Plant populations failed to build up to a satisfactory density during any of the 5 years, despite a favourable initial establishment of approximately 80–100 plants m$^{-2}$. The plant count declined with time. It is most likely that the pattern of autumn and spring rainfall determined flowering and seed set and subsequent regeneration of the clover. The rainfall pattern over the 5 years was such that only minimal flowering and seeding occurred. Often the germinating rains were too late to permit flowering before the scorching summer heat. Sufficient seed must have been produced and/or there was sufficient hard seed carry-over in the drought season of 1982 to establish a nucleus colony in the following season.

Since clustered clover acts as an annual in south-east Queensland, a build up of seed is a prerequisite for regeneration and thickening of the stand. No evidence was obtained to suggest that poor persistence of the nodule bacteria was responsible for the slow build up of the clover stand. The dominant factor, therefore, appears to be the quantity and timing of the germinating rains which need to be adequate in either April/May or August/September to permit timely flowering and seeding in the cooler months of the growing season. This applied particularly in 1978 when seed was sown too late to gain advantage from good autumn and winter rain. Seed reserves may have been reduced also by “false strikes” in cool wet periods during summer because the young seedlings may not survive subsequent periods of high temperatures. Seedling mortality was seen in the district, particularly in January 1979 but the trial was not inspected at that time.

Perhaps our initial seeding rate was below the threshold level for such a rigorous environment. Further investigations should examine whether speedier establishment may result from heavier seeding rates and/or resowing after an unsatisfactory first year seed setting.

Another limitation to seed build up may have been our failure to apply maintenance fertilizer and thereby promoting heavier seeding when climatic conditions were favourable.

ACKNOWLEDGEMENTS

We acknowledge the interest and assistance given by Messrs J. & G. Smith of “Alum Rock” on whose property the experiment was done.

REFERENCES


(Accepted for publication July 17, 1985)

TECHNICAL NOTE

PHOTOSENSITIZATION JAUNDICE SYNDROME IN WEST AFRICAN DWARF SHEEP AND GOATS GRAZED ON BRACHIARIA DECUMBENS

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ABSTRACT

In a dry season grazing trial with Brachiaria decumbens cv. Basilisk at Ibadan in southwest Nigeria, 14 from a group of 36 West African Dwarf sheep, and 1 from a group
of 16 goats, died. The main clinical and post-mortem findings were signs of photosensitization and jaundice. Further investigation of the effect of the grass on ruminant production in Nigeria would be required.

INTRODUCTION

Photosensitization has been observed among cattle and sheep grazed on Brachiaria decumbens, especially in South America (Andrade et al. 1978; Oliverra et al. 1979; CIAT 1980). It has not been reported amongst sheep and goats in Nigeria. In this paper, the author reports clinical and post-mortem findings in West African Dwarf sheep and goats grazed on pastures of B. decumbens in southwest Nigeria.

MATERIALS AND METHODS

Between late December 1981 and April 1982, 36 sheep (2 males and 34 females) and 16 female goats aged 6 to 15 months were grazed on pure pastures of B. decumbens cv. Basilisk, established in June 1981 on the ILCA farm at Ibadan in southwest Nigeria. The pasture was established from seed imported from Australia. The animals, which had been previously grazed on natural pastures at Fasola in Nigeria’s derived savanna belt in the southwest, were given prophylactic measures against Peste des Petits Ruminants (PPR) and enterotoxaemia. They were also dewormed, treated against blood protozoa, and dipped against ectoparasites.

Three groups of sheep, containing approximately equal numbers, were grazed on pastures of B. decumbens located in different paddocks, whilst the fourth group was fed indoors (zero-grazed). Animals were allowed to roam in the open run attached to the sheds. The 16 goats were grazed separately from the sheep on pasture of B. decumbens. All animals were provided with mineral salt licks and fresh drinking water.

RESULTS

Ten days after the animals were introduced to the B. decumbens pastures, 58.3% of the sheep in the 4 paddocks showed some of the following symptoms: yellow colouration of the conjunctivae (38.9%), (sign of jaundice), conjunctivitis and bilateral corneal opacity (8.3%), exudative dermatitis with facial and body alopecia (27.8%), ataxia (13.9%), and paralysis of forelegs (8.3%) (Table 1).

Corneal opacity, exudative dermatitis, and paralysis were absent amongst the zero-grazed animals. Sheep in this paddock were relatively unexposed to sunshine as they were fed indoors. Exudative dermatitis, the overt sign of photosensitization, later

| TABLE 1 |
| Main symptoms observed among sheep in different paddocks of Brachiaria decumbens |

<table>
<thead>
<tr>
<th>Symptoms</th>
<th>Pasture grazed</th>
<th>Fed indoors</th>
<th>Total observation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>I</td>
<td>II</td>
<td>III</td>
</tr>
<tr>
<td>Yellow colouration of conjunctivae (jaundice)</td>
<td>5</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>Conjunctivitis and corneal opacity</td>
<td>2</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Exudative dermatitis (including facial and body alopecia)</td>
<td>5</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>Ataxia</td>
<td>--</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Paralysis (forelegs)</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>No. showing symptoms</td>
<td>100</td>
<td>55.6</td>
<td>44.4</td>
</tr>
<tr>
<td>No. in each paddock</td>
<td>10</td>
<td>9</td>
<td>8</td>
</tr>
</tbody>
</table>
developed into longitudinal facial, spinal and leg alopecia in most cases. Alopecia of the periorbital area and roots of the ears were also observed in some of the animals.

Of the 16 goats exposed to the pasture, only 1 manifested toxicity symptoms, which appeared as periorbital alopecia, and yellow colouration of all the external mucous membranes (eyes, mouth and vulvovaginal area).

Amongst the sheep showing symptoms, the mean rectal temperature was 38.7 ± 0.7°C and mean packed red cell volume (PCV) was 26.2 ± 4.7%. The only goat showing symptoms had a temperature of 38.8°C and the PCV of 25%.

Ten days after the symptoms were first manifested, 14 out of 21 sheep showing toxicity symptoms died, twelve from the pasture-grazing group and two from the zero-grazing group (Table 2).

<table>
<thead>
<tr>
<th>Findings</th>
<th>Paddock</th>
<th>Fed indoors</th>
<th>n</th>
<th>% of Affected animals</th>
<th>Total animals</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pasture grazed</td>
<td>I II III IV</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dehydration</td>
<td></td>
<td>2 3 2</td>
<td>7</td>
<td>33.3</td>
<td>19.4</td>
</tr>
<tr>
<td>Yellow colouration of organs</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>and tissues</td>
<td></td>
<td>5 4 3 2</td>
<td>14</td>
<td>66.7</td>
<td>38.9</td>
</tr>
<tr>
<td>Fatty liver</td>
<td></td>
<td>3 4 5 4 2</td>
<td>11</td>
<td>52.4</td>
<td>30.6</td>
</tr>
<tr>
<td>No. of sheep dead</td>
<td></td>
<td>3 5 2</td>
<td>14</td>
<td></td>
<td></td>
</tr>
<tr>
<td>% death of total showing</td>
<td></td>
<td>30 55.6 44.4</td>
<td>100</td>
<td></td>
<td></td>
</tr>
<tr>
<td>symptoms</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>% death of total sheep</td>
<td></td>
<td>30 25.0</td>
<td></td>
<td>66.6</td>
<td>38.9</td>
</tr>
</tbody>
</table>

The gross pathological findings at post-mortem examination were generalised yellow colouration of organs and tissues (66.7%), fatty livers (52.4%), and dehydration (33.3%). The zero-grazed animals did not appear to be dehydrated. The only goat affected died showing marked generalised yellow colouration of the organs and tissues, fatty liver, and enlargement of the gall bladder.

**DISCUSSION**

The cause of the photosensitization jaundice syndrome is not known. Andrade et al. (1978) reported *Pithomyces chartarum*, a fungus cultured from pastures of *B. decumbens*, as the agent causing photosensitization among cattle and sheep exposed to the pasture. Fungal culture from *B. decumbens* pastures in this study did not yield *P. chartarum*, but yielded *Fusarium moniliforme*, another saprophytic fungus. Dosing sheep with *F. moniliforme* at a rate of 40 mg kg\(^{-1}\) body weight daily for 3 weeks failed to elicit the photosensitization jaundice syndrome observed under grazing conditions.

Neither exogenous nor endogenous sources of poisoning were observed in the pastures, although some of the symptoms resembled those of chronic copper poisoning observed by Edelsten (1980) among a government sheep flock at Marguba in northeastern Nigeria. The only suspected source of poisoning was through the salt lick supplementation, but the same salt lick blocks were supplied to other sheep and goats grazed on *Panicum maximum* on the same station with no untoward effects.

In this observation, neither bacterial nor protozoal infections were reported from blood and tissues submitted to the laboratory. Clinically, the animals did not show fever or anaemia and the mean packed cell volumes (PCV) were normal (Oduye 1976).

Since the syndrome observed was common to the animals in different paddocks, the causative agent is presumed to be associated with *B. decumbens* itself. Among the
list of plants documented as the cause of photosensitization in domestic animals is a different species, *Brachiaria brizantha* (Clarke and Clarke 1975). In the trials reported here, with *Brachiaria decumbens*, photosensitization and jaundice were the main features. However, in Nigeria, these symptoms have not been reported in cattle. Although *Brachiaria decumbens* has been demonstrated to be the most promising grass in pure swards in northern Nigeria (Foster and Mundy 1961), further investigation would be required of its effects on cattle, sheep and goats.

ACKNOWLEDGEMENTS

I thank the Small Ruminant Programme of the International Livestock Centre for Africa, Ibadan, Nigeria, for permission to publish this paper.

REFERENCES


(Accepted for publication 25 March, 1985)

PROCEEDINGS

FERTILIZERS FOR PASTURES—THEIR USE OR ABUSE

Canungra Field Meeting, May 10, 1985

The first field day of the Tropical Grasslands Society in 1985 was held on 10th May on the property of Mr. and Mrs. H. G. Benstead at Canungra. Talks were presented on the theme “Fertilizers for Pastures—their use or abuse” by various speakers, and then followed an inspection of irrigated river flats which had ryegrass/clover pastures oversown into kikuyu. These pastures had been treated with Roundup while one area was also deep ripped to alleviate soil compaction. Another area had been fertilized with nitrogen and sulphur, while another had received only nitrogen to demonstrate the sulphur problem on the farm.

INTRODUCTION—NEED FOR NUTRIENTS

B. WALKER

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Twenty-five years or more of work has gone into fertilizer research for tropical pastures by CSIRO, DPI, Queensland University and commercial firms. By this time, we should have solved many of the problems, but unfortunately there is still a lot unknown and a lot of problems remain to be solved.

What has highlighted the concern about fertilizer use is that, of the 3.7 million hectares of improved pasture in Queensland (of which 1 million ha are legume/grass pastures), only 150 000 ha of this are being fertilized. This represents less than 10% of the total acreage.