

Short communication

Karyomorphometric analysis of somatic chromosomes of selected seagrasses of families Hydrocharitaceae and Cymodoceaceae



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ABSTRACT

Chromosome numbers of eleven seagrass species were determined. The highest chromosome number was recorded in *Halodule* spp. ($2n = 44$) and the lowest chromosome number was observed in *Cymodocea rotundata* ($2n = 14$). Chromosome numbers were identical or closely related among different species in the same genus. Karyomorphology was mapped for nine species (*Halodule pinifolia*, *Halodule uninervis*, *Halodule wrightii*, *Syringodium isoetifolium*, *Enhalus acoroides*, *Halophila beccarii*, *Halophila ovalis* (subsp. *ovalis* and *ramamurthiana*) *Halophila ovata* and *Thalassia hemprichii*). Length of the chromosomes of these species varied from 7.81 to 336.63 μm while the fundamental arm number ranged between 36 and 85. The results confirm the karyotypic variation among the studied species, indicating that this characteristic can be used to confirm taxonomic identity of species which are morphologically very similar (eg. *Halodule* spp.). All tested species were diploid, except for *Cymodocea rotundata*.

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1. Introduction

Seagrasses represents the paraphyletic group of marine hydrophilous angiosperms that evolved on 3 or 4 independent occasions from land or freshwater plants for their marine existence (Jutta, 2012). Despite they represent less than 0.1% of the angiosperm taxa, the taxonomical status of some species is still under debate, and high morphological similarities among certain species contributes to this uncertainty. Chromosomes are the key building blocks of eukaryotic genomes and its organization information provides evidences for their gene expression and genome maintenance (Tiang et al., 2012) and provide evidence for plant evolution and diversification (Stace, 2000). Chromosome organization is known only for about 25% of angiosperms (Benenett, 1998). Chromosome numbers and morphology (Supplementary material Table 1) can serve as useful taxonomic characteristics to distinguish between different taxa (Kuo, 2011) at least to the genus level.

Chromosome numbers of 54 species have been reported (supplementary Table 1) out of the 72 identified seagrass (Short et al., 2011). The knowledge of the chromosome numbers of seagrass is still incomplete. Existing literatures on seagrass chromosome num-

bers indicates inconsistency for the same species, however such information would add knowledge on the evolution of the genera and family in the world. Especially, the chromosomal records for Hydrocharitaceae are sparser and are restricted to only for a few species in this family (Feitoza et al., 2009) whereas the information available for Cymodoceaceae are inconsistent.

Chromosome count in seagrasses is often difficult due to the presence of hard particles in the roots (hindering the squashing), granulation of the cytoplasm (*Syringodium filiforme*), and the large number of chromosomes (*Halodule wrightii*). Chromosome numbers are different in some genera (*Zostera*, *Heterozostera* and *Phyllospadix*) and subgenera (*Zosteralla* in *Zostera*) of the family Zosteraceae, however, the number is similar among different species within the same genus or subgenus (Kuo et al., 2003). However, it is important to study chromosome numbers by using better cytological techniques thereby improving the reliability of the counts (den Hartog, 1979). Chromosome number alone may not be a useful character for distinguishing seagrass species globally and definite karyomorphological features need to be standardized. Both the chromosome numbers and the chromosome morphology (den Hartog et al., 1979) would be a better cytotaxonomic tool for the identification of the taxa.

Hence, the present study was aimed to determine the chromosome number of seagrasses belonging to the families Hydrocharitaceae and Cymodoceaceae and map the karyomorphometric characters of selected tropical seagrasses.

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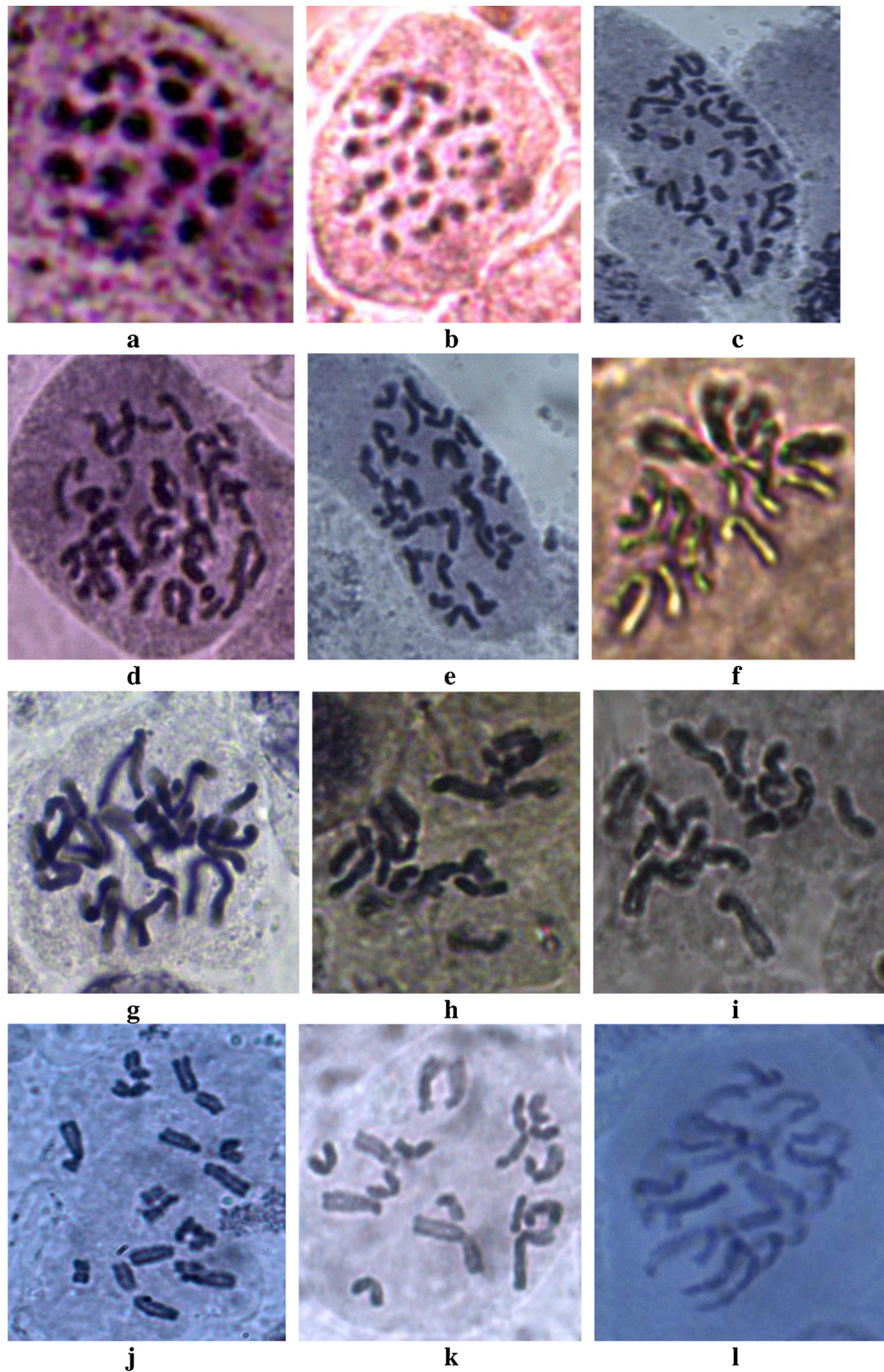


Fig. 1. Micrographs (1000 \times) showing somatic chromosome configurations of a) *Cymodocea rotundata*; b) *C. serrulata*; c) *Halodule pinifolia*; d) *H. uninervis*; e) *H. wrightii*; f) *Syringodium isoetifolium*; g) *Enhalus acoroides*; h) *Halophila beccarii*; i) *H. ovalis* subsp. *ovalis*; j) *H. ovalis* subsp. *ramamurthiana*; k) *H. ovata* and l) *Thalassia hemprichii*.

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