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LETTER TO THE EDITOR

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From rediscovered "niche" to "mainstream" – *Glyceria fluitans* as a candidate grain for manufacturing premium food products

I read with interest the opinion article titled 'Plants and People: Our Shared History and Future' in *Plants, People, Planet*. The diet of many cultures traditionally consists of grains and we must think on a global scale about developing nutritious food, which appears – as discussed by Barbara Schaal (2019) – to hold promise for the future. The author presented the view that there is substantial potential for the discovery of new types of food that can be beneficial to health. Although changes in lifestyle and consumption patterns, and the demand for nutritious new crops varieties have been noted (Schaal, 2019), I would like to stress the role of the rediscovery of particular species, which would be good candidates for manufacturing premium food with palatability. Indian ricegrass (*Achnatherum hymenoides*), a wild plant food, was widely used by native North American tribes, and is nowadays marketed under the brand name *Montina*, a gluten-free all-purpose baking flour with a high protein content (de Lourdes Moreno, Comino, & Souza, 2014; Doebley, 1984). There is a large number of wild African and Asian graminoids that could be considered for intensive breeding programs, e.g., Indian sandbur (*Cenchrus biflorus*; Beseth Nordeide, Holm, & Oshaug, 1994; Bhandari, 1974; Salih, Nour, & Harper, 1992; van Damme, 1998), wild fonio (*Panicum laetum*; Beseth Nordeide et al., 1994; van Damme, 1998), and Indian lovegrass (*Eragrostis pilosa*; Gast, 1972; Gaudin-Harding & Ould-Aoudia, 1972; van Damme, 1998). Of prime importance, among wild plants exploited by native North Americans in the Southwestern USA, are the graminoids of the genus *Glyceria* that was used in Eastern Europe in Roman times (Doebley, 1984; Pirożnikow & Szymański, 2005). From the Middle Ages to the nineteenth century *Glyceria fluitans* (known as floating sweet grass, floating manna grass, and water manna grass) played a special role in Poland, Germany, and Hungary, where it is known as *Manna zwyczajna*, *Flutender Schwaden* (*Wasserschwaden*), and *réti harmutkása*, respectively (Dénes, Papp, Babal, Czúcz, & Molnár, 2012; Drobnik, 2015; Hartwich & Håkanson, 1905; Łuczaj, Dumanowski, Köhler, & Mueller-Bieniek, 2012), Figure 1. The grain of wild *G. fluitans* has been highlighted as a speciality of Polish cuisine by travelers visiting the country (Łuczaj et al., 2012). It was served in dumplings, flatbreads, and in sweet cakes, in broths and soups, with butter or boiled milk, with oriental spices, in addition to its use as a binding additive to sausages. *G. fluitans* was regarded as nutritious, and was recommended by pharmacopoeias to patients with debilitating diseases and malnourished children between the seventeenth and the nineteenth centuries (Drobnik, 2015; Jourdan, 1840; Schumacher, 1825; Stokes, 1812).

Joseph I. Kraszewski, who was educated in Biala Podlaska, Poland, and in Vilnius, Lithuania, was one of the most popular and prolific Polish writers and historians of the nineteenth century. In memoirs from his childhood published in Warsaw's weekly periodical *Nowiny Niedzielne* (No 27, 1877; Sunday News), he described 'manna's feeding with relish'; this is previously unreferenced in scientific literature devoted to *Glyceria*, and could suggest that *G. fluitans* was regarded by the nobility as especially suitable for the nutrition of children. Interestingly, in Rajasthan, India, wild Indian sandbur with ghee and sugar was regarded as a sacred food, especially suitable for the improvement of children's health (Bhandari, 1974). Similarly, in eighteenth-century Poland, *G. fluitans* used in porridge was called *puls coelestris* (heavenly cereal; Bruz, 1775). In the 1880s, the grain of *G. fluitans* was very expensive compared to wheat: it was three times more expensive in Romanów (near Biała Podlaska, former Russian Empire) in 1884, and fourteen times more expensive in Posen Principality (former Prussia) in 1883.

The drive toward a healthier lifestyle and changing consumer demands have generated interest in the quest for new grains, especially those which are gluten-free, that could potentially be used in making processed food products (Boukid, Falloni, Sforza, Vittadini, & Prandi, 2018; Jaworski, Szatańska, & Sawicka, 2016). The selected species of wild graminoids, including *Glyceria* spp., have been called 'sleeping giants' and could be enormously productive for forage purposes with proper development (Small, 1999). A few reports exist on the cultivation of *G. fluitans* in parts of Poland in the nineteenth century, including agro-technological indications regarding this crop which can be found in the Polish handbooks for farmers of that time (Drobnik, 2015). Unfortunately, the nutritional composition of *G. fluitans* has been analysed only once, in Zurich's University of Technology over 100 years ago (Hartwich & Håkanson, 1905). In the report, published in the *Journal for the Study of Nutritional and Edible Remedies*, one of the authors stated that he had consumed the grain in his youth and that he had been a witness to the disappearance of the *G. fluitans* trade in Brandenburg (Prussia). *G. fluitans* seems to be a good source of carbohydrates (75.06%; Hartwich & Håkanson, 1905), and based on its taxonomy,

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FIGURE 1 *Glyceria fluitans* from the Polish translation of Pietro de' Crescenzi's manual of agriculture *Ruralia commoda* (Crescetyn, 1571)

G. fluitans can be considered gluten-free (de Lourdes Moreno et al., 2014); however, it can take years to select cultivars that are suitable for intensive farming and grain harvesting, and as such, it may not be seen in our supermarket shelves for some time to come.

KEYWORDS

cereal breeding, foraging, *Glyceria fluitans*, Polish cuisine, traditional foods, wild graminoids

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