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Recent Hazel Grouse *Bonasa bonasia* Population Declines in Hokkaido, Japan

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According to national hunting statistics, annual harvests of Hazel Grouse *Bonasa bonasia* have decreased in recent years (Fujimaki 1995), although they are still distributed widely throughout forested areas in Hokkaido (Fujimaki & Konishi 1996). Hunting statistics, however, do not always provide an accurate index of Hazel Grouse population trends, because the number of birds harvested is closely related to hunting effort, which may vary among years. To date, no information based on census data has been available on the population trend of Hazel Grouse in Hokkaido.

The purpose of the present paper is to present data on the trend of Hazel Grouse populations in Hokkaido by using census results obtained in the five study areas for 8 consecutive years, or at 4 to 20 year intervals. In addition, data on frequency of occurrence are available from field trip records in Tomakomai (Wild Bird Society of Japan unpubl. data) and in Ebetsu (Hokkaido Yacho-Aigokai 1988).

Route-censuses for Hazel Grouse were carried out in Tomakomai, Furano, Asahikawa, Shintoku and Kamishihoro. In each census all birds seen and/or heard were recorded by walking along the transect line in early morning from 4:30 to 8:00. Since 1991, a metal hunter's whistle (Scandinavian type) was used in the censuses to maximize the detectability of Hazel Grouse. This method is effective for enumerating territorial males, especially in spring and autumn (Swenson 1991a, 1991b).

In the Tomakomai area, censuses were made in forests of different types in the Tomakomai Experiment Forest of Hokkaido University (42° 41' N, 141° 36' E, 50m asl (above sea level)); deciduous broad-leaved forest (T1), deciduous broad-leaved forest mixed sparsely with ever-green coniferous trees (T2), and mosaic of evergreen coniferous forests and larch plantations (T3) in October and November, 1974, 1990 and 1991. The length of transects censused varied from 2 to 10 km in three forests, and the total length of transects was 131 km in T1, 63 km in T2 and 58 km in T3 in 1974. The numbers of birds counted per 10 km were 3.7, 1.1 and 2.7, respectively. In 1990 and 1991, the total length of transects censused was 16, 6 and 12 km, respectively. Grouse were observed only in T3, 0.1 birds per 10 km, and no birds were observed in either T1 or T2. The relative population densities declined by more than 95% from 1974 to 1991.

In the Furano area, Hazel Grouse were censused along 2-km transect lines established in mixed forest of deciduous broad-leaved and coniferous trees (F1) and young deciduous broad-leaved forest (F2) of the Hokkaido Experiment Forest of Tokyo University (43° 18' N, 142° 34' E, 500m asl) in May and June, 1987, 1992 and 1997. In F1 one male was observed or responded to the whistle in May 1987, June 1992 and May 1997, respectively. In F2 one male was counted in May and June 1987, 1992 and 1997,

respectively. These results show that the population trend did not change during ten years from 1987 to 1997.

In the Asahikawa area, a 2.5-km transect was established in a mixed forest (43° 42' N, 142° 39' E, 450m asl) in 1967, 1968, 1974 and 1975, and three 2-km transect lines were established in the same forest in 1996. Hazel Grouse were censused once in May 1967, 1968 and 1996, respectively, three times in May 1974 and eight times in May 1975 along the transect line. The data from two consecutive years were combined. The average number of birds counted per 2.5 km was 1.5 (n=2) in 1967 and 1968 and also 1.5 (n=11) in 1974 and 1975. However, no birds were observed in 1996.

In the Shintoku area, a hiking trail running in deciduous broad-leaved forest of Shintoku-yama (43° 05' N, 142° 50' E, 250, 400m asl) was used as census route. The 2.8-km transect line was covered once or twice in November 1976, 1977, 1991 and 1992. The data from two consecutive years were combined. The average numbers of birds counted per 2.8 km were 1.3 (n=3) in 1976 and 1977. However, no birds (n=2) were observed in 1991 and 1992. S. Ishii (pers. comm.) conducted censuses 50 times at Shintoku-yama from April 1996 to March 1998 and did not observe Hazel Grouse at all.

In the Kamishihoro area, a 2-km transect line was established along the Nukabira River (43° 22' N, 143° 11' E, 600m asl) and censuses were conducted once in early March 1992-1999, respectively. The number of birds counted was one in 1992 and 1993 respectively, two in 1994, three in 1995 and zero from 1996 to 1999.

In the alder *Alnus japonica* forest along the shore of Lake Utonaito (42° 42' N, 141° 43' E, 5 m asl), Tomakomai, bird censuses have been conducted by amateur ornithologists of the Nature Center of Wild Bird Society of Japan almost every day since May 1981. Hazel Grouse were observed once to six times per year in the 1980's. However, no bird has been seen since 1990 (Wild Bird Society of Japan unpubl. data).

In a mixed forest of Nopporo (43° 02' N, 141° 32' E, 70 als, 2,700ha in size), which is surrounded by residential and agricultural areas, Ebetsu, field trips for bird-watching were conducted once a month from 1970 to 1986. Frequency of occurrence (=No. of field trips with occurrence of Hazel Grouse/total no. of field trips) of Hazel Grouse was 33% during April and May, and 15% during the period from October to February in the 1970's. The corresponding values were 0% and 8%, respectively, in the 1980's (Hokkaido Yacho-Aigokai 1988).

Overall, these census results and records from field trips suggest that the Hazel Grouse population declined from the late 1960's or the early 1970's to the early 1980's. Then, some populations appeared to be stable at a low level and others showed further declines during the 1990's. The finding of low levels in the 1990's is strengthened by the fact that a more effective method (the hunter's whistle) was used since 1991.

Major factors that have been known to affect the population fluctuation of Hazel Grouse are habitat degradation (Swenson & Danielsen 1991), hunting (Lindén 1981) and predation (Semenov-Tian-Shanskii 1959, Small *et al.*, 1993, Lindström *et al.* 1994).

During the study, there were no distinct changes in the composition and structure of the vegetation caused by commercial forestry in the censused forests, except F2. There most of the trees were blown down by a typhoon in the summer of 1985. The forest is still in an early successional stage. In Hokkaido, on the whole, large-scale clear-cut sylviculture was stopped in 1973. Now forests are managed by selective cutting, which usually creates habitats favourable for Hazel Grouse (Swenson 1995). These facts suggest that forest management is not the major factor affecting the Hazel Grouse population decline.

During the study, the Tomakomai Experiment Forest, Nopporo forest, and Shintoku-yama were wildlife protection areas, where hunting was prohibited. Consequently, hunting alone is not considered to be a main factor of the population

decline. Factors other than forest management and hunting are considered to be responsible for the Hazel Grouse decline.

The Red Fox *Vulpes vulpes* population on Hokkaido increased abruptly between the early 1970's and the early 1980's (Uraguchi *et al.* 1991, Fujimaki 1995). From the late 1960's the number of cattle increased, consequently increasing the amount of animal waste, including placentae of cows. Abe (1997) has suggested that this resulted in an increase in the Red Fox population. In addition, the number of sika deer (*Cervus nippon*) killed every year by both control and sport hunting increased abruptly from 10,000 in the late 1980's to 50,000 in the late 1990's (Kaji *et al.* 1998). In most cases hunters took best quality meats and heads with trophy antlers from the killed deers and left the offal and other parts at hunting areas. These remains provided food for foxes during the winter. This favorable food condition has apparently contributed to maintain the high fox populations even in forested areas. Hazel Grouse populations appeared to have declined concurrently with the increase in fox numbers. In the boreal forest, Hazel Grouse population sizes are significantly and negatively related to population sizes of Red Fox (Small *et al.* 1993, Lindström *et al.* 1994). Swenson (1995) suggested that Hazel Grouse are less adapted to the fox predation than to predation by other predators such as Martens (*Martes martes*) or Goshawk (*Accipiter gentilis*).

In conclusion, the increased fox population is likely to have been the most important factor causing the recoded decrease in the Hazel Grouse population on Hokkaido.

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北海道における最近のエゾライチョウの減少：北海道各地の森林5地域（苫小牧、富良野、旭川、新得、上士幌）で、7年間または4～20年間隔でエゾライチョウの生息状況を調査した。生息数（調査路の長さに対する出現個体数で示す）は1960年代後半と1970年代前半から1990年代初めにかけて減少し、1990年代になっても減少傾向は続いているか、または低密度のままである。このほか、エゾライチョウの出現頻度は、苫小牧のウトナイ湖周辺のハンノキ林では1980年代から1990年代にかけ、江別の野幌森林公園では1970年代から1980年代にかけて減少した。北海道では1973年以来森林で大面積の皆伐・造林は行なわれておらず、エゾライチョウの生息に不適なカラマツ人工林の面積はほとんど変化していない。また北海道大学苫小牧演習林、新得山、野幌森林公園のような鳥獣保護区でも生息数または出現頻度が減少している。これらのことから、森林施業や狩猟が生息数減少の主要な原因とは考えられない。1960年代末から北海道におけるウシの飼育頭数が増加し、それに伴って農耕地で主に畜産廃棄物に依存して生活するキツネが1970年代前半から増加し、森林内でもキツネの生息数が多くなってきた。また、狩猟と有害鳥獣駆除によりシカの捕獲数は1980年代の10,000頭から1990年代後半の50,000頭に増加した。捕獲されたシカは、良質の肉や角のある頭部をとられたあと、捕獲場所に放置され、それが冬の間キツネの食物となり、キツネの増加に拍車をかけている。この時期はエゾライチョウが減少した時期と一致しており、キツネの増加がエゾライチョウ減少の主な原因となっている可能性が強い。

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