

V. N. Sukachev Institute of Forest FRC KSC SB RAS

ISSN 2311-1410

# Siberian Journal of Forest Science

Number 5  
September–October 2017



SB RAS Publishing House  
Novosibirsk

FEDERAL RESEARCH CENTER KRASNOYARSK SCIENTIFIC CENTER  
RUSSIAN ACADEMY OF SCIENCES, SIBERIAN BRANCH  
V. N. SUKACHEV INSTITUTE OF FOREST  
RUSSIAN ACADEMY OF SCIENCES, SIBERIAN BRANCH

**Siberian Journal of Forest Science**

Number 5 September – October 2017

Peer-reviewed Scientific Journal. Established January 2014

**Founder:** Federal Research Center Krasnoyarsk Scientific Center, Russian Academy of Sciences, Siberian Branch  
Published bimonthly, 6 times per year  
ISSN 2311-1410 (Print), ISSN 2312-2099 (Online)

**Editor-in-Chief**

Alexander A. Onuchin  
onuchin@ksc.krasn.ru

**Associate Editors-in-Chief**

Igor M. Danilin, Tamara S. Sedelnikova  
danilin@ksc.krasn.ru, tss@ksc.krasn.ru

**Managing Editor**

Larisa N. Skripalschikova  
lara@ksc.krasn.ru

**Associate Editors**

Nobuyuki Abe (Japan), Per Angelstam (Sweden), Galina F. Antonova (RF), Natalia E. Antonova (RF), Stanislav P. Arefyev (RF), Sezgin Ayan (Turkey), Vladimir F. Baginski (Belarus), Eugene V. Banaev (RF), Yuri N. Baranchikov (RF), Sergei A. Bartalev (RF), Sergei M. Bebiya (Abkhazia), Vera E. Benkova (RF), Kapitolina S. Bobkova (RF), Jiquan Chen (USA), Nikolai V. Chesnokov (RF), Tumen N. Chimitdorziev (RF), Chimidnyam Dorjsuren (Mongolia), Chultem Dugarjav (Mongolia), Steve Eubanks (USA), Sergey N. Goroshkevich (RF), Zoran V. Govedar (Bosnia and Herzegovina), Irina D. Grodnitskaya (RF), Andrei N. Gromtsev (RF), Georg Guggenberger (Germany), Alexander P. Isaev (RF), Alexander S. Isaev (RF), Galina A. Ivanova (RF), Vyacheslav I. Kharuk (RF), Grigoriy B. Kofman (RF), Kari T. Korhonen (Finland), Igor Yu. Koropachinskii (RF), Ivan S. Kosenko (Ukraine), Alexander P. Kovalev (RF), Yuri N. Krasnoshchekov (RF), Konstantin V. Krutovsky (RF, Germany), Alexander M. Kryshen (RF), Konstantin N. Kulik (RF), Andrei N. Kupriyanov (RF), Ekaterina I. Kuzmenko (RF), Boris N. Kuznetsov (RF), Qinglin Li (Canada), Sune Linder (Sweden), Sergei R. Loskutov (RF), Yuri I. Manko (RF), Tatyana A. Moskalyuk (RF), Akira Osawa (Japan), Sergei V. Osipov (RF), Larisa N. Pak (RF), Eugene G. Paramonov (RF), Igor N. Pavlov (RF), Heli Peltola (Finland), Boris S. Petropavlovsky (RF), Alexander V. Pimenov (RF), Dmitri V. Politov (RF), Petr P. Popov (RF), Mikhail A. Proskuryakov (Kazakhstan), Valery P. Putenikhin (RF), Dmitriy G. Schepaschenko (RF, Austria), Matthias Scheuber (Germany), Christiane Schmallius (Germany), Alexander S. Shshikin (RF), Svetlana D. Shlotgauer (RF), Anatoly Z. Shvidenko (RF, Austria), Vladimir A. Sokolov (RF), Valery E. Tarabanko (RF), Vyacheslav V. Tarakanov (RF), Alexander N. Tashev (Bulgaria), Elena E. Timoshok (RF), Biymyrza A. Toktoraliev (Kyrgyzstan), Petr A. Tsvetkov (RF), Vladimir V. Usenya (Belarus), Vladimir A. Usoltscev (RF), Eugene A. Vaganov (RF), Gennadiy S. Varaksin (RF), Estella F. Vedrova (RF), Eugene L. Vorobeichik (RF), Viktor I. Voronin (RF), Chuankuan Wang (China), Vasily T. Yarmishko (RF)

**Scientific Editor for this Issue of the Journal**

Petr A. Tsvetkov

**Leading Editor**

Tatyana M. Pavlina

**Scientific Editor**

Tatyana N. Mindeeva

**Technical Editor**

Tatyana R. Pantyukhina

*Address for journal office:*

Russian Federation, 660036, Krasnoyarsk, Akademgorodok, 50/28  
Federal Research Center Krasnoyarsk Scientific Center, Russian Academy of Sciences, Siberian Branch  
V. N. Sukachev Institute of Forest, Russian Academy of Sciences, Siberian Branch  
Editorial office for the Siberian Journal of Forest Science  
Phones: +7 (391) 249-4639; +7 (391) 290-5516; E-mail: lara@ksc.krasn.ru; Web: sibjforsci.com; сибирскийлеснойжурнал.рф  
Russian Academy of Sciences, Siberian Branch Publishing House  
Novosibirsk



### **The main topics of the journal**

Forest science, forestry, forest planning, forest inventory  
Structure, dynamics and functioning of forest ecosystems  
Forest ecosystem functions and their change under global and regional climate processes and anthropogenic impact  
Forest geography, ecology and typology  
Forest landscape ecology  
Forest genetics, selection, breeding and introduction  
Silviculture, forest plantations  
Physiology and biochemistry of forest plants  
Biotechnology, wood science, chemical processing of wood and non wood forest products  
Dendrochronology  
Forest hydrology  
Forest fire research  
Forest entomology, forest zoological complexes  
Forest phytocenology  
Forest soil science  
Forest health, microbiology, mycology and pathogens  
Forest melioration and restoration  
Forest policy, economics, management and legislation  
Remote sensing and GIS methods applicable for evaluation of biosphere functions of forests.

*Sibirskij Lesnoj Zurnal* (Siberian Journal of Forest Science) is a multidisciplinary peer-reviewed periodical scientific journal covering a wide range of forest science, forestry, forest management, forest inventory, genetics and breeding, forest ecology and economy issues, and representing the science of complex patterns of the structure, function and development of forest ecosystems and the use of forest resources by man.

*Sibirskij Lesnoj Zurnal* (Siberian Journal of Forest Science) issues will be published first in Russian (ISSN 2311–1410 (Print), ISSN 2312–2099 (Online)), and then translated to English as Siberian Journal of Forest Science (ISSN 2311–1410).

*Sibirskij Lesnoj Zurnal* (Siberian Journal of Forest Science) is included to Russian national system of scientific citation eLibrary.ru, the list of scientific periodicals of the Higher Certification Commission, Ministry of Education and Science of the Russian Federation, is indexing in international scientific databases: Ulrichsweb (Global Serials Directory), Directory of Open Access Journals (DOAJ), AGRIS, CABI Forest Science Database, is prepared to be included to the international databases of scientific periodicals: Academic Journals Database, Springer, Scopus, Web of Science. Full-text articles posted online on the journal's website: [sibjforsci.com](http://sibjforsci.com) (in English); [sibirskijlesnojzurnal.pf](http://sibirskijlesnojzurnal.pf) (in Russian).

*Sibirskij Lesnoj Zurnal* (Siberian Journal of Forest Science) publishes scientific papers under the headings: «Research Articles», «Reports», «Short Communications», «News, Views & Events», and «Book Reviews», aimed at understanding the laws and regularities of forest nature. It covers a variety of topics related to problems of biological diversity at all levels of its organization – population, species, ecosystem, including – articles on anthropogenic and technogenic transformation of forest ecosystems. The journal is not limited to the problems of Siberian forests; it accepts and publishes high quality scientific papers from different regions of the world, representing general scientific interest.

*Sibirskij Lesnoj Zurnal* (Siberian Journal of Forest Science) is registered by Federal Service for Supervision of Communications, Information Technologies, and Mass Media (Roskomnadzor) of the Russian Federation.

Certificates of registration of the mass media:

Periodical print edition, journal – PI No. FS 77-68699 on 09 February, 2017

Periodical online edition – EL No. FS 77-70737 on 15 August, 2017

Russian Academy of Sciences, Siberian Branch Publishing House  
Morskoi Prospekt, 2, Novosibirsk, 630090 Russian Federation

**CONTENTS**

<i>P. A. Tsvetkov</i> Foreword from the Scientific Editor .....	3
<b>SUMMARIZING ARTICLES</b>	
<i>P. A. Tsvetkov</i> Forest Pyrology in Russia: Achievements and Problems .....	6
<i>R. V. Kotelnikov, N. A. Korshunov, N. M. Giryaev</i> Objectives of Decision Making in Protecting Forests from Fires: Main Priorities on Development of Informational Support .....	18
<i>E. I. Ponomarev, V. I. Kharuk, N. D. Yakimov</i> Current Results and Perspectives of Wildfire Satellite Monitoring in Siberia .....	25
<i>A. V. Bryukhanov, N. A. Korshunov</i> Aerial Wildfire Fighting: History, Current Situation, Problems and Perspectives .....	37
<b>RESEARCH ARTICLES</b>	
<i>V. V. Furyaev, P. A. Tsvetkov, I. V. Furyaev, L. P. Zlobina</i> Forest Fire Occurrence and Silvicultural-Economic Prerequisites for Protection Improvement in Forest Regions of Krasnoyarsk Krai .....	55
<i>M. D. Evdokimenko, V. V. Ivanov</i> Specifics of Fire-Preventing Arrangements in the Forests of Baikal Region .....	63
<i>S. N. Sannikov, N. S. Sannikova, G. G. Terekhov</i> The Principles for Creation of Fire-Prevention Forest Belts with Barriers of Deciduous Species for Protection from Crown Fires .....	76
<i>A. V. Sofronova, A. V. Volokitina</i> Assessment of Fire Hazard for Forest Sites at the Territory of Oil and Gas Complexes Using Earth Remote Sensing Data .....	84
<i>I. V. Kosov, I. G. Gette, N. V. Pakhar'kova</i> Application of Fluorescence Analysis for Evaluation of Heat Stability of Scotch Pine Needles after Ground Fires .....	95
<i>G. A. Dorrer, S. V. Yarovoy</i> Describing the Processes of Propagation and Eliminating Wildfires with the Use of Agent Models .....	105
<b>INTERNATIONAL COOPERATION</b>	
<i>J. G. Goldammer, A. M. Eritsov, E. K. Kisilyakhov</i> The Need for Development of Pragmatic and Science-Based Solutions for Forest Management and Fire Management for the Russian Federation .....	114
<b>* YUBILEES</b>	
* Dina Ivanovna Nazimova (to 80 Years of Birthday) .....	SSS
* Anatoly Zinovievich Shvidenko (to 80 Years of Birthday) .....	SSS
* Once I Crossed this Line ... Author's Essay by Tatyana Alexandrovna Moskalyuk about Life and Scientific Activity on the Occasion of the 70 <sup>th</sup> Anniversary .....	SSS