IMPAC TION OF THE RUMEN IN CATTLE DUE TO THE INGESTION OF THE COCOONS OF THE MOLOPO CATERPILLAR GONOMETA POSTICA (WALKER)

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SUMMARY

During 1970 large numbers of cattle died in the North-Western Cape due to the ingestion of cocoons of the Molopo moth Gonometa postica (Walker). Rumenotomy on affected cases was found to be the only remedy.

INTRODUCTION

During the latter months of the year 1970 an increasing number of cattle was lost from rumen impaction in the North-Western Cape. Similar losses, reported by Edwards from the Northern Transvaal in 1935, were caused by cocoons of the moth Gonometa rufubrennea. A related moth of the same genus, Gonometa postica (Walker) (fig. 1) occurs in the North-Western Cape, namely north of an imaginary line drawn from Mafeking to Vryburg, Kuruman, Upington and Karasburg, and in the southern parts of Botswana and South West Africa. The caterpillars of the G. postica appear shortly after the first summer rains. They live on thorn trees, especially on the black thorn and the camel thorn. The cocoons, five by two cm in size, are light grey in colour and covered with tiny, short, black spicules (fig. 1).

This specific study was conducted in the Vryburg and Molopo areas, as result of reports of extensive mortality.

MATERIALS AND METHODS

Of 41 cases which were regarded as typical of the cases of ruminal impaction seen and reported in the area and at the time mentioned, the origin, history, body mass and symptoms of each were recorded. By means of rumenotomy the impacted rumen ingesta were removed in all these cases, weighed and then repeatedly washed in cold water to remove as much of the food particles as was possible. The excess water was drained off and the remaining moist mass weighed again. To identify the fibrous material as originating from cocoons of the Molopo moth, samples from ten such specimens were subjected to the effects of concentrated H$_2$SO$_4$, HNO$_3$ and glacial acetic acid, and the thickness of the individual threads was measured. Similar tests were performed on samples of silk from the cocoons of G. postica and from the nest of the spider of a species of Stegodyphus.

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The rumenotomies performed at the same time afforded an opportunity to compare this procedure as a form of therapy against purely medical treatment tried on previous cases, such as various dilutions of surface tension reducing agents, as well as mixtures of vinegar, sugar and yeast.

Despite the large number of animals reported to have died from this condition, an opportunity to conduct an autopsy only presented itself in three cases: most carcasses were only discovered days later, when usually only the impacted ingesta and skeletal remains were found.

Efforts were made to determine how the animals had gained access to the cocoons; this involved doing counts of cocoons in calf kraals. To verify the conclusions arrived at experimentally, two calves were dosed with cocoons and observed until typical symptoms were noticed, when they were subjected to operation and the typical impacted ruminal contents were found.

**OBSERVATIONS**

*Animals Affected*

Only cattle were found to be affected. Records are available of 41 cases, although several hundred had been reported to have died. No specific breed or class of animal was found to be more prone to this condition than any other. All animals were from seven months to four years of age; the majority was one to two years old.

*Symptoms*

All cases had a history of poor weight gain or gradual falling off in condition, which most farmers attributed to drought and lack of feed or supplements. Typical symptoms of the selected animals were anaemia, dehydration, long, lustreless, loose hair coat and difficult, laboured gait. The patients were in poor to extremely poor condition, sunted in growth and pot-bellied. What was of particular diagnostic importance, when viewed from the rear, was that the animals looked slightly bloated; the distension of the left side was an even semicircular line, whereas the right side was more distended on the lower side of the semicircle (Fig. 2). Where the impacted mass is small, animals show only slight or sporadic symptoms of digestive disorders.

*Autopsy*

The three cases mentioned were emaciated, the rumen containing a single mass of impacted ingesta, the wet mass being 45, 71 and 82 lbs respectively. Examination of the lungs showed oedema, emphysema, petechiae and ecchymoses with froth in the trachea. The heart was covered with petechiae and ecchymoses with froth in the epi- and endocardium. Abomasal folds were oedematous. Isolated areas of remaining fat had undergone serous degeneration. Ana­sarca, hydrothorax and anaemia were found in all cases.
**Impacted Ingesta (removed operatively)**

In each instance this was a solid interwoven mass of ingesta particles adhering to fine silky strands (Fig. 3). The masses weighed from four to 78 lbs; the average mass of 41 cases was 34 lbs. When this condition was first encountered, various materials were thought to be responsible. The majority of farmers thought that it was caused by the ingestion of brain bags, string, fibrous plant material or spider-webs (*Stegodyphus* sp.) As the fine silky strands of the latter closely resemble those found in the impacted ingesta, several tests had to be performed as described above.

**Results of Tests**

The results of the tests performed on ten different samples are indicated in the table below.

The rumen content contained no traces of sclerotised cuticle from the insect prey which is usually incorporated in the nests of sociable spiders.

When the impacted ingested material was washed repeatedly in clean water a 50% reduction in wet weight resulted. The remaining rumen ingesta particles could not be dislodged by any means of force such as repeated beating.

**Pathogenesis**

When cattle ingest the cocoons, the fibres swell and particles of ingesta adhere to, and lodge between them. Progressive enlargement of this mass is accomplished by gradual addition of more ingesta particles as the fine silk strands stretch increasingly. The

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**Table: TESTS ON THREADS FOUND IN THE RUMEN MASS, COMPARED TO THOSE ON SILK FROM NESTS OF STEGODYPHUS AND THESE ON COCOON SILK**

<table>
<thead>
<tr>
<th>Nature of test</th>
<th>Silk from Molopo worm cocoon (1)</th>
<th>Silk from Stegodyphus sp. (Spider) nest (2)</th>
<th>Silk found in rumen content</th>
</tr>
</thead>
<tbody>
<tr>
<td>Addition of concentrated (H_2SO_4)</td>
<td>Swells, contracts and curls but does not dissolve</td>
<td>Dissolves within 30 seconds into an amorphous mass</td>
<td>same as (1)</td>
</tr>
<tr>
<td>Addition of concentrated (HNO_3)</td>
<td>Swells, contracts and curls considerably but does not dissolve</td>
<td>Dissolves within 30 seconds into an amorphous mass</td>
<td>same as (1)</td>
</tr>
<tr>
<td>Addition of glacial acetic acid</td>
<td>no effect</td>
<td>no effect</td>
<td>no effect</td>
</tr>
<tr>
<td>Width of individual silk threads</td>
<td>0.025 mm i.e. 10x thicker than (2)</td>
<td>0.0025 mm i.e. (\frac{1}{10}) thickness of (1)</td>
<td>95% of silk threads = 0.025 mm i.e. same as (1)</td>
</tr>
</tbody>
</table>
ingested material, combined with ingesta clumped together in a large mass, causes rumen impaction and thus impairs ruminal contractions and rumination. Animals emaciate progressively, weaken, and eventually die.

**Treatment**

Removal of the impacted ingesta-mass was found to be the only remedy. Various dilutions of surface reducing agents as well as mixtures of vinegar—sugar—yeast were tried without success. In two cases the latter treatment caused acute death. It was found that some impacted material—but still part of the mass in the rumen—had lodged in and blocked the ventricular (oesophageal) groove.

**Aetiology and prophylaxis**

From case histories it appears that the period of ingestion of these cocoons occurred most probably during the weaning stage. Calves are normally kraaled-off under thorn trees and thus come into contact with large numbers of cocoons which had dropped off from the trees. In some counts done in calf-kraals, it was found that over 60% of these cocoons had been parasitized. It is probable that parasitized cocoons dry out quickly and thus break off easily during spring winds.

The only practical prophylactic measure would be the collection of all cocoons in weaning kraals prior to occupation. The destruction of the caterpillars, cocoons or moths seems to be unpractical and an enormous task.

**DISCUSSION AND CONCLUSION**

In the Northern Transvaal outbreak of 1934, the incidence of rumen impaction only lasted two seasons, while—according to Edwards—parasitization of cocoons was at its peak. This theory can be applicable to the North Western Cape outbreak as well. The reasons why it occurred, seem complex. Lack of feed or supplements apparently had little effect, as several of the animals concerned were kept under ideal conditions. A likely explanation is that calves, which pick up and lick many foreign objects during their weaning period, also ingested the cocoons at that stage.

The control of this condition will be complex and expensive, if attempted. Of greater importance is that farmers know the implications so that they can act if another outbreak occurs.

It is anticipated that cases of rumen impaction will decrease rapidly.

**ACKNOWLEDGEMENTS**

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**REFERENCES**


**BOOK REVIEW**

**THE VETERINARY CLINICS OF NORTH AMERICA: SYMPOSIUM ON FELINE MEDICINE**

Robert G. Stansbury, Guest Editor


This volume of 387 pages deals with surgery and medicine of the cat. The contributions are from 27 authors, each providing a chapter. Although there is no pretence that this book deals with all conditions (it would, in any case, be completely impossible in only 387 pages!) the chapters deal exhaustively with their individual subjects and provide a valuable form of continuing education. As such the book is strongly recommended.

In January, 1971, it had been preceded by a volume on physical diagnosis of small animals. This volume under review will be followed by orthopaedic surgery in small animals (Sept. 1971) and gastro-intestinal medicine and surgery in small animals (June, 1972).