

PRODUCTIVITY AND MOVEMENT OF CALIFORNIA VALLEY QUAIL IN NORTHEAST CALIFORNIA

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Abstract. From 1966-1972, 1,889 California quail (*Lophortyx californicus*) were banded, aged, and sexed. Field observations were made to determine nesting and hatching seasons, productivity and movement. The primary nesting season occurred in June. Percentage of immatures in winter populations varied from 51.5-86 percent and were negatively correlated with June precipitation ($r = .89$). Movements of 5 miles were common with a maximum of 11 miles.

INTRODUCTION

From 1966-1972, 1,889 California quail were banded, aged and sexed to ascertain nesting and hatching seasons, productivity and movement on private ranch lands in Modoc County, California. Particular appreciation is expressed to Carroll Cloud, Roy Markstrom and Bill Allen on whose ranches most of the study was conducted.

The study area is located between New Pine Creek, Oregon and Willow Ranch, California. This area extends 7 miles on the east side of Goose Lake, Modoc County, California. The elevation is 4,800 feet with an average precipitation of 13 inches. The Warner Mountains border the area 3 miles to the east.

METHODS AND MATERIALS

Trapping was initiated in the winter of 1965-66 and thereafter was conducted from December-February each winter. A 10' x 10' wire mesh funnel trap was used. Barley and wheat were used for bait.

Winter trapping attempts ranged from 3 to 10. Weather and availability of quail determined the number of trapping attempts. Snow covering the ground for more than 3 days greatly increased trapping success, so trapping was usually restricted to these conditions.

Each quail was identified with a numbered aluminum leg band and colored wing tag and released at the capture site. Wing tags are a 3/8" x 4" strip of "Saflags" material placed around the base of the humerus and fastened with a staple. Four colors were tried; blue, green, pink, and orange. The orange and pink were the easiest to distinguish in the wild so were used exclusively. The tag is a modification of that used by Hewitt and Austin-Smith (1966). The tag with staple weighed 300 milligrams. Sex and age (Mosby 1963) of each quail were recorded.

Field observations for nesting and brooding quail were made throughout the valley farm lands and adjacent range areas from June-August of each year. All local people known to have observed wing-tagged quail were interviewed.

Rainfall data were obtained from the U.S. Department of Commerce Weather Station, Lakeview, Oregon, 16 miles north of the study area.

RESULTS AND DISCUSSION

Nesting and Hatching

From the field observations it was determined nesting occurred primarily during the month of June and into July, and that hatching began in early July. Broods were usually first seen by mid-July and became abundant by the first of August.

Considering the 23-day incubation period (Sumner, 1935; Edminster, 1954) and approximate 20 days to complete a clutch (Raitt, 1960; Lewin, 1963) places the time of nesting through the month of June and into July. Studies in similar climate areas support this information. Dill (1939), working in Tulalake, California, noted the valley quail nested in June and young were observed in late July and August. In Uintah County, Utah, Nielson (1952) saw the first young quail in mid-June, 1950, and mid-July, 1951.

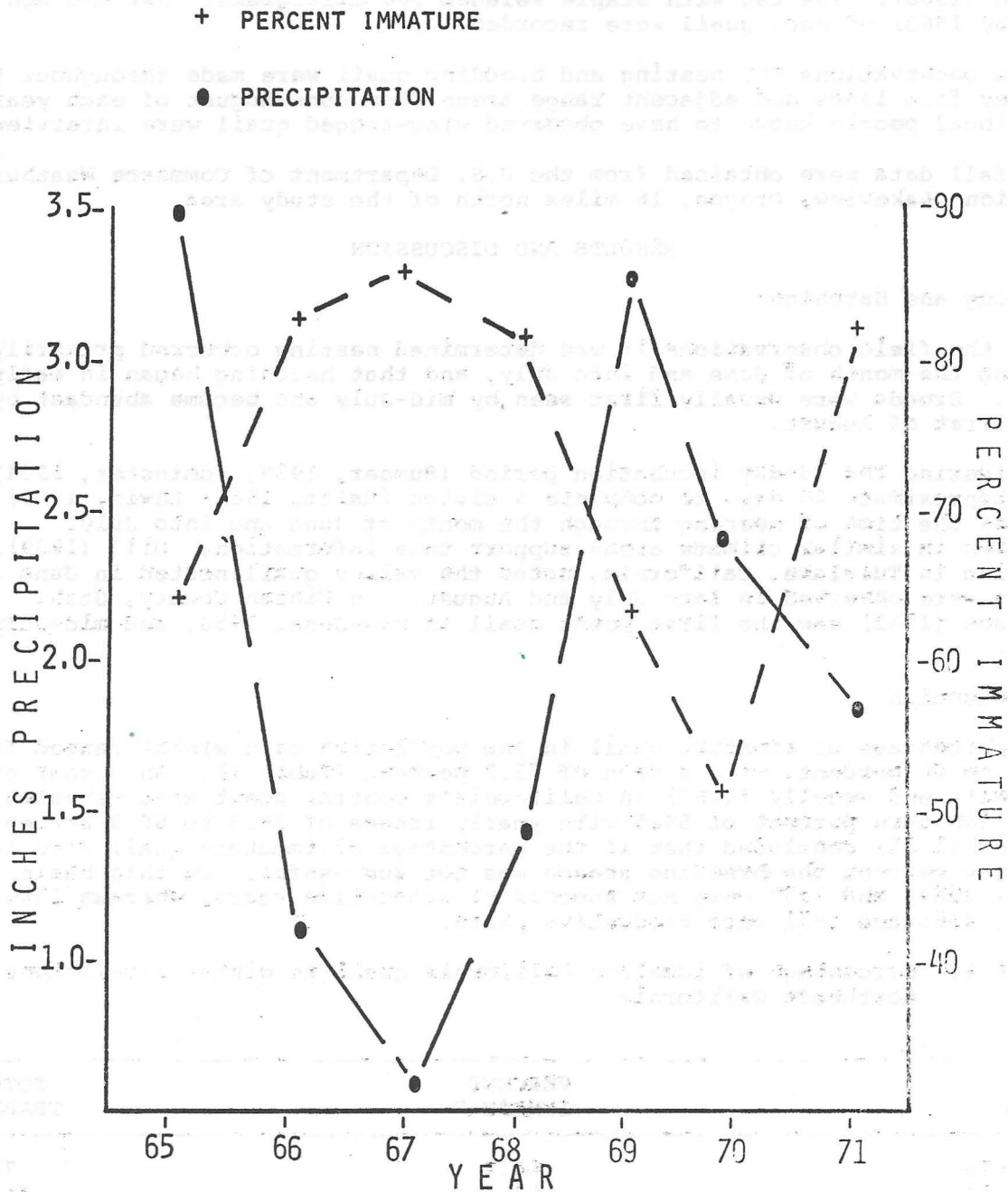
Reproduction

The percentage of immature quail in the population each winter ranged from 51.5 to 86 percent, with a mean of 73.2 percent (Table 1). An 8 year study by Raitt and Genelly (1964) in California's central coast area revealed a mean immature percent of 59.5 with yearly ranges of 36.3 to 68.9 percent. Sumner (1935) concluded that if the percentage of immature quail were less than 70 percent the breeding season was not successful. On this basis, 1965, 1969, and 1970 were not successful productive years, whereas 1966, 1967, 1968 and 1971 were productive years.

Table 1. Percentage of immature California quail in winter populations in northeast California

YEAR	PERCENT IMMATURE	TOTAL TRAPPED
1965-66	64.4	73
1966-67	82.6	213
1967-68	86.0	215
1968-69	81.8	571
1969-70	63.8	464
1970-71	51.5	291
1971-72	82.3	62

Fig. 1. Relationship between productivity and June precipitation for California quail in northeast California.



Buss and Swanson (1950) stated that heavy precipitation during the pheasant nesting season increased mortality and delayed hatching. Summer (1935) noted the susceptibility of California quail chicks to chilling from damp or cool air. Raitt and Genelly (1964) found a correlation between productivity and the number of foggy or rainy days during the hatching season.

The study area is subject to thunder storms during the spring and summer that can deposit over .50 inches in a 24-hour period. June precipitation for 1965-1971 ranged from .67 to 3.5 inches (Table 2). The major factor affecting quail reproduction appears to be the amount of precipitation during June. High precipitation apparently destroys nests, delays nesting and increases mortality of chicks. There was a high linear correlation ($r=.89$) between productivity and June precipitation (Fig. 1).

Table 2. June precipitation, USDC Weather Station, Lakeview, Oregon

YEAR	INCHES PRECIPITATION
1965	3.50
1966	1.09
1967	.67
1968	1.46
1969	3.27
1970	2.43
1971	1.85

Movement

California quail in the Goose Lake area usually congregate adjacent to ranch buildings, cattle feeding areas and cultivated fields from late fall through winter. During the late spring and summer they disperse to adjoining range lands.

Visual sightings and hunter band returns established quail movements up to 11 miles. Considerable quail movement within 5 miles of trap location was established by 37 observations and 20 band returns. On November 4, 1970, an Oregon hunter shot a quail 11 miles north of where it was banded on February 7, 1969. In June 1970 a wing-tagged female quail was observed on a ranch in Fort Bidwell, 10-1/2 miles southeast of the original banding location over the Warner Mountains.

Sowls (1960) reported year to year movements of Gambel's quail (*Lophortyx gambeli*) did not exceed 550 yards with 1,461 yards being the longest. The California Department of Fish and Game have recorded California quail movements up to 5 miles (H.T. Harper, personal letter).

LITERATURE CITED

- Buss, I.O., and C.V. Swanson. 1950. Some effects of weather on pheasant reproduction in south eastern Washington. N. Am. Wildl. Conf. Trans. 15:364-378.
- Dill, H.H. 1939. Winter feeding and shelter for the California valley quail. N. Am. Wildl. Trans. Conf. 4:474-477.
- Edminister, F.C. 1954. American game birds of field and forests. Charles Scribners Sons, New York. 302-336 pp.

- Hewitt, O.H., and O.J. Austin-Smith. 1966. A simple wing tag for field-marking birds. *J. Wildl. Mgmt.* 30(3):625-627.
- Lewin, V. 1963. Reproduction and development of young in a population of California quail. *Condor* 65(4):249-278.
- Mosby, H.S. 1963. Wildlife investigational techniques. *The Wildlife Society, Wash., D.C.* 419 pp.
- Nielson, L.R. 1952. Factors affecting California valley quail populations in Uintah County, Utah. M.S. Thesis, Utah State Univ., Logan. 84 pp.
- Raitt, R.J. 1960. Breeding behavior in a population of California quail. *Condor* 62(V):284-292.
- Raitt, R.J., and R.E. Genelly. 1964. Dynamics of a population of California quail. *J. Wildl. Mgmt.* 28(1):127-141.
- Sowls, L.K. 1960. Results of a banding study of Gambels' quail in southern Arizona. *J. Wildl. Mgmt.* 24(2):185-190.
- Sumner, E.L. 1935. A life history study of the California quail with recommendations for conservation and management. *Calif. Fish and Game.* 21(3):167-256 and 21(4):277-342.