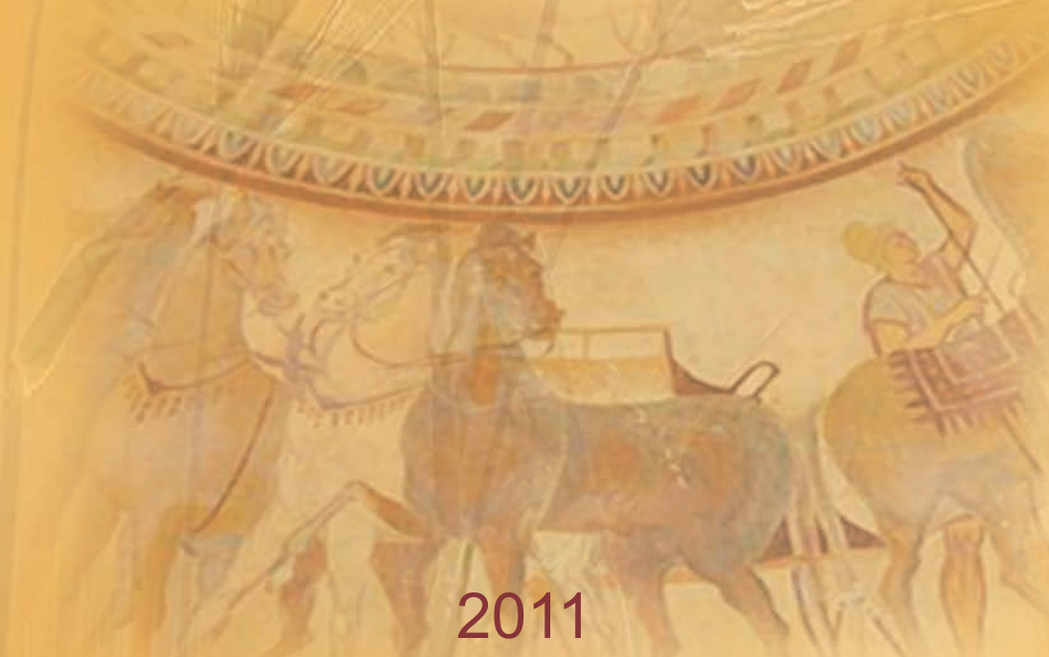
ISSN 1313 - 8820
Volume 3, Number 2
June, 2011

AGRICULTURAL SCIENCE AND TECHNOLOGY



2011

An International Journal Published by Faculty of Agriculture,
Trakia University, Stara Zagora, Bulgaria

Scope and policy of the journal
Agricultural Science and Technology /AST/ – an International Scientific Journal of Agricultural and Technology Sciences is published in English in one volume of 4 issues per year, as a printed journal and in electronic form. The policy of the journal is to publish original papers, reviews and short communications covering the aspects of agriculture related with life sciences and modern technologies. It will offer opportunities to address the global needs relating to food and environment, health, exploit the technology to provide innovative products and sustainable development. Papers will be considered in aspects of both fundamental and applied science in the areas of Genetics and Breeding, Nutrition and Physiology, Production Systems, Agriculture and Environment and Product Quality and Safety. Other categories closely related to the above topics could be considered by the editors. The detailed information of the journal is available at the website. Proceedings of scientific meetings and conference reports will be considered for special issues.

Submission of Manuscripts
All manuscript written in English should be submitted as MS-Word file attachments via e-mail to ascitech@uni-sz.bg. Manuscripts must be prepared strictly in accordance with the detailed instructions for authors at the website
http://www.uni-sz.bg/ascitech/index.html
and the instructions on the last page of the journal. For each manuscript the signatures of all authors are needed confirming their consent to publish it and to nominate on author for correspondence. They have to be presented by a submission letter signed by all authors. The form of the submission letter is available upon from request from the Technical Assistance or could be downloaded from the website of the journal. All manuscripts are subject to editorial review and the editors reserve the right to improve style and return the paper for rewriting to the authors, if necessary. The editorial board reserves rights to reject manuscripts based on priorities and space availability in the journal.

Subscriptions
Agricultural Science and Technology is published four times a year. The subscription price for institutions is 80 € and for personal subscription 30 € which include electronic access and delivery. Subscription run for full calendar year. Orders, which must be accompanied by payment may be sent direct to the publisher:

Trakia University
Faculty of Agriculture, Bank account:
UniCredit Bulbank,
Sofia BIC: UNCRBGSF

IBAN: BG29UNCR76303100117681
With UniCredit Bulbank Stara Zagora

Internet Access
This journal is included in the Trakia University Journals online Service which can be found at www.uni-sz.bg.

Address of Editorial office:
Agricultural Science and Technology
Faculty of Agriculture, Trakia University
Student's campus, 6000 Stara Zagora
Bulgaria
Telephone.: +359 42 699330
+359 42 699446
http://www.uni-sz.bg/ascitech/index.html

Technical Assistance:
Nely Tzvetanova
Telephone.: +359 42 699446
E-mail: ascitech@uni-sz.bg

ISSN 1313 - 8820

Volume 3, Number 2
June 2011

AGRICULTURAL SCIENCE AND TECHNOLOGY

2011

An International Journal Published by Faculty of Agriculture,
Trakia University, Stara Zagora, Bulgaria

AGRICULTURAL SCIENCE AND TECHNOLOGY, VOL. 3, No 2, pp 155 - 159, 2011

Organic matter status in reclaimed Technosols of Bulgaria

V. Tsolova, M. Banov*

Institute of Soil Science N. Poushkarov, 7 Shousse Bankya, 1080 Sofia, Bulgaria

Abstract. *The paper deals with the characterization of organic matter in reclaimed Technosols (WRS, 2007) built in the different mine regions of Bulgaria (Chukurovo, Pernik, Maritsa-Iztok and Lokorsko). The studied soils were formed around 30 years ago through the humus and none humus reclamation methods. The humus formation processes occur with greater intensity in reclaimed without humus technogenic soils and form the vertical differentiation of the section. The newly formed organic horizons contain mainly non-extractable (unreachable) carbon, formed due to the coal impurities and / or on-going evolution of the geological materials, building up the technogenic soils. The extractable carbon, which content averages at about 0.22%, is represented by humic acids with low condensation and maturity. The process of cultivation of the Technosols occurs along with the increasing content of fulvic acids, which decreases the stability and quality of the organic matter, especially in the humus reclaimed Technosols.*

Keywords: organic matter, reclamation, Technosols, humus, mine.

Introduction

The condition of the organic matter is a major diagnostic indicator used in the soil-genetic research and strategies for management and conservation of soil resources. The organic matter improves the chemical, physical and biological characteristics of the soils and determine their productivity. In recent years, it has become a valuable resource in the on going battle to reduce the harmful emissions in the atmosphere. The important role of the organic matter determines its enormous significance for the development of agriculture and the environmental improvement. The paper deals with the characterization of organic matter in reclaimed Technosols (WRS, 2007) built in the different coal and ore mine regions of Bulgaria (Chukurovo, Pernik, Maritsa-Iztok and Lokorsko). These soils were formed 50 years ago and provide abundant information about the modern pedogenesis in different geobioclimatic environment.

Material and methods

The studied soils are reclaimed through the humus and non-humus reclamation methods. Technosols reclaimed with humus horizons of destroyed natural soils /vertisol, cinnamon forest soils and meadow soils/ are arable lands allocated in the Maritsa-Iztok coal mine region. Non-humus reclaimed Technosols are technically (naturally re-vegetated with grass) and biologically reclaimed with forest. Studied Technosols also differentiated in the duration of the post-reclamation development which provides the different stage of soil maturity. Soils with 3, 5, 10, 20, and 30 years development were described below.

The amount and quality of organic carbon including its main chemical fractions are determined by the modified method of Turin (Kononova, 1963). The optical density of humic acids was determined in 0.1 M $Na_4P_2O_7$ + 0.1 n NaOH by Pye Unicam SP6-300 spectroscope.

* e-mail: banovm@abv.bg

The organic horizons depth and the level of humification are also used to describe the characteristics and accumulation of soil organic matter. The morphological survey was carried out in accordance with the criteria for diagnosis and classification of Bulgarian soils (Koynov et al., 1964; Penkov et al., 1992) and Guidelines for Soil Description (FAO, 2006).

Results and discussion

Reclaimed soils in the Pernik region have high carbonate content and alkaline reaction of the medium. These conditions favor the formation and accumulation of calcium humate, which represents the main compounds of humic acids in these soils (Table 1). The latter dominate the whole section depth, but their content is very low and determines the low humification of the organic matter. According to the classification of Grishina and Orlov (Orlov, 1985) the degree of humification is low (10-20%) in the newly formed humus-mineral horizons and very low in the mineral surface and sub-horizons.

Here, as well as in all other coal mining regions, the contents of non-extractable humus carbon dioxide is pre-dominating, which is mainly due to the coal impurities and to the weak transformation of natural organic matter. The uneven distribution of coal impurities determines the absence of pedogenetic differentiation of the section and prevents the diagnosis of the humus-formation processes in the Technosols with 10 year period of development. The influence of the vegetation on the content and mobility of organic acids is indistinguishable during this period.

In the areas with naturally vegetated Technosols in the region of Maritsa-Iztok a rough-humus turf horizon forms as early as during fifth year and reaches 5 cm in 20 years. The power of the humus-mineral horizon formed under the forest vegetation is similar. The newly formed organic horizons accumulate a significant amount of carbon (Table 2), also mainly in inaccessible (low soluble) form. In forest environment, the mineralization of organic matter appears to be more intense and more importantly, increases the content of

fulvic acids, which are a key product in the initial phase of transformation. Moderate humification of organic matter (20-30%) is reported, which indicates its higher biological and agrochemical value.

The humic acids dominate in all types of land use, mainly as free or associated with sesquioxides. They are short-chained and slightly aromatic but with relatively weak mobility. The overwhelming participation of humic acids, which is also discussed in previous publications (Banov, 1989; Marinkina, 1999) is a specific phenomenon that can hardly be regarded as a connate feature of the geological maternal formations. According to Tsolova and Petrova (2003), the coal impurities are the likely source of humic acids in the reclaimed soils.

Table 1. Quantity and composition of organic matter in the Technosols in the Pernik region

Horizons	Depth (cm)	Total C	Humus acids (%)					C_{HA}/C_{FA}	Non extractable	E_4/E_6
			Humic acids	HA, free/ R_2O_3	Ca humates	Fulvic acids	Aggressive FA			
Section № 1 – Mine "Biala Voda", natural vegetation, 10 years										
$C_{1к}$	0 – 20	1.41	0.11 / 7.80	0.0	100.0	0.07 / 4.96	0.02 / 1.42	1.6	1.23 / 87.23	-
$C_{2к}$	20 – 40	1.04	0,07 / 6.73	0.0	100.0	0.05 / 4.81	0,01 / 0.96	1.4	0.92 / 88.46	-
Section № 3 – Mine "Biala Voda", natural vegetation, 10 years										
$Ac_к$	0 – 3	7.45	0.77 / 10.34	0.15 / 19.48	0.62 / 80.52	0.06 / 0.81	0.04 / 0.54	12.8	6.62 / 88.86	-
$C_{1к}$	3 – 20	6.24	0.51 / 8.17	0,00	100.0	0.0	0,0	-	5.73 / 91.83	-
Section № 7 – Moshino neighborhood, natural vegetation, 10 years										
$C_{1к}$	0 – 15	2.19	0.25 / 11.42	0.0	100.0	0.0	0.04 / 1.82	-	1.94 / 88.58	-
$C_{2к}$	15 – 40	4.97	0.20 / 4.02	0.0	100.0	0.07 / 1.41	0.0	2.9	4.70 / 94.57	-
Section № 2 – Mine "Biala Voda", pine, 10 years										
$Ac_к$	0 – 5	3.35	0.34 / 10.15	0.05 / 14.71	0.29 / 85.29	0.18 / 5.37	0,03 / 0,90	1.9	2.83 / 84.48	-
$C_{1к}$	5 – 20	1.99	0.16 / 8.04	0,00	100,00	0,06 / 3,02	0,01 / 0,50	2.7	1.77 / 88.94	-
Section № 6 – Moshino neighborhood, pine, 10 years										
$C_{1к}$	0 – 5	2.39	2.05	0.0	100.0	0.13 / 5.44	0.02 / 0.84	1.2	2.10 / 87.88	-
$C_{2к}$	5 – 20	2.05	0.14 / 6.83	0.0	100.0	0,00	0.0	-	1.91 / 93.17	-

In the areas with naturally vegetated Technosols in the region of Maritsa-Iztok a rough-humus turf horizon forms as early as during fifth year and reaches 5 cm in 20 years. The power of the humus-mineral horizon formed under the forest vegetation is similar. The newly formed organic horizons accumulate a significant amount of carbon (Table 2), also mainly in inaccessible (low soluble) form. In forest environment, the mineralization of organic matter appears to be more intense and more importantly, increases the content of fulvic acids, which are a key product in the initial phase of transformation. Moderate humification of organic matter (20-30%) is reported, which indicates its higher biological and agrochemical value.

The humic acids dominate in all types of land use, mainly as free or associated with sesquioxides. They are short-chained and slightly aromatic but with relatively weak mobility. The overwhelming participation of humic acids, which is also discussed in previous publications (Banov, 1989; Marinkina, 1999) is a specific phenomenon that can hardly be regarded as a connate feature of the geological maternal formations. According to Tsolova and Petrova (2003), the coal impurities are the likely source of humic acids in the reclaimed soils.

Table 2. Quantity and composition of organic matter in the Technosols in the "Maritza-Iztok" coal mines region

Horizons	Depth (cm)	Total C	Humus acids (%)					C_{HA}/C_{FA}	Non extractable	E_4/E_6
			Humic acids	HA, free/ R_2O_3	Ca humates	Fulvic acids	Aggressive FA			
Section № 50 – natural vegetation, 5 years										
A_{turf}	0 – 3	2.31	0.50 21.65	0.45 90.00	0.05 10.00	0.10 4.33	0,03 1.30	5.0	1.70 73.59	7.3
C_1	3 – 20	0.13	0.00	0.00	0.00	0.03 23.08	0.00	-	0.10 76.92	-
Section № 13 – natural vegetation, 10 years										
A_{turf}	0 – 5	1.30	0.13 10.00	0.00	100.00	0.07 5.38	0.03 2.31	1.9	1.10 84.62	7.1
C_1	5 – 20	0.18	0.00	0.00	0.00	0.04 22.22	0.01 5.56	-	0.14 77.78	-
Section № 47 – natural vegetation, 20 years										
A_{turf}	0 – 5	10.28	1.34 13.05	1.00 74.63	0.34 25.37	0.19 1.85	0.07 0.68	7.1	8.75 85.12	6.9
C_1	5 – 20	0.27	0.00	0.00	0.00	0.06 22.22	0.00	-	0.21 77.78	-
Section № 51 – forest, 10 years										
AC	0 – 5	1.56	0.40 25.64	0.10 25.00	0.30 75.00	0.18 11.54	0.04 2.56	2.2	0.98 62.82	6.7
C_1	5 – 20	0.16	0.00	0.00	0.00	0.04 25.00	0.00	-	0.12 75.00	-
Section № 39 – forest, 20 years										
AC	0 – 5	3.70	1.08 29.19	0.62 57.41	0.46 42.59	0.28 7.57	0.05 1.35	3.9	2.34 63.24	7.0
C_1	5 – 20	0.94	0.09 9.57	0.00	100.00	0.09 9.57	0.00	1.0	0.76 80.85	7.0

Table 3. Quantity and composition of organic matter in the Technosols in the "Chukurovo" mine region

Horizons	Depth (cm)	Total C	Humus acids (%)					C_{HA}/C_{FA}	Non extractable	E_4/E_6
			Humic acids	HA, free/ R_2O_3	Ca humates	Fulvic acids	Aggressive FA			
"Mlada Gvardia" dump, profile under 3 years old coniferous plantation										
C_1	0 – 10	7.42	0.82 20.35	0.82 20.35	0.0	0.69 9.30	-	1.2	5.91 79.65	5.60
C_2	10 – 30	9.08	0.68 7.49	0.68 7.49	0.0	0.69 9.30	-	4.3	8.24 90.75	5.86
"Mlada Gvardia" dump, profile under 3 years old coniferous and grasses plantations										
C_1	0 – 6	4.98	0.68 13.82	0.68 13.82	0.0	0.34 6.85	-	2.0	3.92 79.03	5.38
C_2	6 – 30	5.29	0.50 9.45	0.50 9.45	0.0	0.18 3.40	-	2.8	4.61 87.15	5.63
"Zapad" dump, 30 years old mixed forest of birch and pine										
AC	0 – 5	1.77	0.29 16.38	0.0	100	0.10 5.65	-	2.9	4.61 87.1	4.51
C_1	5 –21	1.01	0.23 22.77	0.0	100	0.05 4.95	-	4.6	0.73 72.28	4.77

The typical for soils of the forest areas increase in the contents of fulvic acids in the humus horizon is observed in soils of the region of mine “Chukurovo” (Table 3). The content of humic acids dominates over the content of fulvic acids in these soils, but the extent of humification of organic matter is mostly weak. The data on optical density of the humic acids shows their higher aromatic characteristic and a higher condensation, typical for the more mature humus systems. This feature is more typical for dump "Zapad" where the humic acids are integrally linked to calcium. The acidic reaction of the medium of heap "Ml. Gvardia (pH 4.1 - 4.7) prevents the formation of calcium humates and increases the instability and mobility of organic matter.

The Technosols of Lokorsko also contain insignificant amount of organic matter (Table 4), preserved over the ages as inaccessible, being part of the minerals carbon. The registered accumulation of organic matter occurs in alkaline environment in the presence of carbonates and carries the already described features of the other objects.

In the humus reclaimed Technosols in the region of coal mines “Maritsa Iztok” the content of organic matter significantly varies (Table 5) probably as a result of bad agricultural practices. As the period of land use increases, some accumulation of organic carbon in the surface 5 cm of the A horizon is observed. These are mainly fulvic acids that change the nature of the organic matter from predominantly humatic to humatic-fulvic and fulvic. Although the synthesis of fulvic acids does not occur with an increase in the content of their aggressive faction, a significant deterioration in the quality of humus is reported. Humic acids predominate only in the 5-year section and illustrate well the trends and intensity of the ongoing changes. Calcium humates dmoinate all humus soils. To some extent they mitigate the destabilizing influence of the fluvic acids, which are a highly aggressive faction during the early years of agricultural usage of humus Technosols

Table 4. Quantity and composition of organic matter in the Technosols in the Lokorsko village region

Horizons	Depth (cm)	Total C	Humus acids (%)					C_{HA}/C_{FA}	Non extractable	E_4/E_6
			Humic acids	HA, free/ R_2O_3	Ca humates	Fulvic acids	Aggressive FA			
Section № 5 – natural vegetation, 10 years										
C_1	0 – 10	0.99	0.13 / 13.13	0.0	100.0	0.07 / 7.07	0.0	1.9	0.79 / 79.80	-
C_2	10 – 30	0.42	0.68 / 0.0	0.0	0.0	0.04 / 9.52	0.01 / 2.38	-	0.38 / 90.48	-

Table 5. Quantity and composition of organic matter in the reclaimed Technosols in the “Maritza-iztok” mines region

Horizons	Depth (cm)	Total C	Humus acids (%)					C_{HA}/C_{FA}	Non extractable	E_4/E_6
			Humic acids	HA, free/ R_2O_3	Ca humates	Fulvic acids	Aggressive FA			
Section № 6 – agricultural field, 5 years										
A_{turf}	0 – 5	1.73	0.38 / 21.97	0.0	100.0	0.03 / 1.73	0.03 / 1.73	12.7	1.32 / 76.30	-
	5 – 20	1.73	0.42 / 24.28	0.0	100.0	0.06 / 3.46	0.06 / 3.46	7.0	1.25 / 72.26	-
Section № 28 – agricultural field, 10 years										
A_{turf}	0 – 5	0.94	0.07 / 7.45	0.00	100.00	0.18 / 19.15	0.02 / 2.12	0.4	0.69 / 73.40	-
	5 – 20	0.82	0.10 / 12.19	0.00	100.00	0.13 / 15.85	0.03 / 3.65	0.8	0.59 / 71.95	-
Section № 36 – agricultural field, 20 years										
A_{turf}	0 – 5	2.05	0.35 / 17.07	0.04 / 11.43	0.31 / 88.57	0.31 / 15.12	0.01 / 0.41	1.1	1.39 / 67.81	-
	5 – 20	1.94	0.37 / 19.07	0.07 / 18.92	0.30 / 81.08	0.46 / 23.71	0.02 / 1.03	0.8	1.11 / 57.22	-

Conclusion

In the Technosols in Bulgaria, reclaimed without humus, run humus formation processes, which determine the formation of organic horizons and vertical differentiation of the soil properties. The organic horizons contain mainly non extractable and inaccessible carbon due to the coal impurities and/or the continuous evolution of the geological materials, forming the Technosol. The content of extractable carbon averages at 0.22% and exceeds 1% only in the none-humus reclaimed Technosols in the region of coal mines "Maritza-Iztok" with 20 year period of development. As a result of the genetic characteristics of the studied soils, their sections are dominated by humic acids with low condensation and maturity.

The process of cultivation of the Technosols occurs with an increase in the contents of fulvic acids, which decreases the stability and quality of the organic matter, especially in the humus reclaimed Technosols.

References

Banov M, 1989. Study of some soil-genetic changes in lands reclaimed without humus cover from the region of Maritsa-Iztok mines. Thesis for PhD, N. Poushkarov Institute of Soil Science, Sofia, p. 188 (Bg).

Food and Agricultural Organization of the United Nations, 1997. Guidelines for soil description, Rome.

Kononova MM, 1963. Soils organic matter. Its nature, properties and methods of studying. Russian Academy of Sciences, Moscow, p. 314 (Ru).

Koynov V, Trashliev H, Ninov N, Yolevski M and Boyadjiev T, 1964. Classification and systematics of Bulgarian soils. In: Proceedings of "Soils of the South-Eastern Europe", Sofia, Bulgarian Academy of Sciences (Bg).

Marinkina V, 1999. Study and possibilities for reclamation of sulphid-containing materials disclosed in open-cast mining. Thesis for PhD, N. Poushkarov Institute of Soil Science, Sofia, p. 231 (Bg).

IUSS Working Group WRB, 2007. World Reference Base for Soil Resources 2006, first update 2007. World Soil Resources Reports, 103, FAO, Rome.

Orlov DS, 1985. Chemistry soil-science. University of Moscow. p.376

Penkov M, Donov V, Boyadjiev T, Andonov T, Ninov N, Yolevski M, Antonov G and Gencheva S, 1992. Classification and diagnosis of Bulgarian Soils in relation to land regulation. Zemizdat, Sofia, p.151 (Bg).

Petrova L, Tsolova V and Banov M, 2003. Determination of organic matter in reclaimed lands containing coal admixture. Ecology and Future, II, 3-4, 67-70 (Bg).

Tsolova V and Petrova L, 2003. Humus in soils, reclaimed after open extraction of lignite coal from objects containing sulfide minerals. Edited by Prof. Rosnev B. and co., Collection of scientific research from international conference "75 years Institute of forestry in BAofS, Prof. M. Drinov, II, pp 319-324 (Bg).

CONTENTS 1 / 2

Genetics and Breeding

Effect of the age at first calving on test day production traits in black-and-white cows 67
Zh. Gergovska

Egg production potential of Manchurian Golden quail breeders 73
A. Genchev

Variability and stability of yield and quality of grain of several bread wheat cultivars 81
N. Tsenov, I. Stoeva, T. Gubatov, V. Peeva

Productive and quality characteristics of brown cotton 88
A. Stoilova, I. Saldzhiev , Zh. Terziev

Superovulation and embryo transfer in goats by using PMSG or FSH 94
A. Pampukidou, T. Alifakiotis, M. Avdi, R. Ivanova

Nutrition and Physiology

Effect of dietary amino acid concentration on nitrogen balance in PIC hybrid pigs 98
A. Ilchev, G. Ganchev

Comparative studies on some parameters of innate resistance and metabolic profile of sheep and their offspring depending on the ration 103
B. Bivolarski, E. Vachkova, S. Laleva, P. Slavova, I. Ivanov

Behaviour of cows in milking parlour 107
I. Varlyakov, V. Radev, T. Slavov, N. Grigorova

Production Systems

Feeding value of spring vetch *(Vicia sativa* L.) influenced by preparations with different biological effect 112
Y. Naydenova, N. Georgieva, I. Nikolova

Impact of mixtures between retardants and combined herbicides on the sowing properties of the durum wheat 117
G. Delchev

Profile of lavender oil from second harvest 121
G. Zhekova, N. Nedkov

Essential oil content and composition of Thyme "German winter" 123
G. Zhekova, A. Dzhurmanski, M. Nikolova

Effect of some agronomy factors on the cooking properties of lentil seeds *(Lens culinaris* Medic L.) 126
G. Milev

Comparative study of different varieties of red clover in Bulgarian conditions 130
Ts. Mihovski, B. Chourcova, D. Mitev

Study on the level of generated vacuum in the teat cup milking chamber as a factor for assessing liner suitability 134
V. Vlashev, G. Dineva

CONTENTS 2 / 2

Agriculture and Environment

Content of heavy metals and metalloids in bees and bee products from areas with different degree of anthropogenic impact 136
I. Zhelyazkova, S. Atanasova, V. Barakova, G. Mihaylova

Species composition of weeds in wheat and barley 143
M. Georgiev, D. Pavlov, G. Beev, M. Gerdzikova, R. Bazitov

Variability of some biologically active compounds of *Tribulus terrestris* L. 150
M. Nikolova, A. Ivanova, I. Lazarova, D. Peev, N. Valyovska

Organic matter status in reclaimed Technosols of Bulgaria 155
V. Tsolova, M. Banov

Product Quality and Safety

Use of nearinfrared spectroscopy technology with a remote reflectance fibre-optic probe for predicting of trace elements contents in tobacco 160
L. Dospatliev, S. Atanassova

Occurrence and distribution of *Fusarium* species in wheat grain 165
G. Beev, S. Denev, D. Pavlov

Influence the extraction acidity level on the amount and chemical composition of essential oil from *Rosa damascena* Mill. 169
A. Dobreva

Distribution of moisture in the soil profile in terms of two soil types 172
A. Stoyanova, M. Todorova

Slaughtering analysis and chemical composition of rabbit meat 176
A.Kuzelov, E. Atanasova, T. Angelkova

Grain sample quality assessment using Intechn and Unscrambler platforms 179
M. Mladenov, Ts. Draganova, R. Tsenkova

Instruction for authors

Preparation of papers

Papers shall be submitted at the editorial office typed on standard typing pages (A4, 30 lines per page, 62 characters per line). The editors recommend up to 15 pages for full research paper (including abstract references, tables, figures and other appendices)

The manuscript should be structured as follows: Title, Names of authors and affiliation address, Abstract, List of keywords, Introduction, Material and methods, Results, Discussion, Conclusion, Acknowledgements (if any), References, Tables, Figures.

The title needs to be as concise and informative about the nature of research. It should be written with small letter /bold, 14/ without any abbreviations.

Names and affiliation of authors

The names of the authors should be presented from the initials of first names followed by the family names. The complete address and name of the institution should be stated next. The affiliation of authors are designated by different signs. For the author who is going to be corresponding by the editorial board and readers, an E-mail address and telephone number should be presented as footnote on the first page. Corresponding author is indicated with *.

Abstract should be not more than 350 words. It should be clearly stated what new findings have been made in the course of research. Abbreviations and references to authors are inadmissible in the summary. It should be understandable without having read the paper and should be in one paragraph.

Keywords: Up to maximum of 5 keywords should be selected not repeating the title but giving the essence of study.

The introduction must answer the following questions: What is known and what is new on the studied issue? What necessitated the research problem, described in the paper? What is your hypothesis and goal ?

Material and methods: The objects of research, organization of experiments, chemical analyses, statistical and other methods and conditions applied for the experiments should be described in detail. A criterion of sufficient information is to be possible for others to repeat the experiment in order to verify results.

Results are presented in understandable tables and figures, accompanied by the statistical parameters needed for the evaluation. Data from tables and figures should not be repeated in the text. **Tables** should be as simple and as few as possible. Each table should have its own explanatory title and to be typed on a separate page. They should be outside the main body of the text and an indication should be given where it should be inserted.

Figures should be sharp with good contrast and rendition. Graphic materials should be preferred. Photographs to be appropriate for printing. Illustrations are supplied in colour as an exception after special agreement with the editorial board and possible payment of extra costs. The figures are to be each in a single file and their location should be given within the text.

Discussion: The objective of this section is to indicate the scientific significance of the study. By comparing the results and conclusions of other scientists the contribution of the study for expanding or modifying existing knowledge is pointed out clearly and convincingly to the reader.

Conclusion: The most important consequences for the science and practice resulting from the conducted research should be summarized in a few sentences. The conclusions shouldn't be numbered and no new paragraphs be used. Contributions are the core of conclusions.

References:

In the text, references should be cited as follows: single author: Sandberg (2002); two authors: Andersson and Georges (2004); more than two authors: Andersson et al.(2003). When several references are cited simultaneously, they should be ranked by chronological order e.g.: (Sandberg, 2002; Andersson et al., 2003; Andersson and Georges, 2004). References are arranged alphabetically by the name of the first author. If an author is cited more than once, first his individual publications are given ranked by year, then come publications with one co-author, two co-authors, etc. The names of authors, article and journal titles in the Cyrillic or alphabet different from Latin, should be transliterated into Latin and article titles should be translated into English. The original language of articles and books translated into English is indicated in parenthesis after the bibliographic reference (Bulgarian = Bg, Russian = Ru, Serbian = Sr, if in the Cyrillic, Mongolian = Mo, Greek = Gr, Georgian = Geor., Japanese = Ja, Chinese = Ch, Arabic = Ar, etc.)

The following order in the reference list is recommended:

Journal articles: Author(s) surname and initials, year. Title. Full title of the journal, volume, pages. Example:

Simm G, Lewis RM, Grundy B and Dingwall WS, 2002. Responses to selection for lean growth in sheep. Animal Science, 74, 39-50

Books: Author(s) surname and initials, year. Title. Edition, name of publisher, place of publication. Example:

Oldenbroek JK, 1999. Genebanks and the conservation of farm animal genetic resources, Second edition. DLO Institute for Animal Science and Health, Netherlands.

Book chapter or conference proceedings: Author(s) surname and initials, year. Title. In: Title of the book or of the proceedings followed by the editor(s), volume, pages. Name of publisher, place of publication. Example:

Mauff G, Pulverer G, Operkuch W, Hummel K and Hidden C, 1995. C3-variants and diverse phenotypes of unconverted and converted C3. In: Provides of the Biological Fluids (ed. H. Peters), vol. 22, 143-165, Pergamon Press. Oxford, UK.

Todorov N and Mitev J, 1995. Effect of level of feeding during dry period, and body condition score on reproductive performance in dairy cows, IX th International Conference on Production Diseases in Farm Animals, Sept.11 – 14, Berlin, Germany, p. 302 (Abstr.).

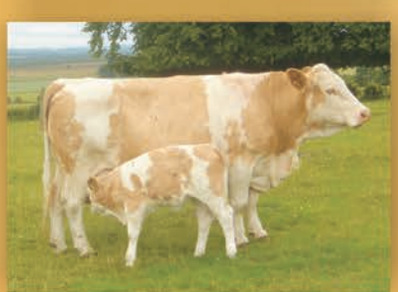
Thesis:

Penkov D, 2008. Estimation of metabolic energy and true digestibility of amino acids of some feeds in experiments with muscus duck (Carina moshata, L). Thesis for DSc. Agrarian University, Plovdiv, 314 pp.

The Editorial Board of the Journal is not responsible for incorrect quotes of reference sources and the relevant violations of copyrights.

AGRICULTURAL SCIENCE AND TECHNOLOGY

Volume 3, Number 2
June 2011



Journal web site:
www.uni-sz.bg/ascitech/index.html

Publisher:
www.alfamarket.biz