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DEPARTMENT OF PRIMARY INDUSTRIES

***THREE** generations of the well-established Upper Caboolture dairying family, the Newtons, with three calves from top producers in the Merryvale Jersey Stud. Pictured are (from the left) Mr. Ted Newton, Mrs. Jeff Newton, Cliff Newton and Mr. Jeff Newton. (Story inside).*

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More Funds for Locust Control

STATE Cabinet has allotted a further $50 000 to provide free supplies of insecticides for use in plague locust-infested areas of Queensland.

Announcing this, the Minister for Primary Industries (Hon. V. B. Sullivan, M.L.A.) said Cabinet also decided to take up the question of reimbursement of State expenditure with the Prime Minister (Mr. Whitlam) and Federal Primary Industry Minister (Senator Wriedt).

Mr. Sullivan said the State's initially-proposed programme of $40 000 had already been over-committed.

It was essential for the present control measures to be continued and it also was highly desirable for the necessary insecticides to be made available free of charge.

'A firm commitment from the Federal Government on funds is required', the Minister stated.

'Last November, State Cabinet allocated $20 000 and the Federal Government proposed that it would provide up to $500 000 as a contribution to expenditures by the four States concerned on locust control on a $1 for $1 basis.

'However, no details of the basis of allocation of these funds has yet been advised to Queensland.'

The Minister said that locust infestation had spread considerably and extended far into the grain-growing areas of the Darling Downs and Central Queensland.

The Australian Agricultural Council was reviewing a proposal to establish an Australian Plague Locust Committee, funded by contributions from the Commonwealth and States.

Mr. Sullivan added that the whole question of Commonwealth-States participation in locust control programmes needed to be resolved urgently.

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APRIL 1974

Irrigation the Key to this

by A. HUTCHINGS, Dairy Cattle Husbandry Branch.

Drinking water is readily available in all paddocks.

Dairy's Success

MANY areas in South-east Queensland have the soil and water resources capable of supporting a viable dairy enterprise. Mr. Jeff Newton, of Upper Caboolture, has shown how it can be done. This is his story.

His 48·6-hectares (120-acre) level property is situated on the edge of the wallum and some 21 km (13 miles) from the mouth of the Caboolture River. With the exception of 6 hectares (15 acres) of alluvial loam beside the river, the property is approximately 24·4 metres (80 ft.) above river level. Soil is mostly a grey clay loam overlying yellow to grey clay 15·2 cm (6 in.) below.

Climate

The 1 300 mm (52 in.) annual rainfall for the district has a monthly distribution as shown in the accompanying graph.

These figures are calculated from records over 30 years. They vary considerably from year to year and all too frequently very little useful rain falls in the June to August period.

There are, on an average, few but very variable frosts.

PASTURES

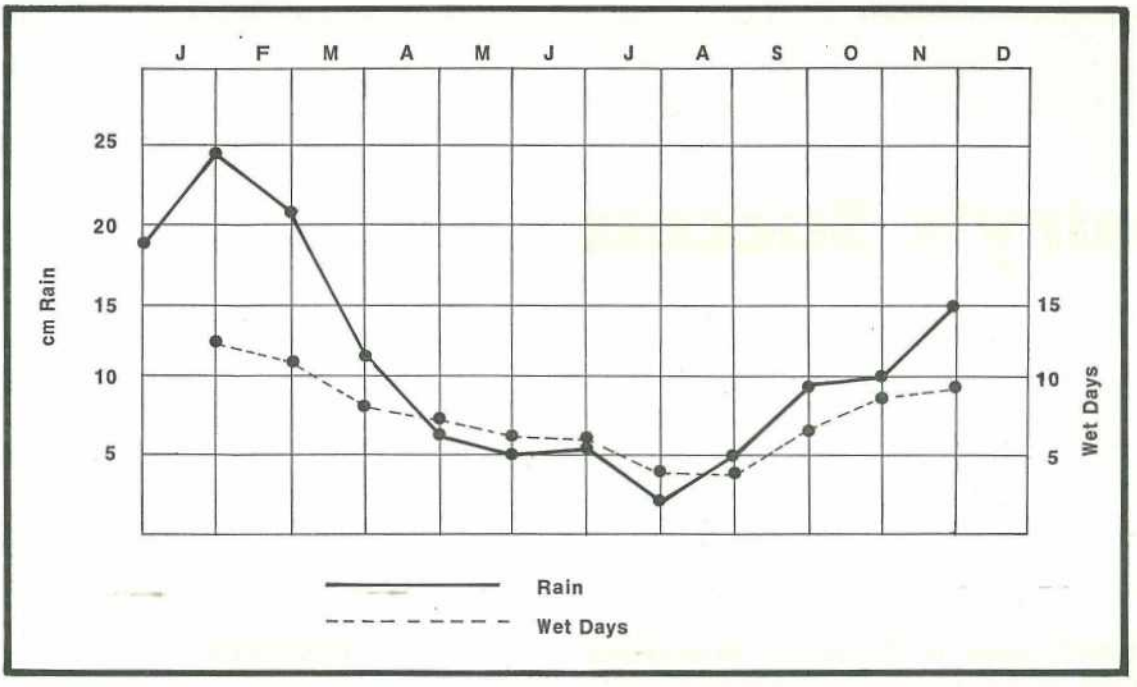
Irrigated pasture

There are 17 hectares (42 acres) of irrigated pastures, 15 hectares (38 acres) being used by the dairy herd. After much experimenting, Mr. Newton has now settled for the following pasture mixture: 4·54 kg (10 lb.) each of Wimmera, Italian, Grasslands Manawa and Kangaroo Valley ryegrasses plus 0·45 kg (1 lb.) each of Ladino and New Zealand white clovers.

The ryegrass has a vigorous life of 2 to 3 years, and consequently is oversown at 2 to 3 year intervals with 4·54 kg (10 lb.) each of Wimmera, Italian and Grasslands Manawa ryegrasses to maintain this vigour.

The surface soil is renovated simultaneously by the following procedure: rip, disc harrow, grass harrow, broadcast seed, lightly grass-harrow and finally roll. This ensures planting at a regular, shallow depth on a firm seedbed. Irrigation is applied as necessary. Good germination is thereby ensured.

Pasture planting and renovation are carried out during the March to May period. Approximately one-third of the irrigated pasture is renovated each year. A light grazing is given 5 weeks after planting.

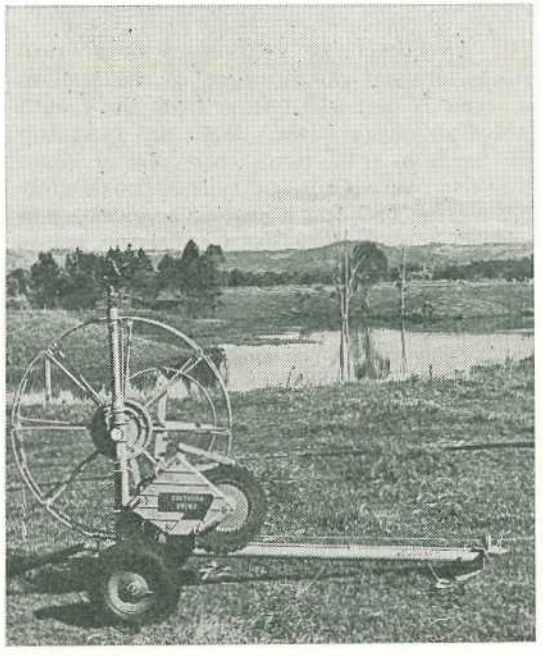


IRRIGATION. Irrigation is complementary to rains to provide not less than 38 mm (1·5 inch.) per fortnight. This ensures satisfactory pasture growth by maintaining a fairly even moisture content in the 30 to 45 cm (1 to 1·5 ft.) root zone.

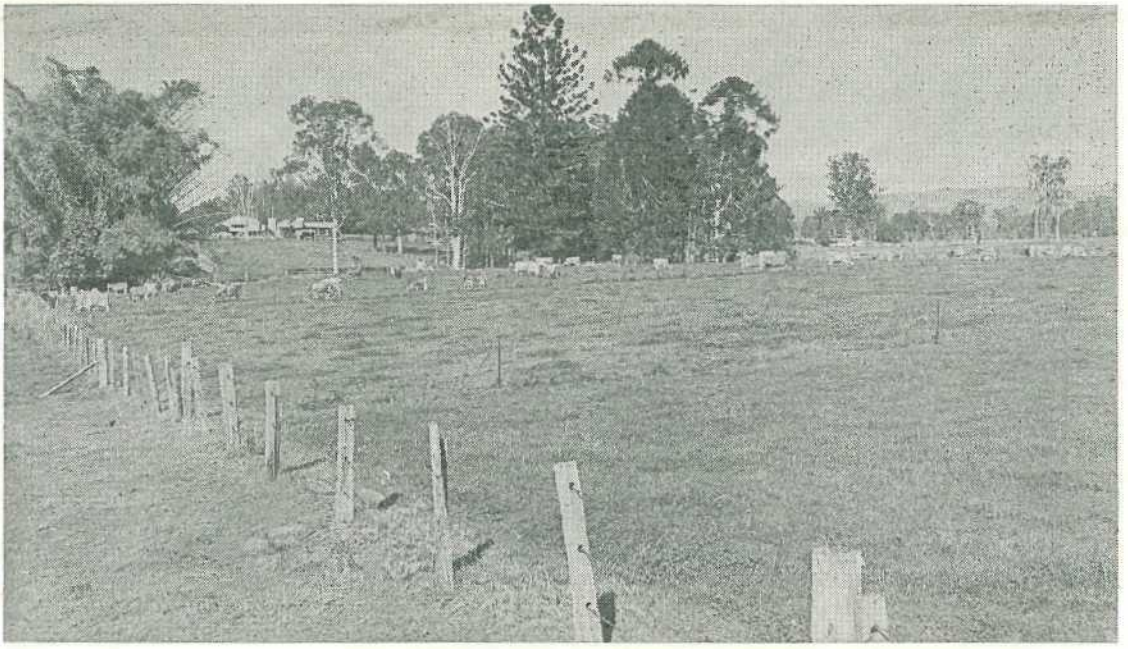
With Mr. Newton's irrigation plant and paddock design, the whole 17·1 hectares can be irrigated in 10 days. Water is pumped from a 76·35 million-litre (17 million-gallon) catchment dam. This is replenished in dry times from the river.

Cost of electricity for irrigation is approximately 60c/ha/cm (acre/inch). The electricity bill for 1972-73 for irrigation was $695.

SUBDIVISION AND GRAZING MANAGEMENT. The irrigated area is subdivided into 19 paddocks, each approximately 0·81 hectares (2 acres). Grazing is conducted on a 14 to 16-day rotation, immediately before irrigation and fertilizer application. Fresh paddocks are given by day and night but grazing is varied according to pasture regrowth.



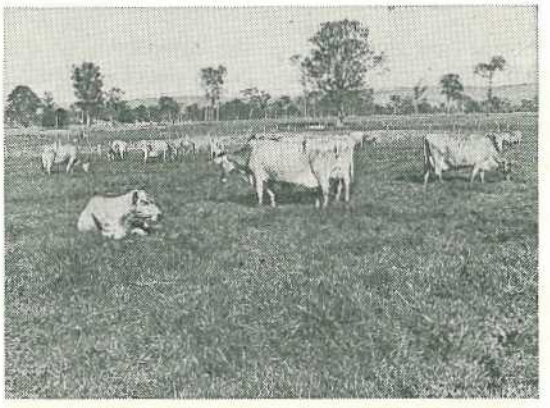
A travelling irrigator ready for use beside the 0·5 km long dam.

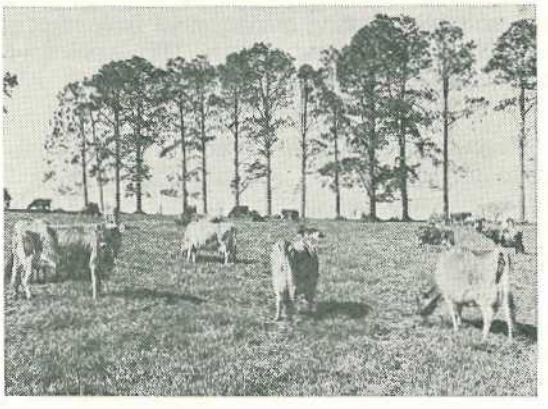


The original and the improved pastures are easy to identify.

The herd is satisfied and there's still plenty to eat.

Below. A contented herd in a picturesque setting.





Bloat has occurred only once, 5 years ago. No special preventive measures have been necessary. The milking herd is fed almost entirely on the irrigated pastures.

FERTILIZING. A basic application of 203·2 kg (4 cwt.) No. 12 superphosphate and 50·8 kg (1 cwt.) each of muriate of potash and Nitram is applied at pasture planting time. Annual dressings of 203·2 kg (4 cwt.) superphosphate, 50·8 kg (1 cwt.) muriate of potash per 0·45 hectare (acre) are applied in the March to April period. Eight or nine monthly topdressings of 125·7 kg/ha (1 cwt./acre) of

Mr. Jeff Newton and his son Clive beside their solar hot water system.

Nitram are applied over the remainder of the year. This system has been developed with technical advice from the Department of Primary Industries and may be modified after future observations and trials.

Rain-grown pastures

Some 24 ha (60 acres), the remainder of the property, consist mainly of paspalum and Rhodes grasses and clover with some remaining couch grass. These pastures are used by the beef cattle and young stock.

CONSERVATION. Good pasture management and suitable stocking management have largely replaced fodder conservation. The expense of capital and labour in conserving forages has thereby been practically eliminated.

Practical methods and practices in the complete management of animals and their feed have 'matched' the greatest animal need (early lactation) with the largest supply of feed. Thereby there is little surplus feed.

The 1·6 ha (4 ac.) of cow cane, 203 tonnes (200 tons) of maize and pasture silage and hand feeding which were used previously are now history.

HERD AND ITS MANAGEMENT

A close seasonal calving system was used so that early lactation coincided with the fastest pasture growth. All calvings were in June–July. Seasonal calving has now to be modified slightly to suit the demands of the market milk trade. The change from total cream to bulk milk supply was made in September 1972. Adjustments to some calving dates will be made over the next 2 to 3 years.

There are 60 milking cows and 12 heifers in this Merryvale Jersey Stud. The total number of stock on the property is 140. This includes 25 Angus and Murray Grey crossbred young stock.

BREEDING. Full use is made of artificial insemination. Mr. Newton is a foundation director of the local (Dayboro) A.I. Co-operative Association which services 510 properties, nearly all of which are dairy herds. Two bulls from the Merryvale Jersey Stud have been used in the A.I. Centre at Wacol.

A beef enterprise is being built up from Angus and Murray Grey crossbred stock by using A.I. on the lower producers. The Jersey stud is being improved still further with proven bulls on high producing cow families.

Simple dividing fences are adequate when there is plenty of high quality feed and a systematic grazing pattern is followed.

SUPPLEMENTARY FEEDING. Routine practice is to feed from 1·8 to 2·8 kg (4 to 6 lb.) of a mixture of gristed grains and hay over the first 4 months of lactation and then to taper off. During the June to October period, the herd has access to molasses and barley straw adjacent to the bails. The average daily amounts eaten are 1 litre (2 pints) of molasses and 1·5 kg (3·3 lb.) of straw. These feeds help to balance the protein-rich succulent pastures.

DISEASE CONTROL. Infertility has not been a problem at any time. Routine vaccinations are carried out for brucellosis and leptospirosis. Regular vaccinations are also given against blackleg. There has been very little clinical mastitis.

Production

Dairy production (factory receipts) for the 1972-73 year was 10·12 tonnes (22 264 lb.) of fat as well as 24 638 litres (5 415 gal.) of market milk. Some 25 bobby calves were also sold. Average production was 159 kg (349 lb.) of fat per cow and 671 kg of fat per ha (578 lb. fat per acre) of irrigated pasture.

Net price of market milk was 11·4c a litre (52c a gal.) and 28c a kg (61·5c per lb.) fat for cheese milk. Sixteen cows under 3 years old averaged 164 kg (354 lb.) of fat in a 291-day lactation for the 1972-73 season.

Labour

Mr. Newton's wife helps with the milking and his father, Mr. Ted Newton, now 74, gives a hand in numerous activities as needed.

Calf rearing

As there is now no skim-milk, calves are reared on wholemilk for 2 weeks, changed to a wholemilk replacer in the third week and weaned on to dry meal plus nutritious pasture 3 weeks later.

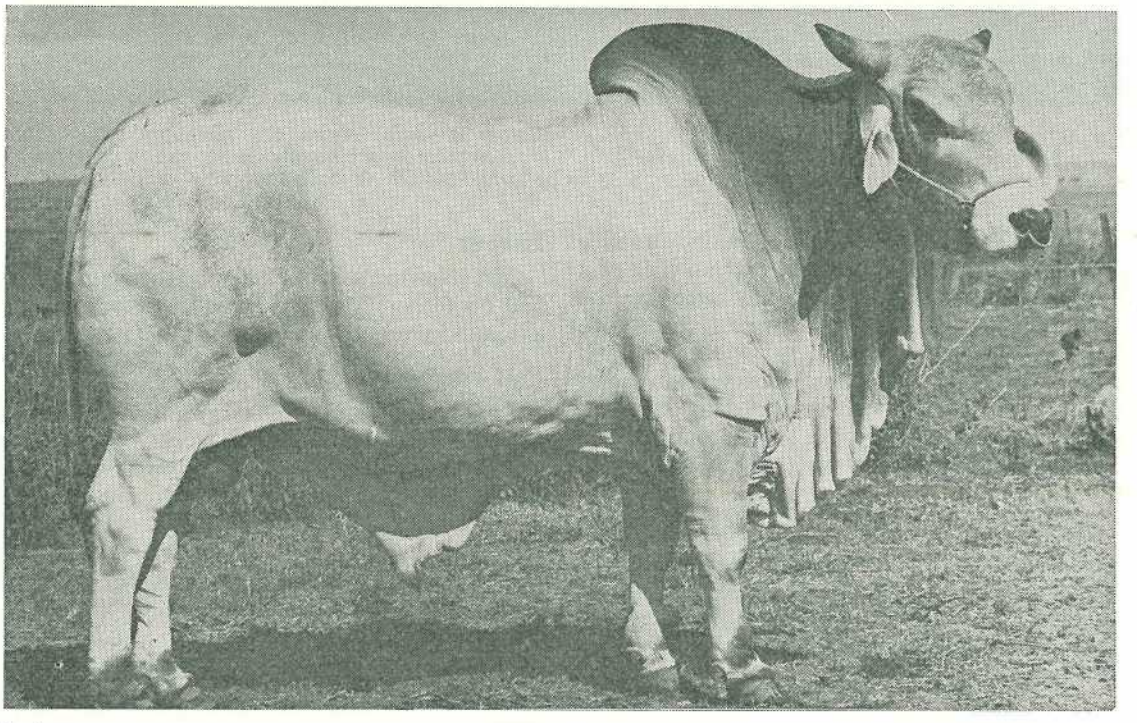
Once-a-day liquid feeding is introduced from the third week onwards. Very few calf problems have occurred. Since improved pasture, including irrigation, has become more prominent in calf feeding, better growth and earlier calvings are becoming general on this farm.

Summary

Mr. Ted Newton and his family have developed this property from uncleared country by hard work and determination. He and his son Mr. Jeff Newton were assisted by such stalwart Department of Primary Industries advisers as the late Mr. A. Nagle, irrigationist and Mr. O. L. Hassall, senior adviser in agriculture.

Increasing use of up-to-date methods in pasture production and skilful feeding techniques will continue to contribute to the well being of this dairy enterprise. But irrigation has provided the master key.

Beef Cattle Breeds—3



Brahman

TROPICAL BREEDS

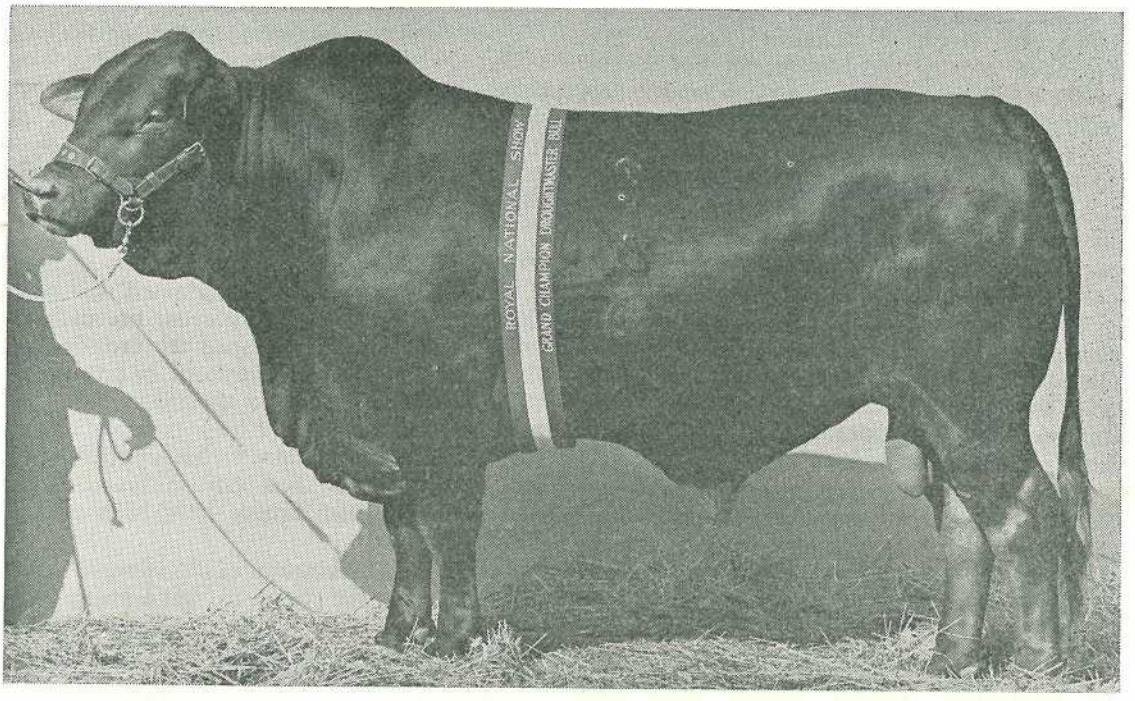
Tropical breeds have various amounts of Zebu blood originating from the humped cattle of India or Africa. Because of this, they are better adapted to a tropical environment where harsh conditions, ticks and other parasites are major factors limiting production.

These breeds perform better than the British breeds in the tropics and are larger in stature but have similar mature liveweight to the British breeds. Mature bulls average from 1 200 to 1 500 lb. (550 to 700 kg) liveweight and cows from 900 to 1 200 lb. (400 to 550 kg) liveweight depending on the environment.

Brahman

ORIGIN. The Brahman was developed in the U.S.A. and is derived from the Zebu humped cattle of India with some infusion of British blood. The dominant Indian breeds in its

by J. J. DALY, Beef Cattle Husbandry Branch.



Droughtmaster

ancestry were the Gir, Guzaret and Nellore. The first importations of Zebus to America were made in 1849, but it was not until the early part of this century that appreciable numbers were imported.

Since the foundation of the breed, selection has resulted in a breed superior in beef qualities to the Indian breeds but still retaining the distinctive characteristics of the Zebu.

DEVELOPMENT IN AUSTRALIA. In the early days of colonization, Zebus were imported from India but these were either lost or absorbed by the British breeds. Sporadic importation took place at various intervals, but it was not until 1933 that significant numbers were imported. In that year, a syndicate including C.S.I.R.O. and Messrs. Winter-Irving and Allison ("Wealwandangie"), Queensland Stations ("Glenprairie"), Mr.

Wright ("Waverley") and Merith Menzies and Co. ("Millungera") imported 18 head into Queensland from the U.S.A.

Further significant importations from the U.S.A. took place during the 1950s when a total of 31 head was imported before the importation ban was applied.

In Queensland, the popularity of the Brahman gradually increased after the 1933 importation. However, expansion was slow because of both traditional breed prejudices and restricted numbers. In recent years, with prejudice lessening and an increased availability of stock, Brahman numbers have expanded greatly and this breed has significantly influenced the Queensland beef population.

Surveys have indicated that, in 1965, only 12% of Queensland's cattle population had some Zebu blood. In 1971, another survey showed that nearly 50% of the total cattle population and 31% of all breeders had some Zebu blood.

This expansion has been concentrated in the coastal and hinterland areas extending from Gladstone to Port Douglas. In this area, cattle ticks and the particular environment favour the Brahmans, and more than 80% of breeders have some Zebu blood.

Brahmans have spread to other States, the Northern Territory and the arid areas, but their popularity is greatest in the coastal, tropical and hinterland areas. There are approximately 450 Brahman studs in Queensland.

BREED CHARACTERISTICS. The Brahman is an impressive looking animal with large pendulous ears, a prominent dewlap and hump. The hump is of meat and fat and serves as a storehouse of energy.

The Brahman has an upstanding appearance because of its somewhat longer legs. It has a long face and a voice that resembles a grunt rather than a low. The most prominent colour is a grey of various shades, though red also is popular. Colours are either solid or there can be a blending of the two more popular colours. Browns, blacks, whites and spotted Brahmans are also seen.

Brahmans are intelligent, inquisitive and shy. They have a different temperament from the British breeds and have to be handled differently. They are good walkers and foragers and have an ability to survive that is superior to most other breeds. This ability is influenced to some extent by its heat tolerance, tick resistance and resistance to internal parasites.

Brahmans produce light calves but, with good milk production, calf performance is high. Under Queensland conditions, growth rates are high and the Brahman demonstrates an ability to do extremely well under harsh conditions. Carcasses are of good quality with a high dressing percentage.

The Brahman appears to be particularly suited to the tropical, coastal and hinterland areas. Because of its many qualities suitable to the Queensland environment, it has an important place in cross-breeding and has been used extensively in developing new breeds for the tropical areas.

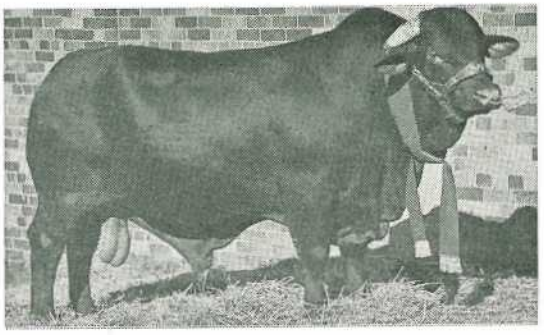
Droughtmaster

ORIGIN. This breed originated in north Queensland and, like all breeds, has a mixed ancestry. It was developed by crossing the Brahman and largely Shorthorn in an attempt to combine the desirable qualities of the two breeds and evolve a breed suitable to the tropics. The Droughtmaster has approximately half Brahman and half British breed blood, and various British breeds have been used in its development.

Mr. R. L. Atkinson, of "Cashmere", Mt. Garnet, was the first to experiment with developing the breed in the early 1930s. Mr. Atkinson was later joined by Mr. R. Rey, of "Kirknie", Home Hill, who began developing his Droughmaster in the early 1940s.

By 1952, sufficient interest had developed in tropical breeds for an association to be formed to improve and promote the new breeds. Droughmaster, Braford, and Brangus breeders formed this association. In 1962, the association was disbanded and separate associations were formed for each breed.

DEVELOPMENT IN AUSTRALIA. With a comparatively recent origin, the breed has expanded rapidly and now has approximately 200 studs in Queensland. The breed is popular in the tropical coastal areas where ticks are a problem. It has also extended its influence into other States. Exports of livestock



Santa Gertrudis

have been made to New Guinea, the Philippines, Solomon Islands and Nigeria. Most Droughtmaster cattle are in Queensland with the heaviest concentrations along the coast and a smaller number inland.

BREED CHARACTERISTICS. Droughtmasters are red in colour and may be either horned or polled with medium to large ears, an extended dewlap and a moderate hump. The breed has good body length, a sleek coat, legs of moderate length and a smooth, turned rump.

Droughtmasters have been selected for the tropical environment and with tick resistance and good foraging ability are well adapted to harsh conditions. They have good fertility, mothering ability and growth rates. Dressing percentage and resistance to bloat are also high. As with all cattle carrying Zebu blood, they have a different temperament to British breeds and have to be handled differently.

Santa Gertrudis

ORIGIN. The Santa Gertrudis breed evolved in Texas, U.S.A. In 1910, King Ranch began crossing Brahman and Shorthorn cattle in an attempt to produce animals that would perform well under local range conditions. In 1920, a superior crossbred bull was born and named Monkey because of his playful antics. This bull was used extensively and marked the real beginning of the breed.

By 1940, a large herd of improved cattle had been evolved on King Ranch, with animals breeding true to type. These animals were three-eighth Brahman and five-eighth Shorthorn and were recognized by the U.S. Department of Agriculture as a pure breed.

DEVELOPMENT IN AUSTRALIA. The first introductions of Santa Gertrudis were made in 1952 when a total of 75 bulls and 200 heifers were introduced into Australia by King Ranch Australia Pty. Ltd. Further importations were made by King Ranch (Aust.) and several Queensland syndicates in 1954. From these introductions the breed has spread to all States with the heaviest concentrations in the eastern States.

More than 200 studs are distributed fairly well throughout Queensland with the majority located in the drier inland areas.

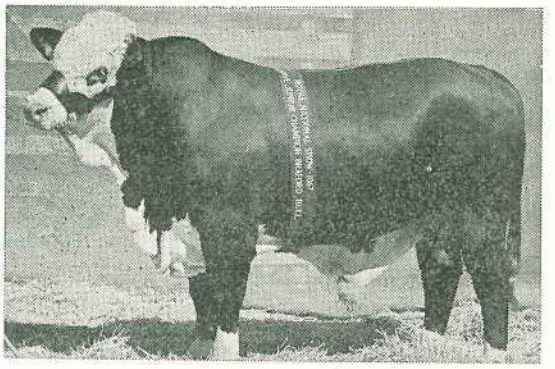
BREED CHARACTERISTICS. Santa Gertrudis cattle are red or cherry red in colour. The coat is short and smooth with a loose hide with neck folds and a sheath or naval flap. The male has a small Zebu-type hump. Santa Gertrudis are deep and thick with good bone and free movement. The ears are medium to large in size. White markings not exceeding half of the underline are permitted, as is a white switch.

The Santa Gertrudis is adaptable and found in hot and temperate environments and does well under harsh conditions. It has a certain amount of tick resistance which is limited by the lower percentage of Brahman blood. As is common in all breeds with some Zebu blood, mothering ability, resistance to bloat and dresing percentage tend to be high. They have a different temperament to the British breeds.

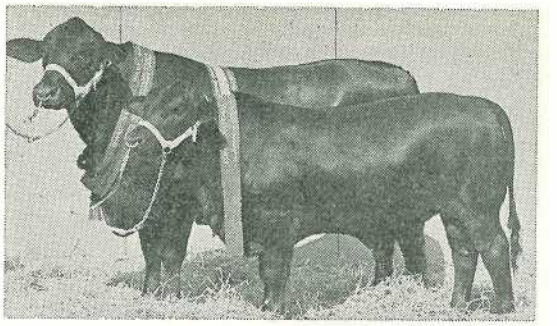
Braford

ORIGIN. Brafords were first bred in the U.S.A. and Australians used a similar technique to evolve the breed here. Mr Adam Rea, of "Eden Garry", Kunwarara, Central Queensland, began developing this breed in 1946 when he introduced Brahman blood into his high grade Hereford herd and evolved what is now known as the Braford. After that, most Queensland Braford herds were based on "Eden Garry" blood.

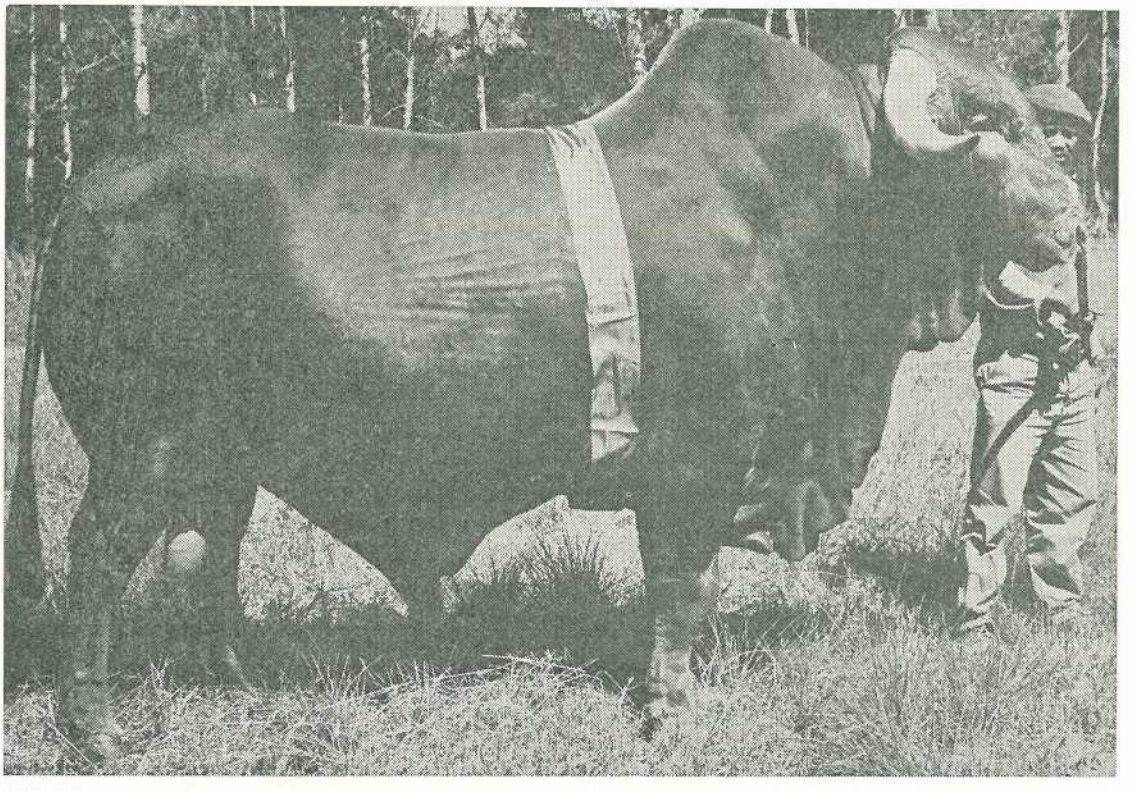
The Braford has approximately three-eighths to five-eighths Brahman blood and the remainder Hereford. The motivation to evolve this breed was to combine the special attributes



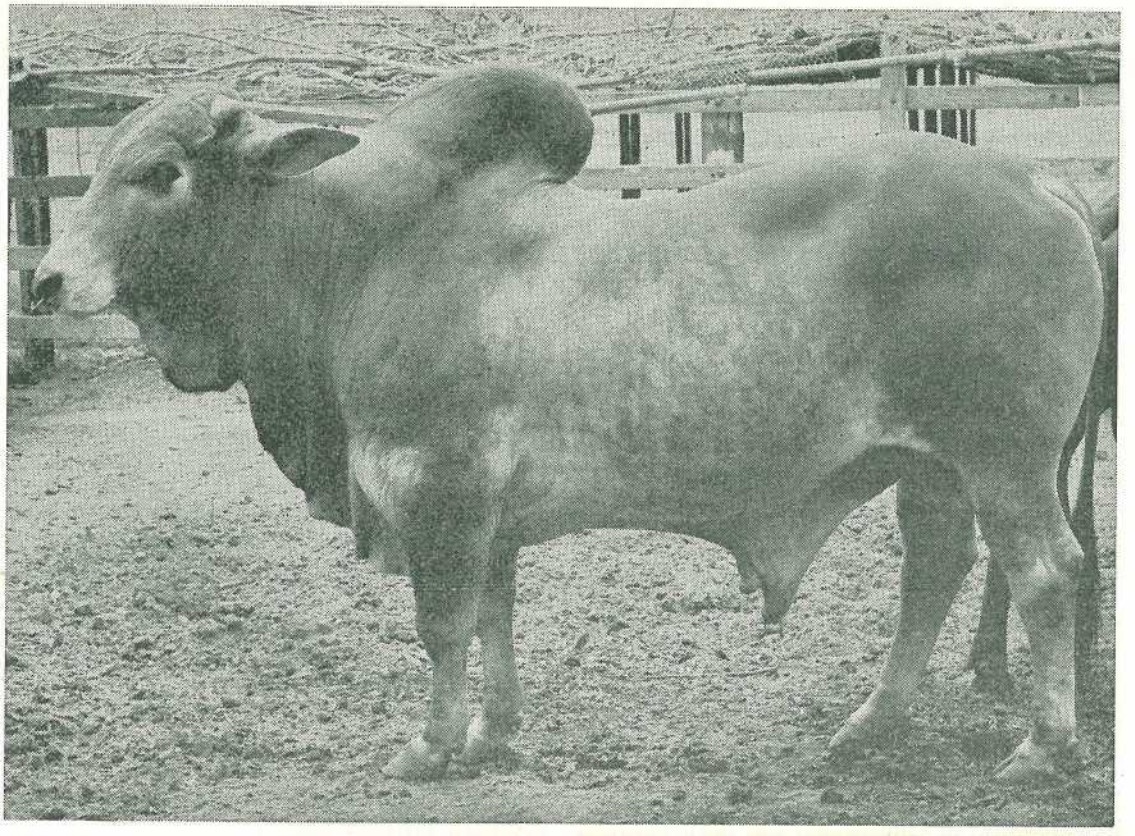
Braford



Brangus



Africander



Sahiwal

of Brahmans and Herefords to give a breed more suited to tropical areas. The Australian Braford Breeders' Association was formed in 1962.

DEVELOPMENT IN AUSTRALIA. Since its formation, the popularity of this breed has increased and spread to other States. In Queensland, its popularity is greatest in the central coastal areas and it seems certain to increase in popularity in the traditional Hereford areas and on the tropical coast. There are more than 100 studs in Queensland.

BREED CHARACTERISTICS. Brafords have a sleek, rich, red coat with white markings similar to the Hereford and a loose pliable skin with neck folds. It may be polled or horned, with medium to large ears either straight or drooped and a slightly rounded rump. It has pigment around the eyes. The males have a slight hump.

The Braford is a good forager and has demonstrated an ability to do well under harsh conditions. It has good fertility, mothering ability, tick and bloat resistance. With good growth rates, it produces a carcass of good quality and with a high dressing percentage.

Like other breeds with Zebu blood, the temperament is different from that of the British breeds and the cattle have to be handled differently. The particular characteristics of the Braford suggest an expansion in its use in the tropical coastal and hinterland areas of Queensland.

Brangus

ORIGIN. Like the Braford, the Brangus breed was developed in the U.S.A. and a similar technique was used to develop it in Australia. The first known attempt to establish the breed in Australia was made by Mr. L. De Landelles, in the Rockhampton district, in 1951. Mr. De Landelles crossed a Brahman bull with a draft of Angus heifers to evolve the breed and over the years significantly influenced the development of the breed in Australia.

During the 1950s and 1960s, the breed expanded in the tropical coastal districts of Queensland and spread to other southern States. The aim of the studs in Queensland was to combine the special merits of the Brahman and Angus and develop a breed suited to the tropics. The Brangus has quarter to three-quarters Brahman blood with the remainder Angus.

As with the Braford until 1961 all stock were registered with the Australian Tropical Beef Breeders' Association. In 1961, a separate authority was founded and the Australian Brangus Cattle Association was formed to promote and improve the breed.

DEVELOPMENT IN AUSTRALIA. The popularity of the Brangus breed has increased but its expansion in Queensland has been retarded because there are few Angus herds in this State.

It is particularly well suited to the tropical coastal areas and, while it has spread to other States, its potential expansion tends to be concentrated in the tropical areas. The Brangus Association in Queensland has approximately 60 members.

BREED CHARACTERISTICS. Brangus are black or red coloured, polled animals with a sleek coat and pigmented skin. They have medium to large ears and loose skin with neck folds. The Brangus has a slightly rounded rump and, in males, a moderate hump.

Like other tropical breeds with Brahman blood, it is a good forager and does well under harsh conditions. It has good fertility, mothering ability and tick and bloat resistance. The Brangus has good growth rates and produces a carcass of good quality with high dressing percentages. It has done well in carcass competitions.

The particular merits of the Brangus make it suited to the tropical coastal areas of Queensland. In common with other breeds with Zebu blood, the temperament is somewhat different from that of the British breeds.

Africander

ORIGIN. The Africander has developed from the native Hottentot cattle of the Cape of Good Hope. The Hottentot cattle appear to have resulted from a crossing of the Egyptian Longhorn and the Longhorn Zebu that took place round 2 000 to 3 000 B.C.

The original Hottentot cattle first observed by the early navigators on the Cape survived early colonization and other disasters. Early Dutch and British settlers first used the breed for draught and it was not until after the Boer War that steps were begun to improve it as a beef producer. The breed's preservation was ensured when the Africander Cattle Breeders' Association was formed in South Africa in 1912. After this, more emphasis was placed on breed improvement.

At present, the Africander is the most important commercial breed in South Africa. More than 30 000 purebreds are registered and its popularity is extending to other southern African States.

DEVELOPMENT IN AUSTRALIA. In the early days of colonization what seem to have been Africanders were imported from Africa. However, only small numbers were introduced and these were either lost or absorbed by the British breeds.

Re-introduction had to wait until April 1953 when Dr. R. B. Kelly, of C.S.I.R.O., introduced five bulls from the U.S.A. for research work at "Belmont", near Rockhampton. Another two females were imported in 1956. As numbers built up at "Belmont", Africanders were released to other research institutions including the Queensland Department of Primary Industries, and the breed was dispersed and tested in various northern environments.

The first release of stock to the public took place in 1960 when fullblood bulls from "Belmont" were sold at open auction. Since 1960, various sales have been made and new studs have developed in various regions. The

Australian Africander Association was formed in 1969. This Association now has 32 members and more than 4 000 cattle registered or eligible for registration.

BREED CHARACTERISTICS. The distinguishing feature of the Africander is its red colour, which may vary from light tan to a deep cherry red. It has a sleek coat and a hump that is smaller, more rounded and set farther forward than the hump of the Brahman.

The face is long and flat and the eyes are deeply recessed. Ears and dewlap are of normal size and the prepuce is not pendulous but like that of the British breeds.

Like other Zebu breeds, it is tick and bloat resistant and has an ability to do well under harsh conditions. The tick resistance of the Africander is not quite as good as that of the Brahman.

Africanders have an extremely good temperament and this, as well as its high fertility and ability to handle severe conditions, tend to favour this breed for the arid and semi-arid regions of Queensland.

It has good reproductive performance and tends to be more fertile than other Zebu breeds. Under tropical conditions, Africander cows are superior milk producers to British breeds and raise good quality calves.

Sahiwal

ORIGIN. Sahiwal cattle originated in the dry central and southern areas of the Punjab in Pakistan. This breed has a rather well developed udder for a Zebu and, while it has good fleshing qualities, was used primarily as a dairy breed.

DEVELOPMENT IN AUSTRALIA. The need to import tropically adapted cattle breeds grew from the work of Dr. R. B. Kelly, of C.S.I.R.O. In a world tour, Dr. Kelly investigated breeds of cattle that might be of value to the northern Australian cattle industry and listed 10 breeds as possibilities for importation. Following this investigation, a group of Brahman and Africanders were first imported from the U.S.A. In the second project, a group of Sahiwal and Sindhi cattle were imported from Pakistan.

Because of quarantine regulations, the cattle from Pakistan were quarantined in Papua-New Guinea before final importation into Australia. Two shipments were made to Port Moresby. The first, of four buffaloes, two Sindhis and four Sahiwals, arrived at the Jackson airport on December 4, 1952. The second shipment of 11 head including five Sindhis and six Sahiwals arrived on December 18, 1952. These animals were a gift from the Government of Pakistan and were selected by Dr. Kelly from Government and private herds. In selecting the Sahiwals, Dr. Kelly chose beef type animals but a proportion of dairy types were also selected.

On reaching New Guinea, the stock were transferred to a specially constructed animal quarantine at Kila Kila, a wartime airstrip, where the stock were to remain for 1 to 2 years. Eventually 10 Sahiwals (five males and five females) and eight Red Sindhis (five males and three females) were transhipped to the tick free C.S.I.R.O. research station at Badgery's Creek, N.S.W. This was done to avoid possible introductions of tick fever organisms. Progeny of these animals were eventually sent into the northern Australian States.

At the F. D. McMaster Field Station at Badgery's Creek, Sahiwals were used to develop the Australian Milking Zebu. The Queensland Department of Primary Industries also embarked on dairy crossbreeding experiments in the coastal and tableland areas with good results.

In Queensland, investigations into the beef production of Sahiwals was limited to C.S.I.R.O. and Department of Primary Industries Research Stations until 1969. In 1969, the first large-scale public release of fullblood Sahiwals took place at Badgery's Creek and a Breed Society was formed. A second reduction sale took place in 1970.

At present, the number of Sahiwals throughout the country is relatively small. There are six studs in Queensland and two in New South Wales which have fullblood Sahiwals and some 35 other studs (mostly in Queensland) that have graded-up animals.

BREED CHARACTERISTICS. Sahiwals are not big cattle. Mature males in good condition are unlikely to weigh above 1 600 lb. (726 kg). However, their bodies are long and deep with relatively short legs and well developed longissimus muscles and thick, deep thighs. Colour varies from creamy brown to reddish dun or reddish brown with varying amounts of white on the neck and underline. In males, the colour darkens towards the extremities which may be black. The coat is short and sleek and, in the male, the hump is massive, the dewlap voluminous, with the sheath not over pendulous.

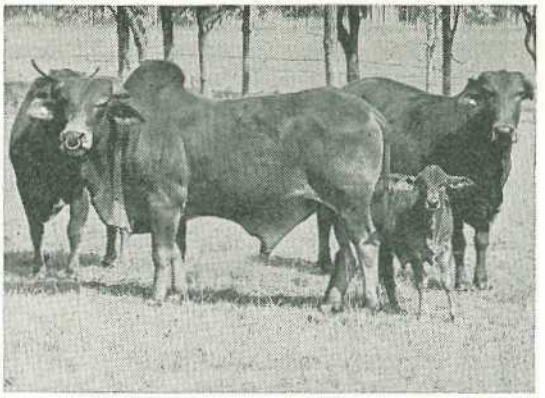
The breed has the Zebu characteristics of tick and parasite resistance, bloat resistance and hardiness under unfavourable climatic conditions. They are the heaviest milkers of the Zebu breeds and their crosses with European breeds exhibit a high degree of hybrid vigour (heterosis). Sahiwals have the typical Zebu temperament but they are easily handled.

Red Sindhi

ORIGIN. As the name indicates, the Red Sindhi originated from the province of Sindhi where they were bred by migratory stock breeders. Because the country is so isolated, the breed has retained its purity and it is today one of the most distinctive of the Zebu breeds.

DEVELOPMENT IN AUSTRALIA. A total of five males and three females was presented to the Australian Government by the Government of Pakistan and imported with the Sahiwals. These animals were used by the C.S.I.R.O. in dairy crossbreeding experiments and a group was later sold as a nucleus herd to Gatton Agricultural College. The College is using these animals in both dairy and beef crossbreeding experiments.

A Breed Society was formed in 1969 and at the present time there are only two fullblood herds (one each in Queensland and N.S.W.) and three other herds using fullblood sires (two in Queensland and one in N.S.W.). There are relatively few Red Sindhi cattle and good prices are being paid for any stock that come on the market.



Sindhi

BREED CHARACTERISTICS. The characteristic colour of the Red Sindhi is a deep rich red, but this can vary from a dun yellow to almost dark brown. Males are darker than females and, when fully grown, the extremities may be almost black. A white mark on the forehead is permissible as is a sprinkling of white on the dewlap and underbody. Pronounced patches of white or grey are held to indicate a mixture of blood.

The Red Sindhi is somewhat smaller and more active than the Sahiwal but has good, fleshy qualities and is well muscled with good hindquarters.

Development of the hump and dewlap is prominent in the males but less so in females. Sindhi cows are quite docile.

Sindhis are good foragers, are hardy and posses the Zebu resistance to ticks to a high degree. They are recognized more as a milk breed rather than a beef breed but, when crossed with British breeds, produce ideal beef types. The females are good mothers.

Pictures are by courtesy of *Queensland Country Life* and Messrs. W. E. Mottram and Son, Transvaal, South Africa.

European breeds that are being increasingly introduced into Queensland through semen imports are described in next month's issue.

[TO BE CONTINUED]

MASTITIS

What's your opinion?

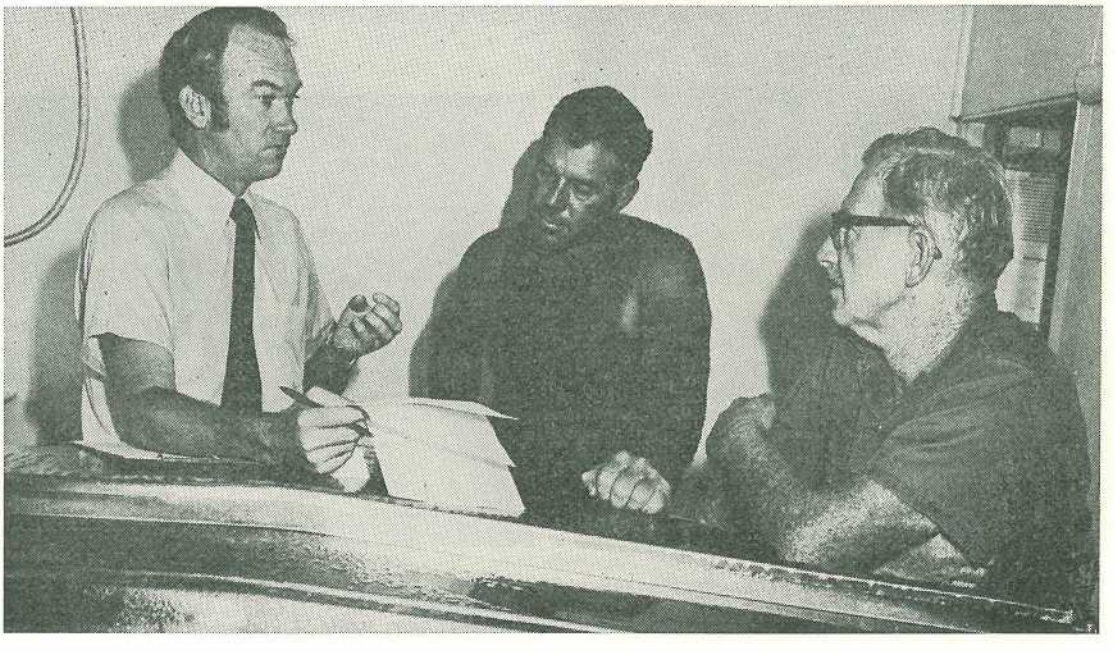
by E. I. CARTER,
Extension Officer.

FROM October to December 1973, more than 300 Queensland dairy farmers co-operated with the Department of Primary Industries in pooling their ideas and opinions on mastitis and mastitis control.

The information from this joint exercise (known as the Mastitis Cell Count Base Line Survey) will be invaluable to Regional Extension Committees and mastitis specialists in planning mastitis extension and research.

The survey was conducted in all wholemilk producing regions in the State. One in 10 of the suppliers to most milk factories was interviewed. The farmers freely gave their opinions on mastitis and commented on their successes or failures in controlling the disease. Ideas were also exchanged on various methods of letting other farmers know about the problem.

This article is not intended to be a fully documented report on the findings of the survey but a noting of the general impressions obtained from discussion with so many practical dairymen. The statements made by some farmers, which are recorded under their photographs, are typical of those obtained from most of the people interviewed.



'Show me a farmer who milks a cow and I'll show you someone who has had a mastitis problem in his herd,' BOB ARCHIBALD, Bald Knob.

'Mastitis is a disease which all dairy farmers should be concerned about,' ALAN ROTHERY, Rockhampton.

Tell me, what do you think about mastitis?

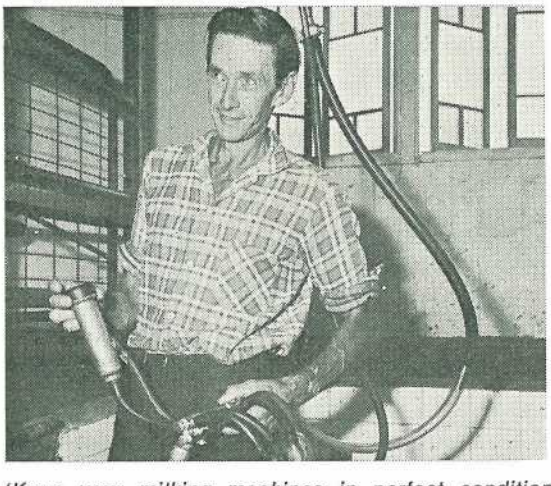
'Cows with mastitis give less milk. Mastitis results in considerable loss of money due to loss in production,' WALTER FISCHER, Marmor.

'Mastitis! Don't forget about subclinical mastitis. This invisible form is just as important,' MERV STEINHARDT, Marburg.

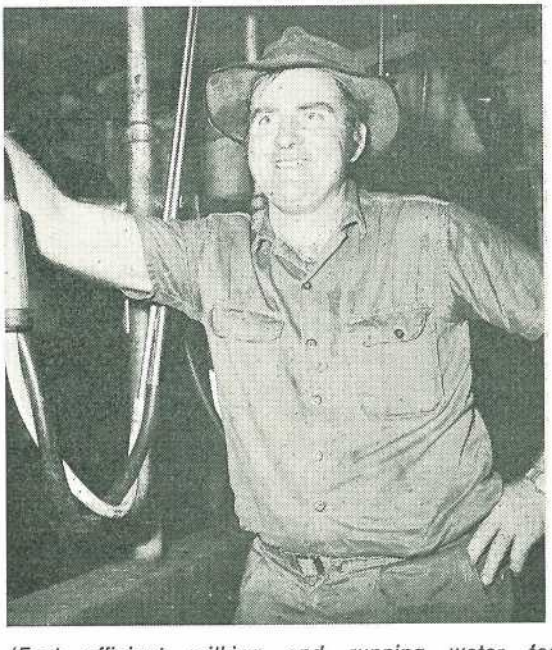
'There's no place for hit and miss practices in mastitis control. Mastitis control doesn't take up much time over and above normal milking routines. The higher returns are well worth while,' LES ZABEL, Minden.

'You can always overcome a mastitis problem with a good control programme. All five steps are important and in particular backflushing the cups between cows,' KEV HICKEY, Bunya.

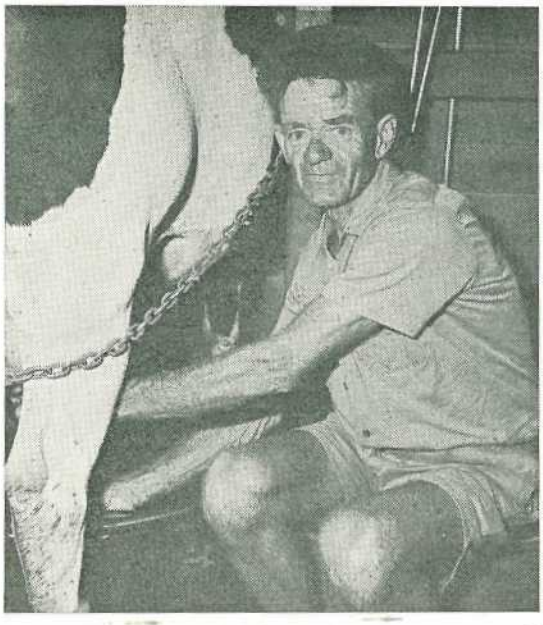
What about mastitis control measures?



'Keep your milking machines in perfect condition and have them checked at least once a year,' FRED LEEK, Woodford.



'Fast efficient milking and running water for washing udders,' HAROLD HOPPER, Maleny.



'Normally during the long wet season mastitis will always come up, but with the introduction of proper controls including teat dipping and running water for washing udders this problem can be kept to a minimum,' GORDON COONEY, Nambour.

'If one cow in the herd has mastitis this cow becomes a danger to the whole herd. Problem cows must be segregated. Regular R.M.T. tests are an advantage,' BRIAN BEESTON, Nambour.

Views on Mastitis

Every dairy farmer interviewed indicated that he had had a mastitis problem in his herd at some stage. The general opinion was that all dairy farmers should be concerned about mastitis. It is an age-old curse of the dairy industry. This inflammation of the cow's udder causes losses in production as well as losses of good milking cows from the herd through culling. Both these losses add up to lower financial returns.

Even though mastitis represented a complex problem, it was felt that, with a better understanding of the various forms of mastitis and the introduction of proper controls, the mastitis problem could be successfully attacked.

It was recognized that encouragement should be given to farmers to develop a fuller understanding of 'subclinical' mastitis. It was felt that it was just as important to detect this invisible form of the disease as it was to note the clinical form with its swollen udders and abnormal milk.

Mastitis Control

Most of the farmers interviewed said that mastitis could be controlled if a logical control programme were put into practice and rigidly adhered to.

Control measures most favoured included rearing all herd replacements, foremilk extraction before milking, washing udders with running water, dipping the teats after milking, regular milking machine checks and treatment of cows with a special, long-acting antibiotic at drying off.

In areas where mastitis tests are conducted on the milk supplies of individual farms, the farmers indicated they would appreciate regular advice of the test result so that they could gauge the effectiveness of their control measures.

The concept of holding special discussion-type meetings to study fully milking management and mastitis appealed to most farmers. Resulting from this encouragement, the Department of Primary Industries will hold a series of discussion meetings in most dairying districts during the year.

Beef Cattle Pastures in the Wet Tropics—2

by J. K. TEITZEL and R. A. ABBOTT, Agriculture Branch; and W. MELLOR, Research Stations Section.

Fertilizers For Pasture Establishment

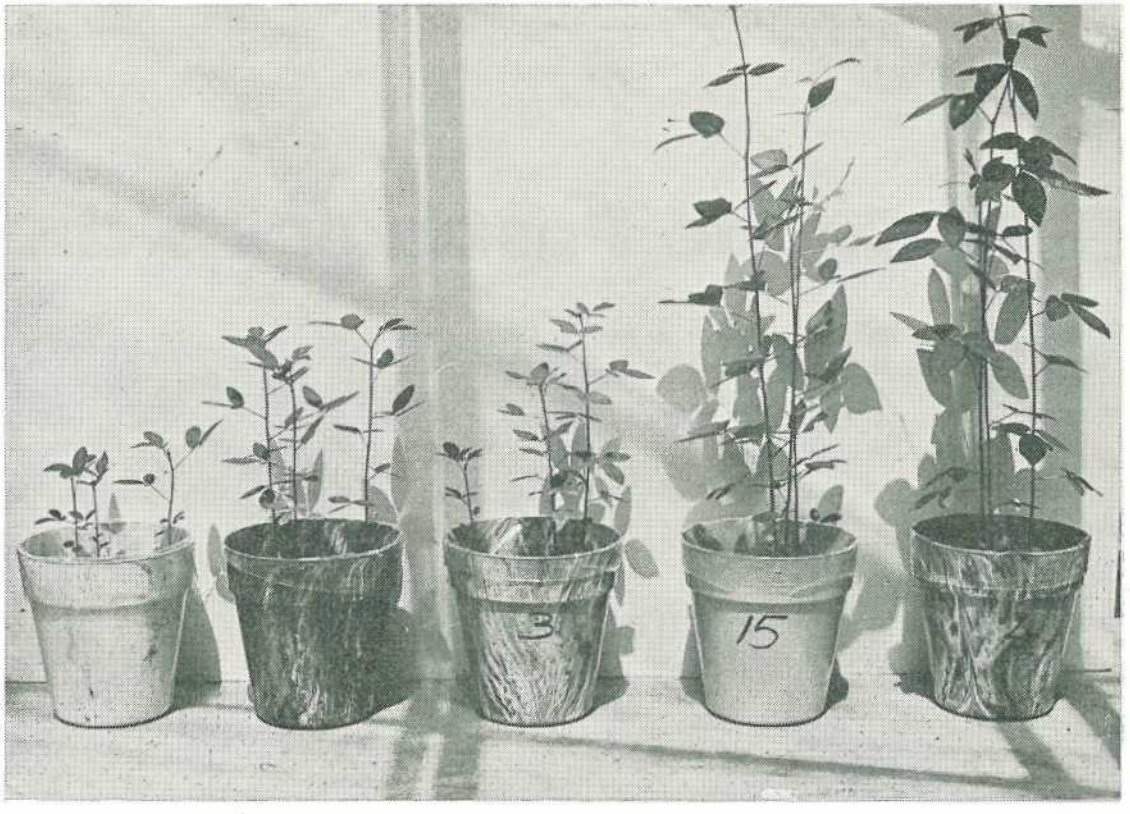
Basaltic Soils

Basaltic soils support only rain-forest vegetation types, so the vegetation gradients are not as useful as on other soil types. However, the soils are fertile and a dressing of 250 kg Mo super per ha is all that is recommended. This will be increased if large numbers of wattles or gums are present.

Granitic Soils

Although these soils are less fertile and fertilizer application becomes essential for successful pasture development, experimental results were more straightforward than on the basalts. Fertilizer recommendations may be adequately presented in the following table:—

Vegetation Type	Planting Fertilizer Recommended kg/ha
Rain-forest Palm swamp	250 superphosphate
Bastard scrub	250 superphosphate 60 muriate of potash
Open forest	500 superphosphate 60–125 muriate of potash 8 zinc sulphate 8 copper sulphate (on sandier soils)
Grassy woodland	500 superphosphate 125 muriate of potash 8 zinc sulphate 8 copper sulphate
Narrow-leaf tea-tree	500 superphosphate 60–125 muriate of potash 8 zinc sulphate
Broad-leaf tea-tree	500 superphosphate 125 muriate of potash 8 zinc sulphate
Treeless plain	500 superphosphate
Sedge swamp Mangrove	Not determined



Legume response to fertilizers on a granitic soil supporting open forest. Left to right. No phosphorus. Phosphorus alone. Phosphorus plus some other fertilizers. Phosphorus plus potassium and copper. Phosphorus plus potassium, copper and zinc. The test plant is phasey bean (Macroptilium lathyroides).

Metamorphic Soils

Fertilizer recommendations for this soil type may also be tabulated:—

Vegetation Type	Planting Fertilizer Recommended kg/ha
Rain-forest .. .. Palm swamp	250 Mo super
Bastard scrub	250 Mo super 60 muriate of potash
Open forest	500 Mo super 125 muriate of potash
Tea-tree	500 Mo super 60–125 muriate of potash

The very sparse or least luxuriant vegetation classes are not represented in metamorphic soils. This probably indicates a natural fertility higher than the granites but lower than the basalts.

Beach Sands

The beach sands are very poor soils and many deficiencies have been recorded. Experimental results have also been conflicting, and toxic fertilizer levels are very rapidly reached. In these instances, too much fertilizer proves worse than no fertilizer at all.

Phosphorus, copper, zinc and potassium deficiencies are the most important and, as the plant nutritional problems on these soils are still not fully understood, they are the only elements recommended at the present time.

Fertilizer recommendations for this soil type may also be tabulated.

Vegetation Type	Planting Fertilizer Recommended kg/ha
Open forest	500 superphosphate 190 muriate of potash 8 copper sulphate 8 zinc sulphate
Grassy woodland or light open forest	250 superphosphate 8 copper sulphate 8 zinc sulphate
Narrow-leaf tea-tree ..	500 superphosphate 8 copper sulphate 8 zinc sulphate
Broad-leaf tea-tree ..	Development not recommended at this stage
Sedge swamp .. / Mangrove ..	Development not recommended at this stage

Soils derived from beach sand are unique in that, at present, less fertilizer is recommended on areas of lower fertility. This is because there is more to soil fertility than just a supply of minerals.

Plants growing on these poor areas of beach sand just could not utilize large quantities of fertilizer in the establishment year. There are two main reasons for this, both related to water. First, because they are so sandy, the soils dry out quickly and moisture deficiency becomes more important than mineral deficiency. Second, there is very little clay or humus to hold the fertilizers in the soil, and most of a large dressing is washed through the soil.

There is evidence, however, that, as soil organic matter builds up under pasture, an improvement in soil fertility results. There should, therefore, be a steady increase in the amount of fertilizer (especially phosphorus and potassium) applied, followed by a steady increase in production.

Mixed Alluvials

Those alluvials containing substantial quantities of basaltic derivatives are the most fertile and only phosphorus deficiency has been recorded to date. More problems appear to be associated with mixed alluvial soils containing few, if any, basaltic derivatives.

Various proportions of either metamorphic or granitic parent material predominate and, as the content of one or the other increases, then the establishment fertilizer requirements more closely resemble those of granitic or metamorphic soils.

Mixed alluvial soils are not widely used for improved pastures. Because of this, plus the variability of parent material content over short distances, the fertilizer requirements of these soils have not been determined as precisely as those of the others. However, the following table still serves as a good general guide.

Vegetation Type	Planting Fertilizer Recommended kg/ha
Rain-forest .. / Palm swamp ..	250 Mo super
Bastard scrub	250 Mo super 60 muriate of potash
Open forest	500 Mo super 60–125 muriate of potash 8 zinc sulphate 8 copper sulphate
Grassy woodland or poor open forest	500 Mo super 125 muriate of potash 8 zinc sulphate 8 copper sulphate
Narrow-leaf tea-tree ..	Same as for open forest except for copper
Broad-leaf tea-tree ..	Same as for grassy woodland except for copper
Treeless plain	500 Mo super
Sedge swamp .. / Mangrove ..	Not determined

PASTURE ESTABLISHMENT

The establishment of a highly productive pasture is essential for success, and, whether the project involves 2 000 or only 10 ha, the basic requirements remain the same. Planting a big area simply means that the financial outlay is greater and costs per hectare can be lowered by using bigger machines. Any attempts to cut corners or eliminate important steps can be disastrous. A suggested procedure is:—

1. Attempt in each planting season only the area that finances and resources will allow to be done thoroughly.

2. Consider all possible hazards such as weeds, timber regrowth, competition from native grasses, dry spells, fire and pests, and prepare for them as soon as possible.

3. Treat each type of country as a separate area for establishment.

4. Aim at a fine, firm, weed-free seedbed.

5. Apply adequate fertilizer.

6. Inoculate legume seed.

7. Sow sufficient good, fresh seed of the recommended species for that class of country.

8. Sow accurately.

9. Sow into a moist seedbed when follow-up rains are reasonably assured.

10. Try, as far as possible, to cover the seed.

11. Graze carefully during the first year, particularly in wet weather.

The types of vegetation discussed earlier require different methods of land preparation for the establishment of improved pastures. Therefore, on a property where several vegetation groups occur, the different requirements of each group must be fitted into the overall plan of development.

The first step involves removing the natural vegetation. This is then followed by preparing a fine, firm weed-free seedbed.

Removing Vegetation

On treeless plainland, ploughing is all that is needed to remove the blady and other natural grasses.

However, where the natural vegetation includes large trees, these must be removed first. Older methods such as ringbarking, chain-sawing and brushing are now superseded by the use of large bulldozers. The most economical method is to have two bulldozers working abreast linked by a ground chain. The chain also makes windrowing easier and cheaper.

Large machines are essential for this work. Small machines waste considerable time falling the larger trees and cannot operate as economically as the more highly-powered machines.

Bulldozers operating abreast are especially efficient in open forest country. A highball is necessary to keep the chain near the ground so that the smaller trees do not escape crashing. However, in rain-forest, a chain alone is more efficient than a ball and chain. A highball only slows down the operation by reducing the leverage and it is not necessary to keep the chain near the ground where the vegetation is so tall.

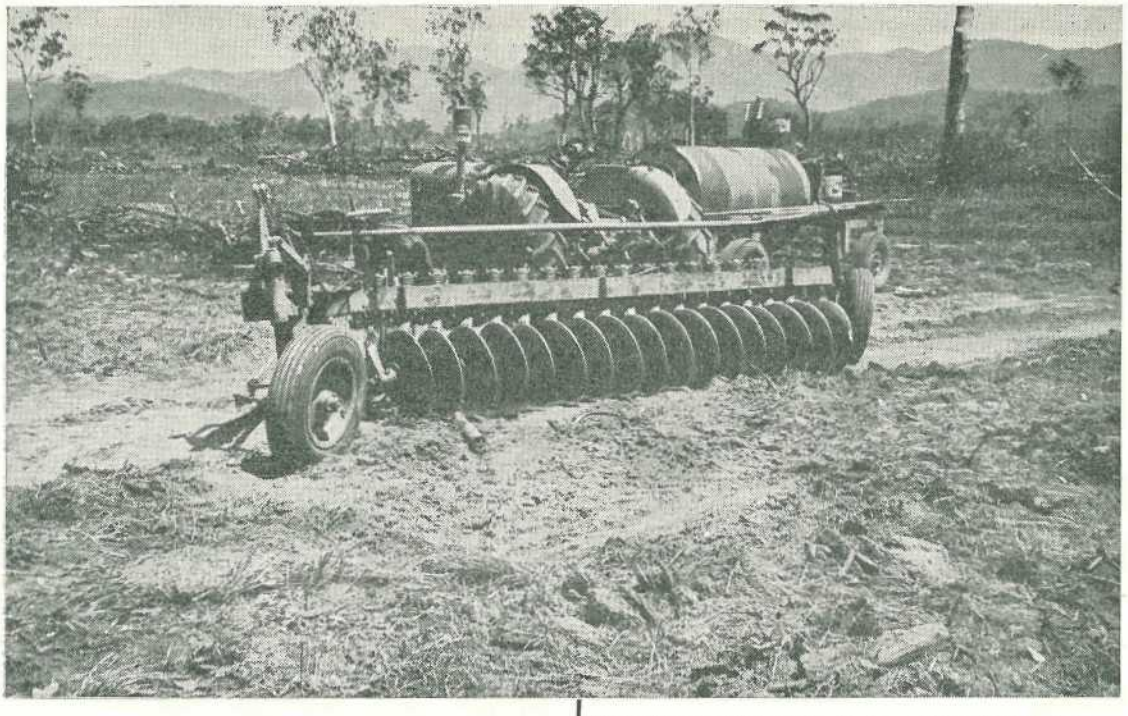
On land being cleared for pastures, it is not necessary to remove every tree and is even undesirable as cattle require shade. So, the large trees, which bring about a sharp increase in costs if an attempt is made to remove them, are best left standing. These can be ploughed around or even ringbarked at a later date.

It is not necessary, either, to remove all the small vegetation in the initial crashing operation. A percentage of small trees can be easily dealt with during the subsequent burning and windrowing operations.

Clearing rain-forest should begin early enough (late August to early October) to allow the trunks and branches to dry sufficiently to be burnt in early summer. However, if begun too early, sucker regrowth is a danger and the leaves falling from the crashed timber may result in a poor burn. This danger exists especially where windrowing is not practised.

The time of the year for clearing open forest is of less importance as the timber does not burn readily anyway. However, it is best done following the wet season. At that time, there is less risk of bogging while the soils remain damp and soft enough for easy pulling.

Because eucalypt hardwood burns poorly, windrowing timber for later burning is absolutely necessary. However, there are still some



Broad-acre ploughing in an open forest area.

producers who doubt the importance of windrowing crashed rain-forest. Some good pastures have been established on rain-forest country by just crashing the timber, allowing it to dry, burning and then sowing the pasture seeds into the ash. Nevertheless, most people now realize that better results are being obtained by sweeping the crashed timber into windrows.

The over-riding factor in favour of windrowing lies in the ability to use a wheeled tractor on the country, thus enabling easier control of subsequent weed invasion. Deaths of cattle from leg injuries, poisoning by poison peach (*Trema aspera*) and lantana, and difficulty in mustering for tick control can be costly and time-consuming if windrowing is not carried out.

Windrowing should be completed by the beginning of summer to allow a start on seedbed preparation.

Seedbed Preparation

The seed of most pasture species is very small. Therefore, in establishing any pasture, the ideal is a well-prepared seedbed, free from weeds and having adequate fertilizer and soil moisture. The ideal cannot always be realized.

In the open forest and plains country, cultivation must be sufficiently deep to destroy blady grass and other weed grasses, to uproot eucalypt suckers and seedlings, and to destroy wattle and tea-tree seedlings. On the other hand, care must be taken to avoid turning up the highly infertile subsoil.

This, in effect, means that, on most of the forest soils, cultivation can be only shallow, that is 8 to 10 cm deep. On soils with some clay content, such as the plains and some lands around Ingham, it is necesary to use a stump-jump disc plough for the initial break up. However, on most of the open forest areas where the soils are sandy and friable, heavy duty offset disc cultivators do an effective job.

After the initial break-up, the area is best let lie in the rough during the dry August-September period. This encourages grass decay, drying out of blady grass roots, and soil aeration. The land should be given a second discing about early October and a third, very light, discing just ahead of planting. Windrows should be burnt during this period.

When replacing or grading up old pastures, the final objective is much the same, but slightly different procedures may have to be employed. The main problem is to cope with the very rapid and aggressive weed growth that always follows an old pasture situation.

It is therefore desirable to have a dry season bare fallow, during which weed seed and old pasture seed is encouraged to germinate. Successive germinations are killed by herbicide and/or tine cultivation.

Planting

Both early and late plantings have been successful in recent years but it is preferable to delay planting until December-January when follow-up rains are assured. The resulting long fallow encourages the growth of weed seedlings which are then controlled before planting.

However, the following are important exceptions that require special treatment and an autumn-early winter planting would be preferable in:

1. Soils subject to erosion. The danger from erosion is greatest if soil is bare before the wet season.

2. Flooded areas. Young seedlings are particularly sensitive to immersion.

3. Sandy soils. These radiate considerable heat during summer and burn off seedlings.

Several methods of planting pasture seed are in general use. Broadcasting on the soil surface, including aerial sowing, is very common, but the safest method is to drill in the the seed. This enables the seed to be planted at the correct depth in firm soil.

A depth of 6 to 12 mm is suitable for most pasture species, but this can be increased on sandy soils and when the species has a large seed. The difficulty with seed drills is that pasture land is often roughly cleared and breakages occur.

A useful alternative is to remove the discs or tines from the combine seed and fertilizer drill and drop the seed and fertilizer directly on the surface of a crumb-structured seedbed. A Cambridge type roller is attached to the rear of the combine and this immediately compresses soil around the seed and covers much of it.

The importance of a fine, firm seedbed and the use of a roller cannot be over-stressed. Care must be taken with the roller on heavier soils during wet weather but, on most forest soils which are light in texture, a good roller is essential.

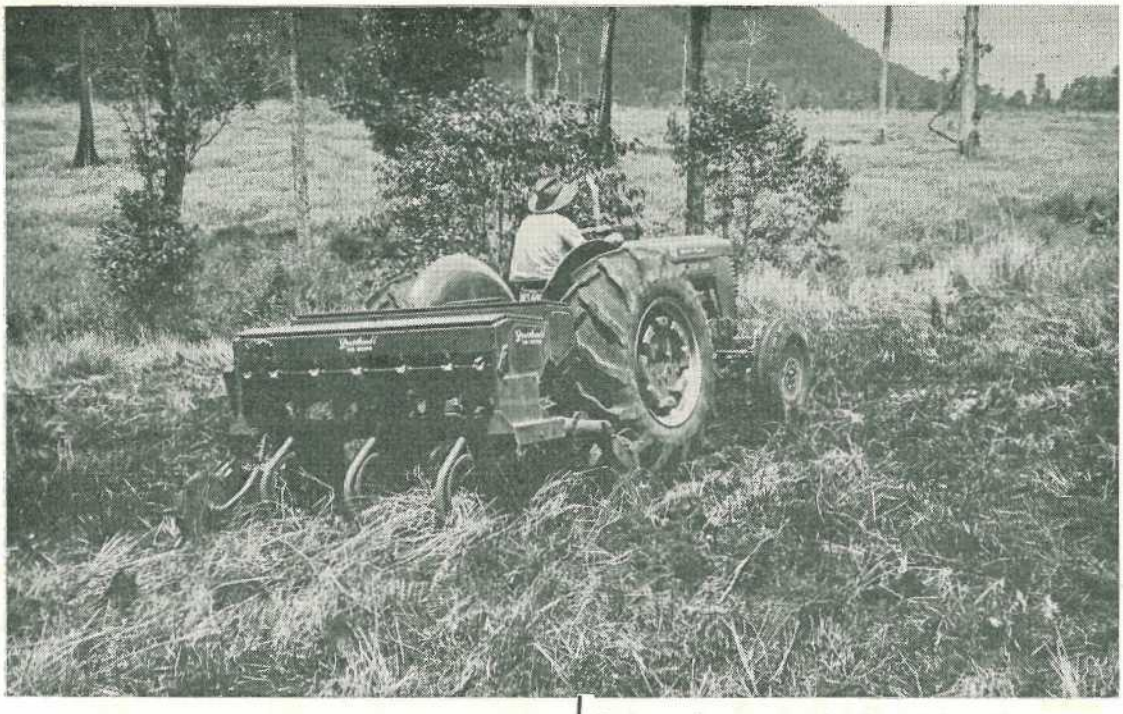
Presence of an effective strain of *Rhizobium* (root nodule bacteria) on the roots of legume plants is essential for maximum fixation of nitrogen. Seed inoculation with the correct strain for the plant species or cultivars is the best way to achieve this.

In ordering supplies of inoculum, the amount of seed and the legume species to be planted should be specified. The inoculation procedure set out in the directions which come with the inoculum should be followed.

Inoculated legume seed and fertilizer should not be brought into direct contact as the inoculum on the seed can be killed. If they are to be mixed before broadcasting, the legume seed should be pelleted with some suitable material (normally rock phosphate for tropical legumes).

Some grasses and legumes are not propagated by seed. Possibly the best known of these is pangola grass. Farmers have developed very efficient methods of planting pangola grass and large areas can be planted quickly.

Methods vary from mowing, hand loading cuttings on a trailer, hand spreading off the back of a trailer followed by discing, to full mechanization of the process: forage harvester, self-emptying trailers fitted with blowers, and discing.



Sod seeding centro in the Utchee Creek area.

Sod Seeding

Sod seeding has proved an efficient method of including legumes in grass-dominant pastures. It is also an attractive method of incorporating the new, improved legume varieties. Several types of sod seeder are available and one of the most efficient has been designed and made by a Queensland farmer.

In any sod seeding operation, competition from the existing pasture species must be minimized. This usually requires a period of very heavy grazing or mowing before sod seeding. Fire has also been used to advantage in some situations.

Seed Purchase and Care

At some periods, supplies of improved pasture species have been very scarce. Therefore, it is desirable to plan well ahead and place orders early. Buying seed from a reliable source is extremely important.

All seed should be Government tested, not only to check on quality but also to determine planting rates. With some species, such as signal grass (*Brachiaria decumbens*), the seed testing laboratory will also test seed with and without acid treatment to determine whether acid treatment before sowing is necessary.

Most pasture seeds have a dormancy period and germination of freshly harvested seed is often poor. It gradually improves up to about 12 months of age before declining in quality.

Storage of seed in the humid tropical environment can be a problem. Probably one of the easiest methods is to suspend the seed bags from the rafters of a shed, allowing the air to circulate freely.

[To Be Continued]

Vegetable Varieties for May Plantings

by Officers of Horticulture Branch.

CROP	SUGGESTED VARIETIES*					
	Stanthorpe	Lockyer, Fassifern and Beaudesert	Coastal, South of Gladstone	Central Queensland (Gladstone to Mackay)	Bowen to Townsville	Far North Queensland (Tablelands)
Bean						
Fresh Market	..	..	Redlands Greenleaf	Redlands Autumncrop Redlands Greenleaf	Redlands Pioneer	Redlands Autumncrop Redlands Greenleaf Redlands Pioneer
Broad ..	Early Long Pod	..	..	..	..	..
Beetroot ..	..	Early Wonder Detroit strains	Early Wonder Detroit strains	Early Wonder Detroit strains	Early Wonder Detroit strains	Early Wonder Detroit strains Chieftain Parramatta
Cabbage ..	..	Ballhead Hybrid Greygreen Olympic Sugarloaf types	Ballhead Hybrid Greygreen Olympic Greengold Savoy King Sugarloaf types	Ballhead Hybrid Sugarloaf types	Ballhead Hybrid All Seasons Sugarloaf types	Ballhead Hybrid Superette
Capsicum ..	..	..	Yolo Wonder Green Giant Northern Belle Long Sweet Yellow	Yolo Wonder Green Giant California Wonder	Yolo Wonder Green Giant California Wonder	Yolo Wonder California Wonder
Carrot						
Market ..	..	All Seasons Topweight	All Seasons Topweight	All Seasons Topweight Chantenay strains	All Seasons Topweight	All Seasons Topweight Western Red Chantenay strains
Processing	..	Royal Chantenay Amsterdam Forcing	Royal Chantenay Amsterdam Forcing	..	..	..
Cauliflower ..	..	..	Snowball Y Snow Gem Phenomenal	Snowball Y Phenomenal	Snowball Y	Snowball Y Snow Gem

Celery ..	..	..	South Australian White	..	..	South Australian White
Cucumber ..	..	..	Marketer Ashley Crystal Apple	Green Gem Ashley Polaris Crystal Apple	Green Gem Polaris Ashley Crystal Apple	Green Gem Polaris Ashley
Egg Fruit ..	..	..	Market Supreme	Market Supreme Long Purple	Market Supreme Long Purple	Market Supreme Long Purple
Garlic ..	..	Garlic	Garlic	..	..	..
Lettuce ..	..	Yatesdale Sunnylake Winterlake	Yatesdale Sunnylake Winterlake	Yatesdale Sunnylake Winterlake	Yatesdale	Yatesdale
Marrow ..	..	..	Long White Bush	Long White Bush	Long White Bush	Long White Bush
Zucchini ..	..	..	Blackjack	Blackjack Ambassador	Blackjack Ambassador	Blackjack Ambassador
Melon						
Rock ..	..	..	..	..	Hales Best Gulfstream Gold Pak	..
Water ..	..	..	..	..	Candy Red Crimson Sweet	Candy Red Sunny Boy
Parsnip ..	..	..	Hollow Crown	..	..	Hollow Crown
Pea						
Market ..	..	Massey Gem	Massey Gem Fiesta	Massey Gem Greenfeast	Massey Gem Greenfeast	Massey Gem Greenfeast
Pumpkin ..	..	..	Queensland Blue	Queensland Blue Butternut	Queensland Blue Butternut	Queensland Blue Butternut
Rhubarb ..	..	..	Sydney Crimson Local strains	Sydney Crimson	..	Sydney Crimson
Tomato ..	..	..	F1 Hybrid varieties Indian River Grosse Lisse strains Tropic	Floradel Indian River Grosse Lisse strains	Walter C1402 Floradel	Floradel Indian River Tropic E.S. 58 Walter
Turnip ..	..	Purple Top White Globe	Purple Top White Globe	Purple Top White Globe	Purple Top White Globe	Purple Top White Globe

* These suggestions are based on the more important commercial varieties.

Dogwoods of S-E Queensland

by BERYL A. LEBLER, Botanist.

IN 1811, Robert Brown, the British botanist who accompanied Flinders on his voyage around Australia, described a plant he had collected in 1802 at Sandy Cape, Fraser Island.

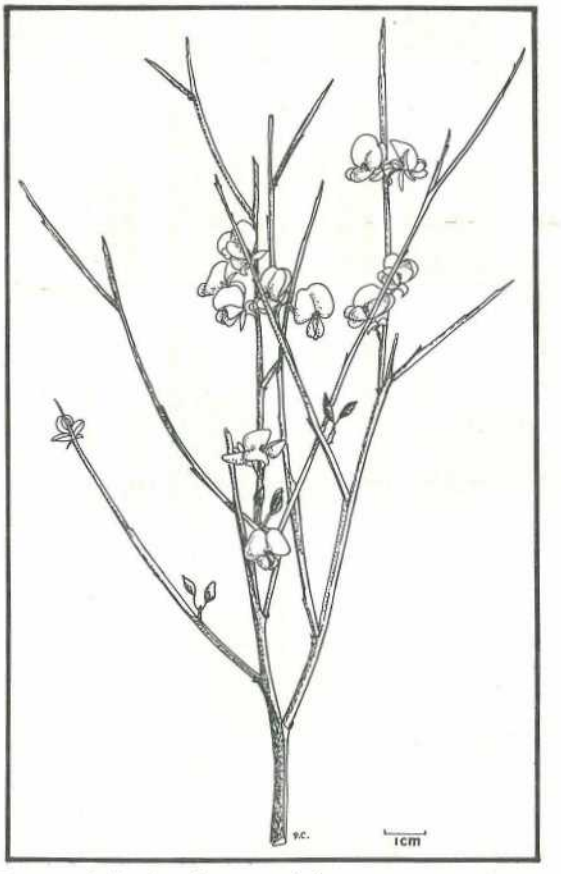
He named it *Jacksonia* in honour of George Jackson, 'a botanist of considerable talent', who had died during that year at the early age of 31.

It is interesting to note that the first specimen of *Jacksonia* had actually been found in 1792 in the south-western part of Western Australia by Jaques Labillardiere, a French naturalist. Labillardiere was a member of a French expedition sent to retrace the course of two French ships which had disappeared after leaving Botany Bay late in the eighteenth century.

When Labillardiere published his account of the plants he had found in Novae Hollandiae, as Australia was then known, he illustrated and described in 1805 the plant he had collected in Western Australia as a species of *Gompholobium*.

In 1811, when Brown described his new genus, he included Labillardiere's plant, as he considered it was a species of *Jacksonia* and not *Gompholobium*.

The species of *Jacksonia* are always shrubs or under-shrubs. Their rigid branches may be terete, angular, or winged, and are usually leafless. Oblong or oval elliptical leaves are usually present on young seedlings and sometimes a few of them are found scattered on older plants. On most plants, the leaves are replaced by minute scales. The twigs can be flattened and leaflike, or they may be angular, very much branched and spinescent, that is, ending in a sharp point or spine.



Dogwood *(Jacksonia scoparia).*

In south-eastern Queensland, the name 'dogwood' is usually applied to these plants, although the same common name is used for other, unrelated plants in other parts of the state, elsewhere in Australia, and in other continents.

The flowers of our dogwoods, like those of wedge peas, are pea-shaped with five sepals, five petals, 10 free stamens and an ovary consisting of one carpel containing two ovules. The sepals are united into a calyx tube which is usually very short. The free calyx lobes are valvate, the two upper lobes being broader than the others. The large upper petal (the standard) is reflexed and orbicular or reniform in shape and is not as deeply notched as in the flowers of wedge peas. In some plants, it is entire.

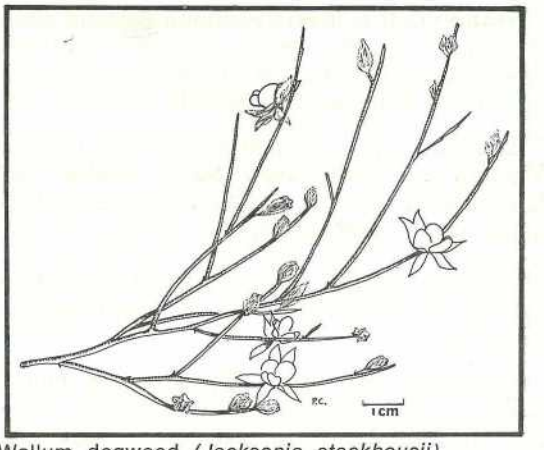
The flowers are arranged in either terminal or lateral racemes, or spikes, or are scattered along the branches. Usually, the flowers are some shade of yellow, but orange and yellow, orange and red, and mauve or lavender flowers can also be found in different parts of Australia. In some species, the wings and keel are brown or orange-red. The pod can be either sessile or stalked, flattened or swollen, and ovate or oblong.

In south-eastern Queensland, only two representatives of the genus occur: *Jacksonia scoparia* and *J. stackhousii*.

DOGWOOD (*Jacksonia scoparia*). *Scoparia* is a Latin word meaning broom-like, or having thin twigs. This plant was the first *Jacksonia* to be described and Robert Brown himself referred to it as 'Broom-like Jacksonia'.

DISTINGUISHING FEATURES. The leafless character of the plant distinguishes it from other yellow-flowered leguminous shrubs. The size and habit of the plant and the colour of its flowers are sufficient to distinguish it from the other Jacksonia growing in south-eastern Queensland.

DESCRIPTION. It is a tall shrub or small tree, which can reach a height of 10 ft. (3 m). Usually it is entirely leafless, but sometimes, particularly in young plants, a few oblong or oval leaves up to 2 in. (5 cm) long can be found. The overall appearance of the plant is grey-green. This is because of the dense covering of minute, closely-appressed, white hairs that are found on all parts of the plant except the petals.



Wallum dogwood *(Jacksonia stackhousii).*

The numerous branches are erect in some plants and pendulous in others. As many as eight flowers are grouped in one-sided racemes on the twigs towards the ends of the branches. Each flower is on a pedicel $\frac{1}{8}$ in. (3 mm) long. The pale grey-green calyx is divided almost to the base into five narrow, spreading and pointed lobes $\frac{3}{16}$ in. (5 mm) long. The two upper lobes are wider than the others. The flower colour is golden-yellow tinged with pink. The reflexed standard is $\frac{1}{4}$ in. (6 mm) long and $\frac{3}{8}$ in. (9 mm) wide. It has a shallow notch at the tip. The wings and keel jut out beyond the standard $\frac{1}{4}$ in. (6 mm). The upper edges of the wings lie close together and the wings slant outwards away from the keel. They are $\frac{1}{4}$ in. (6 mm) long and $\frac{1}{8}$ in. (3 mm) wide, just below the rounded tip. The flowers have a faint pleasant perfume.

The pod is flat and oblong and shortly stalked. It is about $\frac{1}{4}$ in. (6 mm) long and as wide as it is long, and is tipped by the persistent style. The outside surface is covered by long shaggy hairs and it contains two dark brown seeds.

FLOWERING TIME. From late winter through to spring.

HABITAT. It is a very common plant in open eucalyptus forests, usually growing in stony, sandy loam, but it has also been found growing with coast banksia on sandhills near the sea.

DISTRIBUTION. This plant is found only in Western Australia, New South Wales and Queensland, where it grows on the coastal lowlands as far north as Byfield, north of Rockhampton. It has also been found on the Carnarvon Ranges, and the Blackdown Tableland in Central Queensland, and near Gayndah and Eidsvold.

GENERAL REMARKS. The common name, dogwood, is derived from the fact that, when it is burning, the wood produces an offensive odour.

This plant has been successfully cultivated and grows even in heavy clay, provided it is in a well drained situation.

WALLUM DOGWOOD (*Jacksonia stackhousii*). Captain Stackhouse, R.N., found this plant near the mouth of the Clarence River, New South Wales, and recognized it as being a species of *Jacksonia*. He sent it to Baron von Mueller, the Government Botanist of Victoria who, in 1881, named it in honour of the finder.

DISTINGUISHING FEATURES. Its dwarf habit and the paler colour of its flowers easily distinguish this plant from the common dogwood.

DESCRIPTION. It is a sub-shrub that forms rounded clumps on the ground. Several slender, branching stems arise from a common rootstock and lie prostrate on the ground with the ends ascending so that the branches curve outwards and then upwards at the ends. They are sparsely covered with minute appressed white hairs.

The flowers are scattered along the upper parts of the branches, either singly or in pairs, and the corolla is a very pale creamy yellow. On the bracts and the calyx, the covering of hairs is denser than on the rest of the plant. The calyx lobes are larger than the open flower, and the two upper lobes stand erect and are up to $\frac{3}{8}$ in. (9 mm) long. They are united for more than half their length. Spread out beneath the petals are the three lower lobes. The standard is only slightly reflexed. It is $\frac{1}{4}$ in. (6 mm) long, and twice as wide as it is long. It is usually entire but sometimes emerginate. The wings and keel project $\frac{3}{16}$ in. (5 mm) beyond the standard. The pod is shorter than the calyx, almost oval in shape, and is compressed and silky hairy on the outside. It contains one or two seeds, dotted with minute black specks.

FLOWERING TIME. Midwinter to the end of spring.

HABITAT. It is common on wallum flats and grows in sandy soil.

DISTRIBUTION. It is found only on the coastal lowlands of New South Wales and Queensland, from just south of the Clarence River in New South Wales to as far north as Howard in Queensland.

Mat Grass To Milk

ATTENTION is drawn to the article 'Mat Grass To Milk', *Queensland Agricultural Journal*, January 1974 (Vol. 100 No. 1), pp. 18-22.

An example of a urea, molasses, phosphorus mixture is given on page 22. In this table, the quantities of some of the ingredients are transposed.

The text should read—

'An example of a mixture is:

Urea . .	. . 17 kg
Molasses . .	. . 45 litres
M.A.P. . .	. . 13·6 kg
Water . .	. . 136 litres'

S. G. REID, Government Printer, Brisbane

Anthracnose and Pod Twist

Anthracnose

ANTHRACNOSE *(Colletotrichum lindemuthianum)*, a fungal disease, was at one time widespread and damaging in bean crops in Queensland. It was particularly troublesome in those grown in the wetter, coastal areas.

However, it has now been virtually eradicated as a result of a scheme to produce disease-free seed in the Burdekin River valley. The fungus causing the disease is seed-borne, and the occasional outbreak that does occur can generally be traced to the use of seed from a previously infected crop.

Symptoms

Although all above-ground parts of the plant can be affected, the most conspicuous symptom of anthracnose in the field occurs on the pods, where dark-brown, sunken spots develop. In moist weather, the centres of these spots become covered with pink, waxy layers of spores of the fungus.

The disease may be important after harvest as well, when pods with no visible symptoms of the disease at picking become badly affected in transit.

Spots similar to those formed on the pods may also be visible on the stems. Another symptom of the disease is a blackening of the veins on the under-surfaces of the leaves.

Spread

The seed is the most usual agent carrying the fungus from one season to the next and introducing the disease into a new area. The fungus may be carried internally within the seed or on the seed surface. Most seed infection occurs as a result of direct pod penetration or contamination of the seed coat by plant debris during harvesting and subsequent handling.

The disease is favoured by showery weather. Spread occurs over limited distances during periods of wind-driven rain and contact with contaminated farm implements, insects, animals and people's clothes. Once established, spread can be very rapid under suitable conditions with extensive areas becoming diseased.

The fungus may survive for some time on infected crop trash and, if not decomposed, it may provide a source of the disease for future bean crops.

Control

The most successful means of controlling the disease is by using disease-free seed. A scheme to produce disease-free seed began in the Burdekin River valley in 1967 with the implementation of the Burdekin Bean Seed Quarantine Area.

Here, seed production is strictly controlled by the Department of Primary Industries to ensure freedom from seed-borne diseases. Seed from this scheme is now readily available to growers.

Certain hygiene precautions are also important in controlling anthracnose. Refuse from infected crops should be destroyed as soon as harvesting has been completed to ensure rapid and complete decomposition of any diseased plants. Movement of machines and people between diseased and disease-free crops should be avoided, especially while the crops are wet with rain or dew.

Pod Twist

POD TWIST *(Pseudomonas flectens)* is a bacterial disease that occurs almost entirely in the warm months of the year, especially January, February and March.

As most of Queensland's French bean production comes from plantings that mature in the cooler months, the disease is not important in commercial bean crops. However, it does cause some concern to bean seed inspectors during routine crop inspections. It is important therefore to distinguish between this disease and others causing similar symptoms.

Symptoms

In the field, infection occurs only on the pods, Young pods from which the blossoms have just fallen show water-soaked areas. Some wither and drop off. Pods that remain continue to enlarge but the development of the invaded areas is retarded. The obvious result is the spectacular bending and curling of the pods from which the common name of the disease has been derived.

Droplets of translucent, white exudate appear on the watersoaked areas. These later dry, leaving a shiny encrustation on the surface. With time, the watersoaked areas darken to become reddish-brown or black.

Spread

The bacterium causing this disease is spread from plant to plant by the bean blossom thrips *(Taeniothrips nigricornis)*. This insect alone can cause a great deal of plant damage in the form of twisting and scarring of pods. The thrips spread the bacteria to young bean plants from old, diseased plants and infected phasey bean *(Macroptilium lathyroides)* which are also susceptible to the disease.

Control

The disease can be controlled by applying insecticides for the bean blossom thrips at flowering. Old bean crops near newly planted areas should be destroyed as soon as possible after harvesting has finished.

— Plant Pathology Branch

[Further information can be obtained from the nearest Plant Pathology officer or by writing to the Director, Plant Pathology Branch, Department of Primary Industries, Meiers Road, Indooroopilly, Q., 4068.]

DPI

Diseases of French Beans - 3

Anthracnose

Pod Twist