

### III. Biological Data

#### 13. Higher Plants in the littoral zone of Lake Kasumigaura \* Currently this item is not measured.

(by Seiich Nohara)

##### 1. Study site

The following four stations were set at the shoreline of Lake Kasumigaura, and the survey was conducted on August 3-4, 1992.

Furuwatari of Edozaki-iri (St. 1)

Miho (St. 2)

Tsuchiura (St. 3)

Sakihama (St. 4)

In general, large vegetation of *Nymphoides peltata*, one of floating-leaf plants, was found, except at St. 2. Among these stations, natural conditions of the lakeshore are kept near St. 3, except in the vicinity of old shore protection.

We set several observation lines perpendicular to the lakeshore at each station. The number of lines is from 3 to 5 for one station. The line number  $m$  is counted from the right direction facing the lake, and the lines indicated as Line ( $m$ ). The observation points were set 5 m interval along each line. The positions of these points were determined by digital theodolite (Nikon, DTM-A20CLG). The quadrats for plant coverage were set at each observation point.

##### 2. Method

We set 13 observation lines in total for the four stations. The quadrats of 1 m  $\times$  1 m were set at intervals of 5 m, and the most offshore point was set at the water depth of about 1 m. Species of the plants found in each quadrat were recorded, and coverage degree of each species was measured.

The following 7 ranks are used for the coverage degree: r (one plant is found), + (coverage ratio is 1-5%), 1 (6-10%), 2 (11-25%), 3 (26-50%), 4 (51-75%), and 5 (76-100%).

Identification of species and of original growing conditions (aquatic plant, swamp plant or land plant) was made according to the illustrated book of the Japanese flora (Kitamura et al., 1964). Submerged plants were not surveyed, as they cannot be measured by eyes.

Water depth and thickness of mud were measured by putting vertically a glass-fiber pole of 5 mm diameter and of 2 m length.

Further, aerial photographs were taken obliquely from a Cessna type plane, by using 4  $\times$  5 camera (Aerotechnica) and color film (KODAK PCNG ISO160<sup>0</sup>) for Edosaki-iri and Tsuchiura-iri on August 10, and for Takahama-iri and offshore of Asou on August 25.

## **Reference**

Kitamura, S., G. Murata and T. Koyama (1964): Colored illustrations of herbaceous plants of Japan. I, II, III. Hoikusha Pub., Co., LTD., Osaka.