

# Changes in Nitrogen Content of Soil Freshwater and Weed Density under Rice-Duck Farming System

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## Objectives

This work was conducted to establish best farming technique for maintaining a sustainable soil health in big-size rice-duck farmland, and to observe the effects of rice-duck farming system on agricultural irrigation water and weed occurrence.

## Materials and Methods

- Material : Rice, cv. Yonggeum#1 (Transplanting date : May 30, 2004)
- Treatments · Ducks were released in paddy field until heading stage from transplanting, and all residues of hairy vetch grown during winter months were re-supplied as nitrogen source.
  - 30 Ducks-raising  $10a^{-1}$
  - 15 Ducks + 2,000kg  $10a^{-1}$  of Hairy vetch residues
  - 2,000kg  $10a^{-1}$  of Hairy vetch residues
- Weed occurrence and populations : Maximum tillering stage
- Arthropods community : Maximum tillering stage, Grain filling stage
- Yield and yield components of the rice plants
- Nitrogen monitoring in irrigation water at intervals of 10 days after transplanting

## Results and Discussion

- Our study re-demonstrated that duck-raising in paddy field had an excellent effect on the control of dominant weed species. A combined treatment with duck-raising and hairy vetch residues totally removed all observed weed species except *Echinochloa crus-galli*, however, a single treatment of hairy vetch residues hadn't a significant influence on weed control.
- As the results of nitrogen contents of a freshwater in paddy field, duck's excrements caused a little increase of  $NO_3^-$ -N and  $NH_4^+$ -N contents. Also, it didn't show the distinctive relation between duck populations and nitrogen contents. The change in nitrogen form was entirely dependent upon steady-state redox potentials of a freshwater in paddy field.

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Table 1. Weed occurrence at maximum tillering stage under rice-duck farming system

| Treatments                         | Weed occurrence (g fresh wt m <sup>2</sup> ) |                         |                               |                          |                              |
|------------------------------------|--|-------------------------|-------------------------------|--------------------------|------------------------------|
|                                    | <i>Monochoria vaginalis</i>                  | <i>Cyperus amuricus</i> | <i>Echinochloa crus-galli</i> | <i>Bidens tripartita</i> | <i>Persicaria hydropiper</i> |
| Duck-raising                       | 0  | 0                       | 15.6                          | 0                        | 0.5                          |
| Duck-raising +Hairy vetch residues | 0  | 0                       | 10.3                          | 0                        | 0                            |
| Hairy vetch residues               | 10.3   | 2.2                     | 11.2                          | 3.0                      | 1.0                          |

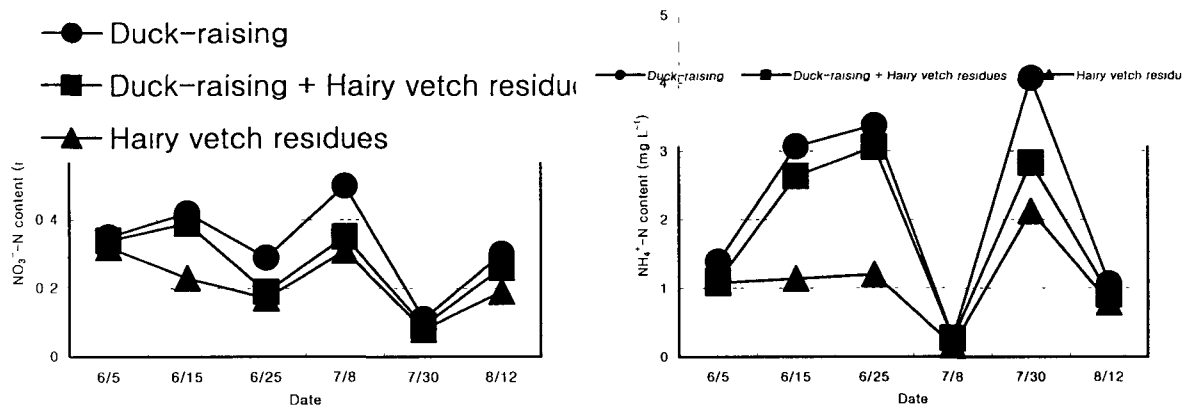


Fig 1 Changes in NO<sub>3</sub><sup>-</sup>-N and NH<sub>4</sub><sup>+</sup>-N contents of a freshwater of soil in paddy field during duck-raising period.