A new record of seagrass, *Halophila decipiens* Ostenfeld (Hydrocharitaceae), in Taiwan

Hin-Kiu Mok¹, Jeng-Di Lee¹, Chung-Pan Lee²

¹Institute of Marine Biology, National Sun Yat-sen University, Kaohsiung, Taiwan, Republic of China
²Department of Marine Environment, National Sun Yat-sen University, Kaohsiung, Taiwan, Republic of China

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Abstract. In a series of underwater surveys made in 1992 by a remotely operated vehicle and by scuba divers, a seagrass, *Halophila decipiens* Ostenfeld, was found at 2-40 meters along the southwestern coast of the Hunchun Peninsula, Taiwan. This is the second *Halophila* species reported in Taiwan. *H. decipiens* was found in several small colonies in a sandy area. Flowering was noticed in April. Its occurrence and abundance exhibit no clear relationship to depth and season. A line drawing of external morphology, a description, the distribution, and a note on ecology are provided.

Key words: Benthic vegetation; Seagrass; Hydrocharitaceae; *Halophila decipiens*; Remotely operated vehicle.

Five linear-leaf species and possibly two oval-leaf species of seagrass have been reported in Taiwan (Yang, 1978; Doebler, 1984). One oval-leaf species, *Halophila ovalis* Hook, is distributed on the Pescardo Islands, southern and eastern Taiwan (Yang, 1978; Yang, pers. comm.). The other oval-leaf *Halophila* species, *H. beccarii* Aschers., was recorded in Taiwan by Masamune, but Yang (1978, and pers. comm.) remains uncertain of its occurrence in this region due to the lack of available specimens.

Most of the early surveys of seagrass in Taiwan had been made in the intertidal zone (Doebler, 1984; Huang, 1989). The subtidal surveys of benthic vegetation in southern Taiwan conducted in the last twenty years have been limited to the study of macroalgae (e.g., Chiang, 1973; Chiang and Wang, 1986; Dai et al., 1992). An underwater survey was undertaken in southern Taiwan in 1992, using a remotely operated vehicle (ROV), at depths between 20 and 100 meters. *Halophila decipiens* Ostenfeld was first discovered at 25 meters via the ROV. The seagrass was small and difficult to collect with the articulator of the ROV. *In situ* observation and specimen collecting were carried out at various depths by scuba divers, with the assistance of the ROV (Tables 1, 2).

The specimens were collected from the water intake and discharge channels of Nuclear Power Plant III at Nanwan (Fig. 1), and deposited at the Institute of Marine Biology, National Sun Yat-sen University, Cat. No: NSYSU–IMB–MOK–SG–001 to 008.


Rhizomes thin, fragile, 0.4-0.7 mm in diameter; nodes 1-rooted, 2-scaled, 2-leaved; internodes 13.0-20.0 mm long; scales transparent, keeled, obovate, hairy abaxially, incised at apex, amplexicaule at base, 2.3-3.7 mm long. Leaves oblong - obovate, rounded at apex, cuneate at base, bright green, unicellular-haired, 9.0-13.0
Table 1. Seasonal occurrence (+) of *H. decipiens* in southwestern Taiwan. Blank indicates no data.

<table>
<thead>
<tr>
<th>Localities</th>
<th>April</th>
<th>July</th>
<th>October</th>
<th>January</th>
</tr>
</thead>
<tbody>
<tr>
<td>Howan</td>
<td>−</td>
<td>+</td>
<td>−</td>
<td>−</td>
</tr>
<tr>
<td>Wanliton</td>
<td>+</td>
<td>−</td>
<td>−</td>
<td>−</td>
</tr>
<tr>
<td>Water discharge channel of NPP-III</td>
<td>−</td>
<td>+</td>
<td>−</td>
<td>+</td>
</tr>
<tr>
<td>Water intake channel of NPP-III</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Nanwan</td>
<td>+</td>
<td>−</td>
<td>−</td>
<td>+</td>
</tr>
</tbody>
</table>

Our specimens differed from those described elsewhere. The stem was indistinct or less than 1 mm vs. about 5 mm long in others (den Hartog, 1970; de Oliveira et al., 1983). Due to the fact that *H. decipiens* has a world-wide pantropical distribution, e.g., the Atlantic, Australia, Indonesia, Thailand (den Hartog, 1970), the variation may be intra-specific. *H. decipiens* can be distinguished from *H. ovalis* by its hairy leaves.

Distribution and Ecology

*Halophila decipiens* has only been reported in Taiwan on the southwestern coast of Henchun Peninsula (this report). The depth limit of this sciaphilous species is about 85 meters (den Hartog, 1970) and it usually occurs between 10 and 40 meters (den Hartog, 1970; Duarte, 1991). We found it in 2 to 40 meters (Table 2). It exhibits a number of adaptations to a low-light environment, including a high ratio of leaf tissue to non-photosynthetic tissue, a low leaf-area index to reduce self-shading, a high turnover of leaf material, and the ability to rapidly colonize sandy bottoms when suitably illuminated (Josselyn et al., 1986:47). Relatively little is known about the ecology of *H. decipiens*, especially of those at depths below 10 meters (Josselyn et al., 1986). The other *Halophila* species in Taiwan, the shrimp grass *H. ovalis*, usually occurs in the intertidal zone and seldom lives in waters deeper than 10 meters.

In the tropical Caribbean the flowering of *H. decipiens* occurs throughout the year and peaks between January and April (McMillan and Soong, 1989). We collected only one flowering specimen, in April, 1992. Further investigation of its flowering season in Taiwan is in order. On the Henchun Peninsula *H. decipiens* grew in small scattered patches. Only one patch was found during two underwater inspections.

Table 2. Distribution, substrate characteristics and colony size of *H. decipiens* on the southwestern coast of Taiwan. +, ++, ++++, abundance in increasing order

<table>
<thead>
<tr>
<th>Localities</th>
<th>Depth(m)</th>
<th>Substrate</th>
<th>Colonies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Howan</td>
<td>2</td>
<td>Sand</td>
<td>+</td>
</tr>
<tr>
<td>Water intake channel of NPP-III</td>
<td>6</td>
<td>mud</td>
<td>+++</td>
</tr>
<tr>
<td>Water discharge channel of NPP-III</td>
<td>8</td>
<td>mud</td>
<td>++</td>
</tr>
<tr>
<td>Wanliton</td>
<td>25</td>
<td>Sand, mud</td>
<td>++++</td>
</tr>
<tr>
<td>Nanwan</td>
<td>40</td>
<td>mud</td>
<td>++</td>
</tr>
</tbody>
</table>

mm long, 3.3–4.6 mm wide, very finely serrulate, the cross-veins 6–8 pairs, the intramarginal-veins run at 0.5 mm from the margin. Petioles 4.5–14.0 mm long. Plants monoocious. Flowers 1-staminate and 1-pistillate, enclosed by 2 bracts; bracts 2, membranous, transparent, keeled, ovate, acuminate, 3.0–3.5 mm long, hairy outside. Staminate flower pedicled, completely broken off after anthesis; tepals oblong-elliptic. Pistillate flower subsessile; ovary ovoid, unilocular; styles 3. Fruit globose, 3.0–3.5 mm long; pericarp membranous, transparent; beak ca. 1 mm long. Seeds numerous, ovoid, ca. 0.5 mm in diameter.
indicating an unstable survival pattern in this region (Table 1). It has been found in continuous beds on the Caribbean coast of Panama (McMillan, 1988). No clear relationship was revealed between abundance and depth or season (Table 2). The substrate of the *Halophila decipiens* beds was sand and mud (Table 2), which may be an important factor in its distribution.

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Literature Cited

Doebler, P. K. 1984. Seagrass of Taiwan as a potential source. Master thesis, National Taiwan University.


台灣新紀錄海草：毛葉鹽草

莫顯儒1 李政諺1 李志潘2

1國立中山大學海洋生物研究所
2國立中山大學海洋環境學系

在一項使用遙控水下潛航器進行台灣南部海域的底棲生態調查研究中，發現生長於水下2-40公尺的新紀錄海草，毛葉鹽草 Halophila decipiens Ostenfeld。本文描述其形態、分佈、與生態資料。