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WEATHER CONDITIONS IN EARLY SUMMER AND THEIR EFFECTS ON SEPTEMBER BLUE GROUSE (DENDRAGAPUS OBSCURUS) HARVEST

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Abstract.—Relationships of temperature and precipitation to the reproductive success of blue grouse (Dendragapus obscurus) were investigated. Maximum and minimum temperatures followed similar patterns during the years 1976-1981 and showed no patterns relative to hatching success. Precipitation data, however, was variable. When significant amounts of precipitation fell during the last three weeks of the hatching period, chick survival and, therefore, recruitment were adversely affected. We suggest that precipitation occurring at the end of the hatch period reduces the September harvest of birds.

Blue grouse (Dendragapus obscurus) inhabit fir forests in many western states (Beer 1943). The range of this species is closely associated with the distribution of true fir (Abies) and Douglas fir (Pseudotsuga) in western North America (Beer 1943). Blue grouse depend on conifer cover in winter and on shrubs, forbs, and grasses during the spring and summer (Rogers 1968). Most blue grouse are migratory, moving from spring and summer ranges in open meadows to timbered wintering areas at higher elevations in winter (Johnsgard 1973).

The quality of breeding habitat seems to affect the number of breeding birds (Zwicke1 et al. 1968). In the latter study, grazed and ungrazed habitats and their effects on blue grouse breeding success were compared. There was greater breeding success on ungrazed areas (Zwicke1 et al. 1968). Herbaceous vegetation that suffers under heavy grazing is used by the birds for food and cover. Good grazing practices are important for the maintenance of blue grouse populations (Mussehl 1963).

Zwicke1 and Bendell (1967) suggest that another important factor in regulating the population densities of blue grouse is the dispersal of the juvenile birds to winter ranges. They also noted that temperature and moisture did not seem to affect the two broods they observed.

As a species, blue grouse have become important upland game birds in the state of Utah in recent years (Bunnell et al. 1977). After reestablishing and lengthening the hunting season, efforts are presently being made to determine the general status of populations as well as population trends (Rogers 1963). Because of their solitary nature and the dense cover they inhabit, their population densities are difficult to estimate (Johnsgard 1973). Fluctuating population densities and inconsistencies of hatch makes management and utilization of the blue grouse resource difficult. In this study, temperature and precipitation were compared to the hatching success of blue grouse to see if either of these factors affected the age and number of birds harvested.

Study Site

The study area lies along the west slopes of the Wasatch Mountains of central Utah (the Wasatch Front), extending from American Fork Canyon on the north to Hobble Creek Canyon on the south. This represents a distance of some 50 km (30 m). Here several major canyons and their drainage basins extend eastward into the mountains away from the Wasatch Front. Coniferous forests (subalpine fir zone), in which Douglas fir and species of true fir are prominent, occur in the drainage basins and along the canyon slopes. The meadow and open areas associated with this zone contain shrubs such as chokecherry (Prunus spp.), serviceberry (Amelanchier

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spp.), snowberry (Symphoricarpos spp.) and elderberry (Sambucus spp.), as well as various forbs and grasses.

**Materials and Methods**

Ten weather stations were chosen to represent the study area. These stations were all located in Utah County, Utah, and varied in elevation from 1370 m (4497 ft) to 1720 m (5640 ft). The data collected at these stations were obtained from the National Climatic Center in Asheville, North Carolina. The maximum and minimum temperatures of each week for the months of May, June, and July were summed and averaged for each of the ten weather stations. The precipitation data for this time period were also summed and averaged. The weekly precipitation and temperature averages were then plotted against the weekly hatching curve for the same year. This was done for the years 1976–1981. The weather stations located in the same general vicinity were grouped together and those figures were then averaged and plotted against the hatch data. The precipitation received at each station was tallied separately, averaged, and plotted on the graph against the hatch curve (Figs. 1–2).

Checking stations were set up to gather harvest information. Wings were used to determine the sex and age of each bird. Three stations were located in canyons (American Fork, Provo, and Hobble Creek) that contained populations of blue grouse. Each station was operated from 9:00 a.m. until 7:00 p.m. on each of the two days of the opening weekend of the grouse season. One wing was

![Fig. 1. Temperature and precipitation plotted against the number of birds in the hatch curve for the years 1976–1978.](image-url)
collected from each blue grouse brought to the station, as well as hunter success information. In addition to the check stations, wing barrels were set up to gather wings during the first two weeks of the hunt.

Wings collected at the stations and the wing barrels were analyzed by Division of Wildlife Resources biologists to determine sex and age of the birds (Bunnell et al. 1977). Additional data were gained from the juvenile wings by back dating to the time of the hatch (Schladweiler 1970).

**RESULTS AND DISCUSSION**

The maximum and minimum temperatures generally followed the same pattern each year (Figs. 1-2). None of the years or stations contained extreme maximum or minimum temperatures. The years 1976 to 1979 had little or no precipitation during the latter part of the hatch period, but the years 1980 and 1981 had precipitation during the last two weeks of the hatch period (Figs. 1-2).

The hatch curve as well as the percentage of juveniles contained in the harvest were determined from the wings collected (Schladweiler 1970). A high number of juveniles (75 percent) in the harvest indicates good or high production and recruitment into the population. In the years 1980 and 1981, 48 percent of the birds harvested were juveniles. In the years 1976, 1977, 1978, and 1979 the harvest included 78 percent, 63 percent, 66 percent, and 73 percent juveniles, respectively. These values are believed to give good indication as to population composition during these years. If the percentage of the

![Graphs showing temperature and precipitation against number of birds in the hatch curve for the years 1979–1981.](image-url)
harvested juvenile birds is low, then the population is considered down. The years 1980 and 1981 had a low percentage of juvenile birds when compared to the years 1976 to 1979. If we graph the precipitation during the last three weeks of the hatch period, and the percentage of juveniles in the harvest against time in years, an interesting relationship appears (Fig. 3). The two lines become mirror images of one another. Further, if percentage of juveniles in the harvest and total precipitation during the last three weeks of the hatch period are graphed against each other (Fig. 4), the relationship shown is statistically significant (P < 0.05). As the precipitation during this period increases, the percent of juveniles in the harvest decreases. This suggests that precipitation late in the hatch period affects chick survival and recruitment.

Zwickel (1967) suggests that moisture and cold weather do not affect the chicks. He also suggests that the dispersal of the juveniles to their winter ranges is the major population regulating factor. The dispersal of the juveniles would seem to affect each brood separately and therefore should not have an overall effect on population.

Factors which could reduce the proportion of juvenile birds in the harvest could be precipitation, temperature, or a combination of both. Our study suggests that precipitation during the hatching season may be responsible for few juveniles in the harvest. Extreme amounts of precipitation or extremely low temperatures during a couple of days late in the hatching period could affect the population drastically. This affect on the population may not be shown in our data because it would be masked by the averages of temperature and precipitation.

Additional studies are needed to determine the specific regulating factors of blue grouse populations. This study seems to indicate that the amount of moisture received during the last part of the hatch period can affect the number of juveniles entering the population.

**Literature Cited**


Boag, D. A. 1963. Significance of location, year, sex, and age to the autumn diet of blue grouse. J. Wildlife Manage. 27:555-562.


