

**Title** *Comparative Volume Assessment of Nili Ravi Buffalo Hoof Being Reared on Different Flooring Systems*  
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### **Abstract:**

The bovine hoof volume can be affected by various factors like age, breed, season, nutrition, and type of flooring. Concrete and abrasive floors increase the wear and tear of horn tissues while rubber mat lowers growth rate and wear and tear. The growth rate of claw horn is faster in yearling and young as compared to mature cattle. Keeping in view the above mentioned effects of age and flooring system on hoof morphology, present study was designed to

1. Estimate hoof volume as an indication of hoof size in buffalo under different flooring systems.
2. Compare hoof volume of adult and immature buffaloes.
3. Compare hoof volume with body weight.

The study was carried out on two different flooring systems (concrete and soft) and consisted of 30 mature (11 years) and 30 immature (2 years) animals. Fifteen adult and fifteen immature animals were selected from Buffalo Research Institute (BR1) Pathoki, district Kasur and the remaining 15 adult and 15 immature were selected from backyard farms in rural areas of Punjab (Sheikhupura). The age and weight of the animals were determined by dental formula and tape measurement method respectively. For assessment of hoof volume three measurements, (coronary band, base, and abaxial) were taken from medial (left and right) and lateral (left and right) claws of fore and hind limb in centimeters. The measurements of lateral and medial claws of same hoof were added and the values were put in the following formula:

$$\text{Claw volume (cm}^3\text{)} = (17.192 \times \text{Base}) + (7.467 \times \text{AbaxGr}) + 45.270 \times (\text{CorBand}) - 798.5.$$

The data obtained was statistically analyzed using one way ANOVA and independent t-test. Significant differences of mean were obtained between right fore and right hind, left fore and left hind hooves of both adult and immature animals, Significant differences of mean were also recorded between hoof volume of animals reared on concrete floor at BRI and soft floor at backyard farm. The results were also significant with respect to weight bearing capacity between fore and hind hooves. No significant difference of mean was observed when volume of right and left fore hoof and right and left hind hoof was compared.

The results of our study showed that hoof volume is affected by flooring systems. The smaller hoof volume was obtained from animals reared on concrete floor as compared to soft floor.

When hoof volume reduces, risk of lameness increases because of decreased weight bearing capacity. Flooring systems greatly affect the hoof volume. The concrete flooring system decreases the hoof volume because of friction. While on the other hand soft flooring system of backyard farms allow less friction and sustain hoof volume up to much extent. Greater hoof volume results in increased weight bearing capacity which is a protective factor in reference to lameness.

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