NORDIC JOURNAL OF
BOTANY

Research

Key to the determination of taxa of Lemnaceae: an update

Manuela Bog, Klaus J. Appenroth and K. Sowjanya Sree

M. Bog, Inst. of Botany and Landscape Ecology, Univ. of Greifswald, Greifswald, Germany. – K.-J. Appenroth, Matthias-Schleiden-Inst. – Plant Physiology, Friedrich Schiller Univ. Jena, Jena, Germany. – K. S. Sree (https://orcid.org/0000-0002-1356-3406) ✉ (ksowsree9@cukerala.ac.in), Dept of Environmental Science, Central Univ. of Kerala, Periye 671320, Kerala, India.

Nordic Journal of Botany
2020: e02658
doi: 10.1111/njb.02658

Subject Editor and
Editor-in-Chief: Torbjörn Tyler
Accepted 15 June 2020
Published 10 August 2020

Species of Lemnaceae have a high potential for fast biomass production, and this is increasingly gaining attention among researchers in basic plant sciences as well as among entrepreneurs for feed, food and energy production. Hence, the correct identification of the species being used for different duckweed research and applications is becoming indispensable. Here, we present an updated identification key based on morphological markers to the currently accepted 36 species of duckweeds, considering all taxonomic revisions since the publication of the previous key by E. Landolt in 1986. We also provide supplementary morphological characterization and the geographical occurrence of each species of Lemnaceae.

Keywords: angiosperm aquatic plants, duckweed, Lemnaceae, species determination key

Introduction

In 1980, in the publication 'Key to the determination of taxa within the family of Lemnaceae', the late Elias Landolt demarcated the different Lemnaceae taxa based on morphological markers and developed a model for the relationship between them (Landolt 1980). This 'key' was then slightly modified in his monograph (Landolt 1986). However, in the last 30 years several taxa have been added, reconsidered or merged. The genus *Landoltia* Les & Crawford was introduced by Les and Crawford (1999, cf. Wiersema 2015); the species *Wolffiella caudata* Landolt (Landolt 1992), *Wolffia neglecta* Landolt, *Wolffia cylindracea* Hegelm. (Landolt 1994), and *Lemna yungensis* Landolt (Landolt 1998) have been newly described; *Lemna ecuadoriensis* Landolt has been merged with *L. obscura* (Austin) Daubs (Landolt 2000); *Lemna valdiviana* Phil. and *L. yungensis* Landolt were recently synonymised under the name *L. valdiviana* Phil. (Bog et al. 2020a, b), and the name *L. minuscula* has been replaced by *Lemna minuta* Kunth (Reveal 1990). Several of these changes were reviewed by Sree et al. (2016). Considering these above-mentioned significant changes in the taxonomy of Lemnaceae, using the three-decades-old 'key' of Landolt (1986) would inevitably confuse the present-day users.

The miniaturization of plant body accompanied by reduction in morphological and anatomical complexity of the members of Lemnaceae have posed challenges for species determination exclusively dependent on morphological markers. Over the past few decades, the advent and the advancements in the field of molecular biology have

NORDIC SOCIETY OIKOS

www.nordicjbotany.org