

Age Determination in Caprinae **(a quick guide)**

The relatively precise methods, which are indirect and can be applied remotely, include:

1. **Biological:** Solitary behavior, restricted range of habitat, sluggishness, and stiffness in movement.
2. **Morphological:** Large body and horn size, broken or worn horn tips, full curl (circle) of the horns in sheep, and often darker coloration compared to younger males.
3. **Remote assessment by horn segments:** Utilizing optical devices such as telescopes or binoculars to estimate the approximate age of the male, though this method does not guarantee accuracy down to the exact year.

The precise method involves counting the horn segments of a harvested, immobilized, or captive animal. The key advantages of this method include the ability to recheck the segment count up close and multiple times, and for harvested specimens, this can be repeated under laboratory conditions.

To accurately determine the age of Caprinae species based on the segments of their horns, the following points must be understood:

1. **Annual Segments:** These segments are separated by interceptor rings, which form during the cold season. As the mountain vegetation withers in the autumn and winter, the animal ceases to receive nutrient-rich green fodder, causing the annual segment to stop growing.
2. **First Segment:** The first segment, measuring a few centimeters, grows during the first summer and ceases its growth with the onset of autumn-winter cold. The interceptor ring separating it from the second segment is not sharply defined, resembling a slight thickening around the horn's circumference. Occasionally, this ring may exhibit a faint darkening. Nonetheless, if the first segment is not worn down to the base or further, it is almost always identifiable.
3. **Second Segment:** The second annual segment is usually the longest, showing a marked disparity between the narrow upper and wide lower portions. Even if the first, thinnest and sharpest segment is worn away, and the second is partially lost, it can still be identified because the third segment is more massive and close to it in length (in mountain goats, it is shorter than the

second but not by much; in mountain sheep, especially large ones, the third segment can surpass the second in length). The proximity of these segment lengths helps prevent errors in age determination using this method.

4. **Third Ring:** The third interceptor ring is the most distinct and well-defined, serving as a key marker for accurate age determination. After the third ring, the subsequent rings closer to the horn base are clearly visible and as identifiable as the third, with the segments between them also being well-defined. Segments following the third ring gradually shorten.
5. **Proximity of Rings:** The progressively closer spacing of interceptor rings toward the horn base, along with the shortening segments between them, indicates an adult, old, and in some cases, very old trophy male. The length of these closely spaced segments decreases from several centimeters to just a few millimeters, forming a segmented "accordion" on the lower rear side of the horn.
6. **Surface Wrinkles:** The outer surface of the horn is often covered with wave-like wrinkles (e.g., in rams), which inexperienced observers might mistake for interceptor rings. However, true interceptor rings are deeply incised, forming narrow grooves that evenly encircle the entire horn. In contrast, wave-like wrinkles are more prominent on the outer side of the horn. Therefore, it is crucial to examine the horn from different angles. Even if the interceptor ring is located near or at the worn horn tips, its traces remain visible on the inner and concave side of the horn.

It is always best to count the annual segments and the separating interceptor rings on the inner concave side of the horn.

Additional criteria for identifying interceptor rings include the following:

1. **Overhanging Segments:** Portions of the previous year's segment tend to overhang the interceptor ring, sometimes even peeling away, which emphasizes the ring's depth.
2. **Tissue Flaking:** In the narrow, deep groove of the interceptor ring, small pieces of tissue can be scraped off. This flaking does not occur in the grooves of wave-like wrinkles (false rings) on the horn.

Difficulties in determining the age of an old male from one of the Caprinae subfamily species may arise for the following reasons:

1. Worn or Broken Horn: Wear or breakage of the horn can result in the loss of the first, second, or even third segments.
2. Minimal Growth Segment: An annual segment may be so minimized due to illness, injury, or trauma suffered during that year that it becomes lost among other segments and difficult to identify. Typically, this problematic period in the animal's life is reflected synchronously on both horns as minimal growth segments that resemble the final segments of old males. Inexperienced observers might overlook such a segment.
3. Segment "Accordion": The "accordion" of segments at the base of the horns in old males, aged 13-15 years or more, requires careful examination to identify the last, minimal-height segments, which may be only millimeters long on the lower rear side of the horn.

Age determination based on horn segments should be conducted on the longest horn, where the segments are best preserved.

If this is insufficient and the segment loss in an old or very old male (due to wear or breakage) is significant, an arbitration method can be employed: compare the horn with that of a younger male from the same population to estimate how many segments have been lost in the older male.

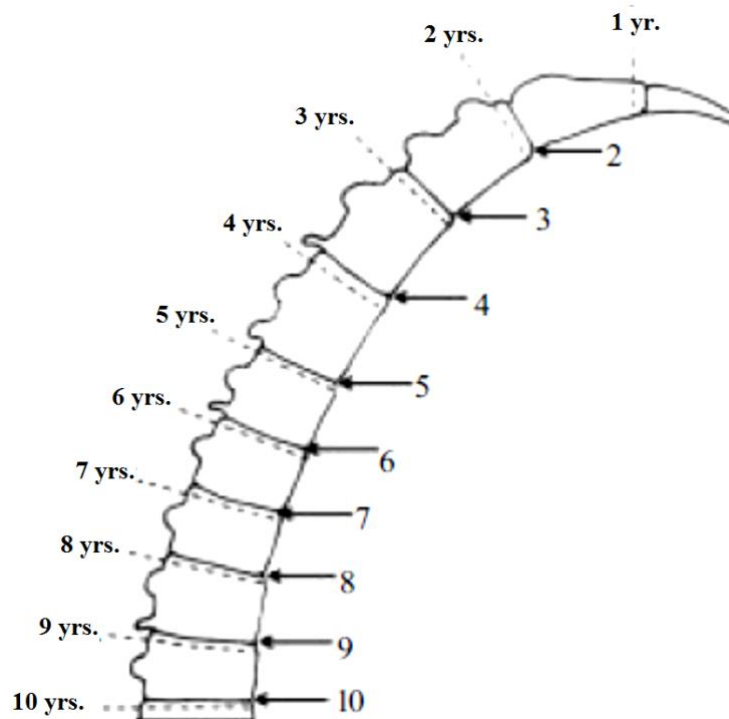


Figure 1 – Growth diagram of horns in goats of the genus Capra

Arrows indicate the primary ("winter") rings that separate the annual segments. The dotted line represents the horn's condition at the end of the animal's subsequent full year of life.

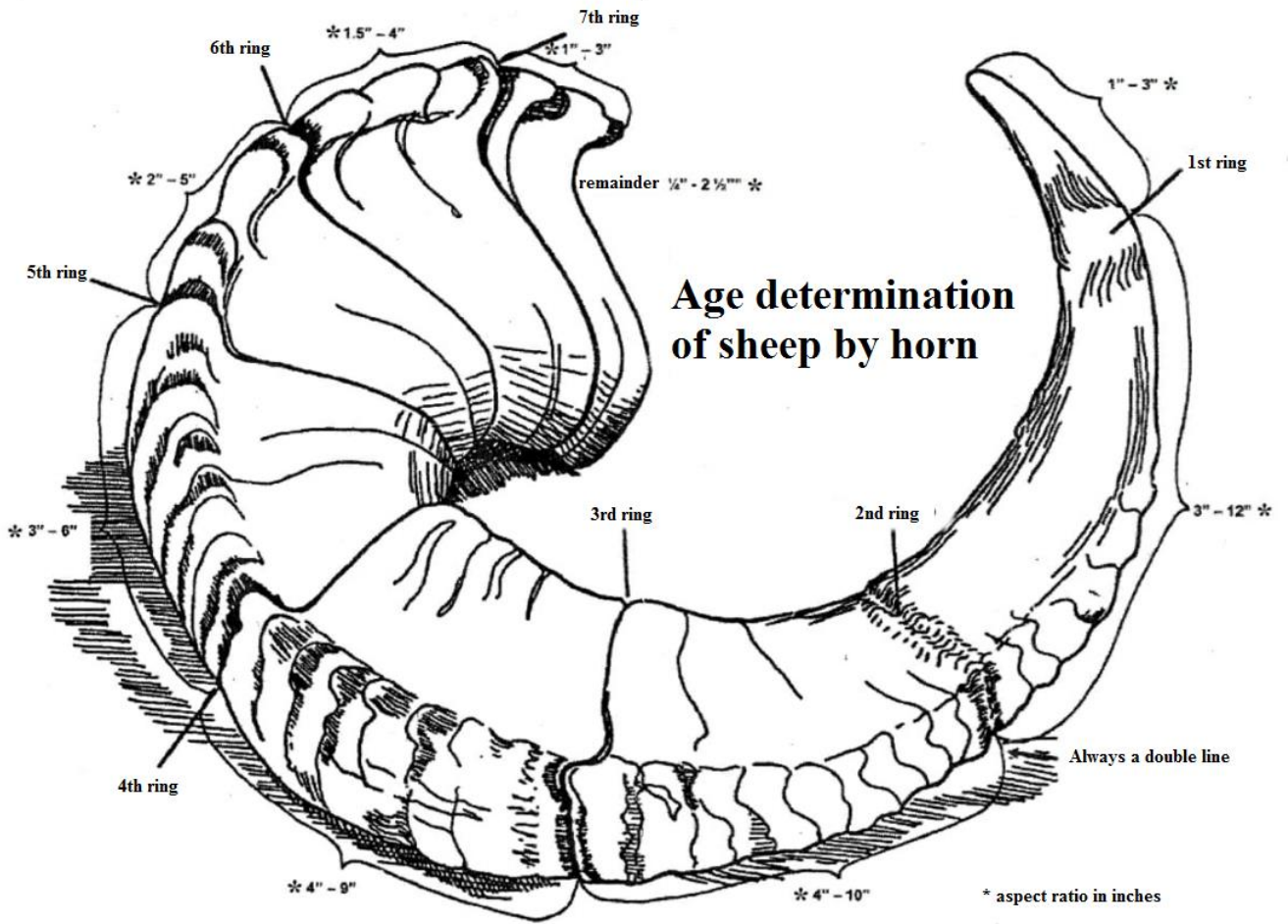


Figure 2 – Annual horn segments of the snow sheep, separated by interceptor rings