakidze, G. Chitaia, G. Mosashvili, R. Japaridze/. Bulletin of Georgian Academy of Agricultural Sciences. – 2017. – #1(37). – pp. 90-97. – geo.; abs.: geo., eng.

The article deals with identificatmion of machinery and their number necessary for technological processes of growing and tending agricultural crops per given land area, angle of the land slope, type of operation, type of crop (annual or perennial), and other parameters and energy consumption of the technological processes. Tab. 3, Ref. 4.

Auth.

b18.4.4.6. Increase of the export potential of strategic crops production by optimizing the irrigation technology. /V. Nanitashvili/. Bulletin of Georgian Academy of Agricultural Sciences. – 2017. – #1(37). – pp. 98-104. – geo.; abs.: geo., eng.

The question of irrigation of tea and citrus crops is discussed as a significant measure guaranteeing a high and quality harvest oriented at the increase of export production. Construction diagrams of the irrigation water-sprinkling equipment for tea and citrus plantations, the main units and principles of operation, as well as engineering data and irrigation technology are given. Fig. 5, Ref. 4.

Auth.

b18.4.4.7. Planning an industrial experiment for grape-seed oil extraction. /G. Gorgodze, I. Bochoidze, N. Sinauridze, M. Gabidzashvili/. Novation. – 2016. – #18. – pp. 32-39. – geo.; abs.: geo., rus., eng.

The paper dwells on a central composite rotatable design matrix for an experiment aiming at extracting grape-seed oil. Analysis of findings shows that the maximal yield of target product should be expected, when $X_i \geq 1$, that is in full compliance with conclusions made during analysis of one-dimensional sections of optimization B_0 regression equation. Tab. 5, Fig. 2, Ref. 2.

Auth.

b18.4.4.8. Methods of isolation and analysis of essential oils. /L. Kipiani/. Novation. – 2016. – #18. – pp. 40-46. – geo.; abs.: geo., rus., eng.

The review proved that the primary method of analysis of essential oils is the use of gas-liquid chromatography with mass spectrometric detection. As a method of ionization the electron impact is viewed as optimal, which allows to characterize the structure of the analyzed components reliably regarding the nature of fragmented ions formed. Ref. 8.

Auth.

b18.4.4.9. Prebiotic artichoke-based mashed foodstuffs. /G. Papunidze, I. Chkhartishvili, N. Seidishvili, S. Papunidze, Ts. Bolkvadze/. Bulletin of the Academy of Agricultural Sciences of Georgia. – 2016. – #2(36). – pp. 124-127. – geo.; abs.: geo., eng.

The article presents the importance of consuming prebiotic inulin, pectin, fructose-containing functional food products. It is noted that artichoke (*Helianthus tuberosus* L) is one of the perspective and important raw materials for the production of such products due to its unique chemical composition. Researched and selected was such technological mode for processing artichoke tubers, which would contribute to the preservation of the nutritional value of food products. Experimental studies specified that good organoleptic characteristics of the products obtained from artichoke tubers depend on the content of organic acids content and pH thereof. Adding local fruits and vegetables, citrus juice (orange, lemon) and a certain amount of ascorbic acid to blanched tubers before homogenization makes it possible to maintain biologically active substances and improve the product's organoleptic and chemical properties. Ref. 4.

Auth.

b18.4.4.10. Prospects for using Georgian red grape husk and seeds in confectionary industry. /G. Khetsuriani, Ts. Khutsidze/. Bulletin of the Academy of Agricultural Sciences of Georgia. – 2016. – #2(36). – pp. 128-130. – geo.; abs.: geo., eng.

The paper describes the possibility of using common in West Georgia red grapes husk and seeds in production of fruit-jelly confectionery products. The physico-chemical characteristics of the semi-finished product - puree - obtained from the blend of husk and seeds as the product richest in natural biologically active substances are studied. The samples of a new range of fruit-jelly marmalade are prepared. The organoleptic and physico-chemical properties of the produced foodstuff and their compliance with the existing standard requirements are established. Based on the analysis of findings, the optimal amount of the puree produced from the husk and seeds and, accordingly, the production technology regulations of the new foodstuff are determined. Changes in the quality of a new range of fruit-jelly marmalade during storage are studied. Tab. 2, Ref. 6.

Auth.

b18.4.4.11. Possibilities of bio-production in Georgia. /T. Kunchulia/. Bulletin of the Academy of Agricultural Sciences of Georgia. – 2016. – #2(36). – pp. 160-163. – geo.; abs.: geo., eng.

Based on the data of Food and Agriculture Organization of the United Nations (FAO) and the World Bank, the paper anticipates creation of serious deficit and increasing of prices on food products in the 40-50s of the current century, as well as analyses reasons for serious changes in the agrarian policies of developed countries that will be caused by increasing food supply coefficient for their own population and necessity to establish food reserves. The above changes will deepen asymmetric attitude of the world towards food security policy and because of that, the population of developing countries will have to utilize genetically modified products. Presumably Georgia has favorable conditions for producing bio-products. However, serious work should be conducted in order to ensure their production in compliance with relevant requirements. Initially, transfer to

production of bio-products should be conducted in piedmont and mountainous regions of the country, which makes 87% of the country's territory and is characterized with concentration of small natural farming, natural fragmentation of land, mainly manual production and usage of old technologies. Consolidation of production in these regions can be conducted by introduction of single technology in small family type farms, ensuring guaranteed purchase of products, selection of crops for bio-production, etc. As for creation of agricultural cooperatives, this should be implemented according to certain operations or creation of processing enterprises. Transfer to bio-production in these regions should be conducted gradually, based on using farm-owned lands for the purpose, in order to ensure that these farms do not lose the diversity characteristic to natural farming that is so attractive for foreign tourists. Ref. 2.

Auth.

b18.4.4.12. Results of amino acids research in the technological processing of European and Kakhuri-type wines. /N. Baghaturia, T. Nanitashvili, N. Begiashvili, Ts. Shilakadze, B. Baghaturia/. Agrarian-economic Science and Technologies. – 2016. – #4 (33). – pp. 25-30. – geo.; abs.: geo., eng.

The article describes the changes of amino acids in the process of technical handling and ripening/ageing of wine. The carried out researches revealed a mechanism of changes of separate wine amino acids during the mentioned processes. Ref. 4.

Auth.

b18.4.4.13. Some biochemical factors which effect on the formation of food products. /M. Garuchava, G. Parulava/. Metsniereba da Tskhovreba. – 2017. – #1(15). – pp. 85-90. – geo.; abs.: geo., eng., rus.

The article discusses some biochemical factors effecting the formation of food products quality. The role of food in the process of healthy diet is shown. The physical-chemical characteristics of the harmful substances that are more common in food products are given and the influence on human body and health is shown. Fig. 4, Ref. 6.

Auth.

b18.4.4.14. Biosynthesis of essential oils in plants. /N. Baghaturia, N. Begiashvili, L. Kotorashvili, M. Ormotsadze/. Science and Technologies. – 2016. – #3(723). – pp. 67-73. – geo.; abs.: geo., eng., rus.

The biosynthesis of essential oils in plants (lemon, tangerine and orange) is researched. The research results of the essential oil accumulation dynamics in citrus fruits are presented. It is established that harvest of citruses in the subtropical zones of Georgia better to take place in the late November and early December, when the essential oil quality is best. Tab. 2, Fig. 2, Ref. 6.

Auth.

b18.4.4.15. Technology for producing a new foodstuff "dry citrazh" from citrus leaves. /G. Ghvaladze/. Science and Technologies. – 2016. – #2(722). – pp. 66-68. – geo.; abs.: geo., eng., rus.

The techno-chemical and biochemical properties of leaves of citruses (tangerine, orange, grapefruit, citron) used for producing a new foodstuff are considered. It is characterized by the best organoleptic properties and is rich in bioactive substances, in particular vitamins C and PP. The new foodstuff will facilitate the widening of a range of dry, aromatic (tea-like) products. Fig. 1, Ref. 4.

Auth.

b18.4.4.16. Testing a bio-mineral fertilizer derived from the processing of trachytes. /I. Kartvelishvili, N. Chkhobadze, J. Kakulia, N. Lomidze, I. Chochia/. Mining Journal. – 2016. – #2(37). – pp. 88-90. – geo.; abs.: geo., rus., eng.

The processing of Tsikhisubani field trachytes by silicate bacteria, using the biotechnological method is shown. The result of such processing is a prolonged fertilizer produced by adsorption of silicate bacteria and potassium on zeolite. The product was tested in a pot experiment under greenhouse conditions on the wheat crop. The fertilizer's efficiency is proved by an increase in plant productivity, as well as by activation of the positive soil micro flora. Tab. 2, Ref. 4.

Auth.

b18.4.4.17. Alternative raw material and technology to produce "Mate" tea. /R. Melkadze, T. Megrelidze/. Works of Technical University of Georgia. – 2017. – #1(503). – pp. 16-24. – geo.; abs.: geo., eng., rus.

The article reviews "Mate" tea production, technological characteristics and large companies producing it. The article considers some disadvantages of well-known technical solutions of "Mate" tea production: the used tropical raw materials with very limited resource area makes it impossible to produce tea in the quantity corresponding to a market demand that is reflected on the deficiency of tea "Mate". The available technologies are rather primitive, time-consuming and expensive, not providing standard chemical and qualitative characteristics of the product. A new alternative raw material for the production of "Mate" tea - Caucasian rhododendron leaves, is proposed and a new technological scheme is developed. Laboratory samples of rhododendron tea are obtained and tested. The implementation of the proposed technology is possible by the

existing facilities for the green tea production at any small and medium enterprise with minimal capital costs. Tab. 4, Ref. 10.

Auth.

b18.4.4.18. Biochemical characteristics of Caucasian blackberry leaves. /R. Melkadze/. Works of Technical University of Georgia. – 2017. – #1(503). – pp. 25-35. – eng.; abs.: eng., geo., rus.

Some physical and chemical characteristics of a 6-leaf Caucasian blackberry shoot (*Rubus caucasicus* L.) were studied. It was found that the minimal moisture content, the extract substances and phenolic compounds are the same for the periods of the beginning and end of the plant's growing season. The composition of phenolic compounds is represented by catechins, flavonols and leucoanthocyanidins. The highest accumulation of phenolic compounds during the growing season is found in the mid-season (July-August). The average monthly amount of free amino acids in the blackberry leaf is 26.68 mg/g. Out of 11 identified amino acids, 5 are unchanged (histidine, arginine, methionine, leucine, valine). The presence of the active form of O-diphenoloxidase in the complex oxidative enzymes of blackberry leaf was found. The blackberry leaf and extract have high antioxidant activity. Tab. 4, Fig. 5, Ref. 49.

Auth.

b18.4.4.19. Antioxidant activity and production technology of garlic paste. /R. Melkadze/. Works of Technical University of Georgia. – 2016. – #4(502). – pp. 11-15. – rus.; abs.: rus., geo., eng.

The article refers to the study of the antioxidant activity of garlic paste, depending on the storage time of the end product and raw material processing methods. It is shown that from the economic point of view vacuum packaging of the product is more preferable, providing maximum safety of the antioxidant activity of the product within 12 months. A technological scheme of garlic paste production was developed. Tab. 1, Fig. 1, Ref. 5.

Auth.

b18.4.4.20. Results of the research of technico-chemical indices of the grapefruit cultivated in West Georgia. /G. Kaishauri, N. Japarashvili/. Works of Technical University of Georgia. – 2016. – #3(501). – pp. 11-15. – geo.; abs.: geo., eng., rus.

This work represents the results of a research of techno-chemical indices of the grapefruits cultivated in a garden of the town of Lanchkhuti, West Georgia. The organoleptic (appearance, colour, taste and flavour of the fruit) and technical (average weight, volume, compactness, linear size-height, diameter as well as form index) indices and the mechanical composition (proportion of biomass components, namely soft mass, skin, albedo and seeds in percents) of grapefruits were studied. The chemical composition of grapefruits was studied as well, including dry matters, sugars (monosaccharides and sacharose), tanning and coloring matters, ascorbic acid, and total acidity. The study outcomes indicate that the grapefruit is characterized as a good commodity. Soft mass is distinguished by its high acidity (3.27% calculated on lemon acid) and by high contents of biologically active matters – ascorbic acid (43.11 •10.3%). Tab. 2, Ref. 7.

Auth.

b18.4.4.21. Technology of producing food additives from wild-growing juniper. /N. Baghaturia, L. Kajaia, M. Demenyuk/. Works of Technical University of Georgia. – 2016. – #2(500). – pp. 11-17. – geo.; abs.: geo., eng., rus.

The technology of producing natural food additives such as biologically active extracts from wild-growing juniper cones and green mass was processed and the following optimal technological parameters were established at the Institute of Food Industry: Indian juniper cones and green mass thermal extraction should be carried out at 40 °C with the 60% alcohol-water solution during 4 hours. The organoleptic and physicochemical parameters of biologically active extracts received from juniper cones and green mass and their marginal parameters were studied. The technological instruction of producing extracts from juniper cones and green mass and internal manufacturing standard were drafted. A study of the scope of the juniper extract use showed that these extracts may be used in food industry as a food additive as well as in perfume and cosmetics industry and pharmacology. Tab. 2, Ref. 3.

Auth.

b18.4.4.22. Testing a bio-mineral fertilizer having resulted from the bacterial processing of trachytes on tomato crop under open ground conditions. /L. Kartvelishvili, N. Chkhobadze, Sh. Malashkhia, L. Chochia, N. Chubinidze/. Mining Journal. – 2017. – #1(38). – pp. 155-158. – geo.; abs.: geo., eng., rus.

The test results of a prolonged bio-fertilizer bacterial fertilizer on a tomato crop under open ground conditions are discussed. The mineral fertilizer was produced as a result of bacterial processing of Tsikhisubani deposit trachytes by adsorption of the leached potassium and silicate bacteria on zeolite. The bio-fertilizer was found to be efficient on the basis of the plant productivity and biological activity data. Tab. 5, Ref. 1.

Auth.

b18.4.4.23. Development of the methods of extraction of phenolic compounds from the seeds of Georgian grapes for the products for therapeutic and prophylactic purposes. /G. Lobzhanidze, T. Namchevadze/. Georgian Engineering News (GEN). – 2016. – #1. – v. 77. – pp. 109-110.– geo.; abs.: geo., eng.

It is well known that one of the basic factors causing many diseases is the imbalance between oxidants and antioxidants in the organism. Hence it is essential to use antioxidants, natural antioxidants being preferable without doubt. The high antioxidant activity of grape polyphenols is well known. The outcomes of our investigation allow producing the nonalcoholic concentrates with grape polyphenols of nutritive-prophylactic purpose, which will contain no less than 200 mg/ml of the active substance in the diluted, bioavailable state. For comparison, it should be noted that the concentration of polyphenols in red wines is no more than 20 mg/ml. Ref. 3.

Auth.

b18.4.4.24. The impact of quick freezing on the microflora of berries. /M. Gurielidze, M. Zhgenti, L. Gulua, T. Turmanidze/. Georgian Engineering News (GEN). – 2016. – #1. – v. 77. – pp. 111-114. – geo.; abs.: geo., eng.

The results of microbiological investigation of promising berry crops such as strawberries, raspberries and blackberries are discussed. Fresh berries, the berries after quick freezing and frozen berries after 2-month storage were studied. In the berries stored at 18°C, just as the growth of yeasts, molds and pathogenic bacteria (enterobacteria, staphylococci, etc.), so phytopathogenic fungi is inhibited, while the number of mesophilic, aerobic and facultative bacteria is reduced considerably. Tab. 4, Fig. 3, Ref. 4.

Auth.

b18.4.4.25. Respiration intensity of some stone fruits during storage. /M. Zhgenti, L. Gulua, T. Turmanidze/. Georgian Engineering News (GEN). – 2016. – #1. – v. 77. – pp. 115-118. – geo.; abs.: geo., eng. The dynamics of respiration intensity of promising peach, plum and nectarine cultivars growing in Georgia during storage was investigated. The cultivars withstanding long storage were identified and the loss during storage was assessed. Tab. 4, Fig. 3, Ref. 3.

Auth.

b18.4.4.26. Changes in some oxidative enzymes in stone fruits during storage. /M. Garuchava, L. Gulua, M. Zhgenti, T. Turmanidze/. Georgian Engineering News (GEN). – 2016. – #1. – v. 77. – pp. 119-122. – geo.; abs.: geo., eng.

The activity of oxidative enzymes peroxidase and o-diphenoloxidase in peaches, plums and nectarines was studied. The dynamics of changes in these enzymes during storage of fresh fruit is discussed. Tab. 3, Fig. 2, Ref. 4.

Auth.

b18.4.4.27. Polycondensation of carbamide for production of prolonged biodegradable nitrogen fertilizers. /G. Papava, E. Gugava, M. Gurgenishvili, N. Dokhturishvili, N. Gelashvili, E. Gavashelidze, R. Liparteliani, N. Khotenashvili/. Georgian Engineering News (GEN). – 2016. – #4. – v. 80. – pp. 121-124. – geo.; abs.: geo., eng.

To prevent the environmental pollution (soil, air, etc.) with nitrogen fertilizers, the polycondensation of carbamide, a fertilizer used worldwide, with the aim of obtaining the polymeric fertilizer, was carried out. A method of production of the carbamide-based polymerized fertilizer was developed. The polymeric fertilizer is poorly soluble in water, it slowly transfers into a soluble form to be assimilated by plants under the action of urease bacteria, and the plant has time to assimilate it. When the polymerized fertilizer is used for cereals, the plant is provided with dosed nutrition during the vegetation period, which guarantees its normal growth, increased crops and ecologically pure products. Ref. 6.

Auth.

b18.4.4.28. Biological waste processing by the extrusion method. /Sh. Andguladze, I. Bazgadze, S. Kolova/. Georgian Engineering News (GEN). – 2016. – #4. – v. 80. – pp. 129-131. – geo.; abs.: geo., eng.

The paper deals with the extrusion method for processing biological wastes. The use of the extrusion technology guarantees the biological value of the finished product. The extrusion technology can be used for utilizing food industry, animal breeding and poultry farming wastes. Ref. 3.

Auth.

b18.4.4.29. Development of a bilberry hydrophilic extract production technology. /T. Gvinianidze, V. Mindeli, V. Kvantidze, A. Kalandia /. Goni. – 2016. – #4. – pp. 29-34. – geo.; abs.: geo., eng.

The bilberry-contained biologically active substances being useful for living organisms are still practically unusable. Against the background of shortage of natural biologically active additives, the rational use of vegetable raw material resources is rather urgent. This report presents a technology for producing a hydrophilic

extract from bilberry. Tab. 4, Fig. 2, Ref. 3.

Auth.

b18.4.4.30. Using a sweet bay infusion (bio-solution) in hazelnut plantations. /L. Tchelidze/. Goni. – 2016. – #4. – pp. 17-19. – geo.; abs.: geo., eng.

The article deals with the mechanism of preparing sweet bay biological solution to control pests as well as the webs (colonies) of American White Butterflies (AWB) in plantations. Tab. 1, Ref. 3.

Auth.

b18.4.4.31. Development of new-generation dietary bread technologies by using soya processing products. /M. Silagadze, S. Gachechiladze, E. Pruidze, G. Khetsuriani, Kh. Khvadagiani, G. Pkhakadze/. Annals of Agrarian Science. – 2017. – v. 15. – #2. – pp. 177-180. – eng.; abs: eng.

In order to develop low-calorie high-biological value dietary bread, we used the soya processing products - roasted full fat soya flour, soya milk and soya pomade. Their chemical and micro nutrient composition was studied. The study showed that the soya processing products had low energy and high biological value, and exhibited low glycemic index that made them very attractive for the design of dietary food products. In order to increase bioavailability of soya, we carried out its sprouting. We studied the impact of different technological factors on the accumulation dynamics of highly digestible components of soya. Based on the studies of the separate and complex influence of the soya processing products on the quality of whole wheat bread, the optimal doses of food additives were determined. A new-generation dietary product with the trade name "Our Daily Bread", as well as its making technology was developed. Fig. 4, Ref. 9.

Auth.

b18.4.4.32. Study of physiological activity of microelements- and glutamine acid-containing chelate citrates. /I. Beshkenadze, A. Chagelishvili, M. Gogaladze, G. Chagelishvili, N. Klarjeishvili, I. Lomtadze, Z. Molodinashvili/. Annals of Agrarian Science. – 2017. – v. 15. – #2. – pp. 243-246. – eng.; abs: eng.

Premixes prepared on the base of microelements and glutamine acid-containing chelate citrates and their composites with natural zeolite and clinoptilolite were tested in a mixed feed for rabbits. Optimal composition and quantity of chelate microelements were determined on the base of test and major experiments. To study more thoroughly the results of the experiments the control slaughter was performed in 120-day old rabbits. Live mass indices of the first experimental group animals (when mixed feed was balanced with the premix that contained microelements and the composites of glutamine acid chelate citrates and clinoptilolite) slaughtered at 120 day age exceeded those of the 2nd (when mixed feed was balanced with premix that contained microelements and glutamine acid chelate citrates) and those of the control group (which was given the fodder used commonly at the farm) by 0.15 and 0.45 kg, respectively. As to the index of slaughter weight, here again the animals of the first experimental group occupied the leading position and this index equaled to 55.07%, that of the second group was- 54.54%, while that of the control group – 51.7%. Meat coefficient index in the first experimental group was 3.11, in the second group - 2,95, and in the control one - 2,89. Study of masses of inner bodies of rabbits after their slaughter showed that the animals of the first experimental group were distinguished by the best indices while the animals of the control group showed the least indices. For more profound study of meat productivity we investigated chemical characteristics of rabbit meat: water, fat, protein and ash. It was proved that here again the animals of the first experimental group show comparative advantage. Fat index in the meat of animals of the first experimental group equaled to 9.2% and exceeded the fat indices of the meat of animals of the second and control groups by 1,4 and 2.1%, while the fat index of animals of the second experimental group exceeded that of the control group by 0.7%. Water and protein were fixed in greater quantity in the meat of the control group animals which is logical. Study of skin-and-fur quality, after slaughter of rabbits, proved that here, again comparative advantage was shown by the animals of the first experimental group. Indices of the animals of the second experimental group exceed those of the control one, but lagged behind those of the first group. Tab. 4, Ref. 29.

Auth.

GM technology, livestock cloning, marker assisted selection, diagnostics

b18.4.4.33. The study of consumers perception of genetically modified products on the Georgian market. /N. Todua, T.Gogitidze/. Economics and Business. – 2017. – v.10. – #1. – pp. 107-124. – geo.; abs.: geo., eng.

The research examines advantages and disadvantages of production and sale of genetically modified products, as well as main aspects of their regulations. It is shown that marketing research plays a significant role in the development of GMO market. The marketing research is considered to be a cornerstone in investigation of consumers' perception towards the GMOs. The study reveals main specifications of perception, knowledge and awareness, and main attitudes and tendencies of Georgian buyers of genetically

modified goods. It also defines main factors that impact the decision making process of Georgians during the acquisition of genetically modified products. Tab. 9, Ref. 31.

Auth.

b18.4.4.34. Aspects of molecular identification of potato genotypes. /I. Anikina, T. Bekseitov, K. Isaeva, N. Kaynidenov/. Business-Engineering. – 2016. – #1-2. – pp. 204-207. – rus.; abs.: eng.

The article presents an overview of material about modern analytical methods of research by using protein and DNA-markers which allows solving problems of potato genotypes identification. Molecular diagnostics is an effective addition to traditional methods for identifying the potato varieties and seed potatoes, which were based on morphological and physiological features of the varieties. RAPD, AFLP, SSR, ISSR and others types of DNA-markers were used for identification of potato genotypes, detection its genetic diversity and passport system of gene pool in worldwide practice; each of these markers can individually determine varieties by using some limited amount of primers. It is noted that SSR-markers have some advantages in potato sorts identification, because of their high polymorphism, rapidity and high reproducibility of assays. Ref. 15.

Auth.

b18.4.4.35. Selecting a polysaccharide complex for stabilizing a milk-based product. /M. Temerbaeva, Yu. Goretskaya/. Business-Engineering. – 2016. – #1-2. – pp. 211-212. – rus.; abs.: eng.

The article presents a promising direction of a gerodietetic fermented milk production. Namely, the selection of a polysaccharide complex to stabilize the structure of the new product. The organoleptic and microbiological studies are given. Tab. 3, Ref. 5.

Auth.

Biomass feedstock production technologies, biopharming

b18.4.4.36. The perspectives of setting up a small food-prophylactic vegetable raw material processing enterprise. /T. Megrelidze, G. Pirveli, G. Gugulashvili, V. Gvachliani/. Science and Technologies. – 2016. – #1(721). – pp. 62-66. – geo.; abs.: geo., eng., rus.

There state of affairs in the modern food-prophylactic and nutritive-medical vegetable raw material processing is demonstrated. The necessity of preserving the useful properties when processing vegetable raw material is shown. To cope with the said problem, the authors have developed a novel technology and a new crushing and drying unit. The study results of changes in the useful substances contained in the vegetable raw material during processing are shown. According to the study results, the new raw material processing technology and the unit ensure the preservation of the initial useful properties and the antioxidant potential of the vegetable raw material. Fig. 1, Ref. 7.

Auth.

b18.4.4.37. Mathematical modeling and application of biosystems in the integrated citrus protection. /G. Aleksidze, E. Orjonikidze, A. Murvanidze, L. Nozadze, T. Epitashvili, I. Geguchadze/. Georgian Academy of Agricultural Sciences. – 2015. – 152 p. – geo.; abs.: eng.

The book deals with the mathematical models of fixing the quantitative dynamics of harmful organisms in an ecosystem, which make it possible to determine the number of useful and harmful insects and their optimal correlations at any moment of time, which is a definite significance for developing the biological control methods. A correctly built mathematical model makes it possible to determine the changeability of the biological systems: predator-prey and host-parasite in time and to define the initial assessments in time, which will not necessitate the conduct of additional measures. The project's aim is to cultivate an ecologically safe product in the Ajara citrus-growing zone. Fig. 21, Ref. 47.

Auth.

b18.4.4.38. Innovative technology for processing seed material by bioactivators. /A. Prangishvili, R. Gaxokidze, Z. Paresishvili/. New Agrarian Georgia. – 2017. – #5(73). – pp. 9-11. – geo.; abs.: rus., eng.

An innovative technology for processing seed material by bioactivators has been worked out in order to increase the biological activity of seeds. The flow sheet of this technology with the help of mechanization and automation envisages equal spraying of cereal seeds with water solution of the bio-preparation "Biorag", to be ended with its two-step drying with a stream of hot air and final packing of the finished product. The flow sheet makes it possible to meet the consumer market demand with the respective increase in the product's shelf-life and quality of the processed cereal seeds. Fig. 1, Ref. 6.

Auth.

b2.11. Food and beverages

b18.2.11.1. Demand for Georgian wine and evaluation of competitive advantage factors of the viticulture and winemaking sector. /E. Kharashvili/. Economics and Business. – 2016. – v. IX. – #4. – pp. 92-108. – geo.; abs.: geo., eng.

Based on the competitive advantage of the viticulture and winemaking sector, the paper evaluates the tendencies of increasing demand for Georgian wine. The paper analyzes the factors influencing the sector's development and demand for Georgian wine, taking into account the opinions of Georgian and foreign researchers, wine research institutions and associations. It is concluded that the viticulture and winemaking sector has competitive advantages in Georgia. The causes of the increased demand are analyzed. The competitiveness of wine industry is analyzed according to the traditional and new wine producer countries. Based on five competitive factors influencing the Georgian wine, conclusions about Georgia's position between traditional producers of wine and some appropriate recommendations are made. Tab. 1, Fig. 4, Ref. 47.

Auth.

b18.2.11.2. Modern trends of food supply to population. /G. Duchidze/. Metsniereba da Tskhovreba. – 2016. – #2(14). – pp. 34-38. – geo.; abs.: geo., eng., rus.

The current situation in food security and its development trends are considered. The problems associated with food security in Georgia are analyzed. It is noted that the local food security can be ensured by a set of measures directed at improvement of social and economic problems associated with the food producing branches, as well as development of national and worldwide economies. Ref. 5.

Auth.

b18.2.11.3. Basic social-economic aspects of food problem solving. /M. Vadatchkoria/. Metsniereba da Tskhovreba. – 2016. – #2(14). – pp. 64-70. – geo.; abs.: geo., eng., rus.

The goals of food security reform include supplying consumers with foodstuffs, creating a competitive environment, promoting the extension of food business and food exports, as well as implementation of the activities necessary for attaining these goals - political will, consistent approach, strictly defined action plan and coordinated action of government, private sectors, consumers and international organizations. Ref. 4.

Auth.

18.2.11.4. Producing dietary products from the raw material of some wild berries. /E. Khvichia, G. Kaishauri/. Science and Technologies. – 2016. – #2(722). – pp. 69-72. – geo.; abs.: geo., eng., rus.

The results of studying the chemical composition of some wild berries (cornel, blackberry, wild pear) are given and a technology of production of preserved food from these fruits (fruit in own natural juice) is developed. The main standard qualitative indices of given products are studied. Tab. 2, Ref. 6.

Auth.

b18.2.11.5. Keeping quality of a pumpkin "Kartuli Tetri Hibriduli". /G. Kaishauri/. Science and Technologies. – 2016. – #2(722). – pp. 73-77. – geo.; abs.: geo., eng., rus.

The results of the research of the keeping quality of a pumpkin "Kartuli Tetri Hibriduli", grown in the Georgia are discussed. The pumpkins are placed to storage under conditions of natural ventilation (at the temperature of 12-14 °C and 70-75% relatively humidity of air), as well as in the refrigerating chamber at the temperature of 4-6 °C and relative air humidity of 90-95%. This sort of pumpkin is well preserved under conditions of natural ventilation almost without spoilage during 8-9 months. Tab. 1, Ref. 6.

Auth.

b18.2.11.6. Tushuri Guda cheese and EU food safety regulations. /A. Korakhashvili, G. Jeiranashvili/. Bulletin of the Georgian National Academy of Sciences. – 2016. – v. 10. – #3. – pp. 143-149. – eng.; abs.: eng., geo.

The risk of Georgian Tushuri Guda cheese contamination with mycotoxins is investigated. Mycotoxins are produced by different genera of filamentous fungi and cause serious health hazards such as carcinogenicity and mutagenicity. Toxigenic fungi produce mycotoxins which contaminate the lactating sheep's feedstuff. During metabolism, the mycotoxins undergo biotransformation and are secreted in milk. Studies show that there is a seasonal trend in the levels of mycotoxins in ewe milk. In the cold months sheep feeds provide favorable conditions for fungal growth. Good agricultural and storage practices are therefore fundamental for controlling the toxigenic species and mycotoxins. Although aflatoxins (especially aflatoxin M1) are the mycotoxins of greater incidence in milk and cheese. It was found that other mycotoxins, such as fumonisin, ochratoxin A, trichothecenes, zearalenone, T-2 toxin, and deoxynivalenol, can also occur in these products. Our investigation shows that there are all favorable conditions in Georgia for safe production of Tushuri Guda Cheese to be exported to Europe. Tab. 1, Fig. 1, Ref. 5.

Auth.

b18.2.11.7. Red dessert wine prepared by innovative technology. /I. Kekelidze/. Georgian Engineering News (GEN). – 2016. – v. 78. – #2. – pp. 122-124. – geo.; abs.: geo., eng.

The paper deals with the enological study results of red dessert wine made from the grape cultivar Saperavi under standard technology and using different techniques of enrichment with phenolic compounds and the dry wine made under standard technology. Advantages of the red dessert wine made by innovative technology over the samples of dessert and dry red wine made under the traditional technology are shown. Tab. 1, Ref. 18.

Auth.

b18.2.11.8. Technology of production of alcoholic beverages using the residue of alcohol distillation. /Ts. Oshakmashvili, M. Khositashvili/. Georgian Engineering News (GEN). – 2017. – #1. – pp. 17-20. – geo.; abs.: geo., eng.

The paper deals with the study of the residue of honey alcohol distillation for biologically active substances. The experiments carried out showed that the residue of honey alcohol distillation was rich in biologically active substances such as organic acids, total nitrogen, phenolic compounds and carbohydrates. High concentration of these substances in the residue of honey alcohol distillation is due to their concentration in the process of distillation of honey wine materials. The main difference between the residue and its appropriate wine material consists in the composition of aromatic components. Tab. 5, Ref. 4.

Auth.

b18.2.11.9. The amino-acid profile of wines according to gas chromatographic analysis. /Sh. Shatirishvili, G. Zakalashvili, M. Kiladze, I. Shatirishvili/. Georgian Engineering News (GEN). – 2017. – #1. – pp. 158-160. – geo.; abs.: geo., eng.

To analyze Kakheti and Rkatsiteli wines for amino-acids by traditional gas chromatography, rather different derivatization methods for analyzing the samples at 50°C depending on the duration of heat treatment were used. It is shown that thermal treatment allows reaching the amount of free amino-acids close to that contained in wines produced by the classical method. Fig. 2, Ref. 3.

Auth.

b18.2.11.10. Research of some phenolic compounds in oak chip extracts. /S. Zakalashvili, M. Bezhuashvili/. Georgian Engineering News (GEN). – 2017. – #1. – pp. 154-157. – eng.; abs.: geo., eng., rus. Based on the analysis of spirit extracts some phenolic compounds of industrial oak chips were studied. The spirit extracts of oak chips of different degree of baking (light, medium and strong) were analysed. The following low-molecular phenolic compounds were identified in the oak chip spirit extracts: vanillin, vanillic acid, syringic aldehyde, syringic acid, coniferyl aldehyde, sinapic acid, syringol, gallic acid, gallic acid, gallic acid, 4-vinylphenol and 4-ethylphenol. The variation of concentration of the above-listed compounds in connection with the degree of baking of oak chips and the possibility of using the spirit extracts of oak chips are suitable for production of alcoholic beverages are established. Tab. 1, Ref. 15.

Auth.

b18.2.11.11. Determination of the free amino-acid profile by means of high-performance liquid chromatography. /Sh. Shatirishvili, L. Berishvili, I. Shatirishvili/. Georgian Engineering News (GEN). – 2016. – v. 77. – #1. – pp. 99-101. – geo.; abs.: geo., eng.

The paper deals with the changes in the free amino-acid profile in the wines "Rkatsiteli" and "Kakheti" in relation to the duration of thermal heating and temperature variation. Main amino-acids, such as threonine, histidine+glutamine, alanine, arginine, methionine and proline, were determined. Tab. 2, Ref. 2.

Auth.

b18.2.11.12. Prevention of oxidation during production of wine materials from Tsolikauri grape cultivar. /L. Chkuaseli, Z. Geliashvili, M. Khomasuridze, M. Meskhidze/. Georgian Engineering News (GEN). – 2016. – v. 77. – #1. – pp. 102-108. – geo.; abs.: geo., eng.

Oxidation causes various flaws and faults in wine. Moderate amounts of oxygen have a beneficial effect on wine, giving to it complexity, whereas the excess of oxygen eventually deteriorates the quality of wine. White wine contains less amounts of phenolic compounds than red one, but the oxidation of phenolic acids, especially of hydroxycinnamic acid, catechols and quercetin, changes the color of wine into brown. For preventing the oxidation of wine, they must continuously control the content of oxygen in wine and use antioxidants allowed in oenology (ascorbic acid, sulfur dioxide, etc.). In the result of experimental investigation, the advantages of treatment of white wine with auxiliary materials Qi-No[Ox] and PVPP for prevention of oxidation were revealed. Application of antioxidant tannin preparation (VR Supra-Laffort) had an adverse impact on the wine color intensity and tone, the content of total phenols considerably increased as well. Tab. 1, Ref. 7.

Auth.

b18.2.11.13. The influence of oak chips, cube, extract and tannin on the color intensity and hue of red wine. /Z. Babichadze, M. Khomasuridze, R. Khutsishvili/. Georgian Engineering News (GEN). – 2016. – v. 80. – #4. – pp. 134-140. – geo.; abs.: geo., eng.

Based on the conducted experiment the influence of oak barrel alternatives on the color hue and color intensity of red wine was studied. The red wine was produced from the Saperavi grape variety. Various materials were used during the research: the chips produced by high, medium, heavy roast and without roast; the cubes produced by medium roast; oak and Quebracho tannins powder; liquid extract. Aging was carried out for 3-6 months. Based on the obtained results, the recommendations for application of the used materials were worked out. Tab. 1, Fig. 2, Ref. 7.

Auth.

b18.2.11.14. Georgia must develop the national politic of nourishment. /P. Koguashvili/. Business-Engineering. – 2016. – #4. – pp. 12-16. – geo.; abs.: eng.

The food consumption standards and the “food minimum” value operating in Georgia are outdated. In order to change the current rather unfavorable situation, the State in cooperation with the academic sector, together with all other necessary measures to be carried out (support on the part of farmers and cooperatives, creation of a specialized agrocredit system, ensuring the land reclamation and zoo-veterinary services, etc.) should work out the food security strategy (action plan) and national food policy, the implementation of which will depend on the reasonable and well-thought functioning of the state structures. Ref. 5.

Auth.

b18.2.11.15. Food security in the system of economic security. /K.Tsimintia/. Business-Engineering. – 2016. – #4. – pp. 26-29. – geo.; abs.: geo., eng.

The indicators for food security should be considered among the functional security indicators, as it holds a special place in the system of economic security. The existing data and calculations certify that the level of access to food as well as the ability to produce agricultural products and the level of self-reliance are still unsatisfactory. The revenues of the significant part of the population are not enough to buy the minimum food basket. In order to ensure adjustable security norms, the following is to be done foremost: development and implementation of the program for production of import substitution agricultural products; implementation of poverty reduction measures and improvement of the agricultural sector performance. Ref. 5.

Auth.

b18.2.11.16. Food security in Georgia: accessibility aspects. /K.Tsimintia/. Business-Engineering. – 2016. – #4. – pp. 146-150. – geo.; abs.: geo., eng.

Despite the positive dynamics during the last fifteen years, the access to food seems to be very low in Georgia. In particular, 11.6% of population is below the poverty line as of 2014 (registered poverty). It means that the minimal food basket calculated for intake of 2300 kilocalories per day, does not meet the present-day requirements. It should also be noted that average monthly charges for food, drinks and tobacco products in the analyzed period are so small (63,8 GEL) that they fail to meet the terms of optimal viability. In 2005-2014, the average monthly income per capita increased 2.96 times, while the average monthly charges per capita - by 2.61 times. While expenses on food, drink and tobacco products increased 1.8 times, the subsistence level of an average consumer only by 1.6 times. The stated figures of low economic access to food are substantiated by calculations of accessibility indexes in this field. Tab. 1, Ref. 5.

Auth.

b18.2.11.17. New baby food products from local raw material. /A. Khotivari, G. Grigorashvili/. Modern technologies to produce ecologically pure products for sustainable development of agriculture. Int. Sci. Conf. Materials. Tbilisi. - 28-30 September. – 2016. – pp. 610-614. – geo.; abs.: geo., eng.

For the purpose of increasing the nutritional value of baby food products, various juices and sauces produced from wild growing fruits and berries were used. The chemical analysis of a number of fruits and berries showed that cornel, apple, hips and sea-buckthorn are rich in micro-nutrients and ascorbic acid. This was the main reason of using these fruit berries as raw material for different food production. Different rates of components were used in blends to identify the best organoleptic properties and nutritional value of the finished product. Tab. 2, Ref. 4.

Auth.

b18.2.11.18. Assessing resistance of potato species to temperature by a delayed fluorescence method. /B. Oniani/. Goni. – 2016. – #4. – pp. 93-95. – geo.; abs.: geo., eng.

Studying the resistance of potato species to temperature allows accurate adjustment of potato planting agro terms, which is necessary because in most potato growing areas in Georgia during climate change in summer, temperature is an important limiting factor for potato vegetation. The convenient method for evaluating plant resistance to environmental factors is the Delayed Fluorescence (DF) Metod. Fig. 2, Ref. 4.

Auth.

b18.2.11.19. Food safety regulation in Georgia. /E. Sarjveladze/. The New Economist. – 2016. – #4(43). – pp. 38-43. – geo.; abs.: geo., eng.

Food safety is one of the most important problems of the modern society. In Georgia, the food safety regulation and state control exercising body is the Ministry of Agriculture-based LEPL - the National Food Agency. It actually ensures the achievement of food safety through the following mechanisms: inspection, supervision, monitoring, sampling, and documentary check. For the purpose of food /animal feed safety control, the Agency carries out surprise inspections - planned and unplanned. As a result of the work performed lately on the basis of Georgia legislation, the situation in the sphere of food safety regulations has significantly improved in the country, both in the direction of harmonization with the relevant EU legislation as well as in terms of market control and monitoring. For the purpose of improving and optimization of the existing situation, the planning and implementation of legislative and effective management activities should be continued with the participation of branch scientists, experts, entrepreneurs and other stakeholders. Ref. 7.

Auth.

b5.2. Economics and business

b18.5.2.1. Economic reasoning of transition to programmable agriculture aimed at environmentally friendly production. /O. Keshelashvili/. Bulletin of the Academy of Agricultural Sciences of Georgia. – 2016. – #2(36). – pp. 146-154. – geo.; abs.: geo., eng.

The problem of programmed harvesting of agricultural crops and programmed agriculture development is discussed. In terms of economics, transition to programmable agriculture implies and requires the rational and effective use of the factors directly and indirectly influencing the growth and development of agricultural crops, the zonal and micro-zonal differential use of natural and economic conditions, the mastering of the industrial and resource potential according to a multi-optional scenario, fitting of the industrial infrastructure thereto and thorough evaluation and consideration of the marketing situation for maximally effective mastering of the internal and external market segments. The ecologically safe products can be obtained only in the local zones and areas allocated and selected for this purpose, where specific farming activities are to be carried out. Such areas can be used by the principle of commercialization, directly on order by a definite group of consumers and on a contractual basis. The output of ecologically safe products in such zones will be small and correspondingly high-priced. This is going to be a specific form of order business, the area of which will presumably widen. Ref. 5.

Auth.

b18.5.2.2. Why and how employment and income of rural population should be increased. /T. Kunchulia, Sh. Kikalishvili/. Bulletin of the Academy of Agricultural Sciences of Georgia. – 2016. – #2(36). – pp. 155-159. – geo.; abs.: geo., eng.

As a result of land reform implemented in Georgia, the number of small farms has drastically increased. According to 2014 household survey, 728 247 family farms were registered in the country. More than 72% of family farms owned up to 1 ha of agricultural land. Small farms are mainly located in foothill and mountain zones that make 87% of the country's territory. Because of vertical zoning characteristic to the country, agricultural land is naturally and economically fragmented. Because of the above, big results should not be expected from the measures aimed at land consolidation. Under the current situation the most beneficial for small farms is the implementation of not expensive activities aimed at increasing employment and income. This includes support to livestock production, the lack of which is critically faced by the population. The paper suggests introduction of poultry (broiler) farming in population and certain number of sheep in the mountain region municipalities to be kept stalled. Ref. 4.

Auth.

b18.5.2.3. Economic assessment of a new wheat fertilization system. /Ts. Samadashvili, D. Bedoshvili, A. Tkheldze, G. Chkhutiashvili, L. Alpaidze/. Bulletin of the Academy of Agricultural Sciences of Georgia. – 2016. – #2(36). – pp. 164-168. – geo.; abs.: geo., eng.

On the basis of the researches conducted in 2014-2015 it is possible to conclude that varieties of wheat widespread in Georgia are characterized by high genetic potential that gives the opportunity to receive big wheat harvest under conditions of intensive agro background. With the use of a new system of fertilization which implies both root and foliar applying of additional nutrients, the productivity of wheat sharply increases. High doses of fertilizer increase plant bushiness, resistance to diseases and wreckers and what is important it does not cause wheat lying down. Using of a new technique of fertilization gives high economic effect of wheat yield. With the use of a new system of fertilization it is possible to get steady, big and quality wheat harvest. Income from wheat harvest gained at applying such fertilization system varies from GEL 533 to 974 per hectare. Tab. 4, Ref. 15.

Auth.

b18.5.2.4. Projections for Georgian village stabilization and development. /R. Jabnidze/. Bulletin of the Academy of Agricultural Sciences of Georgia. – 2016. – #2(36). – pp. 169-174. – geo.; abs.: geo., eng.

The ways of revival of the Georgian village and Georgian agriculture are proposed. In particular, the focus is made on the concentration of all the efforts for settling the two major problems, namely the reduction of rural unemployment and mass employment in rural areas. All this is possible by restoration and rehabilitation in the region of various long-term tested branches. Ref. 5.

Auth.

b18.5.2.5. The role of the state in economic and business development and legal regulation /O. Keshelashvili/. Agrarian-economic Science and Technologies. – 2016. – #4(33). – pp. 5-16. – geo.; abs.: geo., eng.

Economy and in particular, the business is based on freedom and independence. The question is whether it should be regulated or not. As world experience shows, the business should be developed smoothly, but in certain doses it should be regulated and managed by government. The State intervention in the economy and business development is expressed in various forms: 1) limits certain areas in the development and production of certain goods; 2) forms the legal basis for provides the public atmosphere, which contributes to the effectiveness of business and the market system in general; 3) protects competition; 4) stimulates certain areas of development and production of goods. 5) encourages monopoly; 6) fixes and/or freezes prices; 7) establishes tax rules, rates, etc.; 8) effects income and wealth distribution; 9) control employment and inflation; 10) guarantees social and ecological balance. The main economic functions of the State in the economy and business regulation are: 1) creating legal bases; 2) achieving the macro-economic stability; 3) effecting the displacement of economic resources for raising the economic efficiency; 4) effecting the income distribution. Ref. 4.

Auth.

b18.5.2.6. Distinguished tendencies in agriculture – the basis for estimated prognosis. /O. Keshelashvili/. Agrarian-economic Science and Technologies. – 2017. – #1(34). – pp. 5-12. – geo.; abs.: geo., eng.

Based on the study of major tendencies in the development of agriculture in Georgia, some positive changes have been identified in recent years in respect of using the economic and technological environment and economic growth of agriculture. There is a tendency for an increase in arable lands and pastures in most regions, with the concurrent decrease in areas under perennial plants. This fact is a clear indication of the ineffective and non-intensive application of arable lands. A trend for deepening the level of agricultural specialization in individual regions is observable, which is undoubtedly a positive event economically. The study showed that that the volume of local agricultural production is not stable in dynamics, because of which the population food supply index in comparison with the physiological norms is low and characterized by a tendency to decrease. Ref. 4.

Auth.

b18.5.2.7. Designing a repair shop for farm machinery maintenance and repair. /J. Katsitadze, G. Kutelia, I. Abuladze, G. Beridze, R. Margalitadze/. Agrarian-economic Science and Technologies. – 2017. – #1(34). – pp. 13-19. – geo.; abs.: geo., eng.

Significant problems in the organization of farm machinery service have been observed in Georgia lately. Farmers and private entrepreneurs lack appropriately equipped repair shops. As a result, repair work is generally performed by unskilled personnel, while its cost is high. All this adversely affects the quality of farming operations and the agricultural output. The article presents calculation of basic parameters of a simple farm machinery repair and maintenance workshop, its design with basic equipment, as well as a mobile workshop for implementation of urgent works under field conditions. Fig. 2, Ref. 4.

Auth.

b18.5.2.8. Economic regulation of environmental protection and nature management. /O. Keshelashvili/. Agrarian-economic Science and Technologies. – 2017. – #2(35). – pp. 5-12. – geo.; abs.: geo., eng.

Considering present market demands, it seems unfeasible to solve economic problems without implementation of integrated systems of regulated and differentiated measures of land use. Furthermore, it is not realistic to address the problems of nature management and protection without applying proper economic mechanisms and stimulation. The article suggests that scientific achievements give opportunity to identify to what extent the elements of nature could be managed and at what level. The spread of harmful organisms and the measures to control them should be estimated and different models of ecological balance, restrictions, best versions and prognosis should be considered. Ref. 4.

Auth.

b18.5.2.9. Some questions of agribusiness development. /T. Lachkepani, D. Baidauri, L. Baidauri/. Agrarian-economic Science and Technologies. – 2017. – #2(35). – pp. 13-17. – geo.; abs.: geo., eng.

The essence of agribusiness, development history of it, as of specific sphere, and relevant expert opinions are considered. The authors' views concerning the agribusiness development in Georgia are expressed. Ref. 2.
Auth.

b18.5.2.10. European models and current challenges of farm diversification. /I. Natsvlishvili/. Economics and Business. – 2016. – v. IX. – #2. – pp. 31-50. – geo.; abs.: geo., eng.

The investigation of experience of different countries with best agricultural practice plays a significant role in the identification of agricultural policy priorities in Georgia and in making practical recommendations for farmers. The given article discusses current tendencies of agriculture and agricultural policy using the so-called armchair research method; the peculiarities of the European farm diversification models are analyzed and the opportunities and limits of family farms in the European Union are highlighted. The article argues that family farms in the EU are considered as a key element of the European model of agriculture. Family farms make multifarious contribution to the European Union and to its rural economy. In Europe, around 97% of farms are family farms. The European Union through its agricultural policy continues to stimulate sustainable and competitive agriculture. Ref. 11.

Auth.

b18.5.2.11. Assessment of the contemporary situation in entrepreneurship in Georgia. /L. Kadagishvili/. Economics and Business. – 2016. – v. IX. – #2. – pp. 66-81. – geo.; abs.: geo., eng.

In recent years, the Georgian government's efforts have been directed to the development of priority sectors of entrepreneurship, such as industry, agriculture and tourism. Based on the scientific literature, governmental and non-governmental, national and international organizations report and statistical materials the given work analyzes and assesses the strong and weak sides of the development of the above noted fields of entrepreneurship. The contents of the article are structured as follows: initially there is an assessment of the last 20 years of the reforms carried out in Georgia and noted that, despite the positive steps taken towards this direction, the country failed to reduce poverty and raise living standards. Further, it is analyzed the situation of entrepreneurial activities in Georgia in 2012-2014 and made a conclusion that despite the positive trends, the business environment at the current stage in the country cannot provide the rapid pace of development of the national economy. The article also discusses the basic approaches and forms of state support of entrepreneurship and highlights the important role to be fulfilled by the improvement of entrepreneurial environment and the increase of entrepreneurs' education level. On the basis of the conclusions made at the end of the article there are formulated relevant proposals and recommendations. Ref. 24.

Auth.

b18.5.2.12. On the necessity for making amendments in the tea plantations rehabilitation state program. /P. Koghuashvili/. Economics and Business. – 2016. – v. IX. – #2. – pp. 82-89. – geo.; abs.: geo., eng.

The article deals with the problems in the field of tea-growing; it analyzes and shows the state tea-growing program, its shortcomings and proposes the appropriate suggestions. The paper emphasizes that tea-growing is one of the leading sectors of the economy in which over 180 households were engaged in the 80s of the last century. In recent decades, the area under tea has decreased dramatically and the industry faces a danger of total destruction. The author emphasizes that the state program expectations failed to be implemented due to the program-contained standards unacceptable by agricultural cooperatives. According to the author, the promotion of in the cooperation and intensive development of agricultural integration in agricultural sector is an important direction of the state reform and evasion from the taking of adequate measures and sharing rich experience of the countries having successful economies will cause serious problems. Ref. 4.

Auth.

b18.5.2.13. Possible impacts of subsidizing the agricultural sector and responsive behavior of agricultural households and the market. /T. Taktakishvili/. Economics and Business. – 2016. – v. IX. – #2. – pp. 168-175. – geo.; abs.: geo., eng.

The agricultural sector has an important social and economic role in almost every country and therefore it is supported by the government in various forms, beginning from arranging the appropriate infrastructure in rural areas and ending with allocation of definite subsidies for farmers. The paper shows the most common forms of subsidies and possible responses from farm households. The ways through which the policy of subsidies influences decision-making of the households concerning the farming practices and taking the financial resources are discussed. Ref. 10.

Auth.

b18.5.2.14. Agrarian risks, agrarian lending and agrarian insurance problems. /G. Tetradze, P. Koghuashvili/. Economics. – 2017. – #1. – pp. 153-160. – geo.; abs.: geo., eng.

The authors discuss agrarian risks and the problems in connection with lending and insurance. As it is known, the agrarian sector is characterized as most risky sector compares with other branches of economy;

agricultural insurance and lending are additional barriers to the sector development stages. Based on the comprehensive analysis and the available foreign experience the appropriate recommendations and the ways of their implementation are proposed. Tab. 1, Ref. 5.

Auth.

b18.5.2.15. Aims and forms of agricultural subsidies. /T. Taktakishvili/. Ekonomisti. – 2016. – v. X. – #3. – pp. 86-94. – geo.; abs.: geo., eng.

The principal aims and most popular forms of agricultural subsidies are considered. The major reasons and economic grounds of the state intervention into the agricultural sector development are analyzed. The attitude of different economic schools toward agricultural subsidies is considered. The priorities of the agrarian sector subsidizing policy and the activities directed at the growth of productivity and employment in the agricultural sector are analyzed. Ref. 10.

Auth.

b18.5.2.16. State innovation policy in the US potato growing and generalization of its experience in Georgia. /T. Kavtaradze, G. Kavtaradze/. Ekonomisti. – 2016. – v. XII. – #1. – pp. 104-114. – geo.; abs.: geo., eng.

The state innovation policy in the US potato growing from both the strategic and tactical standpoint is studied. The current state of Georgian potato production is analyzed and an opinion on the generalization of the relevant American experience is expressed. Ref. 12.

Auth.

b18.5.2.17. Marketing and agricultural sector. /T. Kuprashvili/. Goni. – 2017. – #5. – pp. 10-13. – geo.; abs.: geo., eng.

Marketing and the agro-industrial sector are not the closely related notions yet. It can be explained by two reasons: first, the agricultural production is still insufficient; second, most specialists and managers engaged in agriculture do not share the important role of marketing under conditions of deficiency of goods. The business philosophy views in agriculture in the cases of marketing and production-marketing orientation are different. In the case of marketing orientation of business the purpose of business is the satisfaction of the consumers' demands and interests, while in the case of production-marketing orientation implementation of the production plans is prioritized. Ref. 4.

Auth.

b18.5.2.18. Farmer and market economy. /G. Natroshvili, M. Tsintsadze, N. Natroshvili/. Metsniereba da Tskhovreba. – 2016. – #2(14). – pp. 70-73. – geo.; abs.: geo., eng., rus.

The article deals with the premises of farm business development and how to become a farmer. The main processes promoting the development of a farm business in Georgia are analyzed. Transfer to market economy required the creation of corresponding industrial units. Correspondingly, as far as collective farms and soviet farms are disintegrated, they were substituted by peasant farms. Despite the fact that they are highly developed in foreign states, in Georgia the farm business's professional level is rather low so far. The small farm facilities existing nowadays are not able to achieve appropriate results. Furthermore, this requires more attention from the state in order to promote farm business. Ref. 3.

Auth.

b18.5.2.19. Food product prices and factors influencing the pricing. /G. Duchidze/. Metsniereba da Tskhovreba. – 2017. – #1(15). – pp. 57-61. – geo.; abs.: geo., eng., rus.

The work presents a review of the prices on food products and the factors having influence on pricing; it also states that the price of goods is the indicator of the efficiency of food market performance; therefore, the work also reviews the aspects of prices and defines that the process of pricing includes consideration of the related factors such as the cost of the product with the direct and overhead expenses included, purchasing capacity of the population, the quality characteristics of the product and etc. Ref. 6.

Auth.

b18.5.2.20. Cooperation and agricultural activities. Problems and perspectives in Georgia. /M. Vadatchkoria/. Metsniereba da Tskhovreba. – 2017. – #1(15). – pp. 75-79. – geo.; abs.: geo., eng., rus.

The government should develop an agricultural policy with due regard for financing such structures that will ensure the optimal decision-making in agriculture. Such structures should propose different forms of farm management for farmers. They should solve administrative problems and should not redirect them to other structures. The cooperation management forms will define in the future investment of agriculture oriented toward development and reproduction. Ref. 6.

Auth.

b18.5.2.21. The prospect of increasing exports of Georgian products under free trade conditions with Europe. /N. Maziashvili/. Business-Engineering. – 2016. – #1-2. – pp. 213-216. – geo.; abs.: geo., eng.

The study data of January-August of 2015 evidenced a stable increase in the total export of Georgian goods in the EU. The studies also found a 40.1% growth of net exports. The trade rates with Europe were also retained in January-November of 2015 and the foreign trade turnover of Georgia with the EU countries amounted to USD 2,792 billion, exceeding the corresponding indicator of the previous year by 3 percent. Hence, the export indicator is 6 percent more and that of import is more by 2 percent. Accordingly, one more expert opinion that the Association Agreement would more encourage the growth of imports than of exports was not proved. Evidently, the growth in the direction of export is more than in the direction of import. Ref. 5.

Auth.

b18.5.2.22. The agribusiness development guidelines in the agricultural sector. /V. Zeikidze, D. Baidauri, T. Lachkepiani, L. Gegenava/. Business-Engineering. – 2016. – #1-2. – pp. 217-219. – geo.; abs.: geo., eng.

The article discusses the priorities of the country's agribusiness development. The development of a new strategy of food market, its importance and main priorities of the country as a whole and its individual regions are given. In addition, the shortcomings existing in the development of agribusiness are identified and the proposals for eliminating them are given. Ref. 3.

Auth.

b18.5.2.23. Ensuring the development of cooperative enterprises. /D. Silagadze/. Business-Engineering. – 2016. – #4. – pp. 22-25. – geo.; abs.: geo., eng.

The cooperatives "Terjola Wine" and "Sazano Winery" established with the financial support of EU in Imereti region were studied using the survey, observation and analysis method. The level of cooperation in the winemaking sector was found to be rather low. Several cooperatives operating in the region fail to lay a key role in the sector, although there are informal relations between individual entrepreneurs, within the scope of which they share information concerning farm chemicals, buyers and other related questions. The study showed a low interest in cooperation on the part of small family farms. Among the interfering factors is that cooperative members own small land and business cannot expand. If cooperatives unite, more products could be produced and sold. The level of cooperation was also found very low in poultry farming. The amendments made in Georgian laws concerning agricultural cooperatives, entrepreneurship, taxes and grants should create conditions for stimulation and development of rural economy. Ref. 10.

Auth.

b18.5.2.24. Economic and financial problems of agriculture and main directions of their resolution.

/M. Shalamberidze, Z. Akhaladze/. Business-Engineering. – 2016. – #4. – pp. 30-31. – geo.; abs.: geo., eng.

The State's role in the development of the agricultural sector and regulation of its financial and economic problems is a subject of different views, but the main factor that could contribute to the overcoming the current crisis in the agricultural sector is that the reforms to be carried out in the sector are properly and precisely implemented, the finances allocated are reasonably spent and necessary foreign investments are attracted. Ref. 2.

Auth.

b18.5.2.25. Prospects of wine tourism in Georgia. /K. Kajaia/. Business-Engineering. – 2016. – #4. – pp. 53-55. – geo.; abs.: geo., eng.

The originality of Georgian wine and winemaking is evident and attracts foreign visitors. The finding of a different and original niche is a real competitive advantage. It is important that the government could make best of such an advantage and propose to an interested beginner farmer or peasant a proper program of agricultural support. Georgia has definite advantages on the competitive world wine market taking into account its ancient wine-growing and winemaking traditions. The country also has companies with well-developed infrastructure, although it is only a small part of what should and can be done for developing wine tourism in the country. Ref. 3.

Auth.

b18.5.2.26. The role of agricultural municipal informational service in the development of farms. /T. Oblishvili/. Business-Engineering. – 2016. – #4. – pp. 56-58. – geo.; abs.: eng.

The main goal of establishment of an information-advisory service and its management are discussed. The idea of setting up such a service originated in 2013 and in the early 2013 the service was already operational. The service for Georgian reality is innovative and is based on the American experience. The foundation of the service caused different opinions, although it should be perceived as a successful example. The service is oriented toward assisting the development of farms and accessibility to the reliable statistical data necessary for establishing economic indicators and make right conclusions. The service supports the development of Georgian agriculture by effective use of its material, financial and human resources. In spite of the service

successes, it will be good to organize visits to the like services in Europe and America. Such activities will improve the personnel's skills and raise their motivation to work better. Ref. 2.

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