

BLANCHARD'S CRICKET FROG IN NEBRASKA AND SOUTH DAKOTA --

Blanchard's cricket frog (*Acris crepitans blanchardi*) is a small warty anuran known for its exceptional leaping ability and is common along stream banks and ponds throughout much of the eastern two-thirds of North America. Its color pattern is highly variable being comprised of greens, reds, browns, and grays, culminating frequently in a stripe or series of splotches arranged along the cranial-caudal dorsal midline. The Blanchard's cricket frog can often be identified by a small triangle pointing caudally, whose base extends between each eye (Harper 1947). Other stripes and lines are not uncommon. In South Dakota the range of Blanchard's cricket frog is limited to the extreme south-central and southeastern counties; in Nebraska, the species is known statewide.

Despite the lack of natural history information on Blanchard's cricket frog in Nebraska and South Dakota, several studies from other states have provided a substantial amount of life history data for this species (Johnson and Christiansen 1976; Gray 1983, 1984; Burkett 1984). Harper (1947) described Blanchard's cricket frog with mean snout-vent lengths (SVL) of 24.1 mm for adult males and 29.2 for adult females. Average body mass was determined to be 1.3 g for adult males and 2.2 g for adult females. In Iowa, Blanchard's cricket frog attains its maximum body size between June and July (Johnson and Christiansen 1976), whereas maximum body size is attained as early as May in Kansas (Burkett 1984). These frogs appear to be active from April through October in Iowa (Johnson and Christiansen 1976) and from March through December in Kansas (Burkett 1984). In Arkansas these frogs are active from February through December, and year round in warm years (MLM, unpublished data). By August, Iowa populations are composed chiefly of juveniles and, at that time, adults begin to disappear (Johnson and Christiansen 1976). Kansas populations exhibit similar trends with two periods of rapid growth. The first of these occurs from July through September and the second from March through May/June (Burkett 1984). The first signs of breeding in Iowa occur from mid-May through mid-July (Johnson and Christiansen 1976). In Texas, Blanchard's cricket frog calls from January through September (Blair 1961). Lastly, Smith (1961) reported calling from late April through late "summer" in Illinois.

A total of 123 Blanchard's cricket frogs was obtained from the University of Nebraska State Museum (UNSM) in Lincoln, Nebraska. Samples of specimens were collected originally between the years of 1933 and 1981. These included 56 males and 67 females from four South Dakota and 12 Nebraska counties. Specimens were measured by using standard calipers, massed with an analytical balance, and sexed either by abdominal incision or by examination of secondary sex characteristics of breeding adults. Observations of abnormalities and infestations were also noted. Body mass was regressed as a function of SVL. Using a one-way ANOVA, body mass and SVL were compared by month.

The mean male body mass (BM) of all Blanchard's cricket frogs in our study was 1.29 g (SD = 0.3564) with a median of 1.34 g and a range from 0.55 to 1.98 g. Mean male SVL was 22.6 mm (SD = 2.95) with a median of 23.2 mm and a range from 15.5 to 26.7 mm. Mean female BM was 1.71 g (SD = 0.7376) with a median of 1.67 g and a range from 0.57 to 3.95 g. Mean female SVL = 24.5 mm (SD = 3.9) and a median of 25.5 mm with a range from 16.3 to 31.5 mm. The relationship between male SVL and BM was related linearly ($r^2 = 0.741$, $p = 0.000$) as

$$Y = -1.05685 + 0.104170X$$

where $Y = \text{BM}$ and $X = \text{SVL}$ (Fig. 1). Females were better represented by a quadratic function ($r^2 = 0.846$, $p = 0.000$)

$$Y = 1.66662 - 0.190564X + 0.0076413X^2$$

where $Y = \text{BM}$ and $X = \text{SVL}$ (Fig. 1).

Monthly changes in male and female SVL and BM from March through September are shown in figures 2 and 3. Maximum body size was reached between May and July, while the smallest body sizes were observed during July.

First signs of gular patch color in males was observed in specimens collected during late May. First signs of females ready-to-lay were observed in specimens collected during early June. No vitellogenic ova exhibited by females were collected later than July 10.

Nineteen abnormalities were observed in 18 specimens representing a total abnormality ratio of 14.6% (18/123). A peak in abnormality occurrence was observed in specimens collected from the Vermillion River in Clay County, South Dakota during 1958. Here, 88.9% (8/9) specimens possessed abnormalities. This sample represented 27.8% (5/18) of the abnormalities recognized in our study. All other abnormalities (13/18, 72.2%) were observed from specimens collected between 1971 and 1979. Overall, the most common abnormalities were abnormal jaws configurations (7/18, 38.9%) and fused/missing toes (7/18, 38.9%). Other abnormalities included abnormal feet (2/18, 11.1%), reduced femur (1/18, 5.6%), and an individual with an unusually enlarged testis (1/18, 5.6%).

Chiggers were observed parasitizing 13.0% (16/123) of the Blanchard's cricket frogs. Only two of these incidences (2/16, 12.5%) were observed from specimens collected between 1933 and 1947. All other infestations were observed in specimens collected between 1971 and 1974 (14/16, 87.5%). Specimens from Gage County, Nebraska exhibited the highest proportion of infested frogs (9/17, 52.9%).

Both the mean (1.29 g) and median (1.34 g) values for male BM were similar to the mean (1.3 g) reported by Harper (1947), whereas the mean (22.6 mm) and median (23.2 mm) SVL was slightly less than his results (24.1 mm). Female mean (1.71 g)

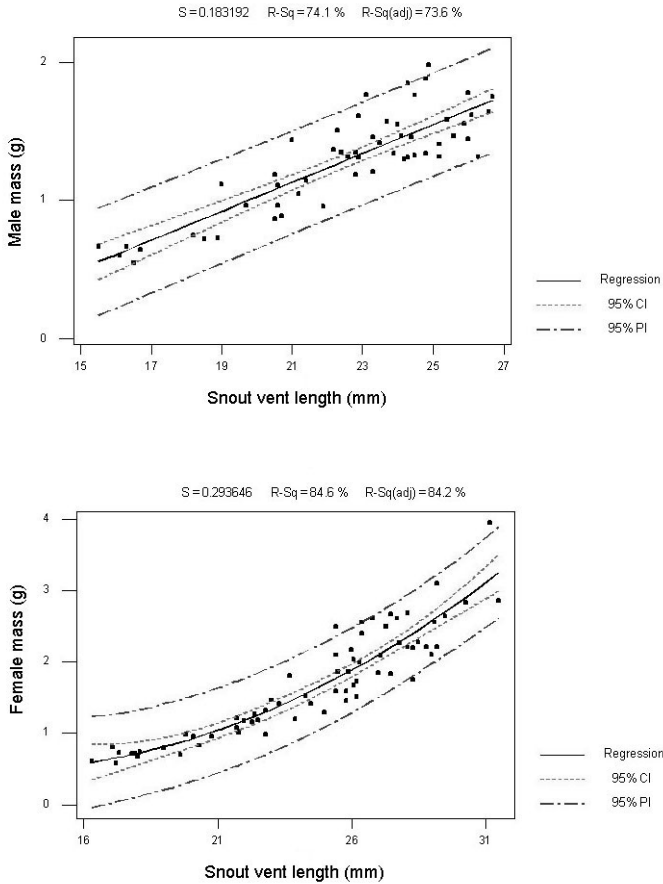


Figure 1. Regression of body mass by snout-vent length in male and female Blanchard’s cricket frogs from Nebraska and South Dakota.

and median (1.67 g) BM were lower than Harper’s (1947) mean value (2.2 g). Female SVL mean (24.5 mm) and median (25.5 mm) were smaller than the mean (29.2 mm) reported by Harper (1947). These results suggested that a cline in body size might exist for Blanchard’s cricket frog, and Harper’s (1947) small sample size might have been skewed toward larger individuals.

Our regression models for BM versus SVL expressed a quadratic relationship for females but a linear relationship for males (Fig. 1). Growth in males is probably more quadratic than linear. We did not examine any males from March or April and there is an obvious change in body size from November to May. This suggests

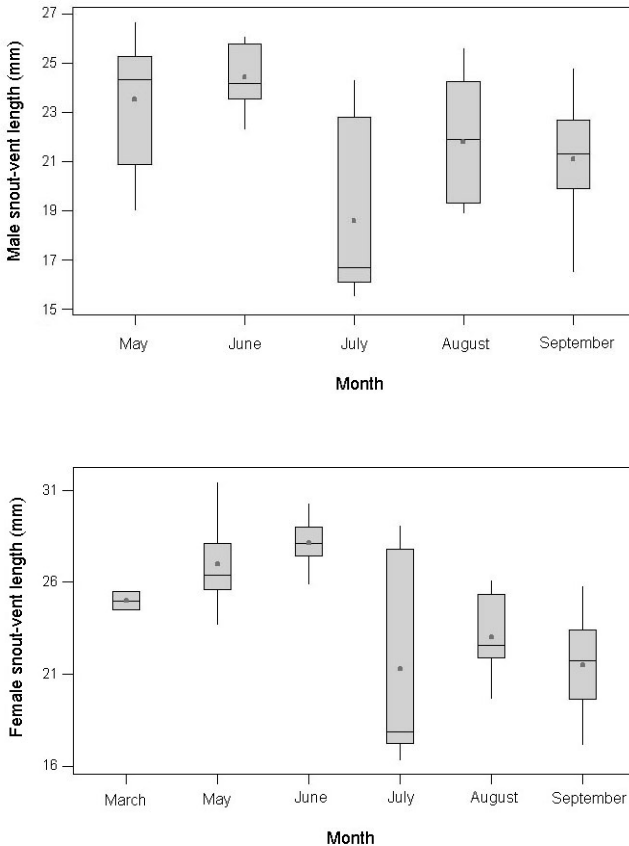


Figure 2. Monthly average snout-vent lengths among Blanchard's cricket frogs from Nebraska and South Dakota, boxplots of snout-vent length by month. Means are indicated by solid circles.

that if we could have examined males from March or April, we might have recognized an early growth spurt during this period.

Data suggested that Blanchard's cricket frog undergoes a short growth spurt between July and August, and then a large one from March through May when the first signs of secondary sexual characteristics were observed. Intense breeding activity probably occurs between late May through early July based on the presence of oviductal eggs in gravid females as well as darkening of the male vocal (gular) pouches. No metamorphs had been collected prior to July and adult

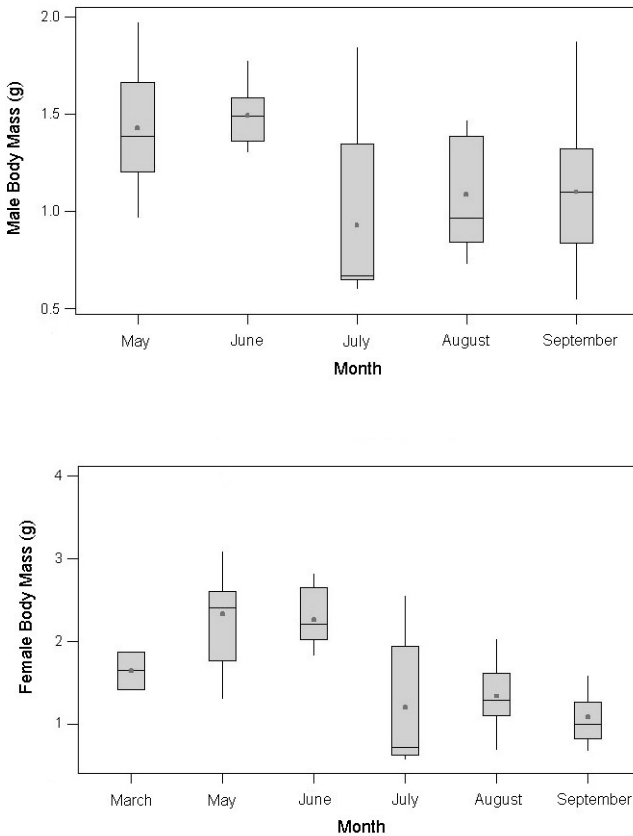


Figure 3. Body mass of Blanchard’s cricket frog from Nebraska and South Dakota, boxplots of body mass by month. Means are indicated by solid circles.

numbers declined in the samples at this time. Together these facts suggested that the population turns over each year as reported in Texas (Pyburn 1958).

The vacillation in numbers of abnormalities in 1958 is interesting, but the reason behind this is unknown. Few abnormalities were observed prior to 1958, while 72.2% were observed from the 1970s. If specimens had been routinely deposited in the USNM, any trends that prevailed between then and now could have been inferred. This information would have been important in interpreting abnormality frequencies in current populations. In our study, abnormal jaws were as common as toe abnormalities. Toe abnormalities appear to be the most common

abnormality in Blanchard's cricket frog while jaw abnormalities tend to be rare in other studies (Gray 2000, McCallum 2003, McCallum and Trauth 2003). This might suggest a different causal agent in incidences of abnormalities in Nebraska and South Dakota than in other regions. The enlarged testis in UNSM 2881 is of unknown causation. This organ was easily more than a ten fold size difference compared to its contralateral testis. Incidences of chigger infestations were most common from 1971 through 1974. Chiggers hypothetically could serve as vectors for disease.

Because routine but judicious deposition of animals in the UNSM collection was not conducted over the past 20 years, much information about abnormalities, disease occurrence, and other changes in the Blanchard's cricket frog life history cannot be ascertained. This fact has left us with an unfortunate gap in our knowledge of this species' natural history.

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