

# ANALYSIS OF PLANT BIODIVERSITY AND SUCCESSION IN A REED RESTORATION FIELD ON LAKE BIWA SHORE BY A LONG-TERM MONITORING SURVEY

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## 1. BACKGROUND

Reed restoration projects on Lake Biwa shore have failed due to lack of monitoring. One cause of their failure is the growth of willow trees. In Biyo Center reed plantation field no willow in 1998 and 14 years later in 2011 willow grew well in that area. The objective of this research is to understand the effects of willow growth on plant succession by a long-term monitoring survey.

## 2. MATERIAL AND METHODS

(1) Long-term monitoring survey: this survey was carried in a reed experimental plantation zone located in Biyo Center, Kusatsu, Shiga, Japan, and consists of six zones (A, B, C, D, E and F). Reeds were planted from 1997 to 2000. Plant surveys have been conducted since 2000 to date by using the *Braun-Blaquet* method.

(2) Ground level survey: this survey was carried out in Biyo Center and other reed plantations by using auto-level equipment and Lake Biwa Standard Level (B.S.L.)

(3) Survey on *Salix chaenomeloides* (willow) in a reed restoration named Harie. This was conducted by using the GPS method to map vegetation coverage.

## 3. RESULTS AND DISCUSSIONS

Plant succession in Biyo Center showed different patterns in each zone and four zones A, B, C and D were colonized by willow. Zone A and B showed the highest coverage of willow, increased from 0 to 37 % in zone A and from 0 to 73 % in zone B. In contrast reed coverage

declined in zone A from 36 % to 4 % and from 33 to 8 % in zone B in a period of 12 years monitoring from 2000 to 2011. In Zone E and F willow was not able to grow completely. The main difference between planting zones is the ground level; higher ground level observed in zones A, B and C and lower ground level and zone in zone D, E and F. Willow was distributed on ground level from B.S.L. -30 to 50 cm, but higher coverage was found in ground level B.S.L. -10 to 10 cm.

Long-term monitoring provided information of coverage of willow increase and relationships with other species was determined. Reed, *Paspalum distichum* and *Bidens frondosa* are some species inhibited by willow growth. *S. canadensis* and *I. pseudacorus* are species favored and their coverage had been increased in the 14 years.

## 4. CONCLUSION

Plant succession for 11 to 14 years showed that areas of higher ground level were colonized by willow can be considered as climax in succession. However, this is not the final stage of succession mainly for lower ground levels due to variations of water level of Lake Biwa. For this reason, monitoring should be extended in a longer term to understand further succession.