A Probe for Collection of Ruminal Fluid in Juvenile Cattle and Cows

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In order to avoid saliva contamination, forestomach fluid used for diagnostic purposes should be collected from the ventral sac of the rumen. For adult cattle, instruments are commercially available.[1,2] [I-III] In juvenile cattle there are no instruments available that are tested for these purposes. Tölgyesi and Goots used Kaltenböck's probe to collect ruminal fluid in adult cattle.[5] This instrument was developed for the treatment of foamy bloat.[4] It is obtainable in two different sizes for use in adult and juvenile cattle.[IV] We modified the model for juvenile cattle and tested it in juvenile cattle and cows for the collection of ruminal fluid.[3] [V]

The Kaltenböck probe was modified by arranging lots of perforations at the rumen-sided end of the probe. On the other end of the probe we attached a quick coupling connection. It serves for connection to the suction pump (Fig. 1). In the probe's head we installed a magnet (Fig. 2). Within the distance of 10 cm the magnet in the probe's head was detectable by a compass (Fig. 3).

The probe was inserted into 4 rumenotomied cows. In 3 of 4 rumenotomied cows the probe's head was detected by the compass from outside the rumen (Fig. 4). In these cases the probe ran forming a large curvature from the cardia to the ventral sac of the rumen (Fig. 5). In the case where the position of the probe's head was not determined by the compass, it met with the medial longitudinal pillar.

We tested the probe in 34 juvenile cattle and 26 cows (Fig. 6). We determined their age and height, the time required for pumping off half a liter of forestomach fluid, the position of the probe's head in the reticulorumen and the length the probe was introduced (the probe was introduced until an obstacle was perceptable).

To determine the position of the probe's head, we applied a coordinate system upon the skin that marked the ventral ruminal sac (Fig. 7 and 8). Its x-, y- and z-axes limited 9 fields (Fig. 8). If the magnet was fixed within the fields No. 4 to No. 9 we assumed the probe's head to be located in the ventral sac of the rumen.

In all trials, half a liter of forestomach fluid was taken. Pumping off half a liter of forestomach fluid took an average time of 13 sec. The position of the probe's head was fixed in the ventral ruminal sac in 43 of 60 cases (71. 7%) (Fig. 9). In 5 of 60 cases (8. 3%) the probe's head was located in the area of the reticulum and the antrum (Fig. 9: Position in fields No. 1-3, Fig. 10: Positions outside the coordinate system). In 12 of 60 cases (20%) the position of the probe's head was not determined. In juvenile cattle (age: 9-23 months, height: 103 - 125 cm) the probe was introduced at a length of 165 - 235 cm. In cows (age: 2-8 years, height: 126 - 143 cm) it was introduced to a length of 170 -320 cm. The height of the cattle does not serve as a parameter for estimation of the length the probe should be introduced to enter the ventral ruminal sac, because there is no good correlation between these parameters (Fig. 11).

The presented probe is suitable for the collection of ruminal fluid in juvenile cattle (height > 125 cm) and cows. Having introduced the probe until an obstacle was perceptable, forestomach fluid was taken in 71.6% of the cases from the ventral ruminal sac.

References

1. Dirksen, G., Smith M.C., Acquisition and analysis of bovine rumen fluid. *Bov. Practitioner* 22: 108-116. 1987. 2. Geishauser, T., An instrument for collection and transfer of ruminal fluid and for administration of water soluble drugs in adult cattle. *Bovine Practitioner* 27: 38-42. 1993. 3. Geishauser, T., Eine Sonde zur Pansensaftentnahme bei Jungrindern und Kühen. *Vet*, 7(5): 6-12. 1992. 4. Kaltenböck, K., Über die Behandlung der Schaumgärung im Pansen der Rinder mit Hilfe einer kreisförmigen Sonde. Wien. *Tierärztl. Mschr.* 51:767-774. 1964. 5. Tölgyesi, G., Goots, L., Die Verwendung der Kaltenböckschen Kreissonde in der tierärztlichen Praxis. *Ung. Agr. Rdsch.* (1):21. 1969.

Instruments

I. Rumen sampling device Sørensen & Schambye's pattern, modified by Dirksen, *Eickemeyer, Eltastr. 8, 78532 Tuttlingen, Germany.* II. Rumen sampling de-

vice Dirksen's pattern, *Eisenhut, Sandweg 52, 4123 Allschwil, Switzerland.* III. Rumen sampling device Geishauser's pattern, *Heiland, Albert-Schweitzer-Ring 5, 22045 Hamburg, Germany.* IV. Kaltenböck's probe, *Kruuse, Byvej 35, 529 Marslev, Denmark.* V. Kaltenböck's probe, modified by Geishauser, *Heiland, Albert-Schweitzer-Ring 5, 22045 Hamburg 70, Germany.*

Figure 1. *Modified Kaltenböck probe.*

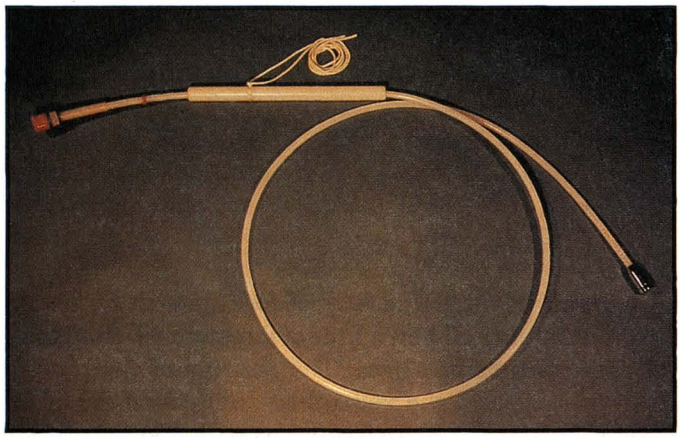

Figure 2. *Probe's head disassembled, magnet.*

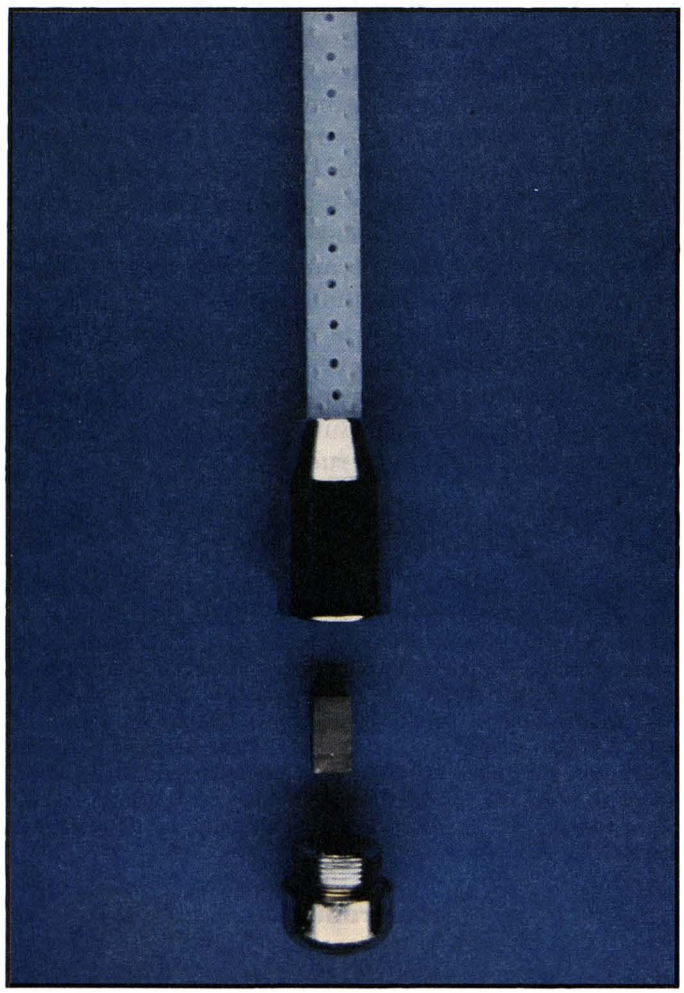

Figure 3. *Detection of the magnet in the probe's head by compasses.*

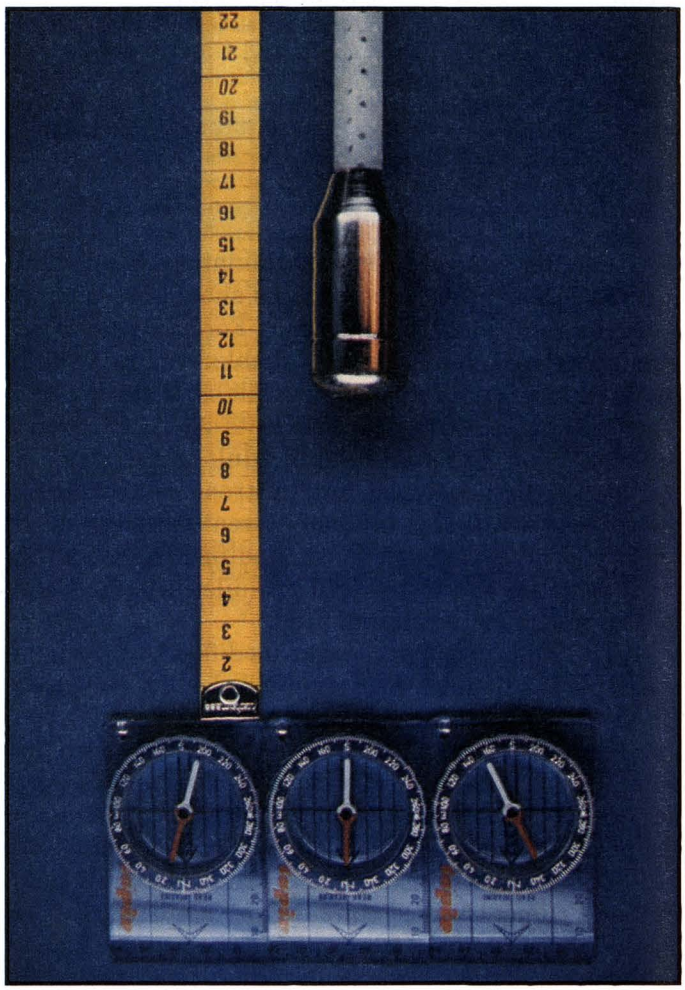

Figure 4. *Detection of the probe's head in the rumen by a compass from outside the rumen.*

Figure 5. *Extend of the probe in the reticulorumen of 3 ruminotomied cows.*

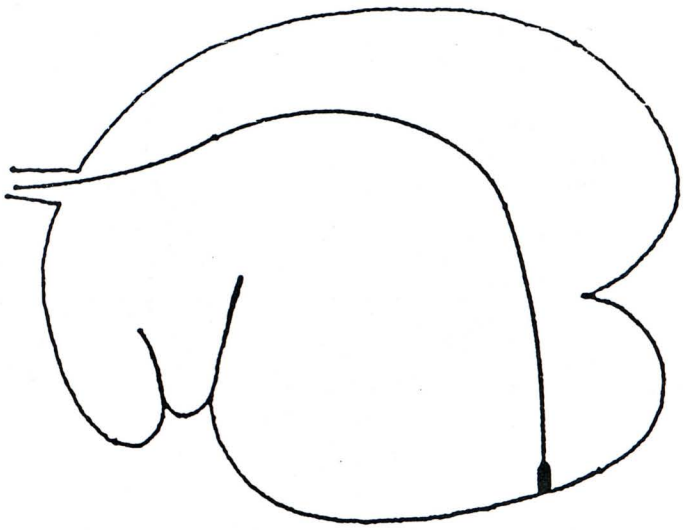

Figure 6. *Rumen sampling by the modified Kaltenböck probe and the Geishauser suction pump.*

Figure 7. *Coordinate system applied upon the skin, marking the ventral ruminal sac (coordinates: y0, y1, y2, y3, z0. a antrum, r reticulum, s stenum, sf stifle fold, u udder, v ventral ruminal sac. schematic representation from lateral).*

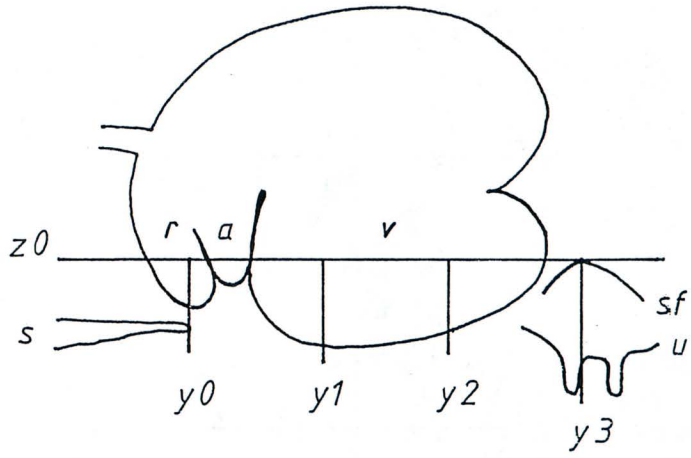

Figure 8. *Coordinate system applied upon the skin (coordinates: y0, y1, y2, y3, z0, z1, z2. s sternum, u udder, x linea alba. schematic representation seen from above).*

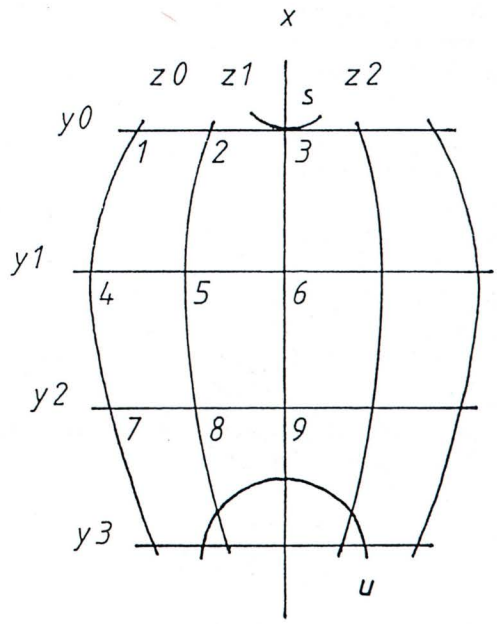

Figure 9. *Positions of the probe's head in the reticulorumen according to the coordinate system (s sternum, u udder).*

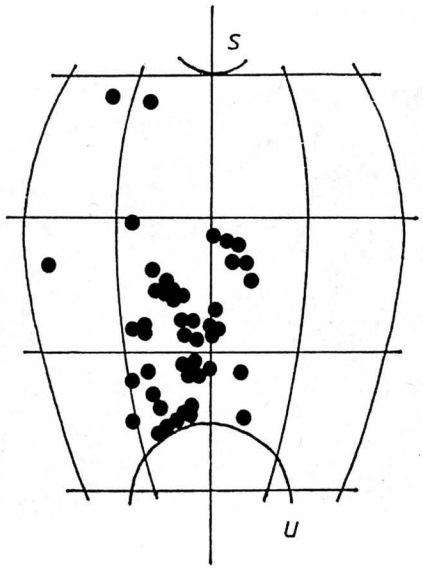

Figure 10. *Positions of the probe's head outside the coordinate system (8 8th rib, 9 9th rib, s sternum, sf stifle fold).*

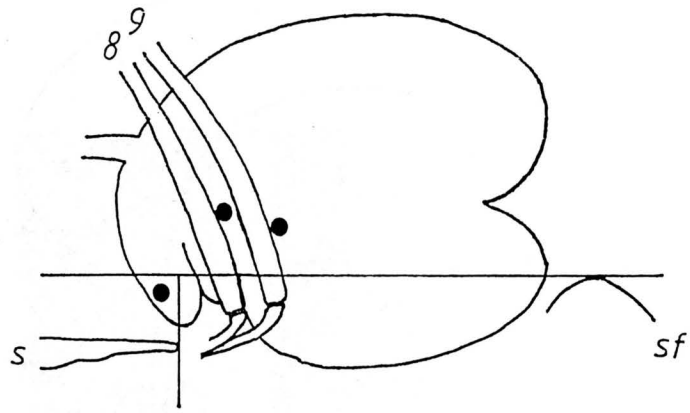

Figure 11. *Height (cm) of the cattle, length (cm) of the probe introduced, and position of the probe's head.*