https://doi.org/10.26898/0370-8799-2023-4-6
УДК: 581.9.581.527.7
Тип статьи: обзорная
Type of article: review

РАСПРОСТРАНЕНИЕ АДВЕНТИВНЫХ ВИДОВ *GALINSOGA PARVIFLORA* И *G. GUADRIRADIATA* (ASTERACEAE) НА ЮГЕ ДАЛЬНЕГО ВОСТОКА

Федина Л.А., (✉)**Малышева С.К.**
Федеральный научный центр биоразнообразия наземной биоты Восточной Азии Дальневосточного отделения Российской академии наук
Владивосток, Россия
(✉)e-mail: malyshsveta@rambler.ru

Представлены результаты изучения заносных американских видов *Galinsoga parviflora* и *G. guadriradiata* на юге Приморского края (Россия). Полевые исследования проведены в 2018–2022 гг. на территории Приморского края в городских и сельских поселениях, на особо охраняемых природных территориях (Уссурийский заповедник им. В.Л. Комарова). Проанализированы литературные данные, информация с интернет-ресурсов, исследованы гербарные образцы. Исследованиями установлено, что за последние 30 лет инвазионный ареал видов рода *Galinsoga* на юге Дальнего Востока значительно увеличился. В настоящее время в Приморском крае эти адвентивные виды активно расселяются по антропогенно трансформированным территориям (обочины автомобильных дорог, заброшенные поля и луга, городские парки и скверы, придомовые территории, строительные карьеры и т.д.) и отмечены в большинстве административно-территориальных районов региона. В северных и восточных районах края виды *Galinsoga* имеют спорадическое распространение. В районах с развитым сельским хозяйством (западные и центральные районы Приморского края) *G. guadriradiata* и *G. parviflora* произрастают массово. Во Владивостоке отмечено несколько крупных травянистых сообществ с доминированием *G. guadriradiata*, площадью до 100 м² с проективным покрытием 90–100%. Большую настороженность вызывает проникновение видов рода *Galinsoga* на особо охраняемые природные территории. Поэтому необходим дальнейший мониторинг инвазионного ареала данных видов на юге Дальнего Востока России.

Ключевые слова: инвазивные виды, *Galinsoga parviflora*, *G. guadriradiata*, Дальний Восток, Приморский край

DISTRIBUTION OF THE ADVENTIVE SPECIES *GALINSOGA PARVIFLORA* AND *G. GUADRIRADIATA* (ASTERACEAE) IN THE SOUTH OF THE FAR EAST

Fedina L.A., (✉)**Malysheva S.K.**
Federal Scientific Center of the East Asia Terrestrial Biodiversity of the Far Eastern Branch of the Russian Academy of Sciences
Vladivostok, Russia
(✉)e-mail: malyshsveta@rambler.ru

The results of the study of the stranger American species *Galinsoga parviflora* and *G. guadriradiata* in the south of the Primorsky Territory (Russia) are presented. Field studies were conducted in 2018-2022 on the territory of the Primorsky Territory in urban and rural settlements, in specially protected natural areas (V.L. Komarov Ussurisky Nature Reserve). Literary data, information from Internet resources, herbarium specimens have been analyzed. Studies have found that over the past 30 years, the invasive range of species of the genus *Galinsoga* in the south of the Far East has increased significantly. At present, in the Primorsky Territory, these adventive species actively disperse over anthropogenically transformed territories (roadsides, abandoned fields and meadows, city parks and squares, adjacent territories, construction pits, etc.) and are noted in most administrative-territorial districts of the region. *Galinsoga* species have a sporadic distribution in the northern and eastern parts of the region. *G. guadriradiata* and *G. parviflora* grow en masse in the areas with developed agriculture (western and central Primorsky Territory). In Vladivostok, several large herbaceous communities are noted with dominance of *G. guadriradiata*, up to 100 m² in area with projective coverage of 90-100%. The penetration of species of the genus *Galinsoga* into specially protected natural areas is of great concern. Therefore, further monitoring of the invasive range of these species in the south of the Russian Far East is necessary.

Keywords: invasive species, *Galinsoga parviflora*, *G. guadriradiata*, Far East, Primorsky Territory

Для цитирования: *Федина Л.А., Малышева С.К.* Распространение адвентивных видов *Galinsoga parviflora* и *G. guadriradiata* (Asteraceae) на юге Дальнего Востока // Сибирский вестник сельскохозяйственной науки. 2023. Т. 53. № 4. С. 57–63. https://doi.org/10.26898/0370-8799-2023-4-6

For citation: Fedina L.A., Malysheva S.K. Distribution of the adventive species *Galinsoga parviflora* and *G. guadriradiata* (Asteraceae) in the south of the Far East. *Sibirskii vestnik sel'skokhozyaistvennoi nauki = Siberian Herald of Agricultural Science,* 2023, vol. 53, no. 4, pp. 57–63. https://doi.org/10.26898/0370-8799-2023-4-6

Благодарность

Авторы благодарят наблюдателей на платформе iNaturalist С.В. Прокопенко, Т.Н. Репину, Г.М. Гуларьянц, В.Н. Зеленкову, О.А. Чернягину, Н.В. Филиппову, В.С. Волкотруб, И.Г. Богачева, Д. Мостового, Л. Ефимцеву, А. Власенко, Е.С. Попова; авторов фотоматериалов с сайта Plantarium А.П. Барышенко, М. Скотникову, А.В. Буздину, С.В. Глотова, Н.В. Суровцеву, Г.В. Чуланову за предоставленную возможность увеличить объем данных для анализа распространения инвазионных видов. Работа выполнена в рамках государственного задания Министерства науки и высшего образования Российской Федерации (тема № 121031000120-9).

Acknowledgments

The authors thank the observers on the iNaturalist platform S.V. Prokopenko, T.N. Repina, G.M. Gularyants, V.N. Zelenkova, O.A. Chernyagina, N.V. Filippova, V.S. Volkotrub, I.G. Bogachev, D. Mostovoy, L. Efimtseva, A. Vlasenko, E.S. Popova; authors of the photographic materials from the site Plantarium A.P. Baryshenko, M. Skotnikov, A.V. Buzdin, S.V. Glotov, N.V. Surovtsev, G.V. Chulanov for the opportunity to increase the volume of data for the analysis of the distribution of invasive species. The work was performed within the framework of the state assignment of the Ministry of Science and Higher Education of the Russian Federation (topic No. 121031000120-9).

INTRODUCTION

The introduction of invasive alien plant species poses a threat to regional biodiversity and contributes to the alteration of natural ecosystems. They cause economic and ecological damage, and some of these invaders are unsafe for human health. Therefore, identifying the foci of their invasion, monitoring their spread, and controlling their population are crucial ecological tasks [1-3].

Currently, one of the significant phytosanitary problems is the widespread distribution of two American species - *Galinsoga parviflora* Cav. (small-flower galinsoga) and *G. Guadriradiata* Ruiz et Pav. (galinsoga quadriradiata), which have been introduced as weeds in almost all countries worldwide due to human activities. The natural range of these species is Central and South America. Their secondary range includes most countries in America, Europe, Asia, Africa, as well as Australia and New Zealand [4-6]. As widely spread adventive species, *G. parviflora* and *G. guadriradiata* are included in the Black Books of Western Russia and the Black Book of the Flora of the Far East[1] [7, 8]. *G. guadriradiata* is listed as invasive and potentially invasive species in Siberia and in the Black Book of the Flora of Siberia[2, 3].

Species of the genus *Galinsoga* Ruiz et Pav. are host plants for many insect pests of field crops. Their numerous leaves (with a large total leaf surface area) shade cultivated plants, leading to yield reductions of 10-50%. In landscape compositions and flower beds, these weed species significantly diminish their aesthetic perception[4]. The biological characteristics of *Galinsoga* plants allow them to compete successfully with other weeds and become dominant in disturbed habitats.

In the Far East, the first *Galinsoga* species to appear was *G. parviflora*. It was first mentioned as follows: "Primorskaya Province, Vladivostok District, Golden Horn Bay, Buff Garden, covers clearings in the shade of trees. August 20, 1925. Alisova E." (VLA). This species was introduced with the goods from America to

[1] *Vinogradova Y.K., Antonova L.A., Darman G.F., Devyatova E.A., Kotenko O.V., Kudryavtseva E.P., Lesik (Aistova) E.V., Marchuk E.A., Nikolin E.G., Prokopenko S.V., Rubtsova T.A., Khoreva M.G., Chernyagina O.A., Chubar E.A., Sheiko V.V., Krestov P.V.* Black book of the flora of the Far East: invasive plant species in ecosystems of the Far Eastern Federal District. Moscow: Partnership of scientific publications KMK, 2021. 510 p.

[2] *Ebel A.L., Strelnikova T.O., Kupriyanov A.N., Anenkhonov O.A., Ankipovich E.S., Antipova E.M., Verkhozina A.V., Efremov A.N., Zykova E.Y., Mikhailova S.I., Plikina N.V., Ryabovol S.V., Silantieva M.M., Stepanov N.V., Terekhina T.A., Chernova O.D., Shaulo D.N.* Invasive and potentially invasive species of Siberia // Bulletin of the Main Botanical Garden. 2014. Iss. 200. N 1. pp. 52–61.

[3] Black Book of the Flora of Siberia. Novosibirsk: Geo Publishing House, 2016. 440 p.

[4] *Vinogradova Yu.K., Mayorov S.R., Khorun L.V.* Black Book of the Flora of the Middle Russia. MOSCOW: GEOS, 2010. 512 p.

Vladivostok and became one of the most common plants in wastelands, slopes, and gardens in the early 20th century. *G. guadriradiata* was first collected by P.G. Gorov and D.P. Vorobyov in 1962 in the Soviet District of Vladivostok, in the vicinity of Akademgorodok (VLA). In the Primorsky Territory, there are also records of *Galinsoga* species growing in specially protected natural areas (SPNAs): *G. parviflora* is registered in Lazovsky, Far Eastern Marine, and Sikhote-Alin Nature Reserves[5-7]. *G. guadriradiata* is found in the following reserves: Lazovsky, Ussurisky, and Kedrovaya Pad [8, 9][9].

MATERIAL AND METHODS

Field studies were conducted from 2018 to 2022 using traditional route reconnaissance methods in urban and rural settlements of the Primorsky Territory and in specially protected natural areas (Ussurisky Nature Reserve named after V.L. Komarov). Literature data were analyzed, herbarium specimens stored at the Federal Scientific Center of the East Asia Terrestrial Biodiversity, Far Eastern Branch of the Russian Academy of Sciences (FSC Biodiversity of Terrestrial Biota FEB RAS) in Vladivostok (VLA), and at the Botanical Garden-Institute FEB RAS (VBGI) were examined. Data from the iNaturalist website[10] and Plantarium[11] were also taken into account.

RESULTS AND DISCUSSION

For the area of the Primorsky Territory, the summary "Vascular Plants of the Far East" previously indicated (1992) that *G. parviflora* occurs frequently, and this species is given in the sources only for the southern part of the region; *G. guadriradiata* is mentioned as a rarely occurring species[12].

Nearly 30 years later, A.E. Kozhevnikov [10] characterizes the distribution of both species in this area as common. In the Primorsky Territory, Galinsoga species have an invasive status (2) - alien species that colonize and naturalize in disturbed, semi-natural, and natural habitats [7]. In terms of their distribution, *G. guadriradiata* and *G. parviflora* in the Primorsky Territory are epiphytes - introduced species that colonize one or several types of anthropogenic habitats (see footnote 4).

In the Ussurisky Nature Reserve, *G. guadriradiata* was first recorded in 2004 in the Suvorov Forestry near a remote wintering site "in a flowering state, a single specimen, 8.09.2004, L.A. Fedina" [9]. Fifteen years later, starting from 2019, the replacement of *Ambrosia artemisiifolia* L. (common ragweed) with *G. guadriradiata* plants was observed along the roadside of public dirt roads. In recent years, *G. guadriradiata* has also spread widely in the settlements in the southern part of the Primorsky Territory. In the villages of Kaymanovka and Kamenushka of the Ussurisky Urban District (UUD), located in close proximity to the Ussurisky Nature Reserve, this species is the predominant weed in the gardens of the residents of these villages, and it grows abundantly in the backyard plots and other settlements in UUD (see the table). The occurrence of *Galinsoga* species in the Oktyabrsky, Chuguevsky, and Krasnoarmeisky districts was recorded for the first time. Our findings also expand the list

[5] *Taran A.A.* New species of vascular plants for the flora of the Lazovsky Reserve (Primorsky Territory) // Botanical Journal. 1987. Vol. 72. N 12. pp. 1673.

[6] *Chubar E.A.* Adventive species of vascular plants in the flora of small marine islands: types of strategies, cenotic activity, level of adventitization (on the example of the Far Eastern Marine Reserve, Primorsky Territory) // Komarov Readings. 2015. Iss. 18. pp. 127–163.

[7] *Pimenova L.A., Medvedeva L.A., Cherdantseva V.Ya., Bulakh E.M., Bukharova N.V., Bogacheva A.V., Egorova L.N., Skirina I.F., Malysheva V.F., Malysheva E.F., Morozova O.V., Gromyko M.N., Gracheva R.G., Rebriev Yu. A., Svetasheva T. Yu.* Plants, fungi and lichens of the Sikhote-Alin Reserve. Vladivostok: Dalnauka, 2016. 557 p.

[8] *Chubar E.A.* Addition to the flora of the islands of the Far Eastern Marine Reserve // Botanical Journal. 1992.Vol. 77. N 12. pp. 131.

[9] *Korkishko R.I.* Vascular plants of the reserve "Kedrovaya Pad". Flora and fauna of nature reserves. M: IPEE RAS, 2000. Iss. 82. 84 p.

[10] https://www.inaturalist.org

[11] https://www.plantarium.ru

[12] Vascular Plants of the Soviet Far East / Edited by S.S. Kharkevich. St. Petersburg: Nauka, 1992. Vol. 6. 428 p.

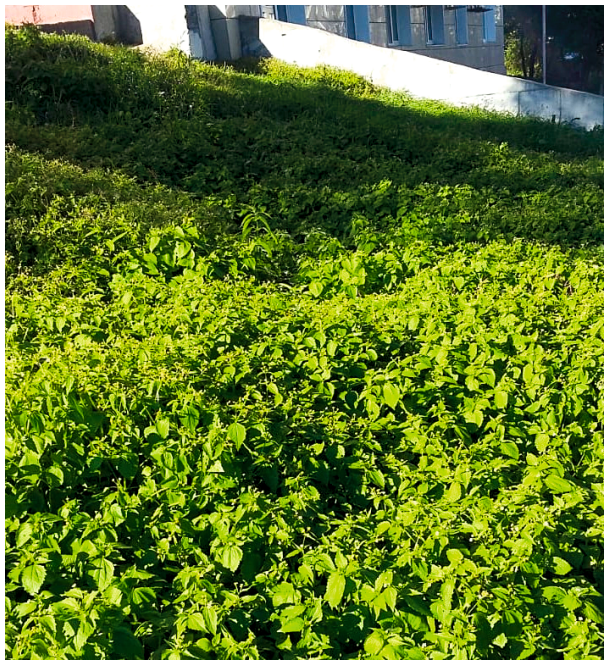
of settlements where these weed plants occur in previously known areas listed in the Black Book of the Flora of the Russian Far East [7].

In Vladivostok, Galinsoga species are found in all areas of the city, as well as along the seaside. In several locations in the city, particularly on the slopes and embankments, monodominant stands of *G. guadriradiata* have been observed, covering an area ranging from 10 to 100 square meters, with a projected cover of 90-100% and an average density of 350 individuals of different ages per square meter. Examples include the following: Pervomaysky District, Grizodubova Street, 53 (43°5′53″, 131°56′46″), N 43°5′53″, E 131°56′46″, 2022; Pervomaysky District, Elochnaya Street, 1, N 43°5′41″, E 131°53′35″, 2022 (see the figure).

The relatively new microdistrict of "Snegovaya Pad" (Pervomaysky District) is also populated by *Galinsoga* species, with one species predominating near certain new buildings and the other near others. Often, both species grow together. Dense communities measuring 3 × 2 meters are formed on the embankments along Anna Shchetinina Street, 15 (43°9′38″, 131°57′20″) and Anna Shchetinina Street, 35 (43°9′48″, 131°57′10″).

Находки и характеристика местопроизрастаний видов рода *Galinsoga* в Приморском крае
Findings and Characteristics of the species of the genus *Galinsoga* in the Primorsky Territory

Location name	Position data	Soil-site characteristics	Data origin
UUD, Kaimanovka village	N43°63'399" E132°23'709"	Field road shoulder, vegetable gardens, en masse	Author's findings 2010–2022
UUD, Kamenushka village	N43°61'695" E132°23'056"	The same	The same
UUD, Kondratenovka village	N 43°37′58″ E 132°9′57″	Vegetable gardens, en masse	»
UUD, Dubovy Klyuch village	N 43°39′45″ E 132°7′52″	The same	»
UUD, Gorno-Taezhnoe village	N 43°41′52″ E 132°9′26″	»	Author's findings 2022
Ussuriisk	N 43°28′54″ E 131°34′3″	Courtyard areas, flower beds, a large number	The same
Khasansky district, Slavyanka settlement	N 42°51′44 E ″131°23′34	The same	»
Khasansky district, hotel complex "Teploe more"	N 42°51′18″ E 131°25′16″	Landscape plantings, slopes, hillsides, a large number	»
Vladivostok, Pervomaisky district, Patrokl Bay	N 43°4′24″ E 131°56′52″	Along the road and exits to the sea, a large number	»
Vladivostok, Leninsky district, Gornostay Bay	N 43°6′55″ E 132°0′51″	The same	»
Vladivostok, Soviet district, Steklyanukha Bay	N 43°6′55″ E 132°0′51″	»	»
Krasnoarmeysky district, Roshchino village	N 45°54′40″ E 134°53′20″	On the building surrounding grounds, vegetable gardens, flower beds, a large number	»
Mikhailovsky district, Mikhailovka village	N 43°56′27″ E 132°0′40″	The same	»
Oktyabrsky district, Pokrovka village	N 43°57′19″ E 131°37′45″	»	»
Chuguevsky district, Uborka village	N 44°23′52″ E 134°5′20″	»	»
Shkotovsky District, Ussuriysky Nature Reserve	N43°64'965" E132°53'156"	The shoulder of a dirt public road, a large number	Author's findings 2004 – 2022



Владивосток, ул. Елочная, 1 – заросли *G. guadriradiata* с проективным покрытием 90–100%.

1, Elochnaya St., Vladivostok – *G. guadriradiata* thickets with a projective coverage of 90-100%.

Large areas of continuous growth of *G. guadriradiata* are noted on the following territories according to the Plantarium website: Vladivostok, Leninsky District, Pushkinskaya Street, 12 (Polytechnic Park), 2016; on the iNaturalist website: Vladivostok, Sovetsky District (Kirova Street, 27), 2020.

On the iNaturalist website, *G. guadriradiata* in the Primorsky Territory is mentioned in the following locations: Vladivostok, Leninsky District, 2021; Vladivostok, Pervorechensky District, 2021; Vladivostok, Sovetsky District, 2021; Vladivostok, Frunzensky District, 2021, 2022; Spassk-Dalny, 2020; Partizansky District (Novitskoye village), 2020; Nakhodka, 2020; Shkotovsky District (Gribanovka village), 2020, 2021; Khasansky District (Lake Lotus), 2021; Ussuriysky Urban District (Kamenushka village), 2021; Arsenyev, 2022; Olginsky District, Olga village, 2022; Shkotovsky District (Shkotovo village), 2022.

On the Plantarium website, *G. guadriradiata* is listed for the following territories: Spassky District (Kvalynka village), 2008; Terny District (Zabolochennaya River valley), 2012; Vladivostok, Leninsky District, 2016.

G. parviflora is indicated on the iNaturalist website in the following locations in the Primorsky Territory: Vladivostok, Sovetsky District, 2018-2020, 2022; Vladivostok, Pervorechensky District, 2019-2022; Vladivostok, Frunzensky District, 2021; Dalnegorsk, 2019; Partizansky District, Nikolaevka village, 2020; Partizansky District, Novaya Sila village, 2020; Partizansky District, Novitskoye village, 2020; Spassk-Dalny, 2020; Spassky District (Knorring village), 2020; Artem, 2021; Dalneretchensk, 2021; Ussuriysky Urban District (Gornotaezhnoye village), 2021; Olginsky District, Olga village, 2022.

On the Plantarium website, the occurrence of *G. parviflora* is noted in the following locations: Nakhodkinsky Urban District (Avangard village), 2016; Artem (Artemovskaya CHP area), 2019.

A comprehensive analysis of author's findings, herbarium specimens (VLA, VBGI), literature data (see footnote 1), and information from internet resources has shown that the distribution range of the *Galinsoga* species has expanded over the past 30 years due to their colonization of the northern regions of the Primorsky Territory, coastal areas, islands, as well as the spread of these ruderal plants to new territories in the southern and central regions. The results of this study confirm the occurrence of the *Galinsoga* species in the following districts and cities of the Primorsky Territory: *G. parviflora* occurs in the districts of Hasan, Nadezhdinsky, Oktyabrsky, Mikhailovsky, Hankai, Pogranichny, Khorolsky, Kirovsky, Spassky, Shkotovsky, Lazovsky, Partizansky, Dalnegorsk, Kavalerovsky, Terny, Olga, Chuguevsky, Krasnoarmeysky, Ussuriysky Urban District, Nakhodkinsky Urban District, Artemovsky Urban District, as well as in the cities of Vladivostok, Artem, Nakhodka, Ussuriysk, Dalnegorsk, Dalneretchensk. *G. parviflora* is found on the islands of Peter the Great Gulf: Bolshoy Pelis, Popova, Putyatin, Russky, Falshivy, Furugelma.

G. guadriradiata occurs in the districts of Hasan, Oktyabrsky, Mikhailovsky, Spassky,

Shkotovsky, Lazovsky, Partizansky, Olginsky, Chuguevsky, Terny, Krasnoarmeysky, Ussuriysky Urban District, Nakhodkinsky Urban District, Artemovsky Urban District, and in the cities of Vladivostok, Arsenyev, Nakhodka, Spassk-Dalny, Ussuriysk. *G. guadriradiata* is found on the islands of Peter the Great Gulf: Popova, Reineke, and Furugelma.

CONCLUSION

The conducted research has shown that *G. guadriradiata* and *G. parviflora* have significantly expanded their invasive range in the southern part of the Russian Far East over the past 30 years. Currently, these weed plants are found in almost all administrative districts of the Primorsky Territory, including the northern districts (Krasnoarmeysky, Dalneretchensky, Terny). It has been established that in recent years, *G. guadriradiata* has become the predominant weed in the gardens of rural residents of the Ussuriysk Urban District, and within the territory of the Ussuriysky Nature Reserve, this species actively colonizes new areas. Thus, the biological characteristics of *Galinsoga* species (rapid growth, high seed productivity, long flowering period until the second ten-day period of November) and their high ecological plasticity contribute to further spread of these adventive species across the area of the Primorsky Territory.

СПИСОК ЛИТЕРАТУРЫ

1. *Шхагапсоев С.Х., Чаадаева В.А., Тайсумов М.А., Шхагапсоева К.А.* Черный список флоры Чеченской Республики // Российский журнал биологических инвазий. 2022. Т. 15. № 3. С. 186–200.
2. *Чаадаева В.А., Шхагапсоев С.Х., Цепкова Н.Л., Шхагапсоева К.А.* Материалы к Черному списку флоры Центрального Кавказа (в пределах Кабардино-Балкарской Республики): часть вторая // Российский журнал биологических инвазий. 2019. Т. 12. № 2. С. 96–113.
3. *Гергия Л.Г., Абрамова Л.М., Айба Э.А., Мустафина А.Н.* К биологии инвазионного вида галинсоги мелкоцветковой (*Galinsoga parviflora* Cav.) в Абхазии // Бюллетень Государственного Никитского ботанического сада. 2019. № 133. С. 241–247.
4. *Пшегусов Р.Х., Чадаева В.А.* Моделирование экологических ниш видов рода *Galinsoga* Ruiz et Pav. в границах нативного и кавказской части инвазионного ареалов // Российский журнал биологических инвазий. 2022. Т. 15. № 1. С. 107–122.
5. *Sukhorukov A.P., Nilova M.V., Kushunina M.A.* The first records of *Galinsoga guadriradiata* Ruiz & Pav. (Asteraceae) from Zambia // Skvortsovia. 2021. Vol. 7. N 2. P. 22–25.
6. Самые опасные инвазионные виды России (ТОП 100): монография. М.: Товарищество научных изданий КМК, 2018. 688 с.
7. *Виноградова Ю.К., Антонова Л.А., Дарман Г.Ф., Девятова Е.А., Котенко О.В., Кудрявцева Е.П., Лесик (Аистова) Е.В., Марчук Е.А., Николин Е.Г., Прокопенко С.В., Рубцова Т.А., Хорева М.Г., Чернягина О.А., Чубарь Е.А., Шейко В.В., Крестов П.В.* Черная книга флоры Дальнего Востока: инвазионные виды растений в экосистемах Дальневосточного федерального округа): монография. М.: Товарищество научных изданий КМК, 2021. 510 с.
8. *Суткин А.В.* Новые находки адвентивных видов сосудистых растений в г. Улан-Удэ и его окрестностях (Западное Забайкалье) // Turczaninovia. 2021. Т. 24. № 2. С. 42–50.
9. *Федина Л.А.* Дополнения к флоре Уссурийского заповедника (Приморский край) за десять лет (2007-2016) // Комаровские чтения. 2018. Вып. 18. С. 55–59.
10. *Kozhevnikov A.E., Kozhevnikova Z.V., Kwak M., Lee B.Y.* Illustrated flora of the Primorsky Territory (Russian Far East). Incheon: National Institute of Biological Resources, 2019. 1124 p.

REFERENCES

1. Shkhagapsoev S.H., Chaadaeva V.A., Taisumov M.A., Shkhagapsoev K.A. Black list of flora of the Chechen Republic. *Rossijskij zhurnal biologicheskih invazij = Russian Journal of Biological Invasions*. 2022, vol. 15, no. 3, pp. 186-200. (In Russian).
2. Chaadaeva V.A., Shkhagapsoev S.H., Tsepkova N.L., Shkhagapsoeva K.A. Materials to the Black List of flora of the Central Caucasus (within Kabardino-Balkarian Republic): part two. *Rossijskij zhurnal biologicheskih invazij = Russian Journal of Biological Invasions*. 2019,

vol. 12, no. 2, pp. 96–113. (In Russian).
3. Georgia L.G., Abramova L.M., Aiba E.A., Mustafina A.N. To biology of invasive species *Galinsoga parviflora* Cav. in Abkhazia. *Byulleten' Gosudarstvennogo Nikitskogo botanicheskogo sada = Bulletin of the State Nikitsky Botanical Garden*, 2019, no. 133, pp. 241–247. (In Russian).
4. Pshegusov R.H., Chadaeva V.A. Ecological niche modeling of *Galinsoga* Ruiz et Pav. species in the native and Caucasian part of the invasive ranges. *Rossijskij zhurnal biologicheskih invazij = Russian Journal of Biological Invasions*, 2022, vol. 15, no. 1, pp. 107–122. (In Russian).
5. Sukhorukov A.P., Nilova M.V., Kushunina M.A. The first records of *Galinsoga guadriradiata* Ruiz & Pav. (Asteraceae) from Zambia. *Skvortsovia*. 2021, vol. 7, no. 2, pp. 22–25.
6. *The most dangerous invasive species of Russia (TOP 100)*. Moscow, Association of Scientific Publications of the CMC, 2018. 688 p. (In Russian).
7. Vinogradova Yu.K., Antonova L.A., Darman G.F., Devyatova E.A., Kotenko O.V., Kudryavtseva E.P., Lesik (Aistova) E.V., Marchuk E.A., Nikolin E.G., Prokopenko S.V., Rubtsova T.A., Khoreva M.G., Chernyagina O.A., Chubar E.A., Sheiko V.V., Krestov P.V. *The Black Book of the Flora of the Far East: invasive plant species in ecosystems of the Far Eastern Federal District*. Moscow: Association of Scientific Publications of the CMC, 2021. 510 p. (In Russian).
8. Sutkin A.V. New findings of adventitious species of vascular plants in Ulan-Ude and its surroundings (Western Transbaikalia). *Turczaninovia*. 2021, vol. 24, no. 2, pp. 42–50. (In Russian).
9. Fedina L.A. Additions to the flora of the Ussuri Reserve (Primorye Territory) for ten years (2007–2016). *Komarovskie chteniya = Komarovsky readings*, 2018, is. 18, pp. 55–59. (In Russian).
10. Kozhevnikov A.E., Kozhevnikova Z.V., Kwak M., Lee B.Y. *Illustrated flora of the Primorsky Territory (Russian Far East)*. Incheon: National Institute of Biological Resources, 2019. 1124 p.

ИНФОРМАЦИЯ ОБ АВТОРАХ

Федина Л.А., кандидат биологических наук, старший научный сотрудник

(✉)**Малышева С.К.,** кандидат биологических наук, старший научный сотрудник; **адрес для переписки**: Россия, 690022, Приморский край, Владивосток, пр. 100-летия Владивостока, 159; e-mail: malyshsveta@rambler.ru

AUTHOR INFORMATION

Lyubov A. Fedina, Candidate of Science in Biology, Senior Researcher

(✉)**Svetlana K. Malysheva**, Candidate of Science in Biology, Senior Researcher; **address:** 159, 100-letiya Vladivostoka ave., Vladivostok, Primorsky Teritory, 690022, Russia; e-mail: malyshsveta@rambler.ru

Дата поступления статьи / Received by the editors 17.02.2023
Дата принятия к публикации / Accepted for publication 12.04.2023
Дата публикации / Published 22.05.2023