

FEDERAL AGENCY OF EDUCATION
BULLETIN OF TOMSK STATE UNIVERSITY. BIOLOGY
SCIENTIFIC JOURNAL
Certification of registration: PI № FS 77-29499 of September 27, 2007

ANNOTATIONS

BOTANY

Lashchinskiy Nikolai N., Vetluzhskich Natalia V. Central Siberian Botanical Garden of the SB RAS, Novosibirsk, Russia. **Brachypodio-Betuletea forests on their northern limit.** Syntaxonomical position of small-leaved forests with well-developed herbs layer on left bank of Ob river in southern part of Tomsk region is analyzed. Few completely new syntaxons are described. Investigated forest types are considered as primary types.

Key words: syntaxonomy; subtaiga; small-leaved forest.

Olonova Marina V. Biological Institute of Tomsk State University, Tomsk, Russia. **Towards the study of subsection *Malacanthae* (Roshev.) Probat., genus *Poa* L. (Poaceae).** In Eurasia subsection *Malacanthae* (Roshev.) Probat. (*Poa* L.) is represented by 25 species. Three contemporary centers of diversity can be recognized there: European, Central-Asian and Pacifica. The last one is most rich in species and represented by 12 ones. Some species of that center – *P. arctica*, *P. lanata*, *P. macrocalyx* Trautv. et Mey. – are supposed to have passed to N. America via Beringia. For resolving the problems of phylogeny and phylogeography of subsection *Malacanthae* the search on molecular level should be undertaken.

Key words: grasses; *Poa* L.; Siberia; biodiversity; biogeography.

Rybina Tatiana A., Amelchenko Valentina P., Manassypov Rinat M. Siberian botanical garden of Tomsk State University, Tomsk, Russia. **Modern condition of flora and populations of rare kinds of plants in especially protected natural territory «The forest park in area of the Akademgorodok» in Tomsk.** The modern condition of flora of a forest park in Akademgorodok is considered. Botanical analyses, the list of rare plants and perspective for inclusion in the Red book are given. The map of modern vegetation with accommodation of rare plants, the characteristic of its habitats and conditions of populations, a degree of anthropogenous transformation of flora, and the recommendation on protection of a vegetative cover are given. Work has a historical value as since 2008 in territory of a forest park began active development of an infrastructure, that, undoubtedly, will lead to strong change of a floristic situation.

Key words: especially protected natural territory; map of vegetation; anthropogenous transformation; the Red book.

BIOTECHNOLOGY

Dorofeev Vyacheslav Yu., Karnachuk Raisa A., Pulkina Svetlana V., Komleva Ekaterina V., Dubina Valentina B., Medvedeva Julia V. Department of Plant Physiology and Biotechnology, Department of Cytology and Genetics, Biological Institute of

Tomsk State University, Tomsk, Russia. Atragene speciosa Weinm. **culture in vitro: the cytogenetic analysis and formation of triterpenoid glycosides and flavonoids.** *Atragene speciosa* Weinm. can be used as nootropic, adaptogenic, etc. remedy for treatment of some diseases. Biological features of this species do not allow its cultivation. *Atragene speciosa* cell culture in vitro has been received. Formation of physiologically active substances, including flavonoides and triterpenoid saponins was discovered in the cells callus culture *in vitro*. Genetic instability of callus culture and several cytotypes on chromosomes number and aberration structure are found.

Key words: *Atragene speciosa* Weinm.; cell culture; *in vitro*; triterpenoid glycosides (saponins); flavonoids; polyploides; aneuploides; chromosomes structure.

MICROBIOLOGY

Tereshchenko Natalie N., Bubina Alla B. *Department of Agricultural Biotechnology, Biological Institute of Tomsk State University; Laboratory of Microbiology, Siberian Research Institute of Agriculture and Peat of SB RAS, Tomsk, Russia.* **Microbiological criteria of soil ecological stability and efficiency of soil-protecting technologies.** The comparative researches of microbiological properties of sod-podzolic light loamy soil, within 8 years taking place under influence of cultivation systems ensuring opposite strategy of soils ecological transformation (from the degradation to the humus accumulation) have allowed to reveal a number of significant microbiological criteria of ecological soil stability and efficiency of soil-protecting technologies: Simpson's index of a variety of microbial community, designed both for rhizosphere, and for nearby rhizosphere area; a mycotrophic degree of plant roots; frequency of mycorrhiza occurrence; parity of average levels of *Pseudomonas* growth stimulating activity in rhizosphere and in nearby rhizosphere area.

Keywords: microbiological criteria; soil ecological stability; soil fertility; field vermicultivation; soil cultivation systems; a biodiversity.

SOIL SCIENCE AND FORESTRY

Bender Olga G., Zotikova Albina P., Velisevich Svetlana N. *Institute for monitoring of climatic and ecological systems SB RAS, Tomsk, Russia.* **Water relation features and pigment complex state of *Pinus sibirica* Du Tour needles in the North-Eastern Altai mountains.** Morphology and anatomy, water relation specific features and pigment complex states of *Pinus sibirica* Du Tour needles at North-Eastern Altai mountains were studied. The needle length decreases across altitudinal transect, but the areas of resin canals, central cylinder and mesophyll on cross section increases. The number of stomata per leaf volume unchanges with increasing elevation. Ratio of bound water to free water changes across altitudinal transect, water contents decreases and water deficit increases. Maximum transpiration is observed at the lowest and the highest sites of transect and is influenced by both soil and climatic conditions. Chlorophyll *a* and *b* contents decrease with up gradient, but chlorophyll *a* is affected to a greater extent than chlorophyll *b*. The both carotinoid contents and ratio of chlorophyll (*a+b*) to carotinoids increase at the highest sites.

Key words: *Pinus sibirica*; altitude; water relations; photosynthetic pigments; needle structure.

Velisevich Svetlana N., Khutornoy Oleg V., Chitorkina Ol'ga Y. Institute for monitoring of climatic and ecological systems SB RAS, Tomsk, Russia. **Growth and reproduction of *Pinus sibirica* Du Tour subpopulation on altitudinal transect in the North-Eastern Altai.** The vegetative and generative morphogenesis of *Pinus sibirica* Du Tour subpopulation on altitudinal transect was investigated. It was determined that the value of growth traits and quantitative traits of generative development that characterize the micro- and macrostrobiles production decreased gradually along altitudinal transect. The maximal value of qualitative traits that indicates seeds viability and potential possibilities to forest reproduction had subpopulation on mountain taiga and subalpine zone.

Key words: *Pinus sibirica*; growth; reproduction.

Zakharikhina Lalita V. Geotechnological Scientific Research Center of the FEB RAS, Petropavlovsk-Kamchatsky, Russia. **Distinctive features of soil formation in the conditions of active volcanisms (by the example of Kamchatka).** It was shown that various conditions of soil formation were typical for young basaltic volcanism and its mature calderaforming stage. The above stages differ in scales, eruptions frequency and composition of their material which are the cause of differences in soils construction, intensity of illuvial processes in the soils, humus content, pH reaction of organogenic horizons, degree of soils saturation with bases.

Key words: volcanism stages; eruptions frequency; soil formation.

Kulizhskiy Sergey P., Blohin Aleksandr N. Department of soil science and ecology of soils, Biological institute of Tomsk State University, Tomsk, Russia. **Physico-mechanical properties of soils on the example of the humus-accumulative soil horizons south of Siberia.** The text of the article highlights the state of steppe soils of the republic of Khakassia in the position of their resistance to mechanical stress. The possibility of a number of contemporary methodological approaches to the study of physical and physico-mechanical properties of the soil, such as laser-difraktometricheskoe grain size composition and physical state and conduct of compression tests to determine resistance to external mechanical influences.

Key words: physical and mechanical properties of soils; soil stability; and southern Siberia; laser-difraktometrichesky method; dynamic load.

Kulizhskiy Sergey P., Rodikova Anna V. Department of soil science and ecology of soils, Biological institute of Tomsk State University; Department of Geography, Tomsk State Pedagogical University, Tomsk, Russia. **Geochemical differentiation of soils of the hollow of lake Shira.** Results of researches of element structure of a soil cover and soils of Shirinsky island steppe on an example of modelling object – lake Shira depressions are discussed. Geochemical specificity of soils and factors, its defining is considered. The basic properties of the components composing soil combinations are studied. The variation of size of local geochemical norm in space that testifies to non-uniform distribution of elements within natural object – a lake hollow is revealed.

Key words: Shirinsky island steppe; lake Shira; geochemical specificity of soils; lake hollow.