

EPPO Datasheet: *Zizania latifolia*

Last updated: 2025-01-08

IDENTITY

Preferred name: *Zizania latifolia*

Authority: (Grisebach) Hance ex F. Mueller

Taxonomic position: Plantae: Magnoliophyta: Angiospermae:
Commelinids: Poales: Poaceae: Ehrhartoideae

Other scientific names: *Hydropyrum latifolium* Grisebach, *Zizania aquatica* var. *latifolia* (Grisebach) Komarov, *Zizania caduciflora* Handel-Mazzetti, *Zizania mezii* Prodoehl

Common names: Manchurian wild rice

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EPPO Categorization: A2 list, List of Invasive Alien Plants (formerly)

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EPPO Code: ZIZLA



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GEOGRAPHICAL DISTRIBUTION

History of introduction and spread

Zizania latifolia is native to Eastern Siberia, and the Russian Far East (Afonin *et al.*, 2008; Komarov, 1934; Tzvelev, 1976; Tzvelev & Probatova, 2019). In these areas, the species is distributed sporadically in the natural environment. Native populations of *Z. latifolia* are also distributed in the east of China along a wide stretch of latitudinal zones (21–50°N). The species can be found in the river basins of the Heilongjiang, Liaohe, Huanghe and Yangtze Rivers (Chen *et al.*, 2017; Wagutu *et al.*, 2022; Yang *et al.*, 2020; Zhang *et al.*, 2016). *Z. latifolia* has been domesticated and is cultivated in China as an aquatic vegetable (Guo *et al.*, 2007). At present, in China, *Z. latifolia* is cultivated on more than 60,000 ha (Xie *et al.*, 2023).

In the invasive range, *Z. latifolia* is locally established in New Zealand in the North Island, namely in Northland, Auckland, Waikato, and Wellington (Freshwater Pests of New Zealand, 2020; New Zealand Plant Conservation Network, 2023). In North America, *Z. latifolia* is considered established in Hawaii on the islands of Kauai, likely on Oahu, and Hawaii Island. One location has been detected in Canada, British Columbia in 2004 where it is locally abundant in shallow tidal water along the edges of Widgeon Slough on Siwash Island (<https://search.museums.ualberta.ca/12-116227>).

In the EPPO region, *Z. latifolia* has been intentionally introduced as an aquatic ornamental since the turn of the 20th century. It was also intentionally introduced from the 1930s onwards in water reservoirs in countries of the former Soviet Union to provide habitat for biota in managed waterbodies (Dubyna *et al.*, 2017). *Zizania latifolia* was reported in Belarus for the first time in 1966 (Dubovik *et al.*, 2021). *Zizania latifolia* was planted in Lake Endla (Central Estonia) between 1953 and 1955 (Kuusk *et al.*, 2003). This population is still present in this area (eElurikkus, 2023). In Lithuania, *Z. latifolia* was recorded in the Dotnuvė stream near the Akademija lake in the city of Akademija in 2006 (Liatukas & Stukonis, 2009). It is reported in other countries, e.g. Azerbaijan and Kazakhstan, though the status of the species is unclear.

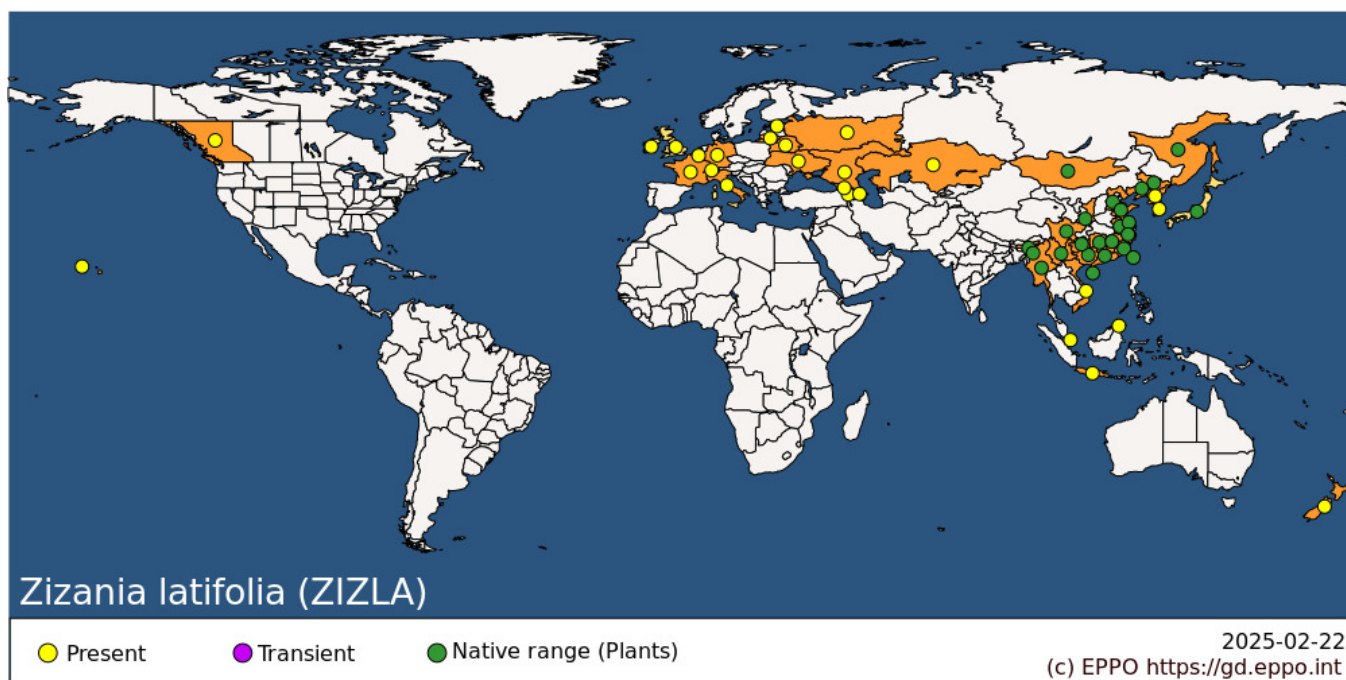
Zizania latifolia was first introduced in 1934 into the European part of Russia to provide habitat for biota in managed waterbodies (Maltseva & Bobrov, 2017; Morozova, 2014). The introduction of *Z. latifolia* into the Rybinsk Reservoir started in the late 1950s and in the Middle Volga region in 1957. At present, *Z. latifolia* can be found along a wide stretch of latitudinal zones (45–60°N). The species can be found in nine regions (oblasts) according to Vinogradova *et al.* (2018): Bryansk, Vladimir, Kaluga, Kostroma, Moscow, Yaroslavl, Krasnodar, Astrakhan and Volgograd. Starodubtseva *et al.* (2017) published a record of the species also in the Voronezh oblast region in a protected area (State federal level nature sanctuary Voronezhsky). *Z. latifolia* occurs e.g., in water reservoirs along

the Volga River (Maltseva & Bobrov, 2017) and in lakes, such as Velikoe, Parovoe and Vashutinskoye (Belyakov *et al.*, 2020; Belyakov & Garin, 2018). *Z. latifolia* is recorded in the Astrakhan State Biosphere Reserve (Afanasiev & Laktionov, 2008).

Zizania latifolia locally established in Belgium where it has been planted as a marsh plant along ponds and lakes (Verloove, 2011). It was first observed in 2009 on the margins of a pond near La Hulpe (<https://waarnemingen.be/observation/44769819/>), probably as a relic of former cultivation (ornamental use). There are few other observations thereafter (Verloove, 2011). Recently, there have been numerous reports of the species throughout Belgium, probably as a result of the species being included in the alert list of the LIFE RIPARIAS project (<https://alert.riparias.be/>) and an extensive population was recorded in 2023 along the River Leie near Ghent (pers. comm. I. Jacobs, 2024).

In France, *Z. latifolia* was introduced in the botanical garden of Paris (Jardin des Plantes). In 1914 it was grown in the Allier Department (Thiollets, Gorbier-Peublanc, near Jaligny) close to the bank of a lake. In 1919, it invaded all the surroundings of the lake, covering an area of 300?m in length and 3–4?m wide. *Z. latifolia* has been first recorded in the wild in October 2016 in the Pyrenees. *Zizania latifolia* was detected for the first time in Germany in Freiburg in Breisgau in 2018 on the shore of the lake Opfinger (Amarell, 2020). It is not known how this population was first introduced into the area. In 2023, the species covered at least 200?m of shoreline of this lake (pers. obs. S. Follak, 2023).

The history of introduction into other EPPO countries is less well detailed.



EPPO Region: Armenia, Azerbaijan, Belarus, Belgium, Estonia, France (mainland), Georgia, Germany, Ireland, Italy (mainland), Kazakhstan, Lithuania, Russia (Central Russia, European Russia, Far East, Southern Russia), Switzerland, Ukraine, United Kingdom

Asia: China (Anhui, Fujian, Guangdong, Guangxi, Guizhou, Hainan, Hebei, Hunan, Jiangsu, Jiangxi, Jilin, Liaoning, Shaanxi, Shandong, Sichuan, Yunnan, Zhejiang), India (Assam, Manipur), Indonesia (Java), Japan, Kazakhstan, Korea Dem. People's Republic, Korea, Republic, Malaysia (Sabah), Mongolia, Myanmar, Singapore, Taiwan, Vietnam

North America: Canada (British Columbia), United States of America (Hawaii)

Oceania: New Zealand

MORPHOLOGY

Plant type

Perennial rhizomatous helophyte.

Description

Wild populations of *Z. latifolia* produce underground as well as surface stems (rhizomes) that form multiple tillers and enable vegetative propagation. Culms erect, 1–2.5 (4) m tall, rooting at lower nodes. Leaf sheaths thickened, leaf blades broadly linear, 50–90 cm long and 1.5–3.5 cm wide. Ligule triangular, 10–15 mm long. Inflorescences are panicles branching out multiple times either upwards or sideways, 30–50 cm long and 10–15 cm wide, lower branches with male spikelets, upper branches with female spikelets. Male spikelet 8–15 mm long; lemma elliptic-oblong, margin ciliate, awn 2–8 mm. Female spikelet 15–25 mm, lemma linear, awn 15–30 mm. Fruits are caryopses, approximately 10 mm (Flora of China, 2006). The seeds of *Z. latifolia* are sparsely arranged on the ear and mature at different times, after which they fall off easily. There is the potential for misidentification of between the *Zizania* species.

Images of *Z. latifolia* can be retrieved from the EPPO Global Database (EPPO, 2024a).

BIOLOGY AND ECOLOGY

General

Zizania latifolia has phenotypic plasticity in morphology and shifts in reproductive strategy and biomass allocation enables it to survive flooding events (Wang *et al.*, 2014). It shows high growth rates and shoot height (up to 4 m in height) with increasing flooding depth, as the species can develop faster stem elongation as a response to increasing water depth (Li *et al.*, 2018). Its capacity to form uprooted floating mats in wetlands also improves its resilience to inundated conditions (Hong *et al.*, 2018; Wen *et al.*, 2023). The species can respond to water level fluctuation up to 5 m (Yang *et al.*, 2020). The optimal water depth is 5–40 cm (Kwon *et al.*, 2006; Li *et al.*, 2018).

In the native range, *Z. latifolia* was reported to produce recalcitrant (desiccation-sensitive) seeds (Jin *et al.*, 2005). In the introduced range, seed does not seem to play an important role in the life cycle of the species. In New Zealand, seedlings are not reported in the natural environment (pers. comm. P. Champion, 2024). Seed production may be very limited or absent in the introduced range as observed in Lithuania (Liatukas & Stukonis, 2009) or in Belgium (Verloove, 2011).

Habitats

Zizania latifolia grows in aquatic and riparian habitats, in particular wetland habitats (Notov, 2009; Ohwi, 1964; Seok *et al.*, 2023). In the introduced range, it can also be found in roadside drainage ditches (Shaw & Allen, 2003) and can also infest damp paddocks and pastures (Arnold, 1959; Northland Regional Council, 2023). In New Zealand, *Z. latifolia* can invade lowland cropping habitats, especially sweet potato (pers. comm. P. Champion, 2024). In Hawaii, taro fields are also habitat for *Z. latifolia* (pers. comm. D. Frohlich, 2024). It can grow along waterlogged banks of large (e.g. Dnipro, Dniester, Ukraine; Volga, Russia) and small rivers (Dotnuvėlis, Lithuania) and coastal zones (estuaries) (Belyakov *et al.*, 2020; Dvoretzkiy, 2021; Liatukas & Stukonis, 2009; Maltseva & Bobrov, 2017; Zub & Prokopuk, 2020).

Environmental requirements

Zizania latifolia requires waterlogged soil conditions for germination and growth.

Data from China indicate that growth of *Z. latifolia* starts when average air temperatures are greater 5°C and that the strongest growth is at temperatures from 18 to 28°C (Yan *et al.*, 2013; Ye *et al.*, 2017). *Zizania latifolia* can withstand cold winter temperatures. In the EPPO region, the species occurs in countries with hard frost, such as

Lithuania (e.g., Kėdainiai district), Estonia (Lake Endla), and Russia (Rybinsk). The area of the Rybinski reservoir appears to mark the northern limit of occurrence of the plant in the EPPO region.

Zizania latifolia is tolerant to brackish water (Tang *et al.*, 2022) as it can grow in low salinity wetlands (salinity less than 15 mmol/L) (Tang *et al.*, 2022). It is intolerant of high salinity, determining the downstream extent on the Northern Wairoa River (New Zealand) (Champion *et al.*, 2001).

Natural enemies

There are no known natural enemies for *Z. latifolia* in the EPPO region. In Japan, there is evidence that water birds selectively forage on the rhizomes of the species leading to the spread of *Z. latifolia* due to dispersal of rhizome fragments (Ohkawara & Tajiri, 2023; Watanabe *et al.*, 2008).

Uses and benefits

The species is utilized as an aquatic vegetable and medicinal plant with a long history of use in China and other countries in the East Asian region (Wu *et al.*, 2023). The vegetable is imported into the EPPO region from China (pers. comm. J. van Valkenburg, 2024). No evidence has been found that *Z. latifolia* is cultivated as a vegetable in the EPPO region. It has ecological and economic value in nature (provides forage and shelter, purifies water etc.) (Wu *et al.*, 2023).

PATHWAYS FOR MOVEMENT

Plants for planting is the main pathway for movement into and within the EPPO region. *Z. latifolia* can be utilized as an ornamental, for planting in the natural environment for 'improving wildlife habitats' (Maltseva & Bobrov, 2017; Dubyna *et al.*, 2017; Liatukas & Stukonis, 2009; citing Fern, 1997). It has been planted for phytomeliorative/phytoremediation purposes (Chen *et al.*, 2017; Tanner, 1996; Zhang *et al.*, 2023; Zub & Prokopuk, 2020) and for erosion control (Chen *et al.*, 2017; William & Champion, 2008; Wu *et al.*, 2023) though not in the EPPO region.

There are historic references that *Z. latifolia* was used as an animal feed in France (Boite, 1887), though this is a historic pathway and nowadays it is very unlikely to be used for this purpose.

IMPACTS

Effects on plants

In China, in its native range, Zhang *et al.* (2016) reported that due to the overgrowth of *Z. latifolia*, the submerged and emergent macrophytes (*Vallisneria natans*, *Hydrilla verticillata*, *Phragmites australis*, *Typha angustifolia*) previously present had nearly disappeared in Wuchang Lake. Wen *et al.* (2023) showed that the emergent community in the Lake Erhai (Yunnan Province) had changed from a *P. australis*, *Typha orientalis* and *Acorus calamus* dominant community to a *Z. latifolia* monodominant community over the past decades. In the Republic of Korea, *Z. latifolia* is reported as a weed in no-tillage rice production (Im *et al.*, 2015).

In New Zealand, Champion *et al.* (2001) concluded that *Z. latifolia* displaces short-stature vegetation (essentially all non-woody species) and envelops taller individual indigenous plants (e.g., within *Dacrycarpus dacrydioides* swamp forest). These plants would be unable to produce progeny within the dense stand of *Z. latifolia*. It has been observed that *Z. latifolia* negatively impacts agricultural land in New Zealand (Arnold, 1959; Champion & Hofstra, 2010). The persistence of the species has changed farming practices. Some areas of sweet potato farming have been overtaken by *Z. latifolia*.

In the USA, *Z. latifolia* is considered a reservoir for pests such as the fungus *Ustilago esculenta*, which can potentially be transmitted to and threaten native *Zizania* species (e.g. Terrell & Batra, 1982; Watson *et al.*, 1991).

In Russia, *Z. latifolia* has spread in the Volga Delta displacing other aquatic species (Afanasiev & Laktionov, 2008). It can dominate aquatic plant communities in southern regions (for example, Krasnodar territory, Samara oblast, etc.) and strongly compete with other species (*Butomus umbellatus*, *Phragmites australis*, *Sparganium erectum*, *Typha angustifolia*, *T. latifolia*) (Matveev & Zotov, 1973; Matveev & Soloviyova, 1997; Maltseva & Bobrov, 2017).

In Lithuania, the area covered by *Z. latifolia* has increased and it forms mono-dominant stands. Liatukas and Stukonis (2009) stated that "... [t]his new species was aggressive in out-competing other species, as the largest patches of *Z. latifolia* had only very few small spots [patches] of other species".

In Ukraine, scientific investigation showed that *Z. latifolia* forms dense stands. The proportion of cover of *Z. latifolia* varies from 85% to 100 % (plants height ranges from 150 to 250?cm) (Dvoretzkiy, 2021). In the Dniester Delta area, *Z. latifolia* can cause the disappearance of many other species, including those of wide ecological amplitude, particularly *Phragmites australis* (Dvoretzkiy, 2021). *Z. latifolia* has significantly spread in the coastal part of the islands of the Dnieper Delta in recent years. *Z. latifolia* can change the structure of natural plant communities (Dubyna *et al.*, 2017).

In Western Europe, observations show that *Z. latifolia* can form persistent monospecific stands along water bodies (Hollings & Hollings, 2006). Thus, it is likely that similar effects on biodiversity described outside of the EPPO region will occur within the EPPO region.

Environmental and social impact

Zizania latifolia builds persistent monospecific stands in invaded natural habitats and changes the composition of the flora and is considered an ecosystem engineer.

The species can impede water flow and increase the chance of flooding by blocking drains and water channels (William & Champion, 2008) leading to the degeneration of pastureland (Arnold, 1959; William & Champion, 2008).

The plant can colonize large areas of lakes and severely interfere with fishing due to blocking access to the open water (Jia *et al.*, 2017; Li, 1996). Jia *et al.* (2017) also showed a gradual loss of open water in Lower Wuchang Lake due to the encroachment from *Z. latifolia* (varying cover from 9.68?km² [1992] to a maximum of 49.17?km² [2001]). This consequently led to financial losses from major reductions in fishing income (exact data is not available).

CONTROL

Control of the species is difficult, because of the large annual accumulation of biomass, its extensive underground root/rhizome system, and its ability to grow from small rhizome fragments and the inaccessibility of most populations.

In New Zealand, successful eradication of small to medium (~100?ha in area) populations has been achieved using the grass-specific herbicides (pers. comm. P. Champion, 2024).

Raising water levels in spring (March–May) during the species' germination period could be successful in reducing the area colonized within lakes (Jia *et al.*, 2017; Zhang *et al.*, 2016).

Physical control can be effective at specific times (1) during the period when substantial self-thinning of shoots occurs (June–July) and (2) when the plant is mature but before senescence (September–October) Chandra and Tanaka (2006). However, this is a labour intensive and costly (Jia *et al.*, 2017).

Mechanical diggers can be used to remove the plant from ditches, drainage channels and waterlogged riverbanks, but there is a high risk of transferring rhizome fragments to new sites (<https://www.weedbusters.org.nz/what-are-weeds/weed-list/manchurian-rice-grass>).

REGULATORY STATUS

In the EPPO region, *Z. latifolia* is included on the EPPO A2 list of pests recommended for regulation as a quarantine pest.

In New Zealand, *Z. latifolia* is a ‘Pest of concern to New Zealand’ (Quarantine pest) (Ministry for Primary Industries, 2023). The species is an unwanted organism and notifiable organism under the Biosecurity Act 1993: propagation, spread, display and sale are prohibited. *Z. latifolia* is one of nine weed species managed by central government for national eradication under the National Interest Pest Response programme (<https://www.mpi.govt.nz/biosecurity/exotic-pests-and-diseases-in-new-zealand/long-term-biosecurity-management-programmes/national-interest-pest-responses-programme/>).

In Australia, *Z. latifolia* is on the National Priority List of Exotic Environmental Pests, Weeds and Diseases. Thus, it is considered as a species of ‘significant environmental and social amenity risk to Australia’ (<https://www.agriculture.gov.au/biosecurity-trade/policy/environmental/priority-list>). In Western Australia, *Z. latifolia* is a ‘Declared Pest, Prohibited - s12’. Prohibited organisms are declared pests by virtue of section 22(1) and may only be imported and kept subject to permits (<https://www.agric.wa.gov.au/organisms/128909>).

PHYTOSANITARY MEASURES

EPPO (2024b) recommends that *Z. latifolia* should be recommended for regulation as a quarantine pest and *Z. latifolia* should be banned for sale in the EPPO region. Plants for planting (horticulture) should be prohibited for import into the EPPO region.

REFERENCES

- Afanasiev VE, Laktionov AP (2008) Historical analysis of the adventising of flora in Astrakhan region. *Bulletin of the Astrakhan State Technical University* (Fisheries series). **3** (44), 150–154 [in Russian]
- Afonin AN, Greene SL, Dzyubenko NI, Frolov AN (eds.) (2008) Interactive Agricultural Ecological Atlas of Russia and Neighboring Countries. *Economic Plants and their Diseases, Pests and Weeds* [Online]. Available at: <http://www.agroatlas.ru>
- Amarell U (2020) Bemerkenswerte Neophytenfunde aus Baden-Württemberg und Nachbargebieten (2012–2019). *Berichte der Botanischen Arbeitsgemeinschaft Südwestdeutschland* **9**, 41–66.
- Arnold EH (1959) Manchurian rice grass. *Proceedings of the NZ Weed Control Conference* **12**, 82–84.
- Belyakov EA, Garin EV (2018) Long-term dynamics of flora of karst lakes: Changes and current state. *Biosystems Diversity* **26**, 160–169. <https://doi.org/10.15421/011825>
- Belyakov EA, Sakharova EG, Sokolova AS (2020) The current state and dynamics of the flora of several small lakes of the Yaroslavl Region, Russia. *Ecosystem Transformation* **3**, 15–40.
- Boite A (1887) *Herbages et Prairies naturelles*. Paris.
- Champion PD, Hofstra DE (2010) Manchurian wild rice (*Zizania latifolia*) biomass allocation and implications for control. Seventeenth Australasian Weeds Conference.
- Champion PD, Williams E, Chisnall B (2001) Manchurian wild rice – ecological impact, herbicide trial and non-target effects of the herbicide Gallant. NIWA Client Report NRC00202. NIWA, Hamilton.
- Chandra DS, Tanaka N (2006) Harvesting aerial shoots of *Zizania latifolia* at different growth stages: effects on belowground biomass, regrowth, and rhizome morphology. *Journal of Freshwater Ecology* **21**, 583–591. <https://doi.org/10.1080/02705060.2006.9664119>

- Chen Y, Liu Y, Fan X, Li W, Liu Y (2017) Landscape-scale genetic structure of wild rice *Zizania latifolia*: The roles of rivers, mountains and fragmentation. *Frontiers in Ecology and Evolution* **5**, 17.
<https://doi.org/10.3389/fevo.2017.00017>
- Dubovik DV, Sauchuk SS, Zavialova LV (2021) The current status of the plant invasions in Belarus. *Environmental & Socio-economic Studies* **9**, 14–22.
- Dubyna DV, Dziuba TP, Dvoretzkiy TV, Zolotariova OK, Taran NY, Mosyakin AS, Iemelianova SM, Kazarinova GO (2017) Invasive aquatic macrophytes of Ukraine. *Ukrainian Botanical Journal* **74**, 248–262 [in Ukrainian].
- Dvoretzkiy TV (2021) Assessment of microclimatic conditions in *Phragmitetum australis* cenoses in the Dniester mouth area under the influence of *Zizania latifolia* invasion. *Hydrobiological Journal* **57**, 3–11.
<https://doi.org/10.1615/HydrobJ.v57.i1.10>
- eElurikkus (2023) *Zizania latifolia* (Griseb.) Stapf. <https://elurikkus.ee/bie-hub/species/8261#overview>
- EPPO (2024a) *Zizania latifolia*. EPPO Global Database. <https://gd.eppo.int/taxon/ZIZLA>
- EPPO (2024b) EPPO Technical Document No. 1094. Pest risk analysis for *Zizania latifolia*. EPPO, Paris. Available at <https://gd.eppo.int/taxon/ZIZLA/documents>
- Fern K (1997) Plants For A Future: Edible & Useful Plants For A Healthier World: 320. – Permanent.
- Flora of China (2006) *Zizania latifolia* (Grisebach) Turczaninow ex Stapf. *Flora of China* **22**, 186–187.
http://www.efloras.org/florataxon.aspx?flora_id=2&taxon_id=242355686
- Freshwater Pests of New Zealand (2020) NIWA publication. <http://www.niwa.co.nz/freshwater-and-estuaries/management-tools/identification-guides-and-fact-sheets/freshwater-pest-species>
- Guo H, Li S, Peng J, Ke W (2007) *Zizania latifolia* Turcz. cultivated in China. *Genet. Resour. Crop Evolution* **54**, 1211–1217.
- Hollings M, Hollings O (2006) *Rumex maritimus* returns to patching pond. *BSBI News* **103**, 11–12.
- Hong MG, Nam BE, Kim JG (2018) Vegetation and water characteristics of floating mat in a coastal lagoon as the habitat for endangered plant species. *Journal of Ecology and Environment*, **42**(1), 1–8.
- Im, Il-Bin, Im, Bo-Hyeok, Park, Jea-Hyeon, Jang, Jeong-Han, Im, Min-Hyeok, & Lee, In-Yong. (2015). Weeds on Rice Paddy Field of Jeonnam Western Region. *Weed & Turfgrass Science*, **4**(4), 295–307
- Jia Q, Cao L, Yésou H, Huber C, Fox AD (2017) Combating aggressive macrophyte encroachment on a typical Yangtze River Lake: lessons from a long-term remote sensing study of vegetation. *Aquatic Ecology* **51**, 177–189.
- Jin ID, Yun SJ, Matsuishi Y, Iwaya-Inoue M (2005) Changes in the water content and germination rate during seed desiccation and their inter-specific differences among *Zizania* species. *Journal of the Faculty of Agriculture, Kyushu University* **50**, 573–583.
- Komarov VL (1934) Flora of the U.S.S.R., Volume II. Israel Program for Scientific Translations (1. January 1963).
<https://www.biodiversitylibrary.org/item/106072#page/1/mode/1up>
- Kuusk V, Tabaka L, Jankeviciene R (2003) Flora of the Baltic Countries. Compendium of Vascular Plants Vol. 3.
https://kogud.emu.ee/files/Flora_of_the_Baltic_Countries_3.pdf
- Kwon GJ, Lee BA, Byun CH, Nam JM, Kim JG (2006) The optimal environmental ranges for wetland plants: I. *Zizania latifolia* and *Typha angustifolia*. *Journal of the Korean Society of Environmental Revegetation Technology* **9**, 72–88.
- Li W (1996) Yellow water in East Taihu Lake caused by *Zizania latifolia* and its prevention. *Journal of Lake Sciences*

Li Z, Zhang X, Wan A, Wang H, Xie J (2018) Effects of water depth and substrate type on rhizome bud sprouting and growth in *Zizania latifolia*. *Wetlands Ecology and Management* **26**, 277–284.

Liatukas Ž, Stukonis V (2009) *Zizania latifolia* – a new alien plant in Lithuania [*Zizania latifolia* – naujas svetimžemis augalas Lietuvoje]. *Botanica Lithuanica* **15**, 17–24.

Maltseva SY, Bobrov AA (2017) Alien species of vascular plants in the Rybinsk reservoir (Upper Volga, Russia). *Russian Journal of Biological Invasions* **8**, 321–326.

Matveev VI, Soloviyova VV (1997) *Tsitsaniya—dikii ris: ekologiya, biologiya, prakticheskoe znachenie (Zizania—Wild Rice: Ecology, Biology, Practical Importance)*, Samara: Samara Gos. Pedagog. Univ.

Matveev VI, Zotov AM (1973) *Zizania latifolia* in Kuibyshev Oblast and its relations with the species of local flora, in *Voprosy morfologii i dinamiki rastitel'nogo pokrova (Morphology and Dynamics of Vegetation Cover)*, Kuibyshev: Kuibyshev Gos. Pedagog. Inst., 1973, vol. **107**, no. 2, pp. 63–69.

Ministry for Primary Industries (2023) Official New Zealand Pest Register - *Zizania latifolia*. <https://pierpestregister.mpi.govt.nz/pests-of-concern/pest-details?id=105445>

Morozova OV (2014) East Asian species in alien flora of European Russia. *Botanica Pacifica* **3**, 21–31.

New Zealand Plant Conservation Network (2023) *Zizania latifolia*, <https://www.nzpcn.org.nz/flora/species/zizania-latifolia/>

Notov AA (2009) *Adventive Component of Tver Regional Flora: Dynamics of Composition and Structure*. — Tver: Tver State Univ. Press 473 p.

Ohkawara K, Tajiri H (2023) Effects of grazing on underground parts of marsh plants by wintering Middendorf's bean goose *Anser fabalis middendorffii*: Its role as a keystone species in plant communities. *Ecological Research* **38**, 583–592.

Ohwi J (1964) *Flora of Japan: combined, much revised and extended translation in English*. Washington, Smithsonian Institution, 1965, <https://www.biodiversitylibrary.org/bibliography/43786>

Seok JE, Lim BS, Moon JS, Kim GS, Lee CS (2023) Spatial distribution of vegetation on stream bars and the riparian zone reflects successional pattern due to fluid dynamics of river. *Water* **15**, 1493. <https://doi.org/10.3390/w15081493>

Shaw WB, Allen RB (2003) *Ecological impacts of sea couch and saltwater paspalum in Bay of Plenty estuaries*. DOC Science Internal Series. New Zealand Department of Conservation 112, 18.

Starodubtseva EA, Grigoryevskaya AY, Lepeshkina LA, Lisova OS (2017) Alien species in local floras of the Voronezh region nature reserve fund (Russia). *Nature Conservation Research* **2**, 53–77. <https://doi.org/10.24189/ncr.2017.041>

Tang H, Chen F, Bai J, Lou Y (2022) Responses of early recruitment processes with rhizome to flooding depth and salinity in Manchurian wild rice (*Zizania latifolia*). *Aquatic Ecology* **56**, 619–629. <https://doi-org-1errmi6ar0bc3.pisces.boku.ac.at/10.1007/s10452-021-09927-5>

Tanner CC (1996) Plants for constructed wetland treatment systems — A comparison of the growth and nutrient uptake of eight emergent species. *Ecological Engineering* **7**, 59–83.

Terrell EE, Batra LR (1982) *Zizania latifolia* and *Ustilago esculenta*, a grass-fungus association. *Economic Botany* **36**, 274–285.

Tzvelev NN (1976) *Grasses of the USSR (edited by Fedorov ??)*. Leningrad, Nauka Publishing House, P. 100

Tzvelev NN, Probatova NC (2019) Grasses of Russia. 2019.

Verloove F (2011) *Zizania latifolia*. Manual of the Alien Plants of Belgium. Botanic Garden Meise, Belgium. At: alienplantsbelgium.be, accessed 12/06/2023.

Vinogradova Y, Pergl J, Essl F, et al. (2018) Invasive alien plants of Russia: insights from regional inventories. *Biological Invasions* **20**, 1931–1943. <https://doi-org-1000983cy1d8d.pisc.es.boku.ac.at/10.1007/s10530-018-1686-3>

Wagutu G, Xiangrong F, Fu W, Tengwer MC, Li W, Chen Y (2022) Genetic structure of wild rice *Zizania latifolia* in an expansive heterogeneous landscape along a latitudinal gradient. *Frontiers in Ecology and Evolution* **10**, 929944. <https://doi.org/10.3389/fevo.2022.929944>

Wang Q, Chen J, Liu F, Li W (2014) Morphological changes and resource allocation of *Zizania latifolia* (Griseb.) Stapf in response to different submergence depth and duration. *Flora* **209**, 279–284.

Watanabe T, Watanabe H, Yamamoto A, Shimizu Y (2008) The importance of *Zizania latifolia* as food for Geese and Swans at inland waters and differences in foraging methods among species. *Japanese Journal of Ornithology* **57**, 97–107.

Watson T, Tidwell E, Fogle DG (1991) Disease note: Smut of Manchurian wild rice caused by *Ustilago esculenta* in California. *Plant Disease* **75**, 1075.

Wen JH, Li BY, Xiao HY, Gong CY, Gao AG, Wang YH, Wu AP (2023) Floating mat formation makes *Zizania latifolia* more competitive under the conditions of continuous significant water level rise. *Plants* **12**(5), 1193.

William PA, Champion P (2008) Biological success and weediness of existing terrestrial pest and aquatic weeds in Northland. Landcare Research Contract Report: LC0708/080.

Wu W, Han Y, Nui B, Yang B, Liu R, Fang X, Chen H, Xiao S, Farag MA, Zheng S, Xiao J, Chen H, Gao H (2023) Recent advances in *Zizania latifolia*: A comprehensive review on phytochemical, health benefits and applications that maximize its value. *Crit Rev Sci Nutr*. **12** 1–15.

Xie Y-N, Qi Q-Q, Li W-H, Li Y-L, Zhang Y, Wang H-M, Zhang Y-F, Ye Z-H, Guo D-P, Qian Q, Zhang Z-F and Yan N (2023) Domestication, breeding, omics research, and important genes of *Zizania latifolia* and *Zizania palustris*. *Frontiers in Plant Science* **14**, 1183739. <https://doi.org/10.3389/fpls.2023.1183739>

Yan N, Xu X-F, Wang Z-D, Huang J-Z, GUO D-P (2013) Interactive effects of temperature and light intensity on photosynthesis and antioxidant enzyme activity in *Zizania latifolia* Turcz. *Plants. Photosynthetica* **51**, 127–138.

Yang Z, Davy AJ, Liu X, Yuan S, Wang H (2020) Responses of an emergent macrophyte, *Zizania latifolia*, to water-level changes in lakes with contrasting hydrological management. *Ecological Engineering*, <https://doi.org/10.1016/j.ecoleng.2020.105814>

Ye Z, Liu J, Jin Y, Cui H, An X, Fu X, Yu X (2017) Physiological and proteomic changes in *Zizania latifolia* under chilling stress. *Biologia* **72**, 1291–1299.

Zhang D, Zhou K, Liu C, Li X, Pan S, Zhong L (2023) Dissipation, uptake, translocation and accumulation of five phthalic acid esters in sediment-*Zizania latifolia* system. *Chemosphere* **315**, 137651.

Zhang X, Wan A, Wang H, Zhua L, Yin J, Liu Z, Yua D (2016) The overgrowth of *Zizania latifolia* in a subtropical floodplain lake: Changes in its distribution and possible water level control measures. *Ecological Engineering* **89**, 114–120.

Zub LM, Prokopuk MS (2020) The features of macrophyte invasions in aquatic ecosystems of the middle Dnieper Region (Ukraine). *Russian Journal of Biological Invasions* **11**, 108–117. <https://doi.org/10.1134/S2075111720020137>

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