DEPRESSION OF THE HYGROPHYTIC WEED IN PASTURE ESTABLISHMENT WITH CONSIDERATION TO WILDLIFE HABITAT

T. Sugiura and H. Kobayashi
School of Veterinary Medicine and Animal Sciences, Kitasato University Towada, Aomori 034 Japan

ABSTRACT
We investigated the influences of lower ground water level on the hygrophytic weed which luxuriated at the abandoned paddy field as a pasture establishment method in wetland with consideration to wildlife habitat. In comparison with the control, the leaf of common reed (*Phragmites communis* Trin.) at the drainage area was decreased by the 60% in weight and distributed at lower layers due to water stress. The photosynthetic rate of the common reed was also decreased by 64%. At the end of the growing season, the botanical composition began to include more short type species.

KEYWORDS
Hygrophytic weed, Pasture establishment, Wildlife habitat

INTRODUCTION
The area of abandoned paddy fields has been increasing since the government implicated a rice production adjustment policy in 1971. The hydrographytic weed luxuriated in the abandoned fields as a result of halted rice production, and the vegetational condition offered a habitat for wildlife that were flushed out from their natural habitat. On the other hand, the livestock farmers expected to use the field effectively as a grassland to secure self-supplying feed or lower the cost of production in opposition to the liberalization of beef imports. When the farmland is used as grassland, it needs extreme care in symbiosis with wildlife. To achieve this objective, we propose a method of hydrographytic weed control by draining the ground water and describe the influences of lower ground water level on the hygrophytic weed in this paper.

MATERIALS AND METHODS
A field of 250 ha area was reclaimed by drainage for a paddy field in 1969. The land was drained and burned every spring until the present time. As a result of the continuous human impact, the vegetation was dominated by the communities of common reed and sedge, which made it an optimum environment for wildlife habitat. The test area set up was partitioned at 100m^2 size by 4 m length iron plates for cutting the water flow from the outside; the ground water was drained to keep the ground water level at 80 cm. The soil water tension at the surface was measured by the porous cups and a manometer every day.

As morphological factors, culm height and length, width and emergence height of individual leaf of the marked twenty common reeds were measured every another week from June to October. At the start and the end of the growing season, all plants in a 0.25 m^2 quadrant were cut at 20 cm intervals in height after the relative illuminance was measured, and the sample parts of the leaf, stem and dead materials of each species were weighed.

The photosynthetic rate of individual leaves at five common reed plants in the drainage and the control areas were measured six times repeatedly by a portable photosynthetic rate meter (koito KIP-8510) on 13 July and 7 October 1994. The average of the fifth and the sixth measurement values of each leaf were considered to be the effective value the individual leaf photosynthetic rate.

RESULTS AND DISCUSSION
Surface soil water tension at the drained area was -31.50 cm H_2O which is equivalent to pF 1.4 as a field capacity of the Ando soil, and it was 5 cm H_2O stronger than that at the control area. The drainage method in this study has proven to be effective for drying the surface soil. At the end of a five month drainage period, there were no significant differences on the culm height and on the standing crop of common reed between both areas. However, it is shown in table 1 that the leaf decreased in weight by 60% and the peak of distribution was 40 cm lower than the control. At the leaf structure, light penetrated to a near ground surface and it formed more short type plant communities. In July, the photosynthetic rate at the drained area was 5 $mgCO_2$ /dm^3/h lower than that in the controlled area. The difference of both areas were increased for the next three months to 8 $mgCO_2$ /dm^3/h. The results show that the drainage treatment reduced the physiological vigor of common reed. From the results, we considered that the lower ground water level influenced on common reed community not only as the morphological factors but also as the physiological factors.

Table 1
Dry Weight(g/m^2) distribution of common reed's leaf and stem

Height	July		October			
	Control		Control		Drain	
(cm)	Leaf	Stem	Leaf	Stem	Leaf	Stem
220-240			2.76			
200-220			55.32	21.20		1.48
180-200			68.24	43.44	3.72	4.20
160-180			51.52	21.36	28.60	19.56
140-160			17.44	33.48	36.88	32.32
120-140	9.80	2.04	8.68	39.36	33.40	49.16
100-120	72.84	23.56	9.00	44.84	20.84	58.40
80-100	102.76	70.84	4.88	55.28	3.76	57.84
60-80	72.32	103.08	5.28	79.56	1.52	58.44
40-60	52.52	127.44	0.00	85.52	1.28	79.00
20-40	23.72	156.84	0.00	100.48	0.00	84.52
0-20	11.60	187.64	0.00	73.64	0.00	94.96