

**MANAGEMENT OF PASTURES AND CATTLE IN THE WET TROPICS  
TOUR OF THE NORTHERN TROPICS BY THE CENTRAL COAST SECTION  
APRIL 17–20, 1978**

Thirty-eight members and friends visited four commercial beef properties, one dairy farm, and the Department of Primary Industries Research Station at Swan's Lagoon, Millaroo, and the Animal Health Station, Oonoonba, Townsville.

The main theme of the tour was tropical pasture management and cattle breeding and management in relation to the current low beef prices in a tropical climate.

The general impression gained was that deterioration in pasture production accompanied a fall off in maintenance fertilizer application. Regular dipping was being replaced by strategic dipping and by selection of cattle for tick resistance, and emphasis was placed on the selection of bulls on performance recording.

While at the Oonoonba Animal Health Station the group was also addressed by Dr K. Entewhistle, and Dr M. Murray of the Department of Tropical Veterinary Science, James Cook University, on aspects of tropical beef breeding and cattle nutrition respectively, while Dr P. Gillard of the CSIRO Davies Laboratory, Townsville, outlined CSIRO pasture research in the dry tropics. These addresses have not been included in the Proceedings.

The following papers and property descriptions give a brief outline of the places visited and the main talks presented.

**"SWAN'S LAGOON", QUEENSLAND DEPARTMENT OF PRIMARY  
INDUSTRIES CATTLE FIELD RESEARCH STATION, MILLAROO, N.Q.**

This station is situated on the Burdekin River 60 km south-west of Ayr. Total area is 8,500 ha and annual rainfall 800 mm. Topography is flat to slightly undulating. The soils are mainly duplex with a slightly acid sandy to loamy surface overlying strongly alkaline clay subsoils. The native vegetation is a savannah woodland of poplar gum (*E. alba*) with the grass understorey being black spear grass (*Heteropogon contortus*), Kangaroo grass (*Themeda australis*) and forest blue grass (*Bothriochloa bladhii*). Some 800 ha of the property has now been developed to Townsville stylo based pastures while 400 ha has been sown to *S. hamata*.

Research is carried out into a number of topics relevant to the beef industry in the dry tropics of North Queensland. These include: comparison of productivity between the Brahman and Sahiwal breeds, productivity and management of Townsville stylo pastures, supplementary feeding studies (mainly protein and phosphorus) of breeders and growing cattle, tick and buffalo fly research, dung beetle monitoring, effects of dehorning at various ages on weight gain, causes of calf loss (conception to weaning), causes of bruising, effect of time of weaning on cow and calf performance.

**ANIMAL STUDIES**

R. G. HOLROYD

*Comparison of Brahman and Sahiwal breeds*

A program was started in the late 1960's to compare the performance of cross-bred herds of varying composition. The four herds which are being developed are half Brahman or half Sahiwal with one half Shorthorn, and three quarters Brahman or three quarters Sahiwal with one quarter Shorthorn.

Only three to five per cent of bulls are selected. Selection is made at 18 months of age, the criteria being weight for age and tick resistance rather than characters such as type and conformation. Bulls are first mated at two years old and are used for two seasons only. Bulls are run with the cows during February, March and April.

The following trends are emerging:

#### *Breeding*

During average seasonal conditions, both breed types have conception and calving rates of 85 and 80% respectively.

#### *Growth rate*

The  $\frac{1}{2}$  Brahman cross produces a heavier weaner than the  $\frac{3}{4}$  Brahman. However the  $\frac{3}{4}$  Brahman tends to have a higher post-weaning growth rate, especially in the first back cross.

Sahiwal cross animals tend to have lighter weaners than Brahman cross but better post-weaning growth rates. Sahiwal cross tend to carry less ticks than Brahman cross and maintain a more even colour. However, Sahiwals have a more nervous temperament, and experience a high postnatal loss of calves which is partially related to the high incidence of "bottle" teats in Sahiwal cows.

#### *The effects of tick and buffalo fly control on Brahman cross cattle*

##### *Ticks*

Two herds of Brahman cross breeders are being examined for the effects of ticks on growth rate and fertility. One herd has been dipped every three weeks for three years. The second herd is never dipped. Growth rate from weaning to two years of age favoured the dipped heifers by 22 kg but there was no difference in the conception rate of heifers, suggesting that tick control is unnecessary in replacement Brahman cross heifers. However, this is not the case with lactating first calf cows where some tick control is necessary as both the weaning weight and fertility of lactating first calf cows was lower in the non-dipped groups.

##### *Buffalo fly*

Brahman cross steers and bullocks are being examined for the effects of buffalo fly on weight gains. One group is sprayed every 21 days with "Sumfly" to control the fly while the other herd is never sprayed. Both groups receive the same handling.

There was no liveweight advantage when cattle were treated for a nine month period but the absence of sores in the treated groups could make them a more attractive proposition for a store buyer.

## **PASTURE STUDIES WITH STYLOSANTHES SPECIES**

S. R. McLENNAN

### *Stocking rates and Townsville stylo pastures*

A grazing trial was commenced in December 1965 in which the effects of Townsville stylo oversown into native pasture are being studied. Treatments are native pasture and Townsville stylo with or without 125 kg ha<sup>-1</sup> yr<sup>-1</sup> superphosphate and stocked at one beast to 1.2 or 2.4 ha. Control paddocks of native pasture are stocked at one beast to 2.4 or 4.0 ha.

#### *Pasture*

Fertilized areas have been heavily invaded by annual grasses (*Digitaria ciliaris*, *Brachiaria milliformis*) and the native perennial grass component has largely disappeared. The legume-grass ratio originally followed the classical legume-grass cycle but in recent years changes in this ratio have been more unpredictable. In the past five years the per cent composition of legume in fertilized pastures has been 57, 3, 53, 21 and 2%.

The unfertilized stylo areas became legume dominant after 2 to 3 years and have remained that way throughout. Legume comprises over 85% of the pasture by weight.

For several years now the fungal disease anthracnose has severely affected Townsville stylo. The legume also becomes heavily moulded during the winter months and intake and digestibility of the mouldy material is low.

#### *Animal performance*

Performance of animals on fertilized Townsville stylo has been superior to that on native pasture and unfertilized Townsville stylo. The main areas of difference have been a faster rate of gain during the wet season and a longer period of weight gain into the winter. Weight losses occur on all pastures during the spring.

Liveweight performance on unfertilized Townsville stylo has been similar to that on native pasture but higher stocking rates can be maintained on the legume.

Following the early storm rains, gains on native pasture exceed those on Townsville stylo pasture because of the time lag for the annual legume to become established.

#### *Phosphorus supplementation*

A trial was conducted over the period January 1970–May 1973 to study the effects of phosphorus supplementation on the performance of grazing cattle. The supplement, black phosphoric acid, was fed via the drinking water. This trial showed that a significant part of the improved performance of fertilized over unfertilized Townsville stylo could be obtained by feeding the phosphorus supplement. Responses occurred only during the period of positive weight change and average 30 kg head<sup>-1</sup> on unfertilized Townsville stylo and 10 kg head<sup>-1</sup> on the native pasture.

#### *Pasture management*

This study was initiated in February 1974 to investigate the integrated usage of native pasture on fertilized Townsville stylo. Treatments involve combinations of native pasture and fertilized Townsville stylo pasture (in increments of 20%) from 100% native pasture to 100% fertilized stylo pasture. Until June 1977, animals had either unrestricted access to both pasture types or were restricted to the native pasture portion for 6–8 weeks after the summer storms, then to the fertilized Townsville stylo until May, with access to both areas from May to the storms. The restricted access treatments were discontinued in June 1977. The stocking rate is 1 beast per 2 ha throughout, and there are two replicates of each treatment with 6 animals cell<sup>-1</sup>.

Substitution of fertilized Townsville stylo for native pasture has resulted in substantial improvement in animal performance with the major advantage coming from the first 20% increment of Townsville stylo. In the first two years of the trial there was little improvement above 40% of the area sown and fertilized but the following two years there was a direct relationship between area of Townsville stylo and animal performance. The greatest improvement was still to the first 20% increment of Townsville stylo.

Restricting access of animals resulted in an overall annual depression of liveweight gain which suggests that the grazing system employed was inferior to a free-range system of grazing.

#### *Investigations with perennial stylos*

A range of perennial stylos was planted in April 1974 into prepared seedbeds to examine their performance and acceptability to stock. They received 100 kg ha<sup>-1</sup> of superphosphate at planting but have had no fertilizer since.

#### *Verano stylo (*Stylosanthes hamata*)*

This stylo may be either annual or perennial in this environment. It grows vigorously during the wet season and is very palatable to the extent that it is largely eaten before the dry season. However, it commonly drops leaf during the dry season and it is affected by anthracnose disease in some years.

*Stylosanthes scabra*

*S. scabra* (CPI 40205) grew well in the early stages and was well accepted by cattle but it has since been badly affected by anthracnose disease. It is obviously not suited to this area.

*S. scabra* cv. Seca was slow to establish but has since developed into a thicket with plants over 2 m in height. It grows well during the wet season and retains some green material throughout the dry. Grazing takes place mainly during the dry season. This plant is resistant to anthracnose. There is little evidence of regeneration of this stylo and this may pose a problem with its use in commercial situations.

Other plants under study include some lines of *Stylosanthes guianensis* and *Stylosanthes viscosa*. The *S. guianensis* plants perform similarly to Verano in many ways, being only weakly perennial. *S. viscosa* is a true perennial and the main doubt about it is its acceptability to stock.

**FARM VISIT—PASTURE DEVELOPMENT ON TULLY RIVER STATION**

N. ALDERMAN

Manager, Tully River Station, Tully, Queensland

"Tully River" station is a breeding and fattening property operated by King Ranch (Australia). The property has an area of 21,000 ha and rainfall varies from 4500 mm in the north to 2250 mm in the south. Soils are generally infertile, being deficient in P, K, S, Cu, Zn and Mo.

Pasture development commenced in 1963 and today 20,000 ha are planted to a variety of tropical pasture species. The property normally carries between 20,000 and 25,000 head of fattening cattle but over the past few years this number has dropped to 17,000 due to lower fertilizer application. A stud herd of 1,000 Santa Gertrudis breeders is also maintained. Weeds such as devils fig, lantana and timber regrowth have increased over the past few years.

The property has now recommenced an extensive fertilizer topdressing program to bring its pasture back to peak condition and production. Experimental applications of Duchess rock phosphate (fines) were tried towards the end of 1977 but application difficulties meant that this project was discontinued.

**THE HUMID TROPICAL LOWLANDS OF N.E. QUEENSLAND, A BRIEF INTRODUCTION TO PASTURE DEVELOPMENT**

C. H. MIDDLETON

Queensland Department of Primary Industries, Research Station, South Johnstone, Queensland

*The region*

The humid tropical lowlands of N.E. Queensland lie between about 16 and 19°S latitude and extend from the ocean inland (20–50 km) to the coastal ranges. Most of the more fertile and flat land is used for cropping (sugar cane, bananas and other crops). The beef industry is confined to the poorer, steeper and/or more remote areas.

*The climate*

Rainfall within the region ranges from 1500 to 5000 mm per year with 75% falling in the hottest 6 months of the year (November–April inclusive). No month receives less than 75 mm mean rainfall. Mean monthly maximum temperatures range from 31 °C in December to 23.5 °C in July while the mean monthly minimum tempera-

ture of the coldest month (July) is 14°C. Frosts do not occur. Conditions for pasture growth are good, apart from excessive rainfall and cloud cover (and reduced radiation) in the wet season, cool mid-winter temperatures and periodic moisture shortage in spring and early summer.

#### *Soils and soil fertility*

The main soil types of the area are:

Granitic soils with recorded deficiencies of P, K, Cu, Zn, Ca and S.

Metamorphic soils with deficiencies of P, K, Mo, Ca and S.

Basaltic soils with deficiencies of P, Mo, Ca and S.

Mixed alluvial soil with deficiencies of P, K, Ca and Cu.

Marine sands with deficiencies of P, K, Ca, S, Cu, Zn, Mo and B.

The quantities of establishment fertilizer for pastures grown on any one soil type are closely related to the natural vegetation previously growing on the area. These recommendations, too numerous to detail here, are available on request from D.P.I. However, as an example, granite soil previously supporting open forest would require 500 kg super, 60–125 kg muriate of potash, 8 kg zinc sulphate and 8 kg copper sulphate per ha.

#### *Pasture mixtures*

Soil drainage and natural fertility are the major determinants of which pasture mixtures to use. The main grass/legume mixtures are:

| <i>Soil situation</i>            | <i>Grass-legume mixtures*</i>                           |
|----------------------------------|---------------------------------------------------------|
| Well drained, fertile            | Guinea-centro-puero                                     |
| Well drained, moderate fertility | Guinea-centro-puero-stylo                               |
| Well drained, low fertility      | Guinea-puero-stylo or signal-puero-stylo                |
| Moderately drained soils         | Hamil-centro-puero-stylo                                |
| Poorly drained                   | Para (legume unreliable but include puero-centro-stylo) |

\*Guinea (*Panicum maximum*) = Common guinea or cv. Riversdale

Hamil (*Panicum maximum*) = cv. Hamil guinea grass

Signal (*Brachiaria decumbens*) = cv. Basilisk

Para (*Brachiaria mutica*) = Common para grass

Centro (*Centrosema pubescens*) = Common centro or cv. Belalto

Puero (*Pueraria phaseoloides*) = Common puero

In addition to the above there are some areas of grass only pastures (pangola, signal, para) originally established for use with N fertilizer.

#### *Maintenance fertilizer*

Maintenance fertilizer requirements are not as clearly defined as those for establishment. For most soils an application of 300 kg ha<sup>-1</sup> super every second year plus trace element re-application every 4 years seems adequate. Potash, where initially deficient, does not appear to need reapplication more frequently than every 3 or 4 years.

#### *Animal production*

The beef industry is mostly based on fattening of stores imported from the Gulf and Peninsula areas. Commercially these are fattened in 9–12 months at a stocking rate of around 1 to 1.5 beasts ha<sup>-1</sup>. A much greater fattening potential on grass/legume pasture (e.g. stocking rate of 3 to 4 beasts ha<sup>-1</sup>, daily LW gain 0.6 kg animal<sup>-1</sup>, fattening in 7–9 months) has been shown experimentally.

### FARM VISIT—THE PROPERTY OF MR S. VELLA, KENNEDY, VIA INGHAM

This property is one of three dairy farms supplying milk to Ingham. The farm of 200 ha runs 160 head of dairy cattle producing approximately 1,456 litres of milk per day.

Eighteen hectares of an irrigated clover/ryegrass mixture has greatly increased milk production and a greater area of this mixture will be planted in the future.

The most successful raingrown mixture is *Paspalum plicatulum* cv. Bryan and common centro (*Centrosema pubescens*). These pastures provide night grazing for the dairy herd and for a small beef herd.

### FARM VISIT—THE PROPERTY OF MR BOSWORTH, FOREST BEACH ROAD, INGHAM

H. BOSWORTH

My property is 183 ha in area and is predominantly on low lying duplex soils subject to local flooding. Up to 30% of the area may be inundated during wet weather. The majority of the property, which carries 546 head of Brahman cattle, is planted to pangola grass. This property has carried up to 800 head a few years ago. With the heavy stocking rate sensitive weed (*Mimosa pudica*) has heavily infested the pangola pasture. I feel that the presence of sensitive weed improves my pastures as cattle eat the tender shoots and immature and mature seed pods. The plant also fixes nitrogen in the soil. If sensitive weed becomes a worry, shutting up the pangola grass for one season and perhaps applying some nitrogen will kill it out.

The pangola grass was initially planted with 300 kg ha<sup>-1</sup> superphosphate and nitrogen was used strategically. Some irrigation is available in the dry season. No fertilizer has been applied for several years.

I never dip the pure Brahman herd. At present I am introducing a Chianina bull into the pure Brahman herd to increase the genetic pool and to avoid some of the hereditary defects which pure Brahmans can carry, e.g. stringhalt; crooked noses, and muscle problems in the hindquarter. The Chianina will give size to the cattle. The cross progeny are very tick resistant and keep an even colour and black pigment. We will look at one calf drop first. We are also considering introducing polled Brahman bulls to overcome the bruising problems with horned cattle.

In selecting replacements for the breeding herd, we cull for stringhalt which often shows up in pregnant heifers and we select for white and grey colour, discarding uneven colours.

### FARM VISIT—"BURNSIDE" BRAHMAN STUD, PROPERTY OF MESSRS REID, INGHAM

The property and pasture development program were described by Mr. L. Reid. The property is 1,200 ha in area and carries 2,500 head of Brahman cattle. Much of the property fronts on to Cattle Creek and is subject to periodic flooding.

To fully utilise this low lying country a special flood fence has been developed. The fence is supported on posts 2 m in the ground and from 2.5 to 5 m out of the ground. When floods occur, floats which are counter balanced with weights and attached to the fence allow the wires to float up to let debris past. When the water drops the wires return into place.

Pangola grass and para grass were planted on this low lying country and Hamil grass planted on the higher country not subject to flooding. All pastures were fertilized with 1,250 kg ha<sup>-1</sup> superphosphate at planting and topdressed with 200 kg ha<sup>-1</sup> for the next 2 to 3 years. No paddocks have been fertilized for the past 3 to 4 years except for a few small paddocks used for weaners.

Haylage is made from hybrid sorghum which is cut and windrowed and picked up with a forage harvester when dried to 40% moisture. This material is blown into a harvestore where it undergoes an anaerobic fermentation and in three weeks is converted into the product known as haylage. Forty hectares of cultivation produce sufficient forage sorghum (under irrigation) to fill three harvestores each with a 240 tonne capacity.

Weaner bulls are put through a period of lot feeding where they are fed straight haylage before putting them out to pasture. The better type bulls are selected for lot feeding again prior to sale at 2½ to 3 years of age. However, most bulls are sold as paddock bulls.

Back rubbers are used for controlling buffalo fly. Carpet underfelt is rolled on a chain and covered with "cod-end" netting. This is then soaked with a sump oil and Coopathon (20:1) mixture. Cattle are dipped only during periods of severe stress.

## QUEENSLAND DEPARTMENT OF PRIMARY INDUSTRIES ANIMAL HEALTH STATION, OONONBA, TOWNSVILLE

K. F. TRUEMAN

### *Historical*

A Stock Quarantine Reserve of 6 hectares was gazetted in 1911 and was increased to the present 83 hectares in 1914. The stated objectives of the Quarantine Reserve were to quarantine overseas stock, stud stock from the southern states, prepare material for immunizing stock against some of the common epizootic diseases and generally to inquire into the nature of some of the more obscure diseases affecting animals.

In June 1920, Government Veterinary Officer J. Legg took up duty and remained until November, 1936. For a period of 5 years commencing October 1931, Dr Legg was seconded to CSIR (now CSIRO) when other scientists and technicians from that organization worked in the old laboratory. They studied contagious pneumonia of cattle while Dr Legg continued to work with cattle ticks and tick fever. This was a very successful period in that it saw the cultivation of the causal organism of 'pleuro', the production of a vaccine and clarification of the organisms causing tick fever in cattle in Australia.

In 1936, Mr C. R. Mulhearn took up duty and pioneered work on the coastal fattening of cattle at Tully and the evaluation of Townsville stylo as a fodder. He was the first to diagnose ephemeral fever.

For over 60 years the Station has been involved in the vaccination of cattle for tick fever and in tick fever research. It has also had a significant role in the campaign to eradicate pleuro.

Following destruction of the laboratory by fire in 1972, a new veterinary laboratory was opened in 1977. It is a complete diagnostic unit, and facilities are included to allow for the diverse range of procedures required for disease investigation and research. It provides laboratories and offices, post-mortem and infected animal rooms, library and conference rooms as well as plant and store rooms, kitchen, etc. At the present time a total staff of 32 is employed at the new laboratory.

*Current activities*

The current research activities of the station include the following:

Providing a veterinary diagnostic service for North Queensland—a large area north from Mackay and west to the Northern Territory border.

Processing large numbers of serum samples for bovine brucellosis associated with the National Eradication Campaign.

Histopathological and bacteriological confirmation of tuberculosis lesions associated with the National Eradication Campaign.

Research on tick-borne diseases, babesiosis and anaplasmosis.

Research into melioidosis, a bacterial disease of animals and man in the tropics.

Classification of Streptomyces nocardial organisms causing tuberculosis-like lesions in cattle.

Research on enzootic pneumonia in pigs.

Studies on the effect of *Brucella suis* in cattle.

Studies on bovine ephemeral fever.

Research on drug cure for bovine leptospirosis.