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## Home range size of free-roaming beef suckler cattle in the forest

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**Key words:** cow, behavior, home range, GPS, forest

**Introduction** Though Japan is now one of the world's most forested developed countries, most of this land is designated as conservation forest and water-holding and soil-binding forest. If we are to use the forest's plentiful plant resources for animal production, we must do so while conserving the intrinsic value of the forest. Therefore, the forest should be used for grazing as it stands, without developing artificial grassland and without fencing. In this situation, information on the home range of cattle is needed for controlling their movement.

**Materials and methods** The grazing area is typical forest in north-east Japan, comprising a mosaic of several lots of planted forest, mainly Japanese cedar and Japanese larch, 10.3 ha ± 12.8 ha in size and surrounded by lots of broadleaf forest of 12.2 ± 17.0 ha. Plants mainly eaten by cattle were Dwarf Bamboo (*Sasa kurilensis*), Butterbur (*Petasites japonicus*), and Sedge (*Carex albata*) (Yasue & Sato, 1995). TDN and CP contents of those 3 plant species were measured from June 7th to September 7th every week. Five cows aged 1-9 years were selected for GPS monitoring (Lotek GPS4400M) in 2005 and 2006, and their locations were recorded every 3 h for the entire 5-month grazing seasons. Grazing seasons were from May 12th to Sep. 15th and from May 15th to Sep. 8th in 2005 and 2006, respectively. The home range for each cow each day (DHR) was measured by the minimum convex polygon that could cover all 8 points using ArcView9 (ESRI) with the extension soft of Home Range Tools (Rodgers et al., 2007).

**Results and discussion** 380 and 361 DHR data were collected during grazing periods of 126 and 116 days in 2005 and 2006, respectively. As the mean sizes of DHR were not different between 17.0 ha in 2005 and 17.2 ha in 2006 and the frequency distribution of each area class of DHR was not different in 2005 and 2006 (kai-square test,  $P > 0.05$ ), DHR data were pooled thereafter for the analysis. Three typed DHRs were suggested as the smaller DHR being less than 10ha, the average DHR, and the largest DHR more than 90ha, because 741 DHR data did not fit the negative binomial distribution (kai-square test,  $P < 0.001$ ). The largest DHR was observed often (2.9% of all data) and the smallest DHR was occurred less (8%) in May at the initial phase of grazing. The frequency distribution of each area class of DHR was average and the largest DHR appeared sometimes (2%) in June or early summer. The frequency distribution of each area class of DHR was average in July and August or midsummer. The smallest DHR less than 5ha was dominant (55.3%) in September or autumn. At the first inflection point of the DHR distribution at the end of July, the difference between the plant TDN decreased. At the second inflection point of the DHR distribution at the end of August, the CP content of all plants decreased considerably. It is suggested that the motivation to select fodder drastically influences the frequency distribution of each area class of DHR for cattle.

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