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**Botanical families, crude protein content and seasonal consumption of forage by goats, in free range systems at Kongo-Central region, Sub-Saharan Africa**

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Goats rank among the most valuable domestic herbivores in Sub-Saharan Africa. At the western part of Democratic Republic of Congo (DRC), goat free-ranging relies on natural forage without regard to species consumed, their protein content and availability. Due to protein importance as essential macronutrient for body structure, functions and animal products, questions remain on the meeting goat nutritional requirements in such system.
This work aims to characterize consumed forage and their protein content. Two herds were selected in two villages at Kongo-Central region, DRC. Three goats of each herd were 8 hours/day tracked and monitored in three gazing days, during the two seasons (dry and wet).
Any forage consumed at least once, was recorded (as qualitative variable), identified, sampled and analyzed by Kjeldahl method for CP content. FactoMineR was performed to categorize recorded forage.
We identified 41 species grazed by goats, clustered ($p<0.05$) in four distinctive categories (Table 1). The first category was grass (15%), mostly consumed in any season and containing 10-30% of CP. The second and the third categories including legumes (10%) with CP>30%, mostly grazed in rainy season, and CP<30% grazed in dry season. The fourth category (75%) clustered 20 botanical families different to grass and legume, all seasons grazed, with 10-30% of CP. Actually, protein content of these forages does not ensure its availability for meeting goats nutritional requirements. Eventual presence of secondary compounds in some forage, limit the protein digestibility and impair their bioavailability.
Kongo-Central natural rangelands and fallowed lands, are worthy diversified forage suppliers. At least 41 species ranked poor, medium or rich protein content were recorded. Medium and rich proteins species act effectively in supplying protein to free-ranging goats, without evidence of their availability. Further investigations are needed to yield more on these proteins bioavailability extent and to quantify whether nutritional requirements in energy and other nutrients are fully met.

***Table 1. Forage consumed by goat at Ngeba and Kikola site, Kongo Central province***

| Category | *Species* | Botanical family | Morphological type: shrub, Herbaceous or tree | Season of consumption DS=Dry season RS=Rainy season BS=Both season | Crude protein content (%) | |
|---|---|---|---|---|---|---|
| | | | | | Rainy season | Dry season |
| Grass | *Cynodon dactylon* (L.) Pers. | *Poaceae* | Herbaceous | BS | 16 | 14 |
| | *Cyperus esculentus* L. | *Poaceae* | Herbaceous | RS | 25 | - |
| | *Digitaria horizontalis* Willd. | *Poaceae* | Herbaceous | RS | 10 | - |
| | *Eleusine indica* (L.) Gaertn. | *Poaceae* | Herbaceous | BS | 20 | *14* |
| | *Panicum maximum* Jacq. | *Poaceae* | Herbaceous | BS | 21 | *16* |
| | *Paspalum notatum* Alain ex Flüggé | *Poaceae* | Herbaceous | BS | 30 | *26* |
| Legume | *Centrosema virginianum* (L.) Benth. | *Fabaceae* | Herbaceous | RS | 32 | - |
| | *Acacia auriculiformis* A. Cunn. ex Benth. (seeds) | *Fabaceae* | Tree | DS | - | 27 |
| | *Acacia auriculiformis* A. Cunn. ex Benth. (leaves) | *Fabaceae* | Tree | BS | 17 | 16 |
| | *Psophocarpus scandens* (Endl.) Verdc. | *Fabaceae* | Herbaceous | RS | 40 | - |
| | *Calopogonium mucunoides* Desv. | *Fabaceae* | Herbaceous | RS | 30 | - |
| Others | *Amaranthus blitum* L. | *Amaranthaceae* | Herbaceous | RS | 32 | - |
| | *Boerhavia diffusa* L. | *Nyctaginaceae* | Herbaceous | RS | 31 | - |
| | ***Oncoba welwitschii* Oliv.** *Syn. Caloncoba welwitschii* (Oliv.) Gilg | *Salicaceae* | Shrub | BS | 20 | 17 |
| | *Carica papaya* L. | *Caricaceae* | Herbaceous | BS | 16 | 15 |
| | *Chromolaena odorata* (L.) R.M. King & H. Rob. | *Asteraceae* | Herbaceous | BS | 32 | 21 |
| | *Combretum racemosum* P. Beauv. | *Combretaceae* | Shrub | BS | 14 | 13 |
| | *Commelina diffusa* Burm. f. | *Commelinaceae* | Herbaceous | BS | 27 | 25 |
| | *Erigeron sumatrensis Retz.* Syn. *Conyza sumatrensis* (Retz.) E. Walker | *Asteraceae* | Herbaceous | BS | 20 | 17 |
| | *Costus phyllocephalus* K. Schum. | *Costaceae* | Herbaceous | BS | 21 | 19 |
| | *Croton hirtus* L'Hér. | *Euphorbiaceae* | Herbaceous | BS | 27 | 22 |
| | *Cyathula prostrata* (L.) Blume | *Amaranthaceae* | Herbaceous | BS | 24 | 25 |
| | *Dacryodes edulis* (G. Don) H.J. Lam | *Burseraceae* | Tree | BS | 11 | 10 |
| | *Elaeis guineensis* Jacq. | *Arecaceae* | Herbaceous | BS | 20 | 18 |
| | *Euphorbia hirta* L. | *Euphorbiaceae* | Herbaceous | RS | 14 | - |
| | *Ficus bubu* Warb. | *Moraceae* | Shrub | BS | 18 | 15 |
| | *Gymnanthemum coloratum* (Willd.) H. Rob. & B. Kahn | *Asteraceae* | Shrub | DS | - | 30 |
| | *Hymenocardia ulmoides* Oliv. | *Euphorbiaceae* | Shrub | BS | 30 | 26 |
| | *Phragmanthera usuiensis* (Oliv.) M.G. Gilbert subsp. *usuiensis* Syn. *Loranthus albizziae* De Wild. | *Loranthaceae* | Shrub | BS | 12 | 12 |
| | *Mangifera indica* L. | *Anacardiaceae* | Tree | BS | 9 | 10 |
| | *Manihot esculenta* Crantz *(Tubers)* Syn. *Manihot utilissima* Pohl | *Euphorbiaceae* | Shrub | BS | 1 | 1 |
| | *Manihot esculenta* Crantz *(leaves)* | *Euphorbiaceae* | Shrub | BS | 31 | 29 |
| | *Manihot esculenta* Crantz *(tuber peels)* | *Euphorbiaceae* | Shrub | BS | 6 | 6 |
| | *Megaphrynium macrostachyum* (Benth.) Milne-Redh. | *Marantaceae* | Herbaceous | BS | 15 | 17 |
| | *Morinda morindoides* (Baker) Milne-Redh. | *Rubiaceae* | Shrub | BS | 24 | 25 |
| | *Musa acuminata* Colla | *Musaceae* | Herbaceous | BS | 14 | 15 |
| | *Passiflora edulis* Sims | *Passifloraceae* | Tree | BS | 35 | 29 |
| | *Persea americana* Mill. | *Lauraceae* | Tree | BS | 12 | 12 |
| | *Psidium guajava* L. | *Myrtaceae* | Tree | BS | 13 | 13 |
| | *Rhabdophyllum arnoldianum* (De Wild. & T. Durand) Tiegh. | *Ochnaceae* | Shrub | BS | 9 | 10 |
| | *Sida acuta* Burm. f. | *Malvaceae* | Herbaceous | BS | 29 | 23 |
| | *Smilax anceps* Willd. | *Smilacaceae* | Herbaceous | BS | 13 | 14 |
| | *Urena lobata* L. | *Malvaceae* | Herbaceous | BS | 19 | 18 |
| | *Tithonia diversifolia* (Hemsl.) A. Gray | *Asteraceae* | Shrub | DS | - | 23 |