Feeding behaviour and diet selection by West African Dwarf Goats (short communication)

Summary
Sixteen West African Dwarf Goats (WADG) were used to study the feeding behaviour and diet selection. The animals were offered freshly cut stems with leaves and fruiting bodies of *Gliricidia sepium*, *Leucaena leueoeephala* and *Panicum maximum*. The feeding behaviour of the goats was observed and recorded whilst the preference of the animals for each diet was also monitored. Data were collected on feed intake, number of bites per minutes, and preference for each of the forages. The data on feed intake were subjected to one-way analysis of variance. Within 30 minutes into the feeding period, it was observed that the goats concentrated on *Leucaena leueoeephala* which they struggled over for favoured positions leading to horn locking. The animals first smelt the different plants took a bite before concentrating on a particular forage. The animals usually consumed fruiting bodies and leaves of leucaena before eating the other two forages. The mean number of bites per goat per minute was 10, 8 and 6 for gliricidia, leucaena and panicum respectively. The animals exhibited bi-pedal stance during feeding.

Analysis of variance showed forage intake to be significantly different (P< 0.05) among the forages. Proximate analysis of the three forages indicated that leucaena had a higher quantity of dry matter (DM), crude protein (CP) and ether extract (EE) compared to the other two forages, while panicum had higher CF, lower CP, ash and EE content compared to gliricidia and leucaena.

Key Words: feeding behaviour, diet selection, WAD goats

Zusammenfassung

Schlüsselwörter: Freßverhalten, Futterauswahl, Westafrikanische Zwergziege

Introduction
In Nigeria, goats and sheep contribute about 30% of the total meat consumption. The goats in Nigeria represent an important source of meat and the demand for goat meat is
very high especially in rural areas where it often commands higher market price than beef. They are indispensable in religious and customary rites (GETU et al., 1994) and are insurance against crop failure (MATTEWMAN, 1980). Nevertheless, goat production is severely limited by inadequate nutrition especially during the dry season when there is a decline in the yield and quality of forages.

The WAD goats are predominantly indigenous breeds found in southern Nigeria. Feed alone makes up a large part of the cost of producing the ruminant livestock. Traditionally, the goats subsist on grasses, household and farm wastes. *Leucaena leucocephala* and *Gliricidia sepium* are two leguminous browse plants that were introduced to rural livestock owners in southern Nigeria to combat the problem of the decline in yield and nutritive value of grasses. *Gliricidia sepium* and *Leucaena leucocephala* almost retain their yields and nutritive values all the year round (TENIOLA, 1990). *Panicum maximum* is a common grass in this region that is usually available and offered to West African Dwarf goats. The aim of the study was to determine the preference of WAD goats for these forages and to observe their feeding behaviour.

**Materials and Methods**

At the Obafemi Awolowo University Teaching and Research Farm, most paddocks consist of *leucaena*, *gliricidia* and *panicum*. These are tropical forages known to be of medium to good quality to most ruminants. Freshly cut *Gliricidia Sepium, Leucaena leucocephala* and *Panicum maximum* were offered to the WAD goats. The weights of the offer were taken before the animals were allowed to start eating and the weights of the residues collected daily for each of the forages were also determined. The forages were tied in bulk to the wooden frame of the experimental house, three of each type at three different locations for each of the forages making a total of nine spatially arranged locations of the three forage types:

- Leucaena ----- > Gliricidia -------- > Panicum
- Panicum ------ > Gliricidia ---------- > Leucaena
- Gliricidia ------ > Panicum --------- > Leucaena

The position of the forages were changed daily

Sixteen West African Dwarf goats were used for the experiment which lasted six weeks. The experiment started on the (15th of November, 1997 to 31st December, 1997) in the experimental house located at the goat unit of the Obafemi Awolowo University Teaching and Research farm, Ile-Ife, Nigeria. Cool clean water was provided in drinking bowls for the goats. The animals were allowed to eat for one hour fifteen minutes (1hr. 15mins), after which the goats were taken back to their metabolic crates. Twine was used to tie the feeds instead of feeding bowls to avoid 'cues' and fighting and to provide something close to a natural environment.
Percentage of time during the one hour fifteen minutes period in standing versus biting, ruminating and idle times were determined by keen observations at five minutes interval for one month. The time it took to completely consume leucaena leaves and start peeling the stem was carefully observed. Data were collected on feed intake, number of bites per minutes, quantity of forage offered and residues. The data were subjected to one-way analysis of variance. The proximate components were determined using the methods of AOAC (1975).

Results and Discussion

On exposure to the diets, the WAD goats first of all smelt the different forages and took one or two bites from each location of forage stand before concentrating on the most preferred which was leucaena. This could be attributed to the animals organoleptic properties that is, to the presence of chemical substances inherent in some forages that are of eliciting taste or olfactory sensations. The goats struggled for favoured position on leucaena which led to horn locking despite the fact that the feeding area was large enough to prevent clamouring/crowding on a feed stand. Four days into the experiment, they went straight for leucaena without smelling and rarely taking a bite of gliricidia and panicum. The animals on reaching the forage stand consumed the fruiting bodies before the leaves and last of all the stem. This is in agreement with LU (1988), who observed that the fractions which goats most often select are buds, leaves, fruits and flowers and those parts contain less fibre and more protein and are thus more digestible than stems and petioles.

An average of one hour fifteen minutes was spent daily. The goats completely consumed leucaena leaves within 30 mins of feeding after which they concentrated on the other two forages. Some of the animals would prefer to go back to feed on the woody part (stem) and the bark of leucaena before eating the other forages. The goats carefully avoided cut forage that stayed overnight and wilted forage by eating little or nothing from it.

Climbers left on leucaena offered (by chance) were skillfully untouched/avoided. This shows that with increasing feed type offered, quality rather than quantity starts to dominate the animals search for food. Also, the preference is also dependent on the environmental conditions in which the decisions are made (CRAWLEY, 1983; DUMANT et al., 1995).

The WAD goats seemed to enjoy standing on their hind legs, resting their forelegs on the forage (a bi-pedal stance while eating). At a stage when eating, the goats made a funny sound and walked leisurely from one storage stand to the other eating with less interest. At about an hour of eating, the animals were quiet, their chewing sound alone was heard. Also less horn-locking and a characteristic sound was infrequently made.

Table I shows the intake of the three forages by WAD goats. They consumed significantly higher leucaena than the other two forages. 18.0, 48.0 & 27.0kg/week for gliricidia, leucaena and panicum respectively. The smaller size leaves appeared to be more acceptable to WAD goats as compared to the long leaves (Table 1).
shows it takes longer time for the goats to chew and ingest the leaves of panicum than
it takes to chew and ingest those of gliricidia and leucaena. Also, the number of bites
per minutes was highest for leucaena and lowest for Panicum, which is in agreement
with the work of STOBBS (1973).

Table 1
Mean Forage Intake (Kg/wk) and mean number of bites per goat per minutes (Durchschnittliche Futteraufnahme
und durchschnittliche Anzahl Bissen pro Ziege und pro Minute)

<table>
<thead>
<tr>
<th></th>
<th>Gliricidia sepium</th>
<th>Leucaena leucocephala</th>
<th>Panicum maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean/week</td>
<td>18.4 ± 0.8</td>
<td>48.6 ± 2.5</td>
<td>27.1 ± 1.3</td>
</tr>
<tr>
<td>Mean number of bites</td>
<td>10 ± 1.7</td>
<td>8 ± 1.1</td>
<td>6 ± 0.41</td>
</tr>
</tbody>
</table>

Table 2 shows the proximate components of the forages. Leucaena had higher crude
protein and ether extract compared to gliricidia and leucaena. This might be
responsible for the higher intakes of leucaena. After completely consuming leucaena,
they moved to gliricidia taking more bites than for panicum. This is in agreement with
the work of PARSONS et al. (1994) and THORNLY et al. (1994) which attributed
forage intake to nutrient composition.

Table 2
Chemical Composition of The Forages (DM) (Chemische Zusammensetzung des Futters)

<table>
<thead>
<tr>
<th>%</th>
<th>Gliricidia sepium</th>
<th>Leucaena leucocephala</th>
<th>Panicum maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crude Fibre</td>
<td>16.8</td>
<td>9.8</td>
<td>28.2</td>
</tr>
<tr>
<td>Crude Protein</td>
<td>18.1</td>
<td>23.1</td>
<td>8.4</td>
</tr>
<tr>
<td>Ether Extract</td>
<td>8.9</td>
<td>3.7</td>
<td>1.4</td>
</tr>
<tr>
<td>Ash</td>
<td>3.2</td>
<td>6.9</td>
<td>4.6</td>
</tr>
<tr>
<td>Nitrogen Free Extract</td>
<td>53.0</td>
<td>56.6</td>
<td>57.4</td>
</tr>
</tbody>
</table>

The animals consumed the bark of leucaena after finishing its leaves despite the
availability of gliricidia and within their reach. This indicates that WAD goats select
stem components and this is in agreement with the report of ADEMOSUN and
KOLADE (1973) and STOBBS (1973). The physical appearance of the forages and
presence or absence of hairs/thorns could contribute to the goats' feeding behaviour
and diet selection since the three forages are visibly different in appearances.
Gliricidia is dull green and succulent, leucaena is glossy green while panicum is pale
green and hairy. This is in agreement with the report of ZEMMELINK (1980). The bi-
pedal stance also enabled the goats to reach and selectively eat the fruiting bodies and
fresh leaves at the upper part of the plant.

It can be concluded from the results of this study that the nutrient composition of the
forage has a positive effect on the feeding behaviour and diet selection of the WAD
goats. Leucaena being the most preferred of the three forages, its greater use should be
encouraged taking into consideration its mimosine toxicity.
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ERNST RITTER, Dummerstorf