TOP PADDOCK

NEWSLETTER No. 11 JUNE 1996

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ISSN : 1320 - 727X

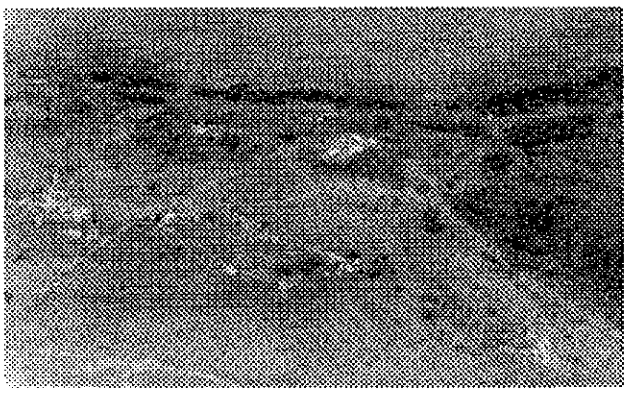
EDITORIAL

As with Newsletter No. 10, this Top Paddock is a special issue to co-incide with and highlight activities at a DPIF Research Station, this time Coastal Plains Research Station (CPRS) for the Open Day on 15 June. CPRS now incorporates the ex CSIRO Middle Point Humpty Doo rice growing area and the Animal Industry and Agriculture Branch (AI&AB) Beatrice Hill Research Stations.

The main areas of Departmental work at CPRS are buffalo production, horticulture and pastures for upland and floodplain areas. The buffalo herd is a genetic resource for the further development of the domesticated buffalo industry. Horticulture research at CPRS has provided industry with adapted, productive varieties of fruits, vegetables and ornamentals. Pasture research aims to preserve and provide adapted cultivars suitable for upland and floodplain environments.

One of the aims of research currently being conducted on the floodplains is to demonstrate the value for animal production of ponding on shallow floodplain areas. While ponding technology is currently not being used by industry on the Coastal Plains, it has the potential to greatly improve productivity in this area.

Tourism is also a feature of the CPRS area. Parks and Wildlife Commission of the Northern Territory has responsibility for two popular attractions in the area, the Window on the Wetlands display and Fogg Dam Reserve. It is interesting that both of these are examples of ponding, i.e. both are man-made.



Beatrice Hill 1960

COASTAL PLAINS RESEARCH STATION A BRIEF HISTORY

Introduction

Coastal Plains Research Station (CPRS) was a name first officially used to describe a research establishment set up by CSIRO in 1959. However, as a Northern Territory institution, the history of the present station is more correctly traced back to the setting up of a block for rice research in 1952 by the Agriculture Section of the Northern Territory Administration (NTA) Lands Branch. The site was on the floodplain near Humpty Doo Station homestead.

The NTA Agriculture Research Farm at Humpty Doo and later at Beatrice Hill and the CSIRO establishment were associated with or resultant from the Humpty Doo Rice Project. This project, which in various forms ran from 1955 to 1963, figures very prominently in the history of the general area, but the names Beatrice Hill and Humpty Doo go back to some of the earliest instances of agricultural endeavour in the Northern Territory and give an interesting background to the CPRS today.

Early Days

The name "Beatrice Hills" was given to a prominent and isolated group of hills close to the west bank of the Adelaide River by John Hutchinson whilst sailing the schooner HMS Beatrice up stream in June 1864.

In 1881, lease Number 1 Hundred of Guy was issued over 5 000 acres around the hills and down to the River. By 1882, work was under way preparing 23 acres for planting of sugar cane and maize and in 1883, 10 000 coffee plants were carried overland from Rum Jungle and planted out over the next twelve months.

Evidently the lower slopes of the hills were used for the various crops grown during this period (including rubber) although rice was also grown in small patches, most likely on the floodplain. A herd of horses and 700 cattle is also mentioned as being on the property.

In 1887, a crop of 13.5 tons of coffee beans were reported to have brought a good price in Melbourne. By 1888, the company running the property was in trouble, went into liquidation in 1889 and the land was resumed in 1890. From then until the 1950's, the area was included in various pastoral leases.

Humpty Doo Station was originally based on grazing lease Number 1C, Hundred of Guy, of 51 square miles issued in 1908. The site of the Humpty Doo Station Homestead, approximately 2 km south of the present junction of the Arnhem Highway and 3 km west of Thomsens Road, is shown on a survey of Agricultural Lease No. 28 in 1910, this lease later becoming incorporated in Humpty Doo Station. It is interesting to note that early documents show the spelling as Umpty doo or Umdidu, though the origin of the name is not made clear. By the 1950's, Humpty Doo was an outstation of Koolpinyah Cattle Station owned by the Herbert Brothers.

Humpty Doo Rice Project

In 1954, rice research began on a block near Humpty Doo Station homestead by a syndicate which was incorporated in 1955 as Territory Rice Limited. The company was two thirds American and one third Australian owned. Increasing areas of rice were grown over the next few years, first on the floodplain near Humpty Doo Station Homestead and later on larger areas near Middle Point. By the 1958/59 Wet Season, over 2 000 hectares of rice was being planted and in 1959/60, 2 180 hectares yielded 3 300 tonnes which was harvested and exported to Hong Kong.

Large scale engineering works were carried out to provide levee banks, channels and water storage for the expanding system. Fogg, Harrison and Whitestone Dams were constructed during this period and Anzac Parade (now called Middle Point Road) was built to connect the Territory Rice Camp (now Thomsens) to the Middle Point rice fields. A new road from the Stuart Highway was built and sealed (now the Arnhem Highway) to replace the station track and electric power was extended as far as the Adelaide River from the existing Darwin grid. Although some successes were achieved, these were outweighed by the failures and the company ultimately failed and was liquidated in 1960.

A new company, Rice Development, based on four share farmers was established to continue the project on a reduced scale and produced crops for the next three years. In 1961, 770 tonnes of a 900 tonne crop was exported to New Guinea, partly over a pontoon jetty on the Adelaide River near Middle Point. However, the company was compelled to operate under restrictive conditions and this, combined with various other problems, led to the winding up of rice development in 1963.

Research and Development History

Beginning in 1952, rice trials were undertaken on a block 3 km from Humpty Doo Station homestead by the Lands Branch Agriculture Section, later Agriculture Branch of NTA. In 1956/57 the operation was shifted to a new area near Beatrice Lagoon and became Beatrice Hills Research Farm. Rice research continued there until 1959 when cattle were first introduced into trials, on rice stubble and fodder crops. In 1959, the rice research program was moved to Upper Adelaide River Experimental Station. In 1961, the area became known as Beatrice Hills Animal Industry Research Station. Work was undertaken on improved pastures both on the upland paddocks and the floodplain. Cattle breed comparisons were carried out including Banteng cattle from Coburg Peninsula. By the 1970's, buffalo had become an important part of the research. During this period, the access roads became much improved beginning with Olympic Bridge (1956) the first all- weather crossing of Beatrice Lagoon. In 1968, 390 hectares of land was excised from the Beatrice Hill Research Station for a naval radio station. This was later expanded to 788 hectares in 1973.

CSIRO established Coastal Plains Research Station in 1959 for research into the potential for rice growing on the coastal plains.

The present Middle Point Village and station workshop are legacies of this project which utilised parts of the ex Territory Rice rice bays. The research continued until 1973 when control of the area was relinquished to the Northern Territory and amalgamated with the Beatrice Hill Research Station; the CSIRO title being retained for the integrated properties.

The 1970's

* Banteng/Brahman cross breeding program.
* Rice research continued.
* Comparison trials of Brahman cattle and buffalo on native pastures.
* Grass species stocking rate trials.
* 1978 self government.
* Sub-division of land in local area for mixed farming.

The 1980's

* Private farms established along Middle Point Road.
* Station boundaries contracting.
* Brahman/buffalo comparison trials on improved pastures.
* 1980 Virology "Sentinel herd" program began.
* Stylo and Guinea grass grazing trials.
* Rice research discontinued at CPRS.
* 1982 Banteng/Brahman crossbreeding program transferred to private industry.
* Horticulture Division sets up block at CPRS for orchard and market garden research.
* *Mimosa pigra* Bio Control research begins, also chemical eradication trials.
* 1985/86 Prison Farm established at Beatrice Hill.
* Buffalo selection and demonstration herd set up and expanded.

The 1990's

* 1991 Prison Farm closed
* 1991/92 Grass & legume grazing trials
* 1993 Ponded pasture research began
* 1994 Window on the Wetlands opened
* 1995 Introduction of imported Riverine buffalo into CPRS herds
* 1995 Renovation of Olympic Bridge

From the first establishment in the 1950's there has been a steady expansion of improved pastures through clearing, planting and fencing new areas as time and funds have permitted. This is continuing.

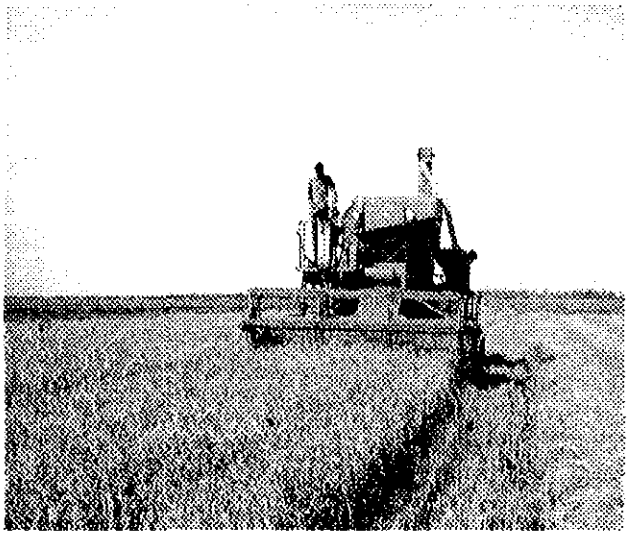
Result

The present CPRS covers an area of approximately 3 000 hectares and carries on average approximately 800 livestock. The staff establishment is eight with another six staff at the separately managed Horticulture block. Middle Point Village is administered by the station management and houses most of Department of Primary Industry & Fisheries (DPIF) staff. The village is also home to some Parks and Wildlife Commission (PWCNT) staff and the location of the Adelaide River District Office.

There is a primary school located at the village which has been there since 1964 and services the local community. CPRS is now on the edge of a rural community which is changing rapidly due to closer settlement and an expanding farming sector. A shire council is now responsible for the upkeep of public areas and the station is no longer the isolated community it once was.

The challenge for the future is for the station to adapt to changing circumstances whilst maintaining its research credentials established over the past 44 years.

Ken Levey
Manager CPRS



Harvesting rice July 1964

COASTAL PLAINS RESEARCH STATION (CPRS) - TODAY

LOCATION/CLIMATE

CPRS is located 50 km (65 km by road) east south east of Darwin and has an elevation of zero to fifty-five metres above sea level. It adjoins the Adelaide River and comprises a total area of approximately 3 000 ha. Of this area, 2 000 ha is sub-coastal (black soil) floodplains and 1 000 ha adjoining upland country. Soils range from heavy black cracking clays on the floodplains to a mix of mainly red, brown and yellow earths on the upland areas. The average annual rainfall for the area is 1 367 mm. Open pan evaporation varies from 138 mm in February and April to 258 mm in October. Mean maximum temperatures range from 31.8C in June to 37.3C in October with the mean minimums from 18.8C in August to 24.0C in November.

FUNCTIONS OF THE STATION

Coastal Plains Research Station provides the venue and resources for: Animal Production, Virology, Sentinal Programs, Pasture Improvement and Management, Weed Control, Horticulture Research and Advisory Services to producers in the Top End of the Northern Territory. The Coastal Plains area is characterised as being partially inundated for the wet season so specialised animal production systems are needed for these areas. Both Agriculture Division and Horticulture Division have research operations at CPRS.

Agriculture Division is responsible for the station management, including maintenance of facilities for livestock, pastures and cropping research. The base of operations is Middle Point Village.

The Horticulture Section conducts research into many fields of horticulture production, including fruit and nut orchards, vegetables, ornamentals, cut flowers etc. The Division has its own facilities on its block located on Middle Point Road.

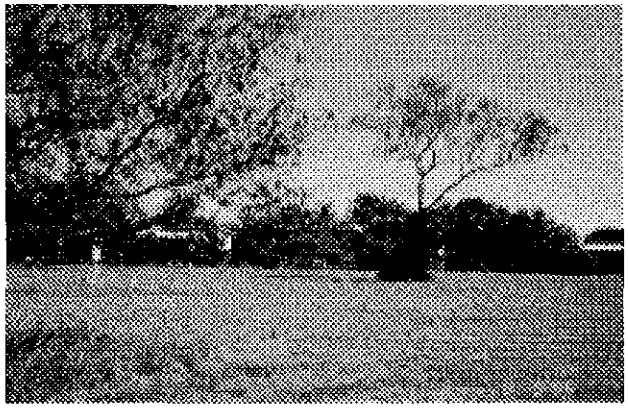
The Parks and Wildlife Commission of the Northern Territory (PWCNT) formerly the Conservation Commission of the Northern Territory has Fogg Dam Reserve adjoining CPRS and operates a tourist facility "Window on the Wetlands" in the Beatrice Hill area. There are other areas of the station in which PWCNT and DPIF are co-operating in demonstrating the practicability of joint use of the floodplain habitat.

Agriculture Division

Buffalo Breeding Herd

The Buffalo Breeding Herd acts as a demonstration herd for the buffalo industry and provides Tenderbuff males for the local market to support industry. It is based on improved pastures, with native and improved floodplain grazing available. It demonstrates the effects of improved technologies on the productive and reproductive potential of buffalo with the emphasis on the production of meat for the high quality market.

Selection for superior bulls is carried out. A controlled mating, single sire system is used and the top 15% of bulls are retained as a group from which to select mating bulls. Selected heifers are being retained in the herd to maintain breeder numbers. Quality breeders and excess female progeny are available for sale to the industry. Excess selected bulls have been sold to the industry since 1992. Females are culled on failure to become pregnant two years running.



CPRS today

Riverine Buffalo Bulls were introduced into some breeding groups in the herd for the first time in February 1995 and progeny have been on the ground since January 1996. There are presently about 600 buffalo in the herd including about 250 mature breeders.

Riverine Buffalo Project

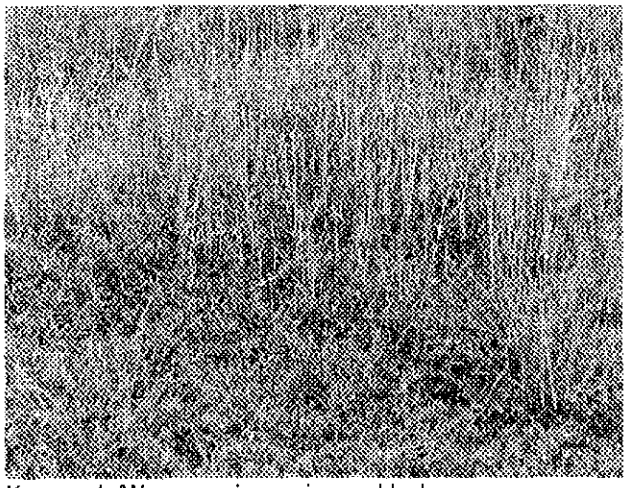
This is a cross breeding program conducted by DPIF in collaboration with the Buffalo Industry Council. In this program, imported Riverine strain Buffalo from North America are being crossed with the local swamp buffalo which have made up all the NT herds until now. The Riverine Buffalo have the potential to be utilised for dairy production and also promise to produce cross bred progeny with higher growth rates and superior meat producing qualities than the swamp buffalo. A primary aim of this program is to provide herd bulls with a high Riverine content to the industry as soon as possible.

Ponded Pastures

Research into ponded pastures at CPRS began in 1993 and development work is continuing on the floodplain areas of CPRS. Pasture ponding has the potential to greatly increase the production capacity of any areas of clay soils developed in this manner. The work at CPRS is specifically looking at the land preparation, pasture species, and practices required to establish sustainable areas of ponded pasture species in the local floodplain environment. The basic principle is that of holding water in the ponded areas for a longer than normal time. This increases the residual moisture available later in the dry season, when local plains are mostly too dry to sustain the more productive pasture species. A range of species suitable for ponding of various depth can be inspected at the station.

Upland Pasture Grazing Trials

These trials were established to provide information on the performance of various grass and legume pasture species on the local upland soils. The grass trials commenced 1991 and

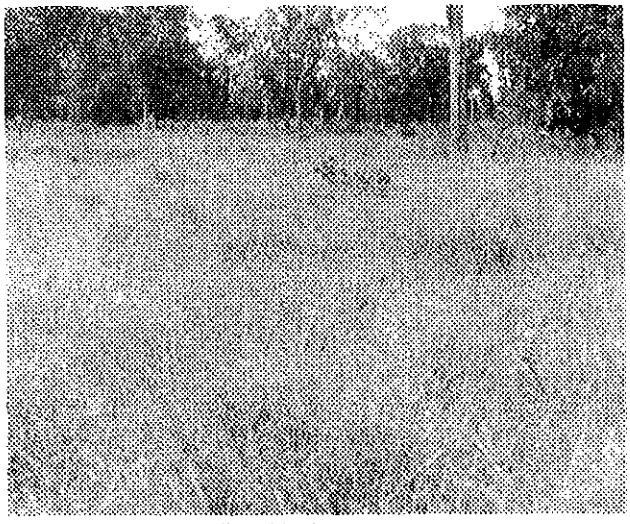


Kazungula/Wynn cassia grazing paddock

were completed in July 1995. The Legume trials began in 1993 and are continuing. The area of the trial was divided in blocks of various grasses and legumes and grazed by cattle at set stocking rates. The condition of the cattle has been recorded monthly on the basis of weight and ultrasound test for fat content. The condition of the pasture is monitored.

Floodplain Pasture Establish Research

This project began in December 1994 and is being undertaken in support of the development of pasture ponding. It is looking at the practical techniques required to successfully establish and maintain a range of pasture species on the local floodplain using both vegetative and seed planting. The research is continuing and it is hoped will provide practical and reliable techniques and strategies for successful pasture establishment on floodplain under local conditions.



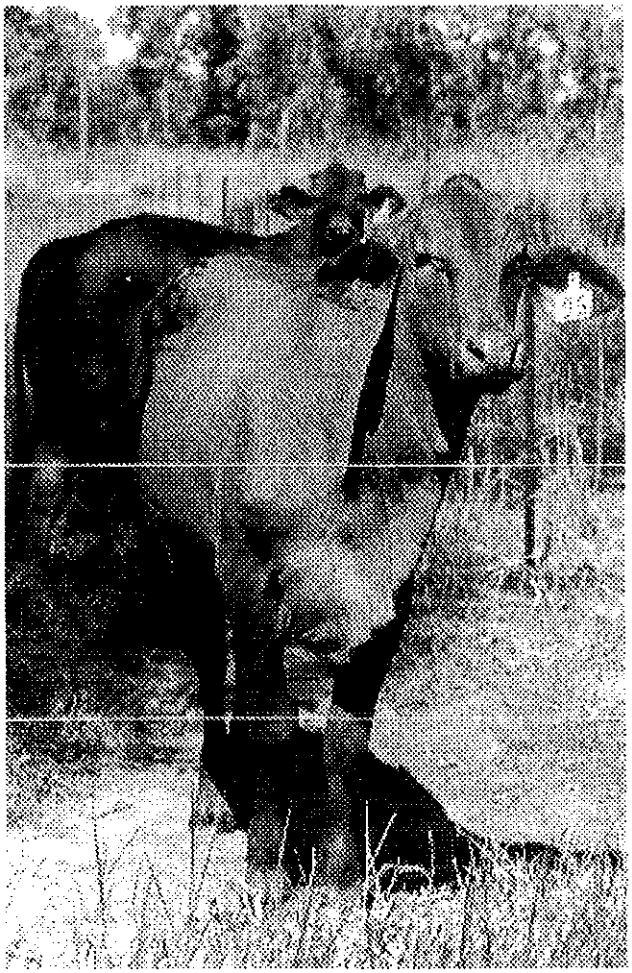
Digitaria swynnertonii paddock

Animal Health Division

A separate herd of cattle and buffalo is held at CPRS specifically to be used as part of the National Arborvirus Monitoring Program. These animals are maintained to provide blood products for regular testing by DPIF Virology Section. The testing procedures indicate the type of viruses to which the animals are exposed by biting insects and provide an early warning of any exotic diseases of livestock which could be introduced into this area of Northern Australia.

Land Resource Management Division

The Bio Weeds Section in conjunction with CSIRO is conducting research into the biological control of *Mimosa pigra*. A plot of Mimosa on the floodplain at CPRS has been exempted from the Station's weed control program to provide a site for a number of studies which began in 1992/93 and are continuing.



Steers in Kazungula/*Centrosema brasilianum* paddock

Horticulture Division

The Horticulture Research block at CPRS is the main research centre in the Top End. It was established in 1983 and covers research on a wide range of annual vegetable crops and tree crops to stimulate the growth of the horticulture industry. Most of the annual crops that can be grown in the Top End have been researched at CPRS. These include melons, other cucurbits and leaf vegetables.

Tree crops planted included in the more than 80 different species are mango, cashew and exotic tropical fruit (e.g. rambutan, sapodilla, carambola, longan).

Some of the other unusual crops being trialed at the station include cocoa, pepper, vanilla, onions, potato, strawberry, asparagus, taro, casava and edible bamboo.

Trials on tropical ornamental plants continue throughout the year, while research on subtropical and temperate ornamentals are undertaken during the dry season.

Ken Levey
Manager CPRS

CPRS village construction 1960

BUFFALO INDUSTRY COUNCIL/DPIF TENDERBUFF NEWS

Tenderbuff still has a supply problem within the industry. In 1995, the NT buffalo industry was unable to supply the number of suitable stock required during the critical August-September period in Darwin when the tourist period is also in full swing. By not being able to supply all year round, we are causing problems for the wholesalers and end users. If a restaurant has buffalo on the menu and it can not be supplied, then that restaurant is likely to leave it off the next new menu and it will be hard to convince them to re-instate it in the future.

I feel that there is no reason why many more producers could not supply this market which is absolutely critical for the long term future of the buffalo industry.

We need to have industry committment to make this scheme work. If producers could make the effort to put aside a minimum of 20-50 head per annum for Tenderbuff then this would make a big difference to the supply situation.

I see that this would involve some early forward planning to build up a small Tenderbuff group which is given some preferential treatment so that they meet the specifications.

It is well known that the Brunei boat trade at present is paying the equivalent of 6 to 8¢ per kg liveweight better money compared with the returns from Tenderbuff. This equates to a premium of $12-$16 per head for a bull going on the Brunei boat at Tenderbuff specifications.

What producers fail to take into consideration is that if Tenderbuff does not progress, and fails then the Brunei market price has no reason to stay at $1.45 (on the wharf) per kg liveweight. While we have two competing markets, it augers well for the price received by the producer.

The bright light on the horizon is current Buffalo Industry Council (BIC) negotiations for southern markets which could return around $1.85 per kg liveweight to the producer in the NT. The BIC has decided to set up a pool so that people who supply stock for the current Darwin market are not financially penalised over those whose animals are killed to go to southern markets. Depending on supplies and the quantity going south, this should lift the total return to the producer to around a minimum of $1.50 per kg livewtight. This then remains competitive with the Brunei boat trade.

The average gross return to the producer of Tenderbuff over the 3 years has remained mostly above $500 per head (see below).

Period	Total	Mean
Jan-Dec 1993	215 head	$513.99
Jan-Jun 1994	123 head	$508.76
July-Dec 1994	82 head	$492.55
Jan-Jun 1995	107 head	$544.52
Jul-Dec 1995	82 head	$509.67
Jan-Mar 1996	65 head	$570.70

Coastal Plains Research Station has provided agistment on pasture for various groups of Tenderbuff males from Carmor Plains, Swim Creek, Marrakai, and recently Bauhinia Downs. All these groups have performed very well on improved pastures. The Bauhinia group (9 head) had an average dressed weight of 207.2 kg and an average fat depth at the p8 (rump site) of 6 mm after 6 months (2 of which were late dry season) on improved pastures.

A group of males on Ernie Schluep's property were in even better condition when recently checked for liveweight and fat depth.

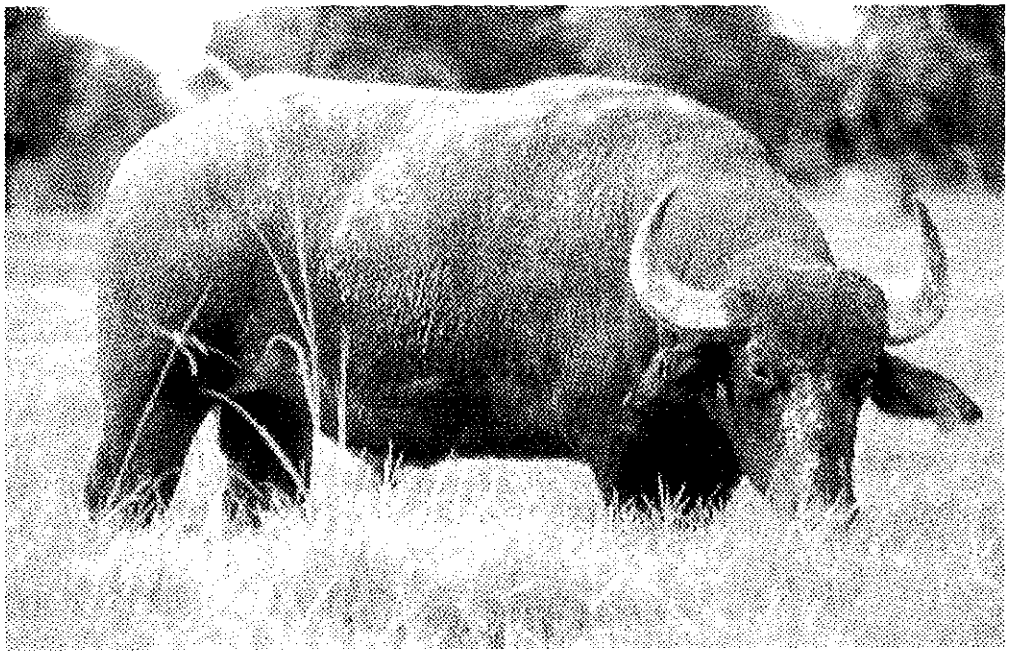
I think what is desperately needed to improve the year round supply situation is an agistment property close to Darwin with improved upland and some floodplain access that can take 50-100 head from producers and turn them off as required.

If agreements are made on the weight gain made going to the agistment property then this would be advantageous to both parties.

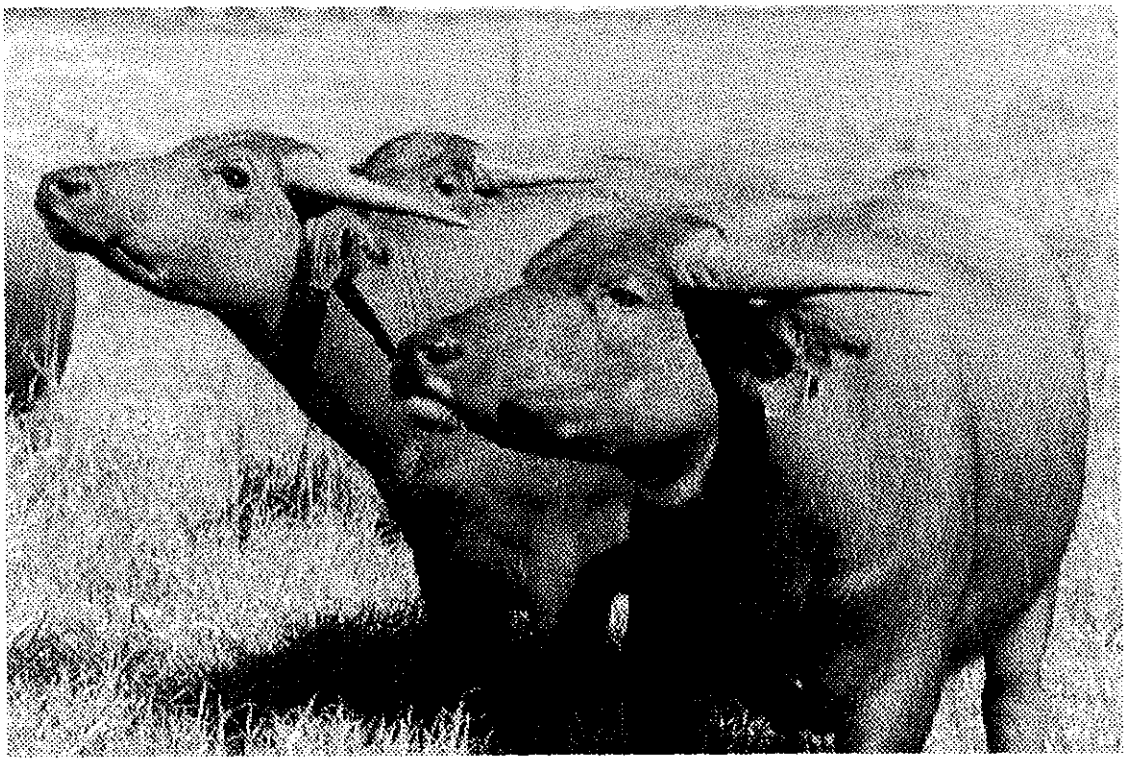
The Melon Patch Feedlot has been providing us with valuable experience in handling a wet season feedlot for Tenderbuff which has not been attempted before. A feedlot is always an option for any producer wanting to finish off his own stock on property in the dry season where there is no access to floodplain.

Management and monitoring is very critical to the success of the feedlot - so that problems can be rectified quickly. Waste disposal in the wet season is a bigger problem than in the dry season and performance appears to suffer somewhat. In most years a wet season feedlot would not be required.

Barry Lemcke
District Agricultural Officer



"Bill" a Riverine buffalo bull



2 year old Tenderbuff males

RIVERINE BUFFALO UPGRADING PROGRAM

The purpose of this program is to upgrade a herd of swamp cows to high grade Riverine by constantly crossing with purebred Riverine bulls. This herd will then be able to provide significant numbers of high grade Riverine bulls to the buffalo industry.

The buffalo herd we are using to upgrade to Riverine buffalo was originally used by the Vet Field Research Section (now incorporated into Agriculture) to do a number of research projects on Swamp buffalo. These included an orphan calf raising trial, correlations between age, teeth and horn rings, the development of semen freezing methods, artificial insemination (AI) programs and pilot work on superovulation and embryo transfer.

When we organised the importation of the first two Riverine bulls, Bill and Hillary, for the Buffalo Industry Council, these cows had been kept away from bulls and were empty. Before these bulls arrived most of our Swamp bulls were sold to reduce the chances of damage to the new bulls, as buffalo bulls are notorious fighters.

We decided to join these bulls to the cows in July as we have access to floodplain pasture and this would enable the bulls to be used in the CPRS Buffalo Breeding Herd in their mating season from February to May. In the first years joining in 1994, the two bulls averaged an 86% pregnancy. This decreased to 56% in 1995. This was most likely due to restricted access to floodplain paddocks during the dry season because of a new road built to the river.

The growth of the Riverine cross calves was excellent. The average weight for age at weaning of the males was 270 kg at 8 months with the females averaging 276 kg at 9 months of age. The weight ranges were 225 kg to 317 kg for males and 232 kg to 338 kg for the females. We are waiting for the weight gains of the Riverine cross calves born in the CPRS Buffalo Breeding Herd as they can be directly compared to pure Swamp calves.

We plan to join the female calves in July when they are yearlings to the young Riverine bull O.J. We will also join a group of Swamps to one of the older bulls to generate more half bred heifers. Eventually, we plan to have a herd of about sixty to one hundred high grade Riverine cows and heifers to provide Riverine bulls to industry.

Gehan Jayawardhana & Terry Olm
Animal Management

PREGNANCY TESTING

OR ARTIFICIAL

INSEMINATION SCHOOL

The Agriculture Division
is planning to run a
pregnancy testing/artificial insemination
school
at Douglas/Daly Research Farm
from July 15th - 17th 1996.

The course will take three (3) days

The cost will be $100

Anyone interested in taking part can contact:

Gehan Jayawardhana on 89 992 224

or

David Zuill on 89 992 341

MIMOSA PIGRA - HAS IT MET ITS MATCH?

Mimosa (*Mimosa pigra*), or giant sensitive plant as it is commonly known, presently occupies approximately 80 000 ha of the Top End floodplains and wetlands. It is a selective plant, preferring degraded or disturbed soils with little or no vegetation to compete against. To the untrained eye, mimosa may look as though it is an innocent bystander inhabiting large areas of floodplain or along river systems. Unfortunately, this woody weed has adapted to the Top End so well, that it displaces vegetation and chokes habitats forming monocultures in impenetrable thickets to the extent that most animals and people can no longer enter those areas.

Mimosa grows and spreads very quickly. It has been estimated that a single mature plant can produce up to 10 000 seeds per square metre per year. These seeds can spread by floating on water, people can inadvertently carry seeds in or on their vehicles, equipment or clothing, and animals may spread the seed to new areas. It can also survive long periods of drought and flooding.

So why did this introduced pest become such a problem?

Habitats such as the Adelaide River floodplain were heavily overgrazed and trampled by the water buffalo. Trampling and wallowing reduced the ground cover so that it ended up looking like a ploughed field which made it easy for mimosa to take hold.

Mimosa has not only had an impact on the plants and animals that use the floodplains, it also affects people and industry.

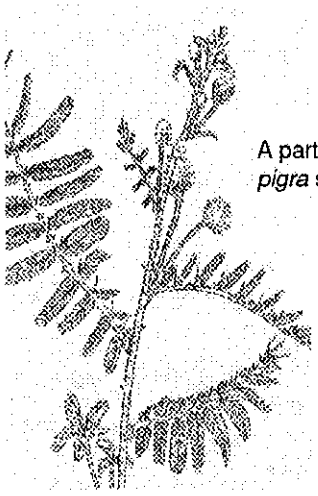
Primary industry is not exempt from mimosa's ravages. Productive grazing lands can become useless if mimosa is allowed to take hold. Recreational fishing and tourism have also been severely impacted by the spread of mimosa. Aboriginal use of wetlands for hunting, gathering and potential tourism ventures has also been severly affected.

Chemical and mechanical control methods are being used to halt the spread of this menacing weed and restore the floodplains. However, biological control may be the best long term option to restore the balance to systems such as the floodplains that get out of kilter when an alien species invades or takes over.

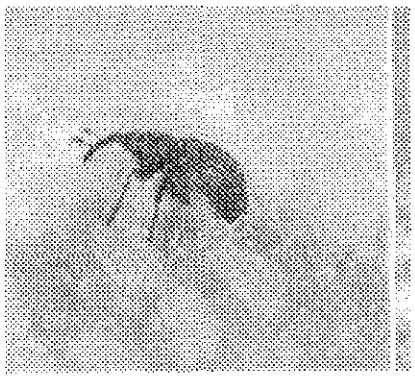
Biological control is not an attempt at eradication. It is an attempt to introduce pests and/or diseases which will keep the weed under control. Several insects have already been released in an attempt to control mimosa. These insects have undergone very strict quarantine testing before being released into the field, and will only survive on *Mimosa pigra*.

The integration of techniques currently being used to control mimosa will aim to return the floodplains to a rich and diverse environment for the animals and people that use them.

Leslee Hills
Weeds Branch



A part of a flowering *Mimosa pigra* stem



An adult *Apion aculeatum* on a *Mimosa pigra* flower bud

PARKS AND WILDLIFE COMMISSION NT - ADELAIDE RIVER DISTRICT

The Parks and Wildlife Commission's headquarters for the Adelaide River District is located within the Coastal Plains Research Station complex at Middle Point Village.

Four Parks and Wildlife Rangers all live at Middle Point.

The District includes 13 parks and reserves (including hunting reserves) scattered over the wetlands of the lower Adelaide River catchment. It also includes the Vernon Islands and Window on the Wetlands Visitor Centre. The functions of these reserves are diverse including conservation, recreation and preservation.

Fogg Dam Conservation Reserve is the most popular of all the park estate in the District and is located near Middle Point. The dam was originally built as part of Humpty Doo Rice Project in the 1950's. The dam was intended to hold wet season runoff to provide freshwater for the dry season irrigation of crops. After the project failed, the dam was declared firstly as a Bird Protected Area in 1959, then a Wildlife Protected Area and finally a Conservation Reserve in 1982. It is one of the Parks and Wildlife Commission Northern Territory's (PCWNT's) oldest reserves. The reserve is small (~1700 ha) but contains a mosaic of habitats from aquatic to floodplain sedge and grassland community, monsoon forests and tropical woodlands. The wildlife found in the reserve is diverse reflecting the different habitat types with numerous species of waterfowl, crocodiles, water pythons, Dusky Rats, Rainbow Pittas and Orange-footed Scrubfowl. The reserve has several bird hides on the spillway and a two tier viewing platform on Pandanus Knoll. These are excellent vantage points to view the waterbirds and sunrises and sunsets. Two walking trails incorporating boardwalk sections meander through the forest and provide a window to the seasonal changes in the wetlands.

The rare and endangered palm *Ptychosperma bleeseri* is the focus of a recovery management program in the western sector of the district. Black Jungle Conservation Reserve contains the largest concentrations of the palm with the only others occuring within a 30 km radius of the reserve. The palm occurs only in the wetlands of the Top End and is threatened by fire, feral animals and human activities. The Parks and Wildlife Commission has committed considerable resources to managing these palm populations to ensure that they do not become extinct.

Three hunting reserves (Lambell's Lagoon, Harrison Dam and Marrakai) are located within the district. At Lambell's Lagoon, steel shot only may be used, with lead shot allowed in the other two reserves. To hunt in any of these reserves a permit must first be obtained from the Parks and Wildlife Commission's Palmerston office.

Window on the Wetlands Visitor Centre sits atop Beatrice Hill beside the Arnhem Highway on the Adelaide River. The centre provides an educational and scenic 'window' on the wetlands of the Top End. Along with computer games giving information on Fogg Dam's large python and rat population, and other ecological and historical information, the centre offers superb panoramic views of the Adelaide River floodplains and is a great spot to watch the sunset in the dry season.

Sarah H Kerin
Senior District Ranger, Adelaide River District

A wetland scene

source are being used in the trial.

Other Exotics (including passionfruit)

Most of the netted exotic block is purely an arboretum, but where possible, yield comparison between varieties will occur. Phenology, ie time of growth, flowering, fruiting and harvest, records are kept on each tree species. These records are kept on all CPRS exotic fruit trees to determine growth pattern trends in relation to the weather patterns, watering and fertilisation.

Mangosteen Research

A precocity trial was established two years ago to determine whether single or double rootstocks or grafting of mangosteen trees will hasten the time to flowering, normally more than 8 years after planting. Problems have developed with the grafted trees and a hormone application to the scions had a detrimental effect. When budwood and rootstocks are available, the trial will recommence with an added aim of reducing suckering on grafted trees.

Durian Research

A precocity trial, similar to the mangosteen trial, has been planted. Durians usually begin flowering after 6-8 years which is an economic disadvantage in comparison to other fruit trees. Two commercial varieties are being used in the trial.

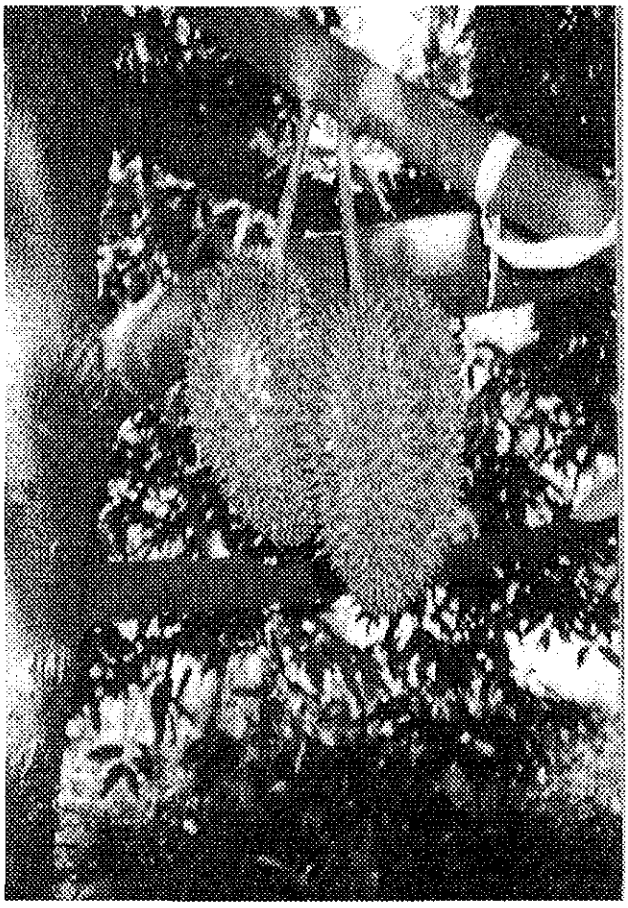
A variety block will also be established to observe the response to weather conditions and to compare yields and fruit quality with the commercial varieties. The varieties will also be used in cross-pollination work to increase fruit quality and quantity.

Annual Crops/Bananas

Bananas

Most of the banana research and development is carried out on growers' farms and involves monitoring nutrition, irrigation scheduling and integrated pest management studies. However, an arboretum of several plants each of 16 cultivars of bananas has been established at CPRS. The main aim of the project is to introduce and assess a range of banana material that could be suited to the locality and so diversify the current banana industry by providing new types that are superior or that appeal to distinct ethnic groups. The aim is to provide a source of planting material to interested groups. The collection so far, includes cultivars that are popular with ethnic groups from South East Asia and the Pacific. The local availability of this material should discourage illegal entry of material from overseas, which could constitute a huge pest and disease risk to the Australian banana industry.

A recent introduction of a Honduras bred cultivar Goldfinger, through DPI Queensland, which has multiple disease resistance and tolerance to nematodes, has been assessed at CPRS. Although Goldfinger grows well, we believe that the fruit quality and post harvest storage life is inferior to current commercial types under our hot climatic conditions.



Durian fruit

COASTAL PLAINS RESEARCH STATION - HORTICULTURE

The Horticulture Division of DPIF conducts research in many fields of Horticulture Production, including orchards, vegetables, cut flowers, etc. The Horticulture Division has its own facilities on its block located on Middle Point Road. The acting Farm Manager, Paul Albano can be contacted on 888 085.

The following projects are currently being conducted:

Mango Trials

Mango Germ Plasm (Varietal Collection), Mango breeding

There are over 75 varieties in the collection at CPRS. This number will increase with new introductions of varieties and species being introduced for trials and further research. The germplasm block is being used in the National Mango Breeding Program to improve our commercial variety Kensington Pride, as well as to evolve superior types for the domestic and export market. One promising seedling selection has already been evolved from the monoembryonic seedlings planted in the 1980's. CPRS is one of the two sites for testing the mango hybrids from the National Mango Breeding Program, the other one being the South Edge Research Station in Queensland. After completion of the crossing work in 1996, over 1 000 progenies will be tested at this site.

Mango planting density trial

As a result of our recent research findings in the field of manipulation of flowering and tree vigour, a new approach has been developed towards high density planting of mango. The technique involves a treatment to ensure flowering followed by pruning just before the expected time of flower emergence. We are looking at spacings of 7 x 5 m and 7 x 7 m which allows almost 2-3 times the number of trees per unit area than the existing number of 100 trees per hectare at 10 x 10 m spacing. The trial has been only planted this year. Results are expected in 3-4 years' time.

Kensington/Sabre block

This block is named as such because the trees are on Sabre rootstock. This block consists of 14 rows, with 7 trees in each row and was planted in 1984. It has been the site of some important trials on flower manipulation, pruning and several other observational trials. The block has also supplied uniform trees and fruits for our post harvest trials. Giant termite damage has resulted in gaps in this block. This block will be removed in the near future.

Tropical Exotic Fruit Trees

Rambutan Research

The current trial in the netted area is a mulch trial yield comparison between varieties.

Another trial area next to the netted area is a rootstock/irrigation trial. Two commercial varieties have been grafted onto 8 rootstocks. The trees will be compared for tree vigour, yield, canker susceptibility, as well as response to various irrigation regimes.

Native Fruit Trees

Observation and yield collection of several native fruit trees has begun. Bush tucker has become fashionable in Australia, but supply cannot keep up with demand. Growing native fruit trees in an orchard situation is being looked at, with some trees planted in a netted area, in case winged vertebrate pests become a problem.

Carambola Research

The variety collection of carambola in the netted area is not being used in a trial at present. New trellis systems are being compared with the old systems. Trellis systems allow more trees per hectare. The trials will compare the yields from each of the systems. Two commercial varieties and a variety used as a pollen

Bamboo

The bamboo project is being funded by RIRDC. It is part of a larger project which includes the University of Central Queensland, QDPI and a commercial bamboo grower in South-east Queensland. The trial area of 162 clumps of one cultivar, *Bambusa oldhamii* is designed to assess plant nutrition and the water requirements of bamboo under Top End conditions. There is very little known about the growth and phenology of bamboo for fresh shoot production and there is effectively no commercial shoot production in Australia. Adjacent to the trial site is a collection of 19 bamboo cultivars for performance assessment which include types for timber, windbreak, ornamental, as well as culinary use. An older collection of 12 cultivars, now four years old, is situated near the station workshop. These cultivars were collected locally and are an indication of the rapid growth that can be achieved under local climatic conditions.

Vegetables

The 1996 vegetable program at CPRS includes varietal selection on honeydew melons, as well as a trial on the effect of three nitrogen rates on the leaf cover of honeydew melons. Although rockmelons, watermelons and hami melons have been grown extensively and successfully in the past, honeydew melons have had problems with leaf wilting and exposure of fruit to sunlight. Sunburn of fruit usually occurs mid-season when the relative humidity is low. Past efforts to increase the water supply before and during stress periods has been inconclusive. This trial, through an increase and manipulation of the nitrogen applied to the plant, aims to increase the total leaf mass and so increase the protection to the fruit.

The variety evaluation observation trial will screen several new introductions for suitability to Darwin. Breeding programs carried out by major seed companies have developed cultivars with a concentrated fruit set to allow an almost once over harvest in an effort to avoid wide differences in fruit maturity.

Spices

Preliminary work on Vanilla has observed the effect of shade on plant performance as well as hand pollination practice. A new block is currently being established on improved support structures to evaluate methods of plant stress to induce flowering.

High grade clonal Pepper planting material has been acquired from Sarawak. A small observation area is being constructed to assess support structures, pruning techniques, propagation methods and to collect basic data on plant behaviour.

Irrigation Research

The Horticulture Division supports an irrigation research and management program at CPRS. The aims of the program are to:

* determine water requirements of tropical tree crops and vegetables
* determine the effect of irrigation amounts and management on fruit yeild and quality
* evaluate methods for measuring soil moisture and scheduling irrigation, promote irrigation management to the growing horticultural community.

Ornamentals

A replicate germ plasm collection has been established at CPRS with approximately 200 different varieties of ornamental plants.

Horticulture Division

Rockmelon trials

NATIVE OR NOT?

Coapim grass (*Panicum spectabile*) was introduced into the Northern Territory late in the 19th century. It was received from Baron Von Mueller, the Victorian Government Botanist. This grass was spoken of as one of the best fodder grasses. Not the least of its recommendations was that it kept green, and in a growing state throughout the year. The grass grew well in the Experimental Garden, and there was a considerable quantity on hand for distribution. By 1907 it had been unsuccessfully tried in numerous places in the bush.

Coapim grass has not been heard of since.

In 1981, there was the first collection of a new grass for the NT at Bulkine Billabong in Wagait Reserve. It was identified as *Echinoclhoa praestans*, a grass also found and described in New Guinea. This grass has since been found and collected at a number of sites around the Top End including Arafura Swamp in Arnhem Land, Finniss River floodplains, Harrison Dam at CPRS and Moyle River floodplain. The sites where it has been found are wet or floodplain where, historically, feral buffalo populations had been low.

Aleman grass (*E. polystachya* cv Amity) was released in Queensland in 1988 as a pasture grass for growing in flooded areas. It found its way to the Top End during the late 1980's and early 1990's, and was planted at CPRS and on some pastoral properties.

In 1995, Conservation Commission (now Parks and Wildlife Commission of the Northern Territory) Botanists Clyde Dunlop and Ian Cowie could not distinguish between *E. praestans* the native grass and *E. polystachya* the introduced grass. To the botanists, the grasses were identical.

A search of the literature reveals that *Echinochloa polystachya* has had a number of name changes over the years. There are 2 varieties of *E. polystachya*, var *polystachya* and var *spectabilis*. Previous names have included *E. spectabilis* and *Panicum spectabile*, which brings us back to the Coapim grass introduced into the Top End over 100 years ago.

The evidence suggests that the native grass *E. praestans* is actually a much earlier introduction of the pasture grass *E. polystachya*.

Arthur Cameron
Principal Pastures Agronomist

Aleman grass

TICK FEVER AT CPRS

This is about a case of tick fever at Coastal Plains Research Station in a young steer from Victoria River Research Station. It is interesting because there are very few cases of tick fever described in the Territory.

A quick description of tick fever

Tick fever is a debilitating disease of cattle caused by minute organisms which live in the red blood cells. The two main organisms in Australia are called *Babesia bovis* and *Anaplasma marginale*. The disease causes fever, anaemia, depression and maybe death in cattle. If it is caused by *Babesia bovis* there may also be 'redwater' (when the urine is a red-brown colour due to damaged red blood cells). The organisms are carried around and moved between animals, inside cattle ticks.

This interesting case

Each year in June, twenty weaner steers from VRRS are taken to CPRS near Darwin to be a sentinel herd. Sentinel herds are used to monitor the presence of diseases carried by insects, at a number of places around the Territory. The animals aren't treated for ticks, as this would deter the biting insects which carry the diseases being researched.

The sentinel herd at CPRS is bled every week, so they are observed more frequently than cattle on stations. This particular animal, a Droughtmaster, was noticed to be very weak about 6 weeks after it arrived at CPRS. It had a large tick burden.

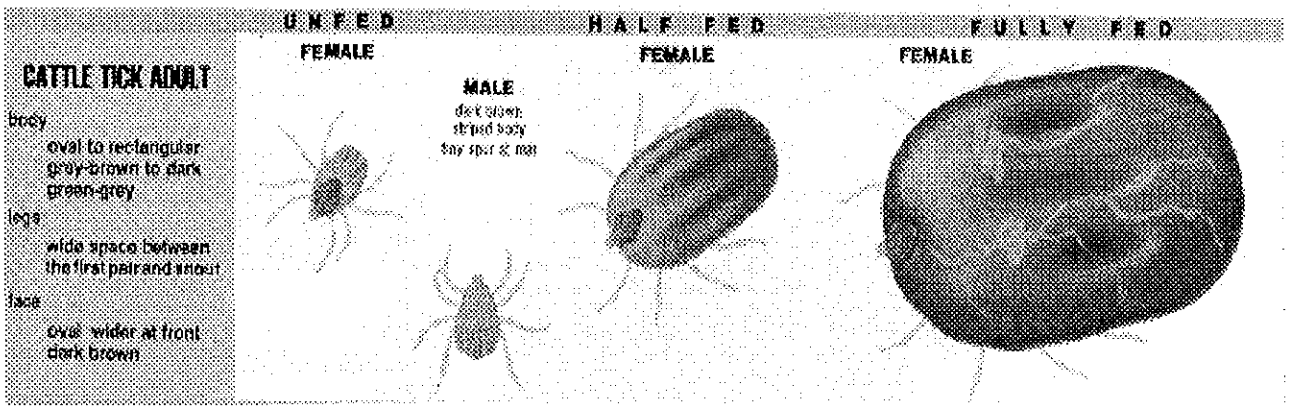
Laboratory Results

Anaplasma marginale organisms were seen in the last blood sample of the sick steer. It can be difficult to diagnose if organisms aren't seen early in the disease, and the clinical syndrome is non-specific. After this case, tests were done on blood from all twenty steers to see if they had been exposed to that organism. When they first arrived at CPRS, 11 had been exposed, six weeks later 14 had been exposed, and about six weeks later again, all 20 had been exposed.

Conclusions

This case highlights that, even though cattle originate from within the tick area, they will not always be protected against tick fever. Tick control is important, because the more ticks there are on an animal, the more likely it is to get a 'large dose' of tick fever organisms and then the disease. Be aware that tick fever can cause sickness or losses in your stock in certain circumstances (e.g. if they move from an area with few or no ticks to an area with more ticks). Call your local Vet or Stock Inspector if you ever suspect tick fever in your stock, or if you would like more information.

Diana Pinch and Lorna Melville
Veterinary Officers, Darwin



(From "Know these Ticks", NSW Department of Agriculture).

MANAGEMENT OF GRAZING ON NT FLOODPLAINS

Background

The main areas of floodplains in the Top End of the Northern Territory are in the Sub-coastal Plain, Marrakai, Finniss and Littoral Land Systems. The Sub-coastal Plain Land System consists of flat areas of heavy-textured or peaty soils that are flooded deeply for several months each wet season. In the Marrakai and Finniss Land Systems there are extensive areas of plains on acid alluvial soils which are liable to shallow flooding each wet season for periods up to 3 or 4 months. These floodplains are mixed in with hills and undulating country. The Littoral Land System contains salt and mud flats liable to saline flooding. This land system has no grazing potential and will not be further considered.

Soils and Vegetation

The soils of the sub-coastal plains are predominantly deep, black cracking clay soils. For growing pastures, these soils are quite fertile. Floodplain soils of the Marrakai and Finniss Land Systems are often mottled yellow duplex soils including solodics, soloths and solodised-solonetz. All surface horizons of these soils are inherently infertile.

The open plains of the sub-coastal plains are covered with *Oryza-Eleocharis* swampy grassland. The vegetation of the major plains and flats of the Marrakai and Finniss Land Systems consists mainly of *Themeda - Eriachne* grassland.

Grazing Potential and Grazing Plants

In their natural state, the most productive areas of the floodplains are the low lying areas of the sub-coastal plains which are flooded the deepest during the wet season. These areas provide a bulk of feed and fresh regrowth during the mid-late dry season when all other feed has hayed off. These preferred areas are dominated by stands of *Hymenachne acutigluma* and *Leersia hexandra* (swamp rice-grass). Next in value for animal production are the shallow floodplains which remain wet through to the mid dry season. Useful grasses include *Pseudoraphis spinescens* (spiny mud grass), *Echinochloa colona* (barnyard grass) and *Paspalum scrobiculatum* (scrobic).

The shallow floodplain areas dominated by sedges are of little grazing value. Marrakai and Finniss Land Systems provide limited dry season grazing, mainly from perennial grasses such as *Themeda triandra* (kangaroo grass) and *Sorghum plumosa* (plume sorghum). Areas of these Land Systems dominated by *Eriachne burkittii* (kerosene grass) provide no useful dry season grazing.

The clay soils of the sub-coastal plains can be improved without the application of fertilisers, although nitrogen fertiliser at establishment stimulates early growth. The solodic soils of the Marrakai and Finniss Land Systems require initial fertiliser inputs of N, P, K, S to build up the fertility. After the initial inputs, the nutrients tend to cycle.

Ponding using shallow banks to control water can increase the productivity of the shallow floodplains. For the aquatic grasses, water ponded on the floodplains extends the growing season. Legumes on the other hand need the water to be kept shallow as they do not tolerate extended periods of flooding.

Grazing History

The floodplains of the northern Territory had been subject to uncontrolled grazing by buffalo mainly, but also cattle and horses, for over 100 years, up until the mid 1980's. Buffalo moved seasonally in relation to depth of water and the presence of green feed. While in general, buffalo moved off the floodplains when the water was too deep and back when the water went down, there were some buffalo on parts of the floodplain during the wet season. Mean density on buffalo on the floodplains were reported as high as 1 beast per 2.5 ha during the dry

season. This density was for the whole floodplains area, but the buffalo tended to congregate where feed was available or on the better areas of the floodplains. On an 80 km^2 portion of the Mary River plain, the stocking rate has been as high as two beasts per hectare during the dry season. These high stocking rates led to overgrazing of the floodplains, and to large numbers of buffalo dying in dry years such as 1961 and 1965.

The effect on the vegetation in general, and particularly the preferred grazing plants was severe. In the 1970's the best areas of hymenachne were outside those areas with historically high buffalo populations. In 1981, the areas of hymenachne remaining on the Mary River plain tended to be on the lowest points of the plain which flood the earliest, the deepest and the longest. The opinion at the time was that overgrazing in the late wet-early dry period was the major long term cause of the deterioration of *H. acutigluma* stands.

The higher densities of buffaloes were all found in association with the coastal floodplain systems. While buffalo occurred over a very large area in a wide range of habitats, densities fell off rapidly as the distance from the coast increased so that no large concentrations occurred more than about 100 km inland. The buffalo population declined between 1981 and 1983 because of heavy utilisation for pet meat and human consumption. Since that time, the feral buffalo populations have been eliminated by the Brucellosis and Tuberculosis Eradication Campaign. The floodplains are now grazed mainly by domestic cattle and some domestic buffaloes.

With the controlling of the buffalo population, the dominant native grass species such as hymenachne and leersia have now returned on the floodplains.

Current Situation

About one half of the Sub-coastal Plain Land System area in the Top End of the Northern Territory is on pastoral properties. The productivity of a number of these Top End pastoral properties has been enhanced by the availability of good dry season feed from areas of native *Hymenachne acutigluma*, *Leersia hexandra, Paspalum* spp. and *Echincohloa* spp. and areas of sown, planted or naturalised *Brachiaria mutica*. These areas are now saved almost exclusively for dry season feed, with the domestic stock excluded from the floodplains during the wet season by fencing. Over the last 15 years, most of the floodplains on pastoral properties have been further sub-divided to control access to the areas of the floodplain which need to be grazed at different times of the dry season.

In recent years, small areas of the floodplains on pastoral properties have been sown or planted with a range of introduced improved pasture cultivars to improve productivity and to provide competition for *Mimosa pigra* seedlings. Cultivars sown or planted include para grass (*B. mutica*), Tully (*B. humidicola*), Amity aleman grass (*Echinochloa polystachya*), native hymenachne (*H. acutigluma)*, Olive hymenachne (*H. amplexicaulis*) and Kazungula setaria (*Setaria spacelata*). Two of these grasses have been present on the floodplains for considerable time without taking over. Aleman grass (*E. praestans*) was introduced over 100 years ago, and para grass about 90 years ago. Most of the spread of para grass has been by deliberate human intervention for pastoral purposes on pastoral properties.

Almost all of the Marrakai and Finniss Land Systems are on pastoral properties. They are largely undeveloped, and in their natural state unproductive, providing only limited dry season grazing.

The coastal plains area plays a significant part in the cattle live export trade to South-east Asia. In 1994 and 1995 totals of 170 785 and 295 814 cattle were exported to South-east Asia via the port of Darwin. During 1994, an estimated 80 000 head passed through the Mary River pastoral properties in the live cattle export trade (DPIF Sources). The estimated value of liveweight gain by all stock on the Mary River Floodplains was $4.2 M. The Mary River pastoral properties represent only part of the animal pro-

duction for the Sub-coastal Plains, and only approximately 25% of the area of Sub-coastal Plains Land System on Top End pastoral properties.

Grazing Management for Sustainability

The keys to sustainable grazing of the floodplains are control of access, duration and intensity of grazing. The floodplains, whether the better areas on the sub-coastal plain, or the less fertile and less productive areas further inland, should be fenced off from the surrounding upland country so that access can be controlled and they can be spelled during the wet season. The floodplains should not be grazed in the late wet/early dry season period, and should be leniently grazed early in the wet season.

These floodplains should not be grazed too heavily, cut or burnt late in the dry season or early in the wet season, as rapid inundation or flooding may drown grasses. Duration of grazing is important. It is critical to keep the stock off the floodplains, particularly low lying areas until they dry out. The low lying areas generally have a water table or moisture close to the surface. Hymenachne areas provide some good quality fresh regrowth during the dry season. Productivity of the shallow floodplain areas depends on regrowth from early wet season storms.

Stocking rate is critical to the long term sustainability of grazing on the floodplains. In the 1970's, Departmental staff thought that the extensive areas of *H. amplexicaulis* and *B. mutica* could carry 1 beast per 0.8-1.2 ha for the dry season. While there is evidence that the better areas of the floodplains carry 1 beast per hectare for some of the dry season, recent thinking in DPIF is that a stocking rate of 1 beast per 1.5-2 hectares over the duration of the dry season will be sustainable in the long term. Recent observations of stock numbers and areas of floodplain grazed on some properties approximate this figure.

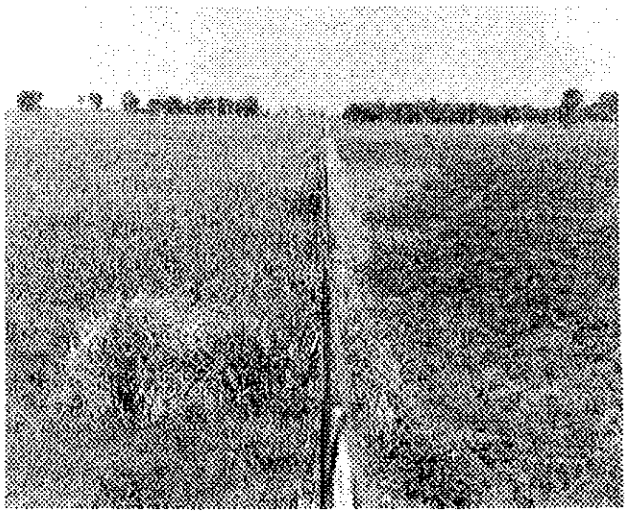
The shallow floodplains which dry out earlier and are grazed for longer are susceptible to invasion by woody weeds such as *Mimosa pigra, Senna obtusifolia* and *Malachra fasciata*. These weeds form a shrubland on many sites of the floodplain. Stocking rates need to be controlled so that grasses present are vigorous and can compete with these weeds. Infestations of these weeds are unlikely to diminish once established. Some of the shallow floodplains of the Sub-coastal Land System, and the floodplains of the Marrakai and Finniss Land Systems will not support sustainable grazing regimes unless they are ponded using shallow banks to hold water longer to grow grasses such as para grass and aleman grass. These floodplains also require initial inputs of fertilisers to stimulate the growth of improved grasses.

Conclusion

The better areas of the floodplains will continue to be productive in the long-term if they are spelled by fencing off the areas during the wet season and if stocking rates average 1 beast per 1.5-2 ha during the dry season grazing period. Shallow floodplain areas will need ponding banks constructed to improve the moisture conditions required and infertile areas will need initial nutrient inputs to allow pastures to remain productive and sustainable.

(This is a summary of a paper presented at the "Sustainable Harvest of Tropical Wetlands Resources" Workshop, March 1996)

Arthur Cameron, Principal Pastures Agronomist
& Barry Lemcke, District Agricultural Officer



Grazed and ungrazed floodplain

MANAGEMENT OF IMPROVED GRASSES ON FLOODED AREAS IN THE TOP END OF THE NT

Introduction

The grasses dealt with here are those species which are being sown or planted on pastoral properties and are regarded as improved pastures for livestock production on floodplain areas of the Top End of the Northern Territory. There are four grasses, native hymenachne (*Hymenachne acutigluma*), Olive hymenachne (*H. amplexicaulis* cv Olive), para grass (*Brachiaria mutica*) and aleman grass (*Echinochloa polystachya* cv Amity). Native hymenachne and para grass are valuable pasture species on Top End properties, and have provided a significant contribution to the value of pastoral production in the Northern Territory for over 50 years. Olive hymenachne and Amity aleman grass which have been introduced into the Top End in recent years also have the potential to contribute significantly to production of grazing livestock.

There are legitimate concerns that these grasses may create problems on native wetlands if they spread from sown paddocks into conservation areas.

Where to Sow

All 4 grasses are specifically adapted to wet and/or seasonally flooded areas. The hymenachnes are restricted to the seasonally flooded black cracking clay soils of the coastal plains and have not performed well elsewhere. Flooding needs to be over 1 m deep and extend for over 6 months duration for them to be productive.

Para and aleman grasses will grow on a range of soil types in wet areas where annual rainfall is over 1 000 mm.

The persistence and productivity of all 4 grasses is favoured by ponding, i.e. the construction of low banks to create shallow ponds which retain water longer into the dry season. In areas where annual rainfall is less than 1 000 mm, this is the only way to ensure that the grasses are persistent and productive unless they are sown or planted into a swamp or permanent water.

Sites should be carefully chosen for these grasses, particularly considering possible spread. They should not be introduced to watercourses or adjacent to other properties where running water could carry seeds or vegetative material to places where they are not wanted. If the watercourse is entirely within a pastoral property, then pastoralists need only consider their own grazing requirements and the effects on the local wildlife, which may be both positive and negative.

The risk of the grasses spreading from established pastures can be reduced by using the non-seeding para and aleman grasses.

Grazing

These grasses are all palatable. Grazing of new plantings should be delayed until the pasture is well rooted and developed. In the first year, grazing should be lenient. They should be used solely as a dry season feed. These grasses do not stand continuous grazing. They need wet season spelling to recover root and leaf reserves.

A safe stocking rate for these floodplain areas is around 1.5 to 2 ha per beast. This may vary with the nature of the wet season, which will influence how much grass is grown, when the floodplain is dry enough to graze and how long soil moisture will support the regrowth of grazed swards, and wet season application of nitrogen fertilisers. Heavier grazing pressure can be used for shorter periods.

It is good management not to graze the grasses too low in the late dry season/early wet season period as the grasses may not survive rapid inundation or flooding without leaf above the water level.

Haymaking

Good quality hay has been made from native hymenachne. Best quality in hay is usually obtained from regrowth after mowing or grazing. Hay has also been made from para grass, but it is stemmy, and crude protein levels after a season's growth are below livestock maintenance requirements. Para grass or aleman grass hay should be made from regrowth. A better quantity and quality of hay can be produced by fertilising with nitrogen late in the wet season, 6-8 weeks prior to cutting. This will generally only be possible through aerial application of fertiliser.

As with grazing, the grasses should not be cut too low, late in the dry season, or early in the wet season as early flooding will drown and decimate the plant population.

Fire

All four floodplain grasses are susceptible to burning. If ungrazed during the dry season, the floodplain grasses can develop a large bulk of dry material by the end of the dry season, which presents an extreme fire risk. If ignited, a fire is difficult to control on the floodplains. Dry vegetative matter which has lodged in wide cracks in the clay soil sustains the fire.

Recovery of the grasses from burning is slow, particularly if followed by flooding early in the wet season. Stands can be decimated and may take years to recover their plant population and productivity. Observations have been made then an early dry season burn may encourage the spread of para grass, but if re-burnt later in the season, it may be destroyed.

Control in non-pastoral areas

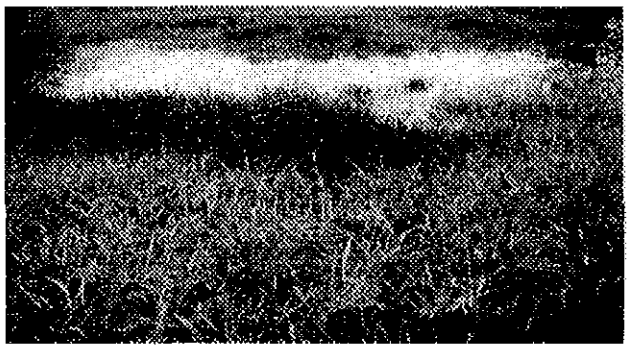
Para grass is present in waterways and wet areas around the Top End. In most of these areas it poses no significant problem. It may also be preventing the infestation by serious weeds of the floodplains such as mimosa (*Mimosa pigra*) and senna (*Senna obtusifolia*).

It is also present in some National Parks and Conservaiton reserves. There are large areas of para grass in Kakadu National Park on the floodplains of Magela Creek and at Ubirr Rock. It was present when the pastoral leases of Mudginberri and Munmarlary were resumed to form the National Park. There are concerns that the para grass and other introduced species will spread, choking out some native vegetation and eliminating native wildlife habitat in those areas. The nett positive and negative effects of these introduced grasses have not been objectively studied and documented. Two of the grasses have been present on the floodplains for a considerable time without taking over. Aleman grass (*E. praestans*) was introduced over 100 years ago, and para grass about 90 years ago. Most of the spread of para grass has been by deliberate human intervention for pastoral purposes on pastoral properties.

Unwanted areas of these four grasses can be controlled by management. Management should be aimed at having the grasses short, with little leaf or reserves available when the areas they occupy are flooded in the wet season. They can be kept short by heavy grazing, frequent mowing, slashing or cutting, or by burning late in the dry season or early in the wet season. A stand which is severely abused in this manner and then flooded may be eliminated in one wet season. This strategy may not be successful in years of below average rainfall or which lack prolonged flooding.

Glyphosate (36% a.i.) at a dilution of 1:100 L can successfully control these grasses. Spray regrowth early in the season prior to flooding, to make plants more susceptible to drowning.

Arthur Cameron, Principal Pastures Agronomist and Barry Lemcke, District Agricultural Officer.



Para grass and native Hymenachne

GRAZING PREFERENCES OF HORSES

Observations were made of three horses grazing improved pasture species in the Humpty Doo area of the NT.

Pastures

The paddock was approximately 1.2 ha (3 acres) in area. The paddock had been sown to pangola grass in 1978 and had gradually degenerated due to overstocking and trampling by stock. Estimate of weed in the paddock would approximate 50%.

In 1984 the paddock was ripped and cross ripped, disced and sown with Common Guinea grass which failed.

The paddock was again prepared and 0.31 ha was sown with the species listed below during the 1986/87 wet season. The species were sown in separate rows 50 metres long by 5 m wide, with no gap between rows.

The species sown were the grasses Common Guinea, Hamil Guinea, Tully, Bryan plicatulum, sabi, buffel, Indian bluegrass and signal grass and the legumes Wynn cassia, Glenn jointvetch and Cavalcade.

Superphosphate and Urea were applied at the rate of 50 kg/0.40 ha (1 cwt/acre), on two occasions, February 1987 and November 1987.

The paddock was grazed in March 1987 and irrigated during the 1987 dry season.

The Pangola grass that had originally been sown in the paddock returned after the paddock had been cultivated and fertilised. It competed vigorously with the Guinea grasses.

An examination of the pasture was made prior to observations on the basis of the percentage of species in each row. The results of this examination are in Table 1.

Table 1: Species Sown or Present

		Percentage Present		
Pasture Species	**Sown Pasture**	**Pangola**	**Native Species**	**Weeds**
Common Guinea	40	55	5	
Common Guinea	30	65	5	
Hamil Guinea	75	10	5	
Tully	95	3	2	
Bryan	85	5	5	5
Sabi	15	80	5	
Sabi	75	5	10	10
Buffel	40	5	5	50
Indian Bluegrass	100			
Signal/Verano	90/10			
Glenn	80		5	15
Wynn/Cavalcade	80/5			15

Three horses were used, two mares and one gelding. The mares are both 14.1 hands and approximately 350 kg and the gelding 15.1 and 380 kg. Horses were allowed two days grazing on other areas of the paddock with access to all pasture species. This was to ensure that by the time observations began, the horses were able to be selective having had ample opportunity to try each species. The horses were introduced on the morning of 5 January 1978 and were removed on the evening of 7 January. A single electrified wire was used to contain the animals on the pasture.

Grazing preferences

Observations were made for one hour periods with a 20 minute break for the observer. Each one hour observation period was subdivided into six ten-minute periods and each of these subdivided into a further 10 one minute observations.

Each horse was given an identifying number so as to facilitate individual observations. General and overall comments were noted at the end of each one hour period. A ranking of preference was then formed from the number of times and duration of grazing of a specific pasture. The three horses under observation did not graze continually throughout the observation period. The horses spent 64% of their time grazing and 36% on other activities.

Table 2: Ranking of Pasture Species.

SPECIES	GRAZING TIME (HRS)	RANKING
Pangola	6.5	1
Sabi	2.1	2
Hamil Guinea	1.6	3
Tully	1.6	4
Common Guinea	1.4	5
Native Grass	1.1	6
Indian Bluegrass	0.7	7
Buffel	0.7	8
Signal	0.6	9
Wynn Cassia	0.4	10
Bryan	0.4	11
Cavalcade	0.2	12

Pangola grass being ranked as first choice was no surprise. The majority of small block holders owning horses have pangola planted as a single species pasture. The grasses which ranked second to fifth, however, are responsive to spray irrigation during the dry season, particularly the Guinea grass and Tully. Whilst these grasses are not as palatable as Pangola, they do offer an acceptable alternative for horse feed during the "dry".

Acceptance of the second to fifth choice species may improve over time as animals become more used to the grasses.

An interesting observation was made with signal and Bryan in that the three horses would graze the seed heads first, then follow the stem down to the blades of the grass. Blades were grazed for 25-50 mm then ignored. The other use to which these grasses were put was as a rolling patch. All three horses rolled several times in these plots and not at all in any of the other species plots.

A subjective judgement on the use of the legumes by the horses would be that they come back to them after grazing the grasses. Cavalcade was selected from the bulk of a Wynn plot, indicating a higher degree of palatability.

In conclusion, the observations have given a reasonable indication of the palatability of the respective grasses and legumes available to block owners for horse pasture.

Paul Graham
Extension Officer

STOCK MOVEMENTS

The following reminders are given about branding and tailtagging for stock movements within the NT, interstate or export.

Branding

Cattle leaving the property must be legibly branded with a NT registered brand.

Tail tagging

Movements within the NT

In 1996, ALL stock from properties where all tailtags on the property are not CF3, CF2, TN or MN are required to be tailtagged to move **to abattoirs or saleyards within the Northern Territory.**

IF ALL TAILTAGS ON YOUR PROPERTY ARE CF3, CF2, TN OR MN TB STATUS. **This tailtagging requirement no longer applies**.

However, producers sending cows to slaughter from mobs with a history of TB are recommended to tailtag the cows and to record serial numbers if cows are trucked from different paddocks.

If a TB lesion is found, the paddock or origin can be identified from the tail tag if you recorded the tailtag serial numbers from each paddock.

Movements from the NT

Export

* No tailtag is required.

To Queensland

* Tailtag to move to abattoirs or saleyards.
* Tailtag is not required to move to properties or feedlots.

To South Australia

* Tailtag to move to abattoirs or saleyards
* Some feedlots require stock to be tailtagged.

To Western Australia

* Tailtag to move to abattoirs or saleyards.

Which Tailtag do I use?

The following are the approved tail tag types for use on Northern Territory stock.

1. Yellow or Pink Tag with black characters for the status tail tag areas below:

Confirmed Free One	(CF1)
Monitored Negative	(MN)
Tested Negative	(TN)
Confirmed Free Two	(CF2)
Confirmed Free Three	(CF3)

A pink tail tag must be used to declare HGP free status unless a pink HGP free eartag is used. ie never treated with HGPs at any period in their life.

2. Green Tag with black lettering for the tail tag areas listed below:

Infected	(IN)
Non Assessed	(NA)
Suspect	(SU)
Restricted	(RD)
Provisionally Clear	(PC)

3. Blue Tag with black lettering for all stranger cattle in consignment. Stranger stock must also be declared on the waybill.

Contact your local stock inspector or veterinary officer for more details.

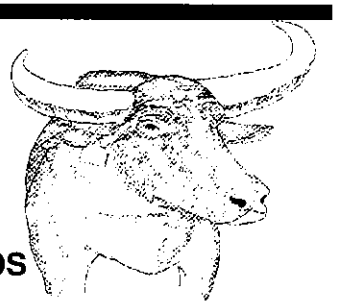
Brian Radunz
Deputy Director, Animal Health

Coastal Plains Research Station

Open Day

FARM BUS TOURS OF:

- **BUFFALO PRODUCTION**
- **FLOOD PLAIN PASTURE & PONDING DEVELOPMENT**
- **WINDOW ON THE WETLANDS**



Plus Static Displays, Food & Refreshments

Saturday 15 June 1996
Middle Point Village
10:00 am - 4:00 pm

FOR MORE INFORMATION CONTACT
BRUCE SAWYER ON 99 2363

AND KEN LEVEY ON 881612