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Intake of Supplementary Feeds by Cattle and Goats in an Indian Pastoral System as Estimated by Direct Observations, Micro-histology and Owner Survey

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Abstract

Little is known about the quantitative use of crop residues in the diets of free-ranging or herded livestock close to Indian national parks, regions where conflicts about scarce feed resources are prevalent. The knowledge of type and amount of crop residues is important to improve the management of natural resources like trees and shrubs. From November till April (beginning dry period), 2 × 25 distinct female cattle and goats from two villages close to the Bandhavgarh National Park were followed for one day each during daytime. Plants species ingested were recorded by continuous direct observations (DiO). Faeces of these animals were collected for micro-histological analysis (MiA) of the diet's botanical composition. Additionally, livestock owners were questioned about the feeds supplemented to their livestock during the night feeding. The results for each crop were analysed by ANOVA considering animal species (cattle vs. goats), season (cool winter vs. hot summer), and agreement between techniques (DiO vs MiA). Crop species (mostly straws) used as residues in feeding were *Cicer arietinum*, *Dolichos lablab*, *Lens culinaris* (lentils), *Oryza sativa* (rice), *Triticum aestivum* (wheat) and *Zea mays* (maize). According to DiO and MiA, these crops made up between 16.4–31.9% of cattle's and 0.4–1.2% of goat's diet in winter and 12.1–12.7% and 0.6–2.2% in summer, respectively. *C. arietinum* and *D. lablab* never exceeded 2% of the diet. For the four other crops, MiA findings were higher ($p < 0.05$) than DiO results. Interaction between animal species and season were significant ($p < 0.05$). Animal species was only important for maize and rice straws consumption (>10% in cattle, merely nil in goats). Lentil straw and maize stover consumption depended on season (more in summer). Opposing owner statements to MiA and DiO confirmed an intensive use of crop residues on the fields (cattle: more than half ate maize stover and lentil straw afield; goats: more than half ate lentil and wheat straw). The combination of DiO, MiA and owner statements results is assumed to improve the reliability of the results as the respective uncertainties are compensated.

Keywords: Crop residue, forage, grazing, India, livestock, nutrition