When the daily calving pattern was divided equally into three 8-h periods; 'night' (2300–0700), 'morning-day' (0700–1500) and 'evening-day' (1500–2300), the mean distribution of calving times was 33, 35 and 32%, respectively, albeit with large variation within each period (21–46, 27–46 and 22–46%, respectively) across the herd-years. Cow breed type, calf sex, calf birth weight and calving difficulty did not appreciably influence the distribution of calving.

Conclusion
It is concluded that, on average, time of calving for spring-calving suckler cows is relatively evenly distributed throughout the 24-h day, albeit large variation is evident across individual herd-years. Cow breed type, calf sex and calf birth weight did not influence the distribution of calving. The distribution of unassisted and assisted calvings were equally distributed.

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134. Rhinoceros milk composition and the effect of lactation stage on milk components

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Application
A knowledge of the milk composition of rhinoceros cows at different stages of lactation was crucial to formulate a milk replacer for orphan rhinoceros calves.

Introduction
A century ago, the five living rhinoceros species were abundantly distributed throughout Asia and Africa. The World Wide Fund for Nature (WWF) estimated that approximately 500,000 rhinos roamed Africa and Asia at the beginning of the 20th century, but that numbers have declined to 70,000 by 1970. Since 2013 only about 29,000 rhinoceros of all kinds survive in the wild (Metrione and Eyres, 2014). More than 80% of these, including those in captivity, are of the Ceratotherium simum species, commonly known as the white rhino. As a result of international interest in the conservation of the species, as well as the involvement of numerous organisations, game reserves and game farmers, rhinoceros numbers have increased since 2007. The increase was most notable in the case of white rhinos where the number of animals has increased from just over 11,000 in 2007 to almost 20,000 in 2013 (Metrione and Eyres). Due to the overexploitation of rhino horn in Eastern countries, poaching of rhinos for their horns remains a constant problem. Many rhino calves are left orphan when their dams are slaughtered by callous criminals. In order to formulate a milk replacer that would meet the nutrient requirements of rhino calves of different ages, a knowledge of the milk composition of rhinoceros cows at different stages of lactation is needed. A trial was done to obtain the required information.

Material and methods
Eighteen lactating southern white rhinoceros cows (*Ceratotherium simum simum*) were used in the study which was conducted in the Northern Cape and North West Provinces of South Africa. Mean days in milk (DIM ± SE) of the three groups were 80.5 ± 21.4 (E, early), 243.3 ± 57.8 (M, mid) and 533 ± 24.1 (L, late lactation). Cows were sedated for regular veterinary examinations which included dehorning. Milk samples were collected under sedation from both teats by palpation and mild pressure and transferred to 50 mL milk collection tubes. Because milk was collected in the field on a game farm, they were chilled in a cooler box and transported to a cooling facility on the farm as soon as possible and stored at 4 °C until analyzed within 48 h after collection. Data were subjected to a one-way ANOVA and differences were declared significant at $P < 0.05$. The milk was analyzed for proximate composition, minerals, and total amino acids.

Results
Total solids (g/kg) decreased significantly from 99.8 (E) to 93.7 (M) and 91.3 (L) as DIM increased. Similarly, milk fat (g/kg) decreased ($P < 0.05$) from 8.4 (E) to 3.2 and 3.0 (M and L) and milk protein (g/kg) decreased from 14.1 (E) to 10.5 (M) and 9.5 (L). The lactose content (mean 67.8 g/kg) was not affected by DIM. The content of all the minerals decreased as lactation increased, but the effect of DIM was significant only for K (767 to 483 g/kg from E to L), Na (357 to 253 g/kg from E to L), Cu (0.20 to 0.12 mg/kg from E to L), Zn (2.24 to 1.9 mg/kg from E to L) and Mn (0.44 to 0.07 mg/kg from E to L). The only amino acids that changed significantly as lactation progressed were Met, Thr and His which decreased, but total amino acids (g/L) were not affected by DIM and means were 10.9 (E), 10.5 (M) and 10.0 (L).

Conclusion
It was concluded that the composition of white rhinoceros milk changed as lactation progressed and that the concentration of most of the milk components that were measured decreased with increased DIM, but lactose and total amino acid contents remained constant.

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135. Dietary supplements reshaping the rumen bacterial community of yak (Bos grunniens)

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A complete understanding of the rumen microbial population and their transformation when exposed to diverse dietary regimens is vital to improving the health, welfare, and overall productivity of livestock

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Introduction
The Yak (*Bos grunniens*), a vital ruminant on the Qinghai Tibetan Plateau, holds a pivotal role in the daily lives of local herdsmen, providing them with essential resources such as milk, meat, fuel, and economic benefits. Yaks predominantly rely on local alpine pastures to fulfill their nutritional needs but undergo slow growth, weight loss, and potential fatalities due to seasonal forage variations, particularly in the cold season, causing economic losses (Dong et al., 2006). In recent years, herdsmen have turned to oats-hay, and concentrate as supplementary feeds during the cold season to address these challenges. Studies have emphasized the key role of the rumen microbiota in the health and productivity of ruminants and the diet emerges as one of the most influential factors affecting the rumen microbiota (Guo et al., 2020). Therefore, the objective of the current study was to investigate the response of the rumen bacterial community in yaks to dietary supplementation during the cold season.

Materials and methods
Twenty-one female domestic yaks, all aged 3 years, were randomly assigned to the three groups: a pure grazing, group, a grazing with oats hay supplement group, and a grazing with concentrate supplement group. Rumen contents were collected to assess the rumen bacterial community after 90 days. Total metagenomic DNA was isolated and 16S rRNA gene sequencing was executed using universal primers for V4 region. After sequencing, primer sequences, barcodes, low-quality sequences, and chimeras were truncated using Qiime software, and clean reads were clustered into Amplicon Sequence Variants using 99% identity. Taxonomy was assigned using the Greengenes database to the representative sequences and diversity analysis was performed. The normality of the data was checked using the Shapiro–Wilk test. Analysis of similarities was performed in R studio by using the Anosim function of the vegan package to examine the grouping variations of each group. Significance was declared at $P < 0.05$ and P values were modified using a false discovery rate to exclude false-positive results.

Results
Higher bacterial diversity was observed in grazing and concentrate supplement groups. The dominant phyla observed in all three groups included Bacteroidetes, Proteobacteria, and Firmicutes. A higher abundance of fiber-degrading genera was observed in the grazing yaks and oats hay supplement group. At the same time, fatty acid-producing genera were dominant in the concentrate supplement group.

Conclusions
Dietary supplementation did not exert a significant impact on the relative abundance of the dominant phyla within all groups. Nonetheless, the abundance of certain bacterial genera displayed a closer association with the varying dietary regimens.

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