2.4.10 Laboratory : Animal Husbandry Resources

Member:	Professor	Hirooka, Hiroyuki, D. Agric. Sci.
	Associate Professor	Kumagai, Hajime, D. Agric. Sci.
	Assistant Professor	Oishi, Kazato, MSc. Agric. Sci.
	Doctor's program	3
	Master's Program	9
	Undergraduate	4
	Post-Doctoral fellow	1

A. Research Activities (2009.4-2010.3)

A-1. Main Subjects

a) Total evaluation for animal production systems

Data and information on genetic performance, nutrition, management and economic situations for beef, dairy, pigs, sheep and goats were collected from various research fields concerning animal sciences in order to evaluate total animal production systems. Modeling and simulation of such systems were carried out.

b) Studies on livestock production systems in tropical areas

Surveys have been conducted to investigate various performances of native livestock, nutrient requirements of the livestock, feeding system, quality of feeds and grassland production in tropical areas. Such information will be used to search better strategies for improving the existing systems. Sustainable farming systems integrated between livestock and crops in smallholders in the developing countries were evaluated through modeling works. The surveys have been conducted in the south area of Thailand and in the central area of Nepal.

c) Studies on environmental problems in animal production

Since animal industries have been specialized and scaled up, environmental pollution caused by such animal industries led to serious problems in society in Japan. Models for predicting excretion of nitrogen and phosphorus from animal production systems were developed and a country-wide fact-finding studies of the connection between crop and animal industries were performed in order to define the role of animal industry in establishing a sustainable agriculture.

d) Studies on effective utilization of unused resources as fodders of animals

Use of by-products as feeds of ruminants have been considered as one of the ways to do resources recycling effectively. Therefore, evaluation of several by-products as feed resources, development of organic, chemical and physical treatments to improve forage quality of the by-products, and use of forages made from the by-products in dairy cattle and beef cattle productions have been carried out. The by-products included woody resources such as bamboos, residues of Yam production, fermented by-products, etc.

e) Other themes

Evaluation for production system of grazing animals using GPS and GIS, Studies on conservation of useful genes, evaluation of similarity of clones, ethical studies about advanced reproductive technologies, theoretical studies on system analysis and statistics, anthropological studies on ways of use of milk and meat, economical studies on consumption of animal products, setting of breeding objectives, etc.

A-2.Publications and presentations

a) Publications

Original Papers

- Hayashi, Y., B. B. Thapa, M. P. Sharma, M. Sapkota and H. Kumagai: Effects of maize (Zea mays L.) silage feeding on dry matter intake and milk production of dairy buffalo and cattle in Tarai, Nepal. Animal Science Journal 80; 418-427, 2009.
- Nishio, M., A. K. Kahi and H. Hirooka: Optimization of mate selection based on genotypic information with overlapping generations. Journal of Animal Breeding and Genetics 127; 34-41, 2010
- Hirooka, H: The effect of vitamin C supplementation of BMS number in Japanese Black fattening cattle-an approach with meta analysis-. Nikuyogyu Kenkyukaiho 87; 37-40, 2009 (in Japanese)
- Komatsu, M, M. Nishio, M. Satoh, M. Senda and H. Hirooka: Potential profitability increase of Japanese Black cattle (Wagyu) by raising marbling and carcass weight through planned mating based on DNA testing of QTL alleles. Nihon Chikusan Gakkaiho 80; 157－169, 2009 (in Japanese)
- Tabata,Y, D.Togo, M.Kitagawa, K.Oishi, H.Kumagai, S.Kume and H.Hirooka: Nitrogen, phosphorus and potassium utilization and their cycling in a beef-forage production system. Animal Science Journal 80:475-485, 2009
- Tabata,Y, K.Oishi, H.Kumagai and H. Hirooka: Application of cycling index and input-output environs for interpretation of nutrient flows in mixed rice-beef production

systems in Japan. Animal Science Journal 80; 352-359, 2009

- Kanyinji F. H. Kumagai, T. Maeda, S. Kaneshima, D. Yokoi: Effects of supplementary inosine on nutrient digestibility, ruminal fermentation and nitrogen balance in goats fed high amount of concentrate. Animal Feed Science and Technology 152; 12-20, 2009

- Gradiz L.., L.. Alvarado, A.K.. Kahi., H. Hirooka: Fit of Wood's function todaily milk records and estimation of environmental and additive andnon-additive genetic effects on lactation curve and lactation parametersof crossbred dual purpose cattle. Livestock Science 124; 321-329, 2009

- Tabata Y. and H. Hirooka: On cycling index for evaluation of nutrient cycling in animal production systems. Journal of Japanese Agricultural System Society 25; 93-102, 2009 (in Japanese)

- Kikuhara, K.., H. Kumagai and H. Hirooka: Development and evaluation of a simulation model for dairy cattle production systems integrated with Forage crop production. Asian-Australasian Journal of Animal Science 22; 57-71, 2009

- Kikuhara, K..and H. Hirooka: Application of a simulation model for dairy cattle production systems integrated with forage crop production: the effects of whole crop rice silage utilization on nutrient balances and profitability. Asian-Australasian Journal of Animal Science22; 216-224, 2009

- Hirooka, H., T. Ishikawa, K. Kusa and M. Ishida: Modeling approach for nitrogen use efficiency and cycling in beef cow-calf production systems integrated with forage rice production. Nihon Chikusan Gakkaiho 80; 17－25, 2009 (in Japanese)

Reviews

- Tsukahara, Y. and H. Hirooka: Crossbreeding in goats: the utilization for growth, dairy, reproduction and adaptability traits. The Jounal of Animal Genetics 37; 121-132. 2009 (in Japanese)

- Nishio, M. and H. Hirooka: Methods to utilize information on markers and genes in animal breeding. The Journal of Animal Genetics 37; 9-19, 2009 (in Japanese)

Reports

- Hirooka, H. and Y. Choumei: Production and utilization of self-sufficient feeds in beef cow-calf production in Japan. Chikusan No Jyouhou 10; 61-70, 2009 (in Japanese)

- Choumei, Y. and H. Hirooka: Transition and future prospect in the utilization of self-sufficient feeds in Japanese beef cow-calf production. Chikusan No Kenkyu 63（8）; 785-791, 63（9）; 912-922, 2009 (in Japanese)

- Tsukahara, Y.: Langston University E (Kika) de la Garza American Institute for Goat

Research. Livestock Technology August; Gravure A, 20-22, Japan Livestock Technology Association, 2009 (in Japanese)

b) Conference and seminar papers presented

- The Annual Meeting of Japanese Agricultural Systems Society in Spring symposium of 2009: 1 Presentation
- The 10th Annual Meeting of Japanese Society of Goats: 1 Presentation
- The 59th Annual Meeting of Kansai Society of Animal Science: 3 Presentations
- The 111th Annual Meeting of Japanese Society of Animal Science: 4 Presentations
- The 47th Annual Meeting of Society of Beef Cattle Science: 2 Presentations
- The 6th Asian Buffalo Congress: 1 Presentation
- The 112th Annual Meeting of Japanese Society of Animal Science: 6 Presentations
- The 11th Annual Meeting of Japanese Society of Goats: 1 Presentation

A-3.Off-campus activities

Membership in academic societies

- Hirooka, H. : Japanese Society of Animal Science (Representative), Japanese Agricultural System Society (Director, Editor), Kansai Society of Animal Science (Councilor), Society of Beef Cattle Science (Councilor), Japanese Society of Animal Breeding and Genetics (Editor), Japanese Animal Production System Society (Councilor)
- Kumagai, H. : Society of Beef Cattle Science (Editor), Japanese Animal Production System Society (Secretary), Japanese Society of Grassland Science (Councilor)
- Oishi, K. : Japanese Animal Production System Society (Secretary)

Research grants

1. Grants-in-aid for Scientific Research(KAKENHI)

- Exploratory Research : Hirooka, H. : Studies on the use of genetic information in animal production sites in post-genomic era
- Scientific Research (B) for foreign studies : Kumagai, H. : Evaluation of the relationships among production efficiency, nutrient use efficiency and plane of nutrition for indigenous cattle in South-East Asia
- Young Scientists (B) : Oishi, K. : The grazing animal and native grassland: quantification of animal productivity and control of native grassland under grazing production system
- Scientific Research (A) for foreign studies : Inamura, T. (Part: Hirooka, H.) : Evaluation and mitigation of the influence of intensive agriculture on environmental pollution in western part

of inland China

2.Other Research Grants

- Research aid from National Agriculture and Food Research Organization : Hirooka, H. : Development of Japanese animal production system providing large amounts of forage
- Research aid from Ministry of Agriculture, Forestry and Fisheries : Ishida, S. (Part: Hirooka, H.) : Development of the economical and environmental beef production technique that can produce beef containing high n6/n3 contents
- Research and development projects for application
in promoting new policy of Agriculture Forestry and Fisheries, 2009 fiscal year : Ieki, H. (Part: Kumagai, H.) : Development of bamboo pellets for cattle feed: improvement of digestibility in ligneous resources by culturing with the white-rot fungus

B.Educational Activities(2009.4-2010.3)

B-1.On-campus teaching

a) Courses given

- Undergraduate level : Outline of Bioresource Science II (Hirooka et al.), Production of Animal Husbandry Resources (Hirooka), Fundamentals for the Experiments of Bioresource Science (Kumagai et al.), Introduction to Foreign Literature in Bioresource Science II (Kumagai et al.), Laboratory Course in Bioresource Science I, II (Kumagai, Oishi et al.), Applied Animal Sciences (Kumagai), Seminar in Applied Animal Science I, II (Kumagai, Oishi et al.), Livestock Production Techniques and Practice II (Hirooka et al.)
- Graduate level : Seminar of Animal Husbandry Resources (Hirooka, Kumagai, Oishi), Laboratory Course of Animal Husbandry Resources (Hirooka, Kumagai, Oishi), System Science for Animal Production (Hirooka), Livestock Production and Technology in Overseas (Kumagai)

B-3.Overseas teaching

<u>International students</u>

- International students : Master 2 (Indonesia)