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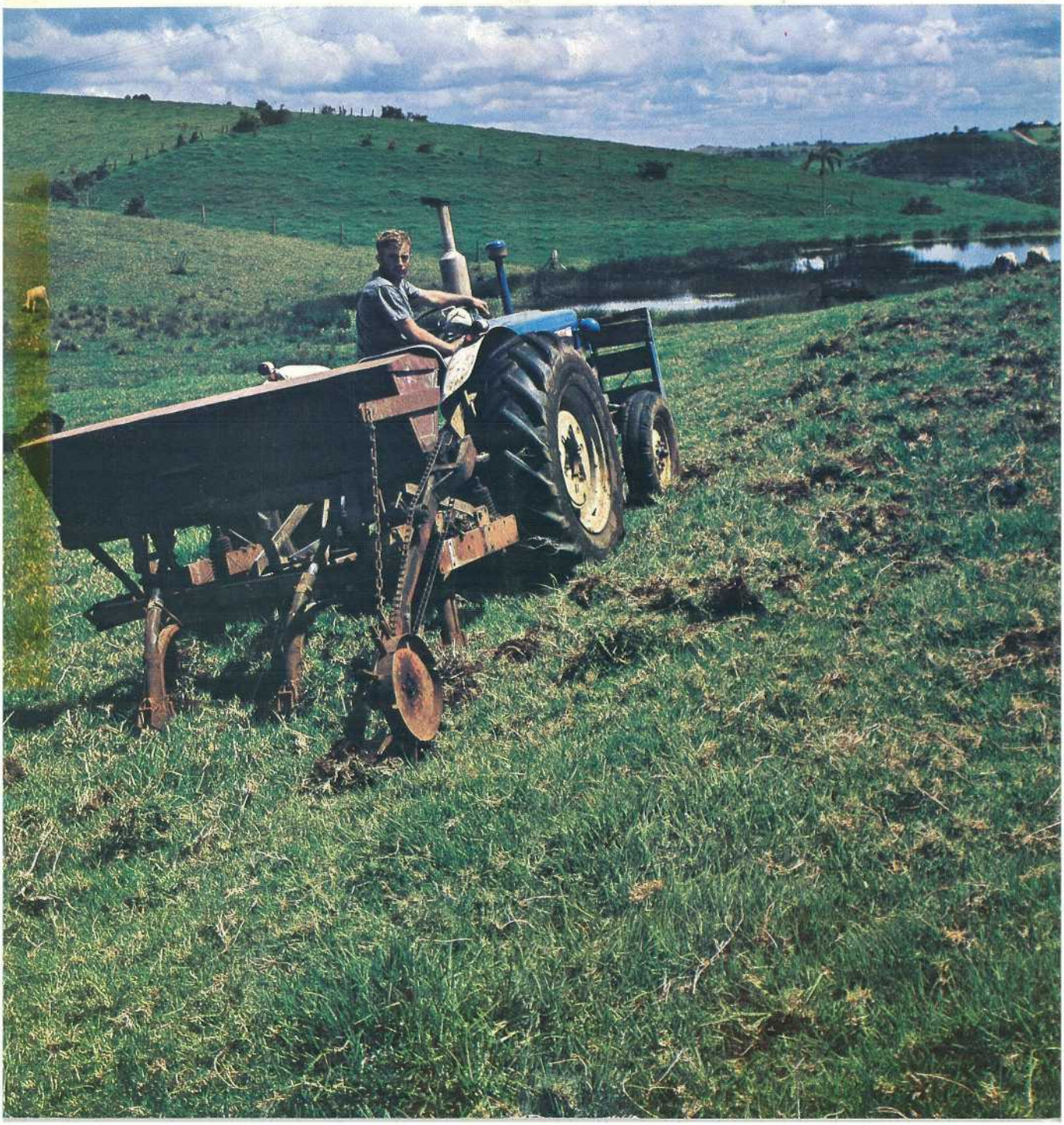
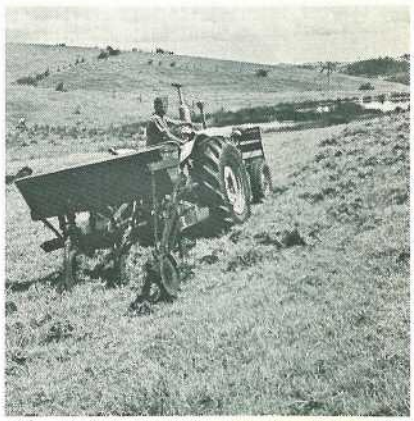


DEPARTMENT OF PRIMARY INDUSTRIES



Mr. Peter Ruddle sod-seeding oats into pasture on the Maleny dairy he works with his father. Sod-seeded oats, together with pasture renovation and fertilizer, ensures ample winter feed. (Story inside).

Editor: A. E. FISHER

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QUEENSLAND AGRICULTURAL JOURNAL

Ends Lag in Soil Conservation

NEW measures to speed up the soil conservation programme on the Darling Downs have been announced by the Minister for Primary Industries (Hon. V. B. Sullivan, M.L.A.).

He said the State Government had approved the concept of a Provisional Project Plan in declared Areas of Soil Erosion Hazard.

The number of these hazard areas would be increased by the declaration of another six Darling Downs shires—Wambo, Chinchilla, Millmerran, Rosalie, Crow's Nest and Glengallan—in the immediate future.

'The preparation of project plans and processing of objections is taking longer than expected', the Minister said.

'In some cases, construction work is being held up pending resolution of objections on matters that affect only a minor part of a complete project plan.

'Farmers keen to start work according to the advertised project plan must wait until the plan is approved and this has a dampening effect on their enthusiasm to get on with the job.

'It is hoped that the provisional project plan approach, which may cover a number of properties, a single property or even portion of one, will overcome this problem'.

Mr. Sullivan said that, under this provisional system, farmers could go ahead and construct works of a non-contentious nature and claim subsidy on them before a project plan for their area was approved.

The constructed works later would become part of the approved project plan. In either case, similar subsidy provisions would apply.

'While it will not be possible to provide the six shires to be declared with a project planning service at present, their declaration will mean that farmers in these areas will be eligible for subsidy on modifications to machinery for stubble management purposes', Mr. Sullivan said.

'In this practical way, the State Government recognizes the importance of stubble management as a soil conservation measure on the Darling Downs.'

The Minister added that the 50 per cent. subsidy on machinery modifications was limited to a maximum Government contribution of $500 a farm.

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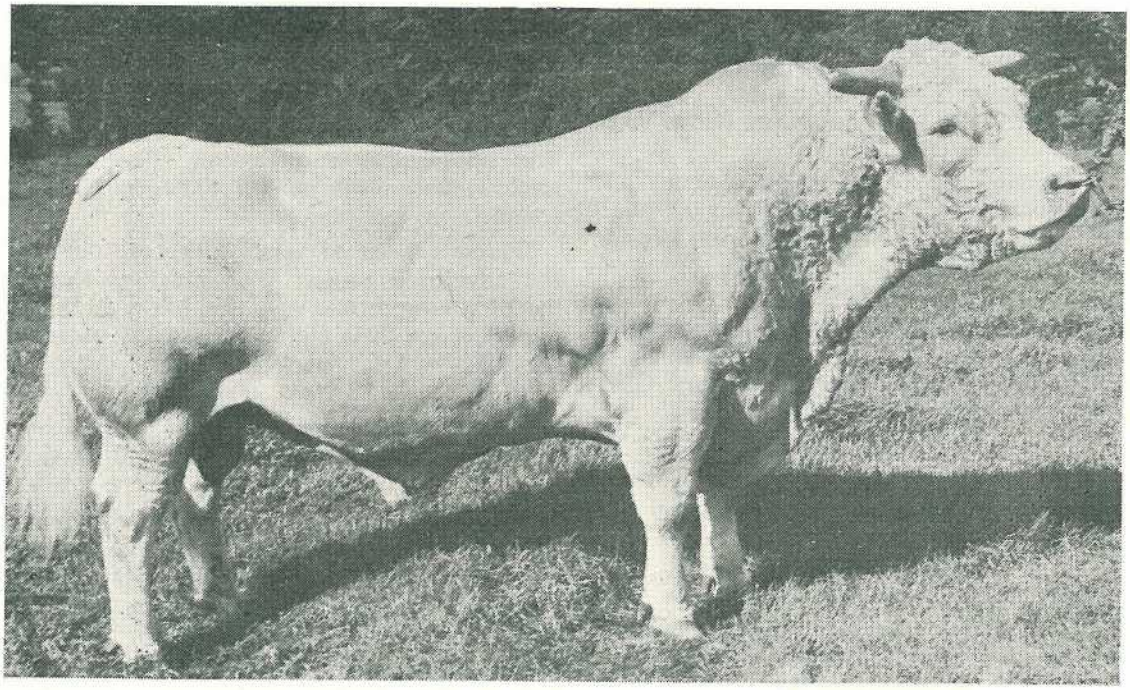


Charolais

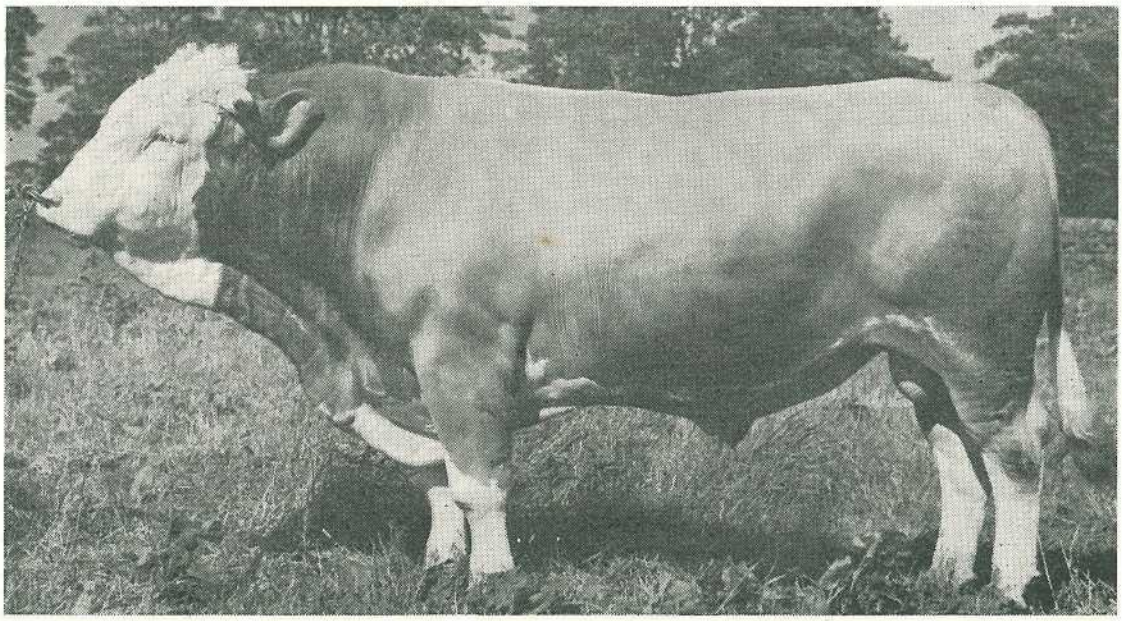
EUROPEAN BREEDS

Because most of the breeds in Continental Europe were originally developed for draught, or were evolved from breeds used for draught, European breeds are generally larger than the British breeds, mature later, have less fat, and grow faster under favourable conditions. The operative word here is favourable conditions. As purebreds under Australian conditions, they will need favourable conditions to give full expression to their genetic potential.

Generally, the European breeds tend to be bigger and heavier than both the British and tropical breeds with the larger breeds averaging 2 500 lb. (1 134 kg) and 1 600 lb. (725 kg) for mature bulls and females, respectively. However, not all of these breeds have such heavy mature weights.

In recent years, interest in these breeds has grown. This has been because overseas breed comparison studies have highlighted their superior performance characteristics. As pure

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



Simmental

breeds, the expansion of these breeds in Australia appears to be restricted to the more intensive areas. Their use in crossbreeding programmes appears to be quite extensive, particularly in producing dairy-beef and in crosses with Zebu types for the tropics.

The embargo on the importation of live animals means that semen has to be imported to develop these breeds in Australia.

Charolais

ORIGIN. The Charolais is the most prominent breed of Continental Europe. The history of the Charolais dates back to the seventeenth century in the French province of Charolles and later the adjoining province of Nivernais.

Nineteenth century French publications refer to the Charolais as a strain of the Jurassic breed of the Jura Mountains that lie between France and Switzerland, which was developed by France in the province of Charolles. In this area, cattle had to perform a dual role of draught and meat.

However, as a breed, the Charolais was considered too heavy and not suited for draught and so were selected and kept primarily as beef producers. The Breed Society was

founded in France in 1887 and today this breed is the second most numerous breed in France.

DEVELOPMENT IN AUSTRALIA. It is only in recent years that Australian breeders have become interested in using Charolais blood. This is because of the breed's increasing popularity in other countries and the reports of comparative performance studies in the U.S.A., U.K. and Europe.

Quarantine regulations prohibit the importation of live animals and the ban on semen imports from certain countries was lifted only in 1969. Since then hundreds of thousands of doses of semen have been imported from the United Kingdom, Canada and New Zealand. Crossbred stock have been bred and numerous studs have been formed to grade up to pure Charolais. A Breed Society has been formed and at present more than 60 Queenslanders are involved in grading-up programmes.

BREED CHARACTERISTICS. Charolais cattle are white or cream in colour with flesh-coloured pigmentation of the skin and mucous membranes. They are horned, stoutly built and rugged. The breed is noted for its large size, rapid gains and good carcass quality.

Calves are large at birth and calving difficulties are often linked with this. The extent of this is difficult to determine because of breed prejudices and the difficulties of interpreting overseas trial results.

The future expansion in the breed in Queensland is difficult to predict. It has a potential to make high growth rates in temperate environments. Its real future in Queensland appears to be in cross-breeding either with British or tropical breeds, but more particularly with tropical breeds, to give an animal more adapted to the tropics.

Simmental

ORIGIN. The Simmental breed is found in many European countries and originated in the Simme Valley of Switzerland. It is one of the most popular dual purpose milk-beef breeds of Europe and probably the largest in number with more than 35 million head scattered over the Continent.

It is the major beef breed of eastern France, southern Germany, Czechoslovakia and Hungary. In Austria, Romania and Yugoslavia, it makes up about half the total cattle population. Significant numbers are also found in Russia, Poland, Bulgaria and Italy.

In recent years, Simmentals were exported to the United Kingdom, Africa and the Americas, and this breed's popularity appears to be increasing in these countries.

DEVELOPMENT IN AUSTRALIA. Large quantities of Simmental semen are being imported into Australia and many properties are planning programmes to develop purebred stock. Its future expansion is difficult to predict but, because of its markings, it could be favoured by Hereford breeders in crossbreeding programmes. When crossed with the Hereford, the progeny of the cross is markedly similar to the Hereford.

BREED CHARACTERISTICS. The breed is a dual purpose type, larger than the British breeds, with a well muscled body and an absence of excess subcutaneous fat that is so wasteful in some of the British breeds. At a time when consumers are demanding lean meat, this breed, in common with other European breeds, is finding greater favour.

The basic colour is creamy tan to medium red with a white face and white markings on the legs, tail switch and underline. In Switzerland, the cream to tan colour predominates in most districts, but there is a trend to a red shade. The horns are of medium size and turn outwards and upwards in the cow but are straighter and less upturned in the bull.

The Simmental does not possess the double muscling gene that has been linked with large calves and difficult calving in the Charolais and Maine-Anjou breeds. However, some calving difficulties have been reported.

Milk yields of recorded cows in Switzerland average 8 800 lb. (3 990 kg) a lactation with a butterfat of 4%. This is comparable with the average production of Friesians in Queensland. In Queensland, the Simmental is likely to give less milk. Along with good milk production, Simmentals have excellent fleshing qualities and produce calves with high weaning weights and after-weaning gains.

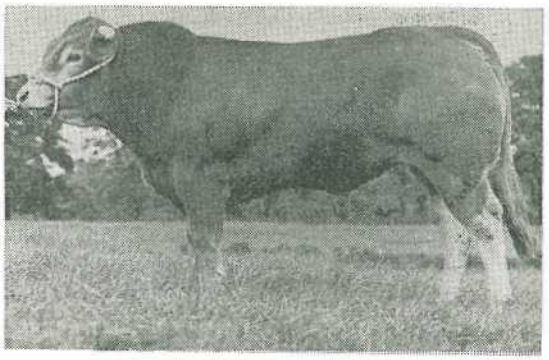
Limousin

ORIGIN. The Limousin is the second-most important breed of Continental Europe. The Limousin may have the same ancestors as the German and Austrian Yellow cattle. The breed was developed in south-central France first for draught and later for beef, but never for milk.

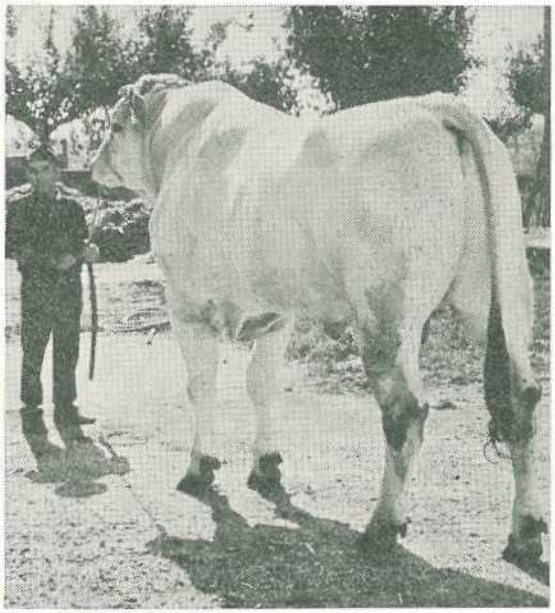
DEVELOPMENT IN AUSTRALIA. Large quantities of Limousin semen are being imported into Australia and the grading-up to purebreds is being undertaken on many properties. Its potential expansion as a pure breed tends to be limited to the more favourable areas but its use in crossbreeding could be extensive.

BREED CHARACTERISTICS. Limousin cattle are particularly hardy and, in the hilly region of their origin, display an ability to survive winters without housing. The hair colour is solid, rather reddish tan with no white markings except on the udder. The extremeties are a lighter shade and there are often lighter rings around the eyes. The horns of the bull are outthrust with a slight curve, while those of the cow bend forward without much upturn.

Limousins are large animals though somewhat smaller-boned than the Charolais. It is an excellent beef animal with a long body and high growth rate. This breed is currently gaining in popularity in the U.S.A. and Canada where it is of particular importance as a vealer producer. The breed is also noted for the absence of calving difficulties that may be troublesome with some of the other larger breeds.



Limousin



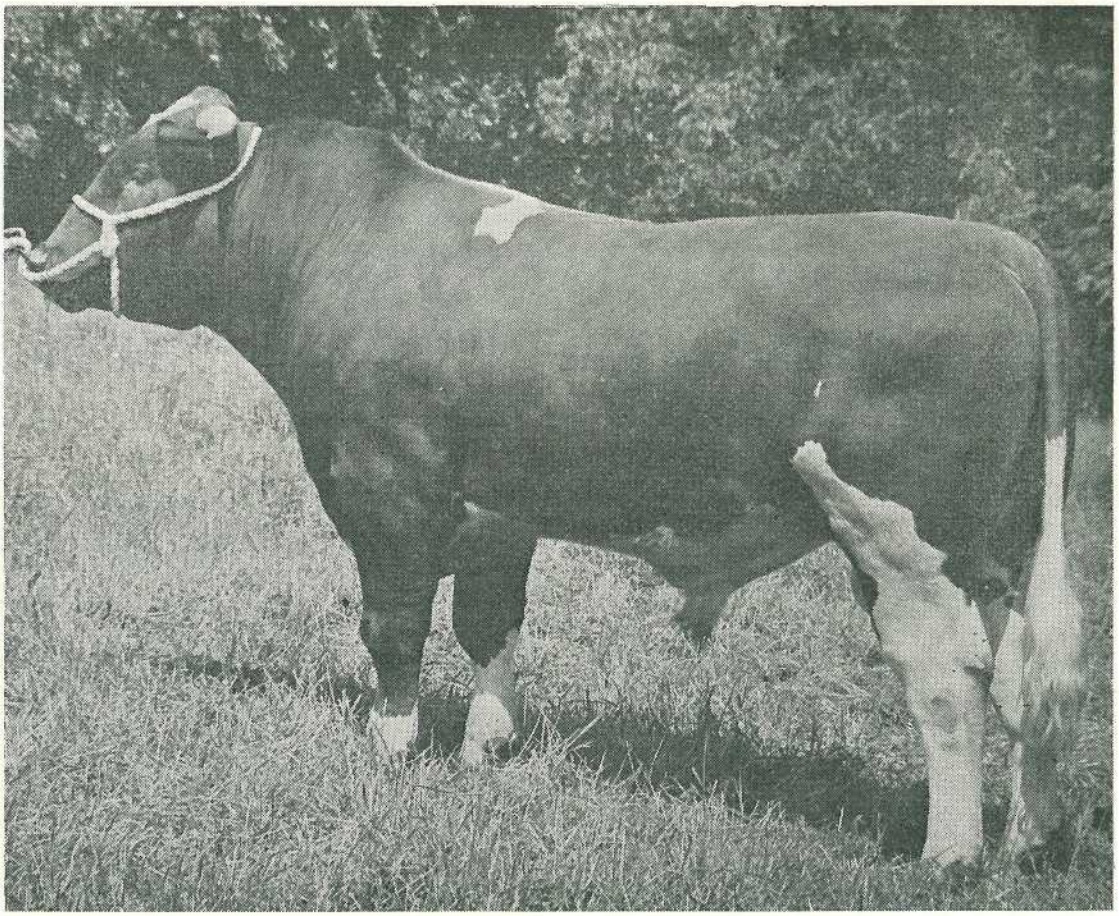
Chianina

Chianina

ORIGIN. The Chianina is the largest breed of cattle in the world, and accounts for approximately 6% of the cattle population of Italy. It is named after the Chianina Valley in central Italy where it is considered to have originated. Although developed as a draught animal, the Chianina is now grown primarily for meat, which is of excellent texture.

Claims are made that the Chianina goes back to the ancient days of Rome where it was used as a sacrificial cow. In Italy, animal geneticists speculate that the breed is related to the *Bos indicus* cattle even though it does not exhibit the characteristic hump or excessive dewlap.

In 1932, the Italian Government assisted in promoting and improving the breed by sponsoring a herd book and a scientific approach to testing and selecting. In recent years, the breed has been exported to countries in North and South America where it appears to be doing well.



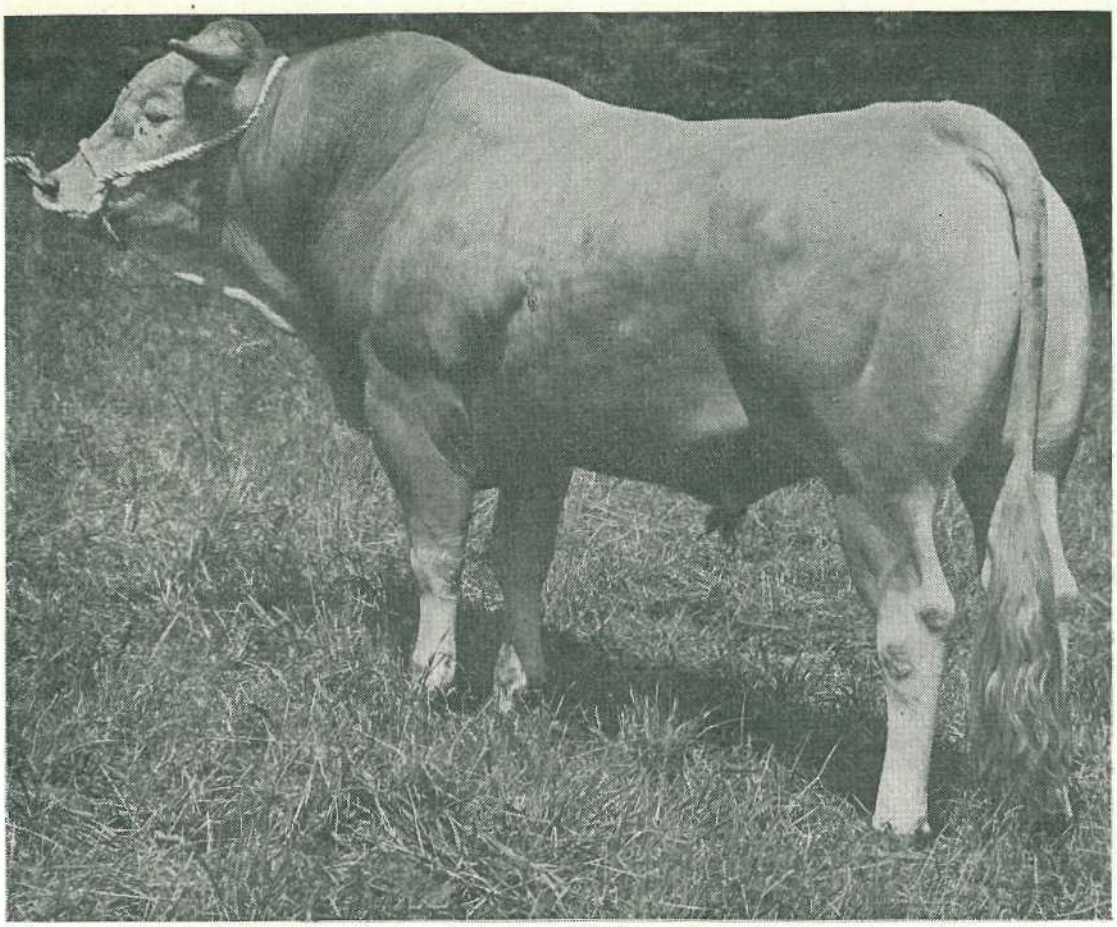
Maine-Anjou

DEVELOPMENT IN AUSTRALIA. Like the other European breeds, its introduction into Australia depends on semen imports. Once in Australia, the expansion of the breed is difficult to predict. If it has some degree of tick resistance, then this breed could be of particular use in the tick areas of Queensland.

BREED CHARACTERISTICS. This is the largest of all breeds with bulls in good condition, but not fat, standing 6 ft. (1·8 m) high at the withers and weighing up to 4 000 lb. (1 800 kg). Mature cows weigh up to 2 400 lb. (1 085 kg) and stand 60 to 68 in. (1·5 to 1·7 m) high at the withers.

Both males and females are pure white though the brush of the tail is frequently black. The skin has black pigmentation except for the underline. Calves are born tan in colour and gradually change to white at about 60 days of age. When crossed with other breeds, the white hair is usually recessive but the pigmented skin is dominant.

Breed comparison studies in Europe have indicated that in growth rate the Chianina is as good as or superior to any other European breed. It is an efficient converter, has high fertility and an absence of calving difficulties.



Blonde D'Aquitaine

Milk production of dams is not as good as that of some of the milk-beef breeds but is sufficient to rear good calves.

Maine-Anjou

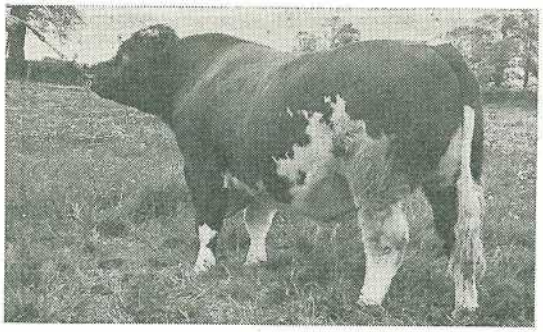
ORIGIN. Beginning round 1840, the Maine-Anjou breed was developed in Brittany through crossing Shorthorn bulls imported from Britain with the local red and white breed known as the Mancelle. This native breed was used for both draught and milk.

The original emphasis in crossing with the Shorthorn was to produce a better draught animal. The name is derived from the provinces of Maine and Anjou where the cattle originated. Over a time, the selection emphasis has shifted to produce a dual purpose beef-milk type.

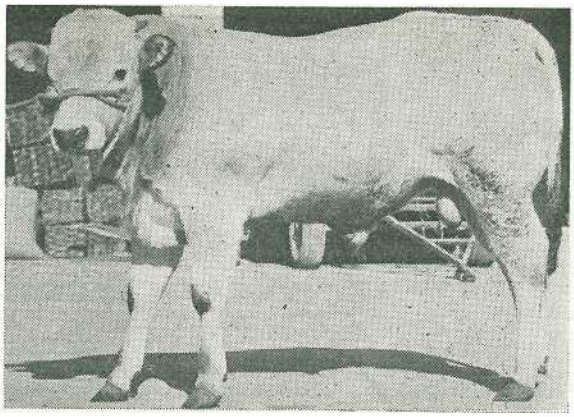
DEVELOPMENT IN AUSTRALIA. Semen is being imported, but the final distribution of this breed is difficult to predict.

BREED CHARACTERISTICS. This breed is probably the largest of all the French breeds with mature bulls weighing up to 3 000 lb. (1 360 kg) and cows up to 2 000 lb. (900 kg). They are dual purpose cattle with the emphasis on beef production.

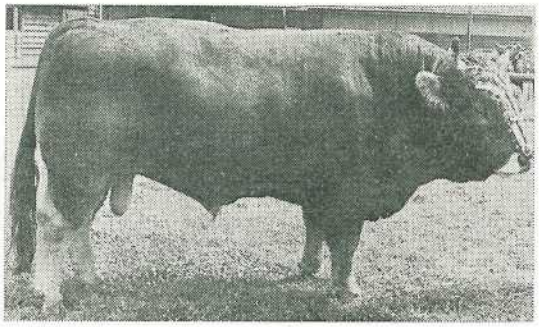
Colours range from a solid red to red with some white markings to dark roans. They are a long, upstanding breed with moderate depth



Meuse-Rhine-Yssel (MRY)



Piedmont



Brown Swiss

and a long rump. The skin is loose and of medium thickness and pigmented. Bone structure is not as heavy as in the Charolais.

Maine-Anjou cattle have a high growth rate and good carcass quality. It has been reported in the U.S.A. that some calving difficulties have followed the use of Maine-Anjou bulls.

Blonde D'Aquitaine

ORIGIN. Blonde D'Aquitaine is a French breed of comparatively recent origin formed by uniting two varities of local cattle. In the 1920s cattle in the Garonne Valley south-south-west of the Limousin area were known as the Garonnais while those in the uplands which carried some Limousin blood were known as the Quercy breed. In 1961, these breeds were joined to form the Blonde D'Aquitaine.

DEVELOPMENT IN AUSTRALIA. Semen is being imported but it is difficult to predict this breed's future expansion.

BREED CHARACTERISTICS. Blonde D'Aquitaine is one of the most thoroughly tested and selected breeds in France. It is wheat coloured (yellow or yellow brown) and of large size. It has high growth rates, good carcass qualities and an absence of calving difficulties.

Meuse-Rhine-Yssel (MRY)

ORIGIN. The Meuse-Rhine-Yssel (MRY) breed originated in the Netherlands but is found in most countries of Western Europe. The breed probably traces back in the distant past to the same ancestors as the Friesian which it almost equals in productivity.

DEVELOPMENT IN AUSTRALIA. Semen is being imported.

BREED CHARACTERISTICS. The colour is red patches on white but the markings are not as sharply defined as those of the Friesian. The neck and shoulders are usually red and the face, if red, usually has a white streak extending from the forehead to the muzzle. Red over most of the body now predominates on most individuals. These cattle are horned.

Milk production of the MRY almost equals that of the Friesian but the fat content is somewhat less and the MRY has a better

beef conformation. It is a milk-beef type with more emphasis in selection standards on muscling.

Brown Swiss

ORIGIN. The Brown Swiss appears to have developed simultaneously in the Alpine regions of Switzerland, Germany and Austria. It is more widely scattered over the world than any other continental European breed except the Friesian, mainly because of exports from Switzerland.

DEVELOPMENT IN AUSTRALIA. Semen is being imported.

BREED CHARACTERISTICS. It has a brown colour varying in shade from light grey to rather dark brown which is solid over the entire animal's body except for a lighter, nearly white, colour on the udder and lower legs of some animals.

In some countries, it has been selected more for milk production, in others as a dual purpose breed and it shows excellent response to both kinds of development. In the U.S.A., a milk-producing animal is preferred but in Germany a milk-beef animal is usually selected.

As the breed now exists in Switzerland, mature bulls average about 2 000 lb. (950 kg) and cows 1 350 lb. (610 kg). Milk production of recorded cows averages around 8 000 lb. (3 629 kg) with a fat content slightly less than 4%.

Piedmont

ORIGIN. The Piedmont is a native of Italy and developed as a draught animal in the upper Po Valley. It was also used to supply milk. Over a time, the emphasis moved towards a dual milk-beef type of animal.

DEVELOPMENT IN AUSTRALIA. Semen is being imported.

BREED CHARACTERISTICS. Colour is a solid, creamy, light grey which blends to a much darker shade on the shoulders of males. Bulls also usually have a characteristic black patch around the eyes and both sexes have a black tail brush and horns of medium size. This breed is well muscled, heavy boned and produces a carcass of good quality.

German Yellow

ORIGIN. The German Yellow or Gelbvieh breed is similar in appearance to the Simmental and probably carries a fair proportion of Simmental blood. It is found in East and West Germany and Austria, with the largest concentrations in the south-western areas of the West Germany highlands near Wurzburg-Nuremberg.

DEVELOPMENT IN AUSTRALIA. Semen is being imported.

BREED CHARACTERISTICS. Colour varies from yellowish tan to reddish tan with lighter colour rings around the eye. It is a dual-purpose type having been selected for both milk and beef production with the greater emphasis on beef. The hindquarters are particularly well developed and stock have high growth rates and good milk production.

Pictures are by courtesy of the British Milk Marketing Board and Universal Livestock Services (Great Britain).

Vegetable Varieties for June 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 Pioneer	Redlands Pioneer	Redlands Pioneer Redlands Autumncrop
Beetroot ..	..	Early Wonder Detroit strains	Early Wonder Detroit strains	Early Wonder Detroit strains	Early Wonder Detroit strains	Early Wonder Detroit strains
Cabbage ..	..	Ballhead Hybrid Greygreen Greengold Sugarloaf types	Ballhead Hybrid Greygreen Greengold Sugarloaf types	Ballhead Hybrid Sugarloaf types	Ballhead Hybrid All Seasons Sugarloaf types	Ballhead Hybrid Superette
Capsicum ..	..	..	Yolo Wonder Green Giant Northern Belle	Yolo Wonder Green Giant California Wonder	Yolo Wonder Green Giant California Wonder Long Sweet Yellow	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 King Chantenay	Royal Chantenay King Chantenay	..	..	..
Celery ..	..	..	South Australian White	..	..	South Australian White
Choko ..	..	..	..	Smooth Green	Smooth Green	Smooth Green
Cucumber ..	..	..	Marketer Ashley	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
Lettuce ..	..	..	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	Conqueror Rio Gold
Water ..	..	..	..	..	Candy Red Crimson Sweet	Candy Red Sunny Boy Charleston Grey
Parsnip ..	..	..	Hollow Crown	..	..	Hollow Crown
Pea						
Market ..	Massey Gem Greenfeast	Massey Gem	Massey Gem Fiesta	Massey Gem Greenfeast	Massey Gem Greenfeast	Massey Gem Greenfeast
Processing	..	Victory Freezer strains Frosty	Victory Freezer strains Frosty	..	..	..
Pumpkin ..	..	..	Queensland Blue	Queensland Blue Butternut	Queensland Blue Butternut	Queensland Blue Butternut
Rhubarb ..	..	..	Sydney Crimson Local strains	..	..	Sydney Crimson
Tomato ..	..	..	Floradel Indian River Grosse Lisse strains Strobelee Tropic Walter	Floradel Indian River Grosse Lisse strains	Walter C 1402 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.

Skilful Management Boosts

SKILL in managing both their dairy herd and the pastures the cows eat has brought the reward of high returns to Maleny dairyman Mr. Phil Ruddle and his son Peter.

The pasture and herd management practices these farmers have developed are described in this article.

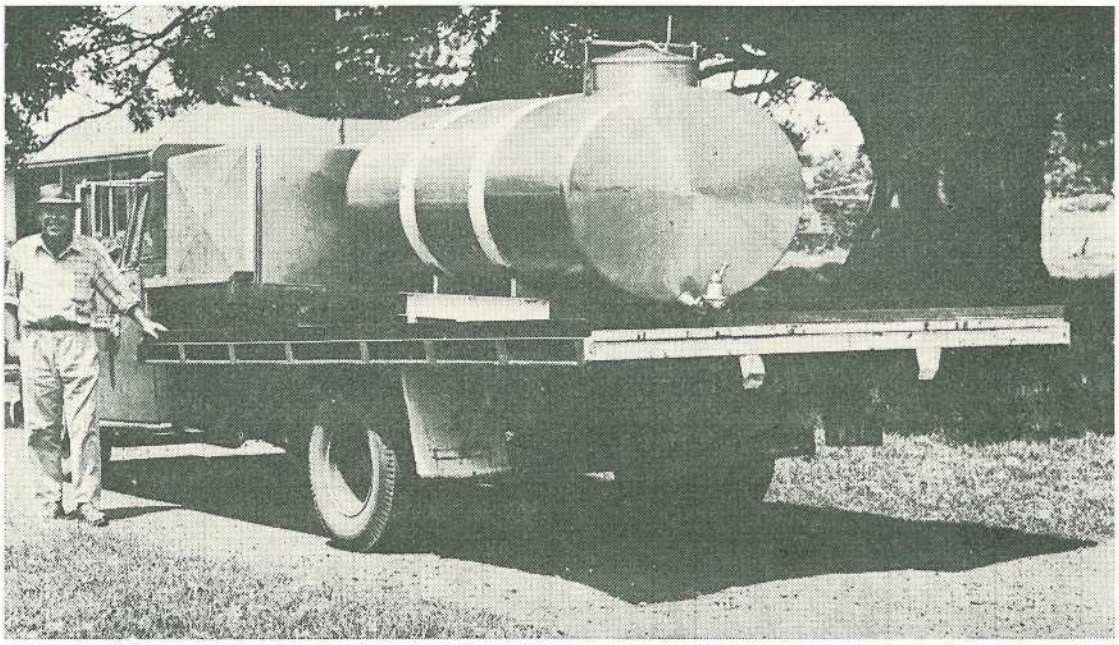
The Maleny plateau covers some 260 square kilometres (100 square miles) of red volcanic clay loam. Rainfall is high, though typically light during the winter. These two conditions favour growing permanent pasture. This is being done on many properties, particularly since the introduction of the Dairy Pasture Subsidy Scheme.

The property

The 104-hectare (260-acre) property of father and son team, Messrs Phil and Peter Ruddle, is in the forefront of pasture development. Mr. Ruddle took over the property after discharge from the army in 1943 when dairy produce was in demand and the return/cost ratio was much more attractive than at present. His father had taken up the property in 1909.

There is no level land. The undulating property has now been developed with the exception of 32 hectares (80 acres) of steep

Mr. Phil Ruddle and his bulk milk tanker that he uses to deliver milk to the Maleny casein factory daily.



Farm Profits

by A. HUTCHINGS, Dairy Cattle Husbandry Branch.

gorge. An approximately 64-hectare (160-acre) area is divided into 36 paddocks varying from 1·6 to 2·4 hectares (4 to 6 acres) each. The dry cow area is divided into 4 paddocks.

The rainfall figures shown in the table are calculated from records over 30 years. The rainfall varies considerably from year to year and, all too frequently, little or no rain comes for 2 two months, or even longer, in the June to September period. The number of wet days recording more than 0·025 centimetres (1 point) of rain is shown in the lower list of figures.

The number of wet days per month adds a little more understanding of the usefulness of the rains, especially in winter and spring. The light rains, even less than 12·7 mm

RAINFALL AND CLIMATE

Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm
262·3	349·8	353·4	174·9	125·7	88·5	98·9	55·8	61·4	117·0	124·9	170·8
1 029	1 372	1 386	686	493	347	388	219	241	459	490	670
number of wet days											
14	15	17	13	9	7	8	6	7	9	11	11

A day's feed for 200 cows in this 4-acre paddock. This is typical of the whole property.

(30 points), are most beneficial because of the absorptive property of the mulch from the dense grass and root growth. Moisture conservation is assisted by the cooler atmospheric conditions.

Occasional frosts rob the cows of top feed. Cold winds sometimes reduce their comfort but this is offset to some extent by good body condition.

Pastures and their management

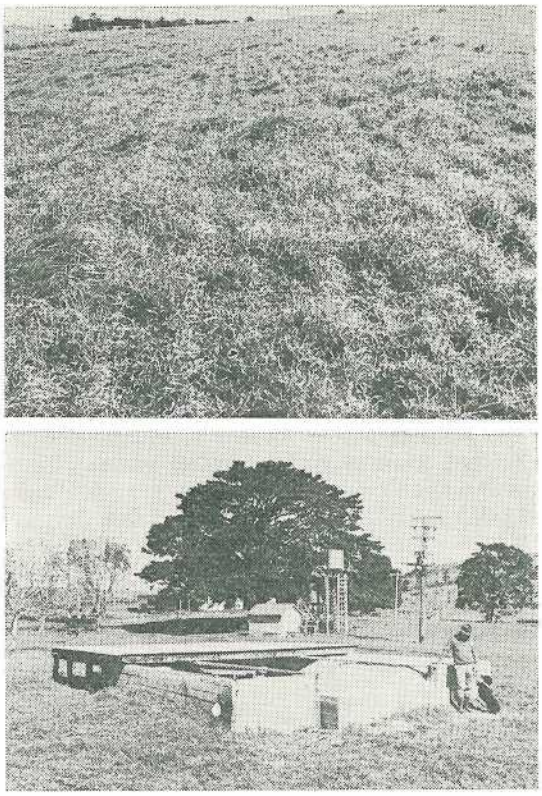
Pastures consist of kikuyu, paspalum and clover. Mat grass has largely been eliminated because, while mat grass tolerates poor conditions of fertility and moisture, the better grasses suppress it as fertility of the soil is improved.

FERTILITY AND SOIL STRUCTURE. These have been brought to the present high level of productivity by:

- Regular applications of nitrogen.
- Annual applications of mixed fertilizer.
- Ripping-sod seeding.
- Aerial fertilizing and spreading yard effluent on steep country daily.

Nitrogenous fertilizer, mainly Nitram, is broadcast at 165 to 247 kg per ha (1.5 to 2 cwt per acre) two or three times during spring and summer. The smaller quantity is put on when pasture growth is getting ahead of the animals' needs and none is put on during the wet period. Each paddock is fertilized in three sections so that the cows have feed in different stages of growth. This helps to maintain intake. Total application of Nitram during spring and summer period is approximately 630 kg/ha (5 cwt. an acre). Mixed fertilizer at 508 kg per ha (4 cwt. per acre) is used when sod-seeding oats. The mixture consists of 500 kg of superphosphate, 100 kg of nitram and 50 kg muriate of potash. In this site it becomes readily available to surrounding plant roots.

The gorge is aerially fertilized and total effluent from the yards is pumped onto it daily through a 5-cm (2-in.) polythene pipe. Large amounts of water are used to clean the bails and yards with a high pressure pump.

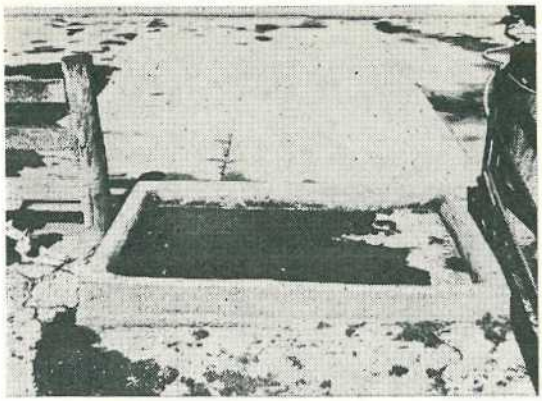


Sod-seeded oats. As far as rainfall permits, the whole farm is sod-seeded to oats each year. (Top). Fertilizer storage and mixing facilities under a sliding roof.

It is calculated that the annual fertilizer content of dung and urine from a high producing milking cow contains the equivalent of 203 kg (4 cwt.) of Nitram, 101·6 kg (2 cwt.) of superphosphate, 100 kg (2 cwt.) of muriate of potash and 50 kg (1 cwt.) of lime. There is no loss from the urine and the thick pasture cover ensures that the constituents of the dung are absorbed with small losses by weathering. With a 240-cow herd, the dung and urine have real value.

Winter feed

Slow grass growth during the cooler months is supplemented by grazing oats and renovated pasture. Oats is sod-seeded on the contour at 67 to 100 kg per ha (1·5 to 2 bushels per acre) in 35 cm (14-in.) rows together with the mixed fertilizer mentioned earlier.



A bluestone footbath at the entrance to the bails. This controls footrot so that there is only an occasional mild case.

Sod-seeding extends over March, April, May and June and occasionally into July. Algerian oats is preferred because of its tillering and extended regrowth. As many as 10 grazings have been obtained from early plantings and some oats has persisted in the sward during December. As far as weather permits, the total 64 hectares (160 acres) is sod-seeded each year.

Grazing management

The herd is given a fresh paddock by day and by night. The smallest paddocks are thus stocked at a density of up to 125 cows per hectare (50 cows per acre) of grazing on a 3 to 4-week rotation.

Although the two grasses are intermingled or grow side by side, the cattle select, as far as they are able, paspalum early in the spring and until it reaches the flowering stage of growth. Their pattern of grazing then changes to a preference for kikuyu.

Planned feed for the year

Mr. Ruddle has developed a system of year-round feed production by adequate use of fertilizer and sod-seeding oats. It is not necessary to conserve feed. Winter pastures respond to the rather light winter-spring rains. During wet weather in summer, extra pasture growth is restricted by reducing the use of fertilizer. Surplus pasture is slashed to maintain high quality feed.

The herd

Large-framed Jerseys and some Jersey-Friesian crosses make up most of the 240-cow herd. The number is to be increased to 270 next year. The Jersey and Jersey crossbred is suitable for the local casein market as payment is on fat percentage.

A modified seasonal calving system has been developed; 60% of the herd calve during the spring and the remaining calvings are spread over the rest of the year. This profitably uses the pasture-clover-oats system of feeding. Indeed, pasture management has been planned to suit the environment and climate and the calving pattern adjusted to best suit the feed. The number of cows in milk has at times reached 220 and has rarely dropped below 150.

Breeding

Three Hereford bulls are held in yards close to the bails for hand mating. There are few breeding problems. The occasional shy breeder is sold.

In recent years, herd replacements have been bought mainly at sales. Heifers in calf, preferably close to calving, are the most suitable. From 30 to 40 are bought each year, and about as many are culled.

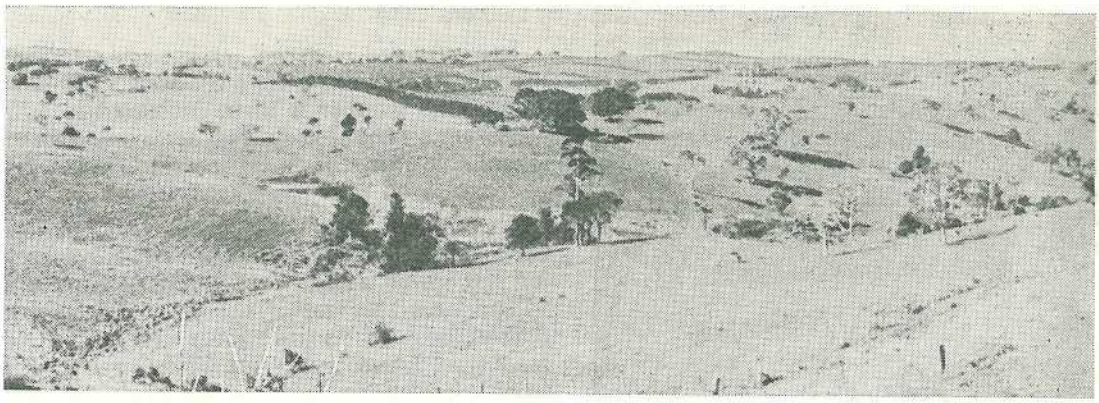
Bobby calves

All calves are reared by multiple suckling and sold at about 6 weeks old. An appropriate number of nurse cows are let into the small calf yards at milking time. From two to four cows are yarded with six to eight calves during the seasonal calving period. The calves are not supplemented but the cows receive some meal.

A decision was made a few years ago to buy rather than to rear replacements as the area of land was to be fully stocked with milking cows.

Supplementary feeding

From 1·8 to 2·3 kg (4 to 5 lb.) a cow a day of a mixture of approximately 60% lucerne hay and 40% grain by weight is fed. A mixture of two grains is preferred



A general view of the Maleny plateau.

and barley is the grain of choice but price and availability affect the purchases. While hammer-milling, 1% of phosphorus supplement and 1% of salt are also added. A small quantity of diluted molasses containing copper sulphate is automatically mixed at the feed trough. Copper sulphate is added at 28·3 g (1 oz.) a 100 cows a day. (Maleny is a borderline copper deficient district).

Bloat occurs fairly constantly, but is worse during the wet seasons. It is largely controlled by feeding tallow, which is melted in an electric heater and conducted into the hammermill at a rate which provides 56 to 113 g (2 to 4 oz.) a cow a day. The amount is adjusted according to the prevalence of bloat. Edible quality tallow is used because of its acceptance by cows. The market price of tallow recently doubled to $200 a tonne.

As some cows are particularly susceptible to bloat and individual animal metabolism fluctuates, experience has found it necessary to inspect the herd regularly about an hour after entering a paddock. Bloat occurs much more often in the morning than at night.

FEEDING is semi-automatic so that delay in the milking bails is avoided. Mr. Ruddle designed his first controlled meal feeding system 20 years ago.

MILKING BAILS are the walk-through type. The five doubled up units are soon to be increased to eight (16 milking units). This will speed milking from 140 to 220 cows an hour.

Disease

The disease problem is small by general herd standards. It is largely prevented by good management and prompt and appropriate treatment. The incidence of mastitis is very low.

Production

Total factory receival for 1972-73 was 37 508 kg (72 517 lb.) of fat. This included the 96 387 litres (60 gallons a day quota milk) market milk. In addition, 180 bobby calves and 25 cull cows were sold. The factory return for casein, the main market, is 137c/kg (62·4c/lb.) fat, 10·2c/litre (46·5c/gal.) for market milk and 114c/kg (51·9c/lb.) fat for cream.

Labour

The property is run by Mr. Ruddle, his son Peter, and another married man. Except in emergencies wives are not employed. Milking is carried out mainly by two men, the third man attends to bobby calves.

This farm illustrates a stable, low-cost production system which has stood the test of many years involving considerable variation in climatic conditions from year to year. Capital expenditure is relatively low in relation to the level of production achieved and this is the result of maximizing returns to pasture management. It is the reward for skilful management.

Cattle Tick Control

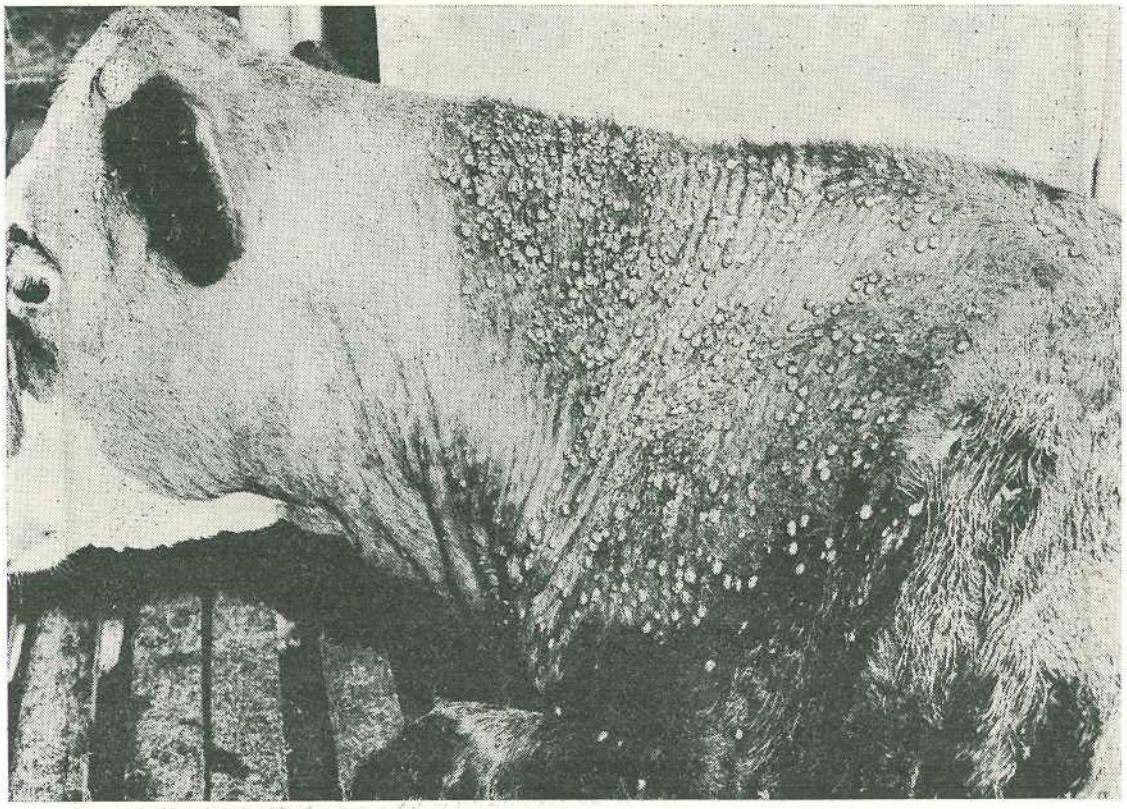
by J. F. KEARNAN, Tick Control Extension Officer.

EXCEPT for drought, the cattle tick (*Boophilus microplus*) is the most serious problem confronting the Queensland cattle industry, costing it about $30 million a year.

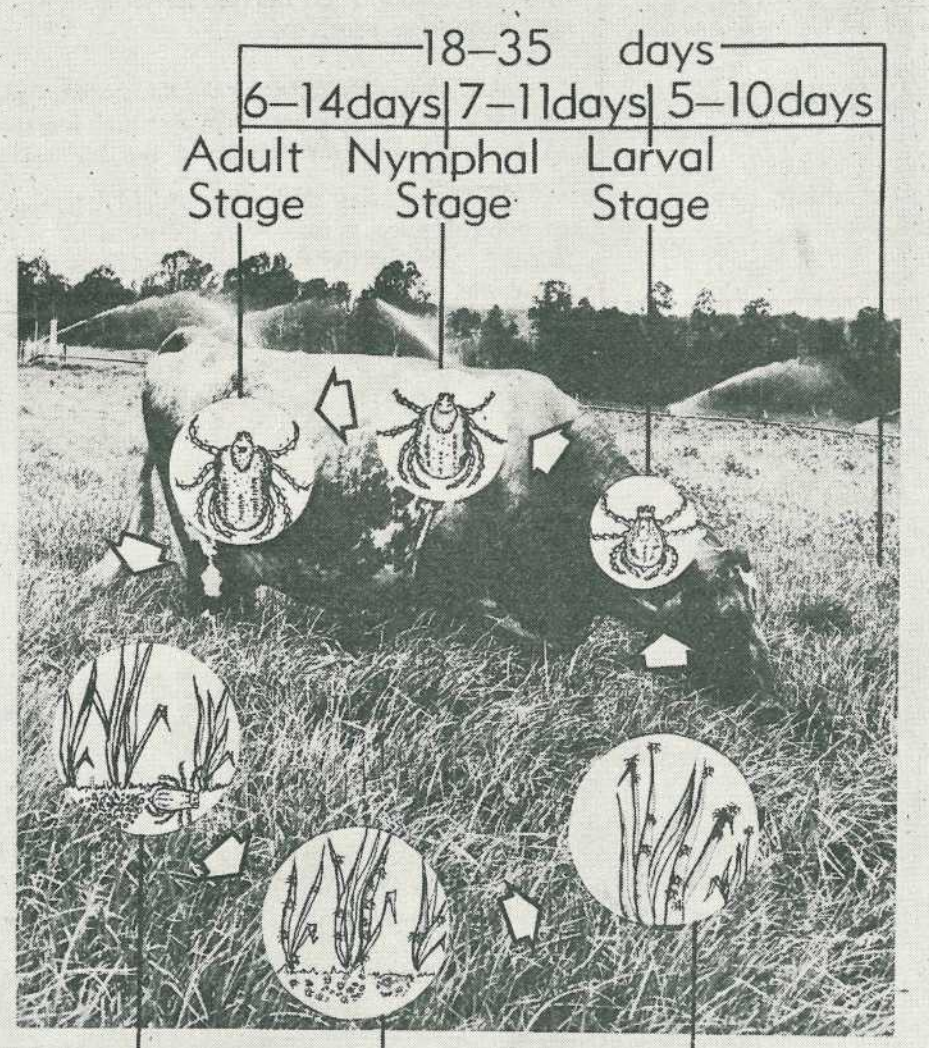
All forms of tick control attack some stage of the life cycle of the tick, so it is essential for stockowners to have a sound knowledge of the life cycle.

In theory, the cattle tick should be relatively easy to control since it completes its parasitic life cycle of about 21 days on the one host, and it feeds predominately on cattle. Apart from horses, sheep and deer, other hosts can usually be ignored. However, in practice, the cattle tick continues to be a serious problem.

Heavy, engorging tick burdens, like the one on this beast, cause worry, anaemia and reduce weight gains. They also ensure future, heavy pasture contamination with tick larvae.



THE LIFE CYCLE OF THE CATTLE TICK



It causes loss of bodyweight gains, tick worry and anaemia, and is also responsible for the transmission of the blood parasites that cause sickness and losses from tick fever.

Life Cycle

The life cycle consists of four stages: the egg, the larva, the nymph and the adult. The tick begins and ends its life on pasture but depends on its host for feeding and developing to maturity.

The engorged female falls to the pasture and crawls away to shelter among pasture plants and surface debris. There she rests. The rest period may range from 2 days at 36°C to 39 days at 15°C. She is susceptible to low temperatures and a temperature of minus 5°C or below is fatal to an egg-laying female. She may hibernate over the winter until spring.

Egg production depends on temperature and may cease temporarily if conditions become too cold. The egg-laying period varies from 7 to 10 days in the summer to several weeks in the winter. The most favourable temperature lies between 24 and 27°C while below 15°C egg-laying virtually ceases.

Each female tick lays on an average 3 000 eggs. The eggs are remarkably resistant and may survive for long periods at low temperatures provided the area is moist. Hatching depends on temperature and humidity. It stops when the temperature falls below 21°C and the humidity falls below 70%. The incubation period is 14 days at 36°C but is 146 days at 16°C.

After hatching, the reddish-brown larvae swarm over the pasture and crawl up grass stalks awaiting a host. They have senses which allow them to detect the presence of cattle and other animals.

The survival time of larvae on pasture is of great importance. They do not feed, although they may take up moisture from dew or even the atmosphere. The most critical feature necessary for their survival is high atmospheric humidity. They may survive on pastures for up to 3 to 4 months in summer and 5 to 6 months in winter.

However, these survival times vary significantly with different environments and 8 months is usually regarded as the longest period between the time the engorged female falls to the ground and the disappearance of the last larvae. Larvae kept at 35°C live only 16 days, but they have survived for 7 days completely submerged in water.

Parasitic Stage

After crawling on their hosts, the larvae move about but soon attach themselves and begin to feed. On the average, larvae moult on the sixth day and emerge as eight-legged nymphs. After feeding for about 7 days, they grow to about 12 mm long and their skin splits along the sides in the moulting process from which the adult tick emerges.

Females mostly emerge from the nymphal stage on about the fourteenth to fifteenth day of parasitic life and are usually fertilized soon after moulting and begin engorging slowly at first but then very rapidly on the last day.

Most females drop to the ground between the twentieth and twenty-third days of parasitic life, mainly between 6 a.m. and 10 a.m. It is generally agreed that the cycle does not extend beyond 35 days.

Points of Interest

Heavy deaths occur in all the parasitic stages of the tick, but the highest are within 24 hours of attachment.

Cattle lick themselves regularly and the irritation caused by ticks induces more frequent licking. In this way, large numbers of larvae may be removed.

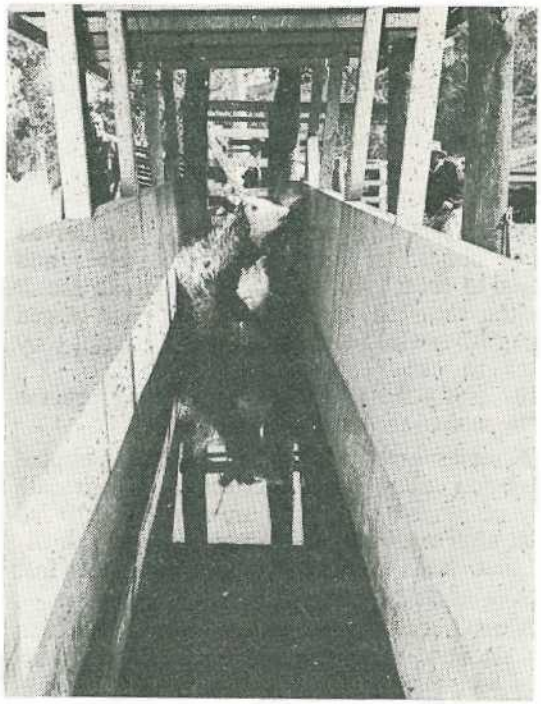
All engorged stages are difficult to kill with chemicals, particularly the engorged nymphal and adult stages.

METHODS OF CONTROL

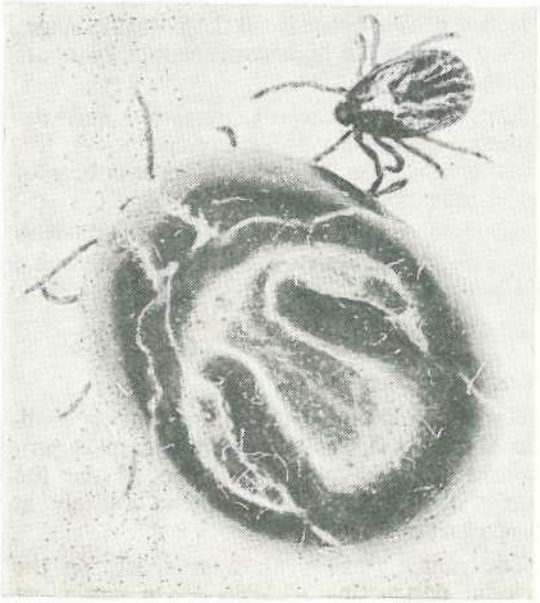
Planned Dipping

Planned dipping is based on employing available dipping fluids efficiently in a control programme that exploits knowledge of the life history of the tick and is aimed entirely at the parasitic stage.

Too many graziers place emphasis on the periodic destruction of ticks when cattle are seen to be infested but pay scant attention to the reproductive capacity of engorged ticks dropping off.



Planned dipping in good facilities with an effective tickicide at 18-day intervals successfully breaks the life cycle of the cattle tick.



The smaller cattle tick is a male and the larger an engorged female. A fertilized, engorged female lays an average of 3 000 eggs. This illustrates the reproductive capacity of the species under favourable conditions.

Planned dipping aims at keeping pastures relatively free of seed ticks. It consists of a series of dippings at less than 21-day intervals, preferably 18 days, thereby breaking the life cycle by preventing engorged females dropping off and laying eggs. Usually five or six dippings at less than 21-day intervals will leave very few surviving seed ticks on the pasture, provided the tickicide is efficient.

In south-eastern Queensland, planned dipping is particularly effective if it is timed to catch the 'spring rise', as the eggs laid by ticks dropped in early autumn and early spring tend to hatch simultaneously in October. Therefore dippings repeated at intervals of 21-days or less from mid September until December or early January, regardless of the extent of tick infestation on the animals, make sure that as few as possible engorged females are dropped on the pastures.

It has been found that, as a result of these early strategic dippings, tick numbers remain relatively small from January until March and are readily controlled thereafter by a few dippings at comparatively long intervals.

In central and northern Queensland, the main planned dipping should probably be directed at the autumn months.

Larval survival study plots have been established in various parts of Queensland by the D.P.I. and C.S.I.R.O. Observations from these can be applied to planned dipping. Graziers are encouraged to consult with local Department of Primary Industries officers who are able to obtain information applicable to their particular area. However, for success, planned dipping requires that—

- Musters are clean.
- Ticks are susceptible to the chemical in use.
- Dipping or spraying equipment is effective.
- Chemicals are used at the correct strength.
- Fencing is good.

Tickicide Resistance

The need to apply tickicides at frequent intervals to control ticks has led to a series of crises. Resistance has developed in succession to arsenic, to the chlorinated hydrocarbons

such as DDT, BHC, dieldrin, aldrin and Toxaphene, and to the organic phosphorus (O.P.) and carbamate compounds.

In 1963, a strain of ticks resistant to Delnav and certain other organo-phosphates appeared at Ridgelands near Rockhampton. This strain, referred to as the Ridgelands strain, was subseuqently found widely distributed throughout the southern and central coastal areas and to a lesser extent in northern Queensland. It was readily controlled with Asuntol and Ethion.

In 1966, another strain resistant to a wide range of organo-phosphorus and carbamate tickicides appeared on a property near Esk. This strain is referred to as the Biarra resistant tick. It is now widespread throughout south-eastern Queensland, and has been found recently in central and nothern coastal areas.

Yet another type of organo-phosphorus resistant tick, referred to as the Mackay type, has appeared at Mackay, Calliope, Bloomsbury and Silkwood. However, Dursban, Nexagan S and Imidan effectively control these strains.

During late 1970, still another strain resistant to Dursban appeared on properties at Beaudesert, Boonah and Gympie. This one has been called the Mount Alford strain. A different Dursban resistant strain at Rockhampton was called the Gracemere strain. The chemical chlorphenamidine added to the organo-phosphorus preparations has been used successfully to control these types of resistance and is now available for general use.

Over the past year alone, batches of ticks from 667 different properties were tested for resistance. Of these, 425 had one or other kind of resistance and, of these, more than half were the more difficult Biarra type.

While newly-developed tickicides are available which will control the resistant strains now known (for example, chlorphenamidine, Bimaret, Promicide and Dipofene 60), the industry should not become complacent. Cattlemen must accept as inevitable not only that the types of resistant ticks now known will become more widespread, but also that new ones will continue to arise.

The best that can be hoped for in the circumstances is to aim at using available chemicals to best advantage: at the correct strength and at intervals and times calculated to give the best kill of the maximum number of ticks. The principle here is that the fewer occasions on which ticks are exposed to tickicides, while still maintaining good control, the less likelihood there is of resistant strains being selected out in the tick population.

Tick Resistant Cattle

Resistance to tick infestation occurs in all breeds of cattle, but is associated primarily with Zebu (*Bos indicus*) cattle and is highly heritable. Numerous workers have shown the advantages that follow the use of resistant cattle and there is general acceptance that they provide a logical long-term solution to the cattle tick problem.

It is now recognized that 50% *Bos indicus* or Zebu blood is necessary for a reasonable degree of resistance. Some producers have gained effective biological control of cattle ticks by breeding and selecting cattle for tick resistance. These producers have to dip up to six times a year only. This represents a saving in chemicals, time and labour and makes more effective use of chemicals by delaying the development of resistance.

However, breeders should note that crossing British breed cattle with bulls having less than 50% Zebu blood will raise the tick resistance of the progeny only marginally.

Producers should also understand that, as long as it remains necessary to retain susceptible British-breed cattle in the herd, little early improvement in tick control can be expected. This is because of the reproductive prolificacy of engorged cattle ticks dropping off susceptible cattle.

Pasture Spelling

Field trials have shown that very few seed ticks survive on stock-free pastures after 3 months in northern Queensland and 5 months in southern Queensland. When clean cattle are introduced into a spelled paddock, dipping intervals can be lengthened, thereby reducing costs and tick worry.

Because of the increasing problem of tick resistance and the cost of dipping, pasture spelling should become an integral part of any tick control programme wherever it can be applied.

Pasture spelling has had limited application because of a variety of factors: cost of fencing and watering facilities, difficulties in combining pasture utilization with resting and grazing periods, as well as apathy on the part of cattle owners. Nevertheless, the recommended spelling periods of 3 to 5 months have been one of the major deterrents to cattle owners.

However, recent observations have indicated that summer spelling periods of about 2 months could be effective. In summer, egg-laying and egg hatching take about 4 weeks and about 50% of larvae die 2 weeks after hatching and about 90% after 4 weeks. Thus a single summer break of 2 months could have a considerable effect on tick numbers. It should be mentioned that some properties with quite large herds in northern, central and southern Queensland have successfully applied the principle for tick control.

Introduce Tick-free Cattle

To minimize the spread of resistant ticks, the Department of Primary Industries, requires that store cattle be dipped within 72 hours and be free from ticks before movement from a property. It is a sound practice to dip cattle that have been bought before bringing them onto a property. This will minimize the risk of introducing a resistant strain of cattle tick.

Special Tick-control Staff

Because of the importance of the cattle tick, the Department of Primary Industries has for several years employed four specialist officers whose full-time function is to assist owners with their tick control problems. These officers are—

Mr. J. F. Kearnan, Laidley.

Mr. F. R. Emmerson, Maryborough.

Mr. G. H. Dunwell, Rockhampton.

Mr. K. S. Waters, Townsville.

These officers are in addition to the permanent disease control staff and work closely in conjunction with them. The industry should make full use of the services of officers in permanent centres, as well as these specialists, in tick control programmes.

Boar Performance Test Report

LANDRACE boars 'Approved' under the Boar Performance Testing Scheme at Rocklea during January 1974 are listed below. Average boars score 50 points for economy and 50 for carcass. Points scores can be compared only with those of boars of the same breed.

Breeder	Ear Number	Q.A.R. Number	Points Score		
			Economy of Production	Carcass Quality	Total
DANDARAGGA STUD PIGGERY, care of R. S. Little, Jimbour, Q., 4406	SIRE: Dandaragga Regal 3 Q.A.R. 470 DAM: Northlea Royal 3099				
	1025	637	72	64	136
NORTHLEA STUD FARM, care of K. P. Fowler, 156 Hogg Street, Toowoomba, Q., 4350	SIRE: Bluegate Dromus 59 Imp. DAM: Northlea Royal 3902				
	5100	639	51	76	127
	5101	640	75	80	155
L. B. & L. J. TROUT, M.S. 757, Kingaroy, Q., 4610	SIRE: Caminda Supreme 40 Q.A.R. 444 DAM: Northlea Dehlia 3055				
	794	636	49	54	103

Hints on Using O.P. Preparations

CARE taken when treating cattle with organo-phosphorus (O.P.) preparations for tick control is rewarded with fewer cases of sickness and death. This is especially so with young stock.

by S. F. POWELL and S. G. KNOTT, Veterinary Services Branch.

Although thousands of cattle are dipped and sprayed safely with organo-phosphorus (O.P.) preparations each year, sickness and death can, and sometimes do, occur.

Care of the dipping or spray vat alone is not enough. This care must extend to all farm and station practices. For example, the risk of exposing stock to poisoning from O.P. preparations used in the first place to control horticultural pests may be overlooked by all but the most observant cattlemen.

But this can happen, and the case history about to be described shows how easily cattle can be poisoned by O.P. preparations intended for other uses.

A farmer sprayed his macadamia orchard with a mixture which contained azinphos ethyl at 2·5 litres to 182 litres of water. Azinphos ethyl is an horticultural O.P. pesticide which is very toxic for stock. After spraying the macadamia trees, 38 mm of rain fell and washed more of the spray off onto the grass growing beneath the trees.

Two cows used for the household milk supply and two 6-month-old vealer calves were grazing in the sprayed area. Three days after the trees were sprayed, the cattle were sprayed for cattle tick infestation with an O.P. preparation commonly used for tick control.

When the motor broke down, two vealers and one cow had been treated. It was noticed that a vealer appeared distressed and it collapsed and died shortly afterwards. The second vealer and the sprayed cow then developed similar symptoms. When examined, the affected animals were found prostrate on the ground. They were gasping for breath with mouths open, showed muscular trembling and jerking, and were scouring and dribbling urine. Despite treatment with atropine which is an antidote, both animals died.

Examination of the remaining cow which had not yet been sprayed for ticks revealed muscular twitching, dilation of the eye and shortness of breath. This animal was removed from the paddock, treated with atropine and it subsequently recovered.

There is no doubt that the deaths were caused by organo-phosphorus poisoning induced by swallowing horticultural spray that had drifted or been washed onto the grass. Subsequent spraying with an O.P. tickicide accelerated the deaths.

Symptoms and Susceptibility

Organo phosphorus compounds were developed in the late 1930s as chemicals for possible use in chemical warfare. They were later adapted for commercial and animal use.

In toxic dose rates they suppress an essential enzyme (cholinesterase) at nerve and muscle junctions, which allows the accumulation of acetylcholine at the nerve muscle junctions. This causes nervous symptoms in

affected animals. These symptoms are drooling from the mouth, weeping from the eye and discharge from the nose, diarrhoea, frequent urination, muscular shivering and tremors, followed by convulsions and collapse. This is followed by respiratory failure and death by asphyxia.

However, animals can learn to tolerate large doses of O.P. if the exposure is gradual, so that repeated exposures help to induce tolerance. Although O.Ps. are absorbed through the skin, the oral route is more toxic than is the skin route. Disease conditions affecting important organs such as the liver and kidney increase susceptibility to O.Ps. Young calves are more susceptible to poisoning than older animals.

Brahman cattle are more sensitive to certain O.P. compounds than some European cattle, while Brahman bulls are more sensitive than Brahman heifers.

Treatment

A commonly used antidote is atropine. Another preparation, P.A.M., can also be used for treatment and it has been used effectively by veterinary surgeons. As atropine makes the effect of P.A.M. more potent, the two drugs can, and have been, used effectively for treating animals affected with O.P. poisoning.

Precautions

Cattle may die quickly or after a sickness lasting for 1 to 4 weeks. On post mortem, no specific results are observed.

In Queensland, most trouble is associated with the dipping of calves.

Precautions that should be taken include:—

1. Dip stock in the cool of the morning or evening.

2. Avoid dipping stock, especially calves, while the animals are hot and/or thirsty.

3. After droving, give the animals an opportunity to drink and rest before dipping.

4. Calves should be dipped separately from adult stock and undue immersion should be avoided.

5. When dipping calves, a shepherd's crook or some other instrument should be available to assist those that get into trouble.

6. Spraying very young calves reduces the toxicity hazard.

7. Check the concentration of dips regularly.

8. Be careful when mixing preparations with which to spray stock. Follow the directions and do not guess.

9. Separate dipping in O.Ps. and drenching for worms with O.P. anthelmintics by at least 2 weeks.

10. An interval of at least 4 days should separate consecutive dippings.

11. Keep stock away from grass or trees treated with horticultural O.P. compounds.

Precautions with Insecticides

INSECTICIDES should always be kept in their original containers.

This enables easy identification of the spray and facilitates treatment in case of accidents. It may also help to deter children from drinking the poison.

It is best to keep all insecticides, as well as other poisonous agricultural chemicals, locked in a room or shed away from human and animal food and out of the reach of children.

Insecticide containers should never be used for any other purpose. Empty containers should be made useless and buried.

Some farm accidents with insecticides have been the result of carelessness. Some risk always accompanies the use of the potent, modern insecticides. However, if this danger is recognized and proper precautions are taken, the risk to human health is greatly reduced.

—ENTOMOLOGY BRANCH.

Beef Cattle Pastures in the Wet Tropics—3

Pasture Species

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

The more important commercial species are described below. Suggested planting rates apply to a grass-legume mixture.

Grasses

GUINEA GRASS (*Panicum maximum* var. *typica*). Common guinea grass is the best known and most widely used pasture grass in the area. It has a strong, stool-forming habit with long, broad leaves, and long seed stalks bearing a drooping panicle.

The reason for the popularity of guinea grass is its ability to produce large quantities of highly nutritious feed under a wide range of conditions. However, it does best on fertile soils and responds well to fertilizers. It will not tolerate poorly drained soils.

Management is most important. If left ungrazed, it becomes coarse, stemmy and unpalatable. On the other hand heavy grazing (frequent cutting below 20 cm) during the February-May period will kill it.

Guinea grass grows well with centro, stylo and puero. The normal practice is to plant it with either one of these legumes or various mixtures of the three. The recommended planting rate of guinea grass is 4·5 kg of good seed per ha.

HAMIL GRASS (*Panicum maximum* cv. Hamil). Hamil grass is a variety of giant guinea grass which grows taller, has larger but more open stools, and coarser hairier stems than common guinea. Because it can grow up to 4 m high, management can be even more difficult than with common guinea.

The seed of Hamil grass is reputed to be better than that of common guinea and, possibly because of this, Hamil is considered an easier grass to establish. However, we have not been able to prove this experimentally and it appears that any differences are mainly the result of more careful seed harvesting by particular operators.

The chief advantage of Hamil grass lies in its ability to do better than common guinea in areas of moderately poor drainage. Otherwise, guinea grass seems a more desirable species, chiefly because of a better seasonal distribution of higher quality feed. The planting rate is 4·5 kg of good seed per ha.

COLONIAO (*Panicum maximum*). Coloniao guinea grass is another variety of giant guinea grass. It closely resembles Hamil grass except that it is practically hairless. It is not widely used and it is not as productive as common guinea grass. The planting rate is 4·5 kg per ha.

Panicum maximum CPI 37910 (Makueni guinea). This is a fairly recent introduction from Kitale Research Station, Kenya, where it is known as makueni. It is a very leafy, medium growth form (1·8 to 2·5 m high) of guinea grass. Practically the whole plant is covered with hairs and the leaf blade has a furry feel. However, the leaves are very fine

and smooth to touch and, at this stage, the hairiness is not thought to be a major problem. The chief attribute of makueni is a cool season growth pattern superior to that of other guinea grasses. As yet, it is in the experimental stage and has not been released commercially.

ELEPHANT GRASS (*Pennisetum purpureum*). Elephant grass is an erect, tufted species with very thick, strong stems. As a consequence, management is even more important with this species than it is with guinea grass. If kept in a dense, leafy state and not allowed to grow much above 1 m high, it is probably the most productive of all the grasses.

Elephant grass is not as adaptable as guinea grass and does best on the more fertile soils. Legumes such as centro and puero grow well with it. The seed of elephant grass is of poor quality and the usual means of propagation is by stem cuttings. A convenient method of planting is to put the stem cuttings through a sugar-cane drop planter.

PANGOLA GRASS (*Digitaria decumbens*). Pangola grass is one of the most widely planted grasses in the area. It spreads rapidly, smothers weeds, and is adaptable to a wide range of soil conditions.

Pangola grass is reasonably drought hardy but has the disadvantage that it does not combine well with legumes other than hetero. The application of nitrogenous fertilizers then becomes necessary for vigorous growth. However, it makes very efficient use of nitrogen and can support high stocking rates.

Vegetative establishment is also necessary, tending to make planting of large areas costly. However, planting time usually coincides with the slack season of the sugar industry when many farmers have time on their hands. Mechanical methods have been devised and these enable fairly large-scale plantings to be carried out with a relatively light labour force.

During recent years, pangola grass has been found susceptible to a range of pests and diseases and production losses have been severe. The significance of these is not yet clear, but it would be wise to take them into consideration if any large-scale plantings are contemplated.

New strains of pangola grass are being evaluated at South Johnstone.

SIGNAL GRASS (*Brachiaria decumbens*). Signal grass produces very large amounts of good quality fodder and, in this, it is superior to pangola, para and guinea grasses. It is so vigorous that is suppresses the growth of legumes other than hetero and, to get high production from straight signal grass pastures, the application of nitrogen fertilizers becomes necessary.

It therefore comes into the same category as pangola grass and, like pangola, makes very efficient use of this applied nitrogen. It is a superior winter producer to pangola grass and is more drought resistant. However, it prefers a better-drained soil.

In the past, signal grass has not been used extensively, mainly because of seed germination difficulties. These difficulties are largely caused by a hard seed coat, and it has now been found that this can be removed by acid treatment of the seed.

Seed dormancy factors are also involved. Consequently, it is wise to get a seed germination test, with and without acid treatment, before planting. The normal planting rate is 4·5 kg of good seed per ha.

PARA GRASS (*Brachiaria mutica*). Para grass, a vigorous, trailing species, has been widely used on lower flats and any area where drainage is a problem, provided fertility is reasonable. In some experiments, it has produced as well as pangola grass, but is not as adaptable or as drought hardy.

There is, however, some information that suggests that para grass is more nutritious than pangola. Legumes such as stylo, centro and puero will also grow well in association.

Viable seed is set but is not readily available and the most common form of propagation is to plant cuttings or runners in rows 1 to 1·3 m apart with 60 to 90 cm between plants. If seed is available, plant at 2·2 kg per ha.

SETARIA (*Setaria anceps* and *Setaria splendida*). Two varieties of *Setaria anceps* (formerly *S. sphacelata*), Nandi and Kazungula, are grown in the Ingham district. Kazungula is the more recent introduction and is not used as widely as Nandi.

They resemble one another but Kazungula has a broader crown, is coarser, more vigorous and less compatible with the associated legume. In one experiment near Ingham, Kazungula suppressed stylo where Nandi and stylo grew well together.

Farther north in the high rainfall areas, these setarias have been failures, but in the southern, drier parts of the wet coast, they are of interest, chiefly because they give better winter growth than guinea grass. However, their summer production is inferior, particularly in the hot dry period before January.

Commercial plantings have shown a tendency to decline in vigour and so these species should be planted with caution.

Setaria splendida is still in the experimental stage but looks very promising in poorly drained areas. Tests also suggest that it has an unusually high digestibility for a tropical grass.

RUZI GRASS (*Brachiaria ruziziensis*). Ruzi grass is not very productive and better species are available.

PLICATULUM (*Paspalum plicatulum*). Plicatulum is showing some promise in both trial and commercial plantings under conditions of low fertility and poor drainage.

MOLASSES GRASS (*Melinis minutiflora*). Molasses grass is an unproductive species and is no longer recommended.

Legumes

CENTRO (*Centrosema pubescens*). Centro has been the mainstay of the cattle fattening industry in the more fertile, high rainfall areas. It is a vigorous, creeping, twining plant that produces a dense mat of foliage. Guinea, para and elephant grasses grow well with centro and the resultant pastures are nutritious and highly productive.

Establishment problems are, however, quite frequently encountered. Centro is a notoriously slow grower for the first 12 months but, once established, it is resistant to waterlogging, stands heavy grazing, and is drought hardy.

The inclusion of puero or Siratro in a mixture with centro as the main legume increases early productivity and suppresses weeds.

The winter production of centro is poor. A hard seed coat often gives germination problems, and scarification of seed before planting is recommended. The planting rate is 5·5 kg per ha.

BELALTO CENTRO (*Centrosema pubescens*). Belalto is the result of screening a wide range of *Centrosema* introductions from the Far East and South and Central America. Its outstanding feature is the very good cool-season growth. In this, it is markedly superior to common centro. The good cool-season vigour apparently assists Belalto to remain free from fungus and insect attack during this period.

Belalto may be distinguished from common centro by a more vigorous twining-trailing habit; slender stems which have a tendency to root at the nodes; shorter, more rounded leaflets, shortly pointed and finely downy; purplish-brown young leaflets and terminal portions of the stolons; and a smaller flower than common centro.

The planting rate is 5·5 kg per ha.

SCHOFIELD STYLO (*Stylosanthes guyanensis*). Schofield stylo has an upright, shrub type habit and can grow as high as 1·5 m. It grows well on a very wide range of soils, but it is particularly valuable on the low fertility soils along the whole length of the wet tropical coast.

Stylo grows well and is easily established with most of the grasses mentioned, but will not tolerate shading. When grown with tall grasses, management to prevent shading is most important. Winter production is poor.

The planting rate is 2·2 kg per ha.

COOK STYLO (*Stylosanthes guyanensis*). Cook is regarded as the outstanding stylo for the wet coast and is seen as a replacement for Schofield. It is a fairly recent introduction from Colombia and in trials at South Johnstone it has out-performed other stylo strains during the cool season and was at least their equal in other seasons.

Cook has attained a height of 1·5 m and, in any given comparison, it has grown taller than Schofield.

Distinguishing features include bright red bracts that partly clasp the stem, and flowers that are surrounded by a reddish hair sheath and have an orange standard with purple lines down the centre and lighter yellow wings.

The planting rate is 2·2 kg per ha.

ENDEAVOUR STYLO (*Stylosanthes guyanensis*). Endeavour is another outstanding stylo variety released after testing at South Johnstone. Its major attributes are rapid establishment and early vigour, but it does not have the vigorous winter and spring growth of Cook. Experiments to date have shown Cook to be superior to Endeavour, but Endeavour has been more thoroughly tested and larger quantities of cheaper seed are available.

The planting rate is 2·2 kg per ha.

PUERO (*Pueraria phaseoloides*). Puero is an extremely vigorous, trailing legume producing runners up to 9 m long. It combines well with most of the tropical grasses and, when grazed properly, these pastures are among the most productive in the wet belt. Grazing animals find puero a most palatable species and this presents a management problem.

If there is only a small amount of puero in the pasture, animals will eat it in preference to other species with the result that they tend to graze it out. However, where puero has been present in large quantities and has been distributed evenly over the whole paddock, persistence has not been a problem.

In fact, several commercial puero based pastures have remained productive for a number of years. Puero grows better on a wider range of soils than centro but it is more susceptible to frosts.

The main difficulty with puero is in obtaining commercial quantities of seed. Previously, all seed was imported but quarantine restrictions now prevent this. In Australia, most of the puero seed crop is destroyed by a pod borer unless sprayed frequently with insecticide. The planting rate is 2·2 kg per ha.

GLYCINE (*Glycine wightii*). The Tinaroo cultivar of *Glycine wightii* has been used with some success in several commercial pasture mixtures in the area. Its total annual production is inferior to that of common centro and Schofield stylo but Tinaroo will produce well in the cooler months if moisture is available. Its use should, however, be confined to areas where drainage is good.

The planting rate is 2·2 kg per ha.

HETERO (*Desmodium heterophyllum*). Hetero is the only legume which to date has been found truly compatible with vigorous sward-forming grasses such as pangola and signal grasses under grazing in the Queensland wet tropics.

This legume withstands exceptionally heavy grazing on a range of soil types. In fact, the pasture must be kept well grazed, especially during the wet season. Undergrazing at this time followed by heavy grazing or mowing can reduce the hetero stand. Actually, little is known about its productivity or special requirements as it is still in the experimental phase.

Hetero is a difficult plant to harvest seed from, but all-crop headers can be used. Vegetative plantings of hetero runners have also been successful. When planting from seed, the rate depends largely on availability and varies from 0·5 to 1·1 kg per hectare. The forage harvester used to gather cuttings for vegetative planting during July or early August, also picks up substantial quantities of seed.

Other *Desmodium* species, GREENLEAF DESMODIUM (*Desmodium intortum*) and SILVERLEAF DESMODIUM (*D. uncinatum*), were found to be unsuitable for the district. Other desmodiums tried but found wanting include *D. canum, D. ovalifolium* and *D. gyroides*.

SIRATRO (*Macroptilium atropurpureum*). Siratro is a vigorous, trailing legume which does remarkably well under a wide range of conditions along all the wet coast for the first 2 years. After that, it becomes heavily infested with *Rhizoctonia,* especially in the very wet areas, and rapidly disappears from the pasture.

In a few commercial pastures in the drier regions (2 000 mm rainfall), Siratro is continuing to persist after a number of years. However, the occurrence of *Rhizoctonia* infestations in the same district gives reason for concern.

Vigna SPECIES. All vignas tested at South Johnstone are susceptible to insect and disease attack and are not considered suitable pasture legumes.

TOWNSVILLE STYLO (*Stylosanthes humilis*). Townsville stylo is frequently found growing wild in the area. However, for pasture use, it is mainly intended for drier, western areas and much more productive legumes are available for the wet tropics.

CALOPO (*Calopogonium mucunoides*). Calopo is no longer recommended for commercial pastures because far better species are available.

Recommended Pastures

The general recommendation for most properties is to plant grass-legume pastures over the major portion (about 75%) while the remainder of the property (usually the most favoured situations) is planted to a straight grass pasture which is fertilized with nitrogen (grass/bag N pastures). Pangola, signal or para grasses are the usual grasses chosen for use with nitrogen.

The most popular grass-legume mixtures are:

Situation	Grass–legume mixture
Well-drained fertile soils ..	Guinea-centro-puero
Well-drained soils of moderate fertility	Guinea-centro-puero-stylo
Well-drained soils of low fertility	Guinea-puero-stylo, or signal grass-puero-stylo
Moderately-drained soils ..	Hamil-centro-puero-stylo
Poorly-drained soils ..	Para-centro-puero-stylo

FIRST GRAZING

The first grazing of a new pasture is a most important part of its establishment. Grazing too early or too late can ruin the pasture or at least greatly reduce its productive life. Definite recommendations on the time that should elapse between planting and the first grazing are impossible as many variables such as climate, soil type, pasture species, and stage of growth must be taken into consideration.

To enable the new pasture to compete satisfactorily with weeds, it is important to allow it to become well established before grazing. With guinea grass, it is wise to delay grazing until after the first seeding which, in the year of sowing, is usually May. Nevertheless, earlier grazing may be required under some conditions to prevent the vigorous grass from suppressing the legume component.

The species of legume is important in this regard. For example, stylo is not particularly palatable in the early stages and is very sensitive to shading. Consequently, a pasture including stylo may be grazed relatively early without injury to the legume. On the other hand, centro and puero are more palatable and are more likely to be damaged by early grazing.

In early grazing, two main points should be kept in mind: do not graze too soon; and do not graze too long.

[TO BE CONCLUDED]

Lantana Poisoning in Cattle

LANTANA poisoning causes regular losses of cattle in coastal and subcoastal Queensland.

Losses usually occur in late winter and early spring when green feed is scarce and cattle, hungry for green feed, turn to lantana.

Lantana poisoning causes severe liver and kidney damage which results in a high death rate. Where possible, cattle should be prevented from grazing on lantana.

Spring outbreaks of poisoning can best be avoided by eradicating the lantana on a property. If this is not possible, the infested country should be fenced off.

—VETERINARY SERVICES BRANCH.

Cunnamulla Wether Competition

by P. S. BEASLEY, Sheep and Wool Branch.

THE Cunnamulla wether competition began in 1964, and is run by the Cunnamulla and District Show Society.

The aims of the competition are to compare the monetary value of wool produced annually by the different groups of wethers submitted and to promote interest in sheep breeding in the district.

Each grazier participant submits a total of 10 wethers which are shorn by the same shearer during Show week each year.

All sheep are then ear-tagged and each group of 10 is divided randomly into two groups of five sheep per group. Five wethers are then run on red mulga country and five on black Mitchell grass country. All sheep entered in the competition are run in the same paddock on each of these two types of country, so that management, climate and nutrition are as similar as possible for all competition sheep during the 12 months until the next Show.

The conditions of the Wether Competition are—

1. The first 20 written entries received by the Show Society have priority. Other entries are reserves in order of receipt. Entries close on the Friday before the competition.
2. Each of the 10 wethers may be any age. All sheep entered must carry the registered earmarks of the exhibitors.
3. Sheep are delivered to a centre near Cunnamulla on the Monday of Show Week, where they are shorn by one shearer. They are ear-tagged, split in their groups of five by the stewards and taken to their respective paddocks.
4. An exhibitor may submit from six to nine wethers if 10 are not available.
5. Sheep entered in the competition originally as weaners may be re-entered for a second year.
6. About 4 weeks before the Show, a wool sample is taken from the mid-side of each sheep and sent to the Queensland Department of Primary Industries' Wool Biology Laboratory at Yeerongpilly. Determinations of weight, clean scoured yield and fibre diameter are made and sent to Cunnamulla.
7. Finally, on an open day 2 days before the Show, the sheep are shorn.

The total weight of greasy wool in each fleece is determined. This is multiplied by the yield (%) to give the clean fleece weight.

The Australian Wool Commission type is assessed from the average fibre diameter, length of staple, tenderness, and colour. The price per kilogram paid at the last sale for that particular type is then given to each fleece.

Using the weight of clean fleece and the price per kilogram, the value of the fleece is determined for every fleece from each of the sheep in the competition.

The three most valuable fleeces from each group of five wethers of the mulga and Mitchell grass country are entered in the competition and are displayed. A card on each fleece (see Figure 1) shows the following:

Name of exhibitor,
ear-tag number of sheep,
greasy fleece weight,
percentage yield,
clean fleece weight,
fibre diameter of fleece,
monetary value per kilogram,
total monetary value of fleece.

FIGURE 1

Exhibitor: Cunnamulla Pastoral Co. *Date:* 21 May 1974

Tag No.	Weight of Greasy Sample (kg)	Greasy Weight (including belly) (kg)	Total Greasy Fleece Weight (kg)	Yield (%)	Clean Fleece Weight (kg)	Fibre Diameter (microns)	Type	Value (cents per kilogram clean weight)	Total Value ($)	Place In Competition
011	0·15	6·65	6·80	63·4	4·31	22·0	73	440	18.96	3
012	0·15	7·60	7·75	56·7	4·39	21·0	56	445	19.54	2
013	0·15	7·15	7·30	56·9	4·15	22·0	73	440	18.26	
014	0·25	7·10	7·35	61·6	4·53	22·0	73	440	19.93	1
015	0·15	7·05	7·20	57·2	4·12	23·0	74	430	17.72	

Total Value of Top Three Fleeces: $58.43

The winning fleeces from each section are displayed in the Wool Court during the Show.

On this Open Day anyone interested is invited to see the competition sheep shorn and their wool assessed. Up to 120 people visit the display during the day.

Explanation of Conditions

The two types of country on which the sheep are run are the major types in the Cunnamulla district. Since 1970, the valuer has been instructed to use fibre diameter to determine the wool type and price.

Only the three best fleeces from each group of five sheep constitute the entry. It is inevitable that some ear-tags are lost, some sheep die or lose some of their wool. Having three sheep per entry allows for these eventualities.

All sheep in the competition have ear-tags in both ears to minimize the risk of loss of identity. The ear-tag numbers allotted to each owner are recorded along with the registered earmark to facilitate sorting the sheep into owner groups at the final shearing.

Classes and Awards

The wether competition is divided into six classes. The Society's ribbon and card is awarded to the first, second and third place-getters in each of these classes. Handsome, locally-donated trophies are presented to the winner of each class.

Class 1. The Maximum Production Trophy for Wethers is awarded to the grazier whose six sheep (three from red mulga country and three from black Mitchell grass country) give the greatest total monetary return from fleeces grown during the year.

Class 2 is awarded to the grazier whose three sheep on black Mitchell grass country gave the greatest monetary return from wool produced during the year.

Class 3 is awarded to the grazier whose three sheep on red mulga country gave the greatest monetary return from wool produced during the year.

Class 4 is awarded to the most valuable fleece grown by a sheep running on black country.

Class 5 is awarded to the most valuable fleece grown by a sheep running on red country.

Class 6 is awarded to the Champion Commercial Fleece. The most valuable fleece grown by a sheep running on either black or red country.

During 1973-74 a Weaner Competition was started because of requests from many local sheep breeders.

Class 7. The maximum Production Trophy for Weaners is awarded on exactly the same lines for weaners as for Class 1 in the Wether Competition.

Class 8 is awarded for weaners as Class 2 is for wethers.

Class 9 is awarded for weaners as Class 3 is for wethers.

Previous Winners

Maximum Production Trophy Award winners are: 1965 W. G. Peskett and Son, 'Coban', Cunnamulla; 1966 Elliott and Co., 'Spring Creek', Wyandra; 1967 Belyanna Pastoral Co., 'Turn Turn', Eulo; 1968 Belyanna Pastoral Co., 'Turn Turn', Eulo; 1969 Belyanna Pastoral Co., 'Turn Turn', Eulo; 1970 Ecroyd and Co., 'Gilnockie', Cunnamulla; 1971 Belyanna Pastoral Co., 'Turn Turn', Eulo; 1972 Belyanna Pastoral Co., 'Turn Turn', Eulo; 1973 Belyanna Pastoral Co., 'Turn Turn', Eulo.

The Belyanna Pastoral Co., 'Turn Turn', Eulo, won the trophy outright in 1969 and 1973, following three successive wins on each occasion. This trophy is also donated after a total of five wins. A special trophy is donated to each winner every year.

Comments

The competition promotes keen but friendly rivalry among sheep producers in the Cunnamulla district and has added a new dimension of interest in the local annual Show.

As well as this, various strains of sheep can be compared under similar climatic, management and nutritional environments on two areas representative of the major sheep producing types of country in the Cunnamulla district.

Despite the droughts and the wool recession, interest in the competition has increased with entries coming from as far away as the Trangie and Goulbourn districts.

This competition has been changed over the years to suit Cunnamulla conditions. These may not necessarily apply to other centres in Queensland. Over the period consideration has been given by the Cunnamulla Show Society to similar competitions for ewes and also the putting a value on the carcasses of wethers entered in the competition. For various practical reasons, these are not possible at the moment.

Similar competitions are run by the Barcaldine Show Society and the Tambo Flock Ewe Society and it is hoped that others will be started in many more of the major centres of sheep production throughout Queensland.

Boar Performance Test Report

LARGE WHITE boars 'Approved' under the Boar Performance Testing Scheme at Rocklea during January 1974 are listed below. Average boars score 50 points for economy and 50 for carcass. Points scores can be compared only with those of boars of the same breed.

Breeder	Ear Number	Q.A.R. Number	Points Score		
			Economy of Production	Carcass Quality	Total
R. G. & M. J. BRISKY, M.S. 150, Pittsworth, Q., 4356	SIRE: Wallingford Field Marshall 679 DAM: Wallingford Dream 725				
	997	633	80	40	120
DANDARAGGA STUD PIGGERY, care of R. S. Little, Jimbour, Q., 4406	SIRE: Wallingford Julius Caesar 687 DAM: Elourea Jewelless 21				
	1156	634	103	61	164
K. HINCHLIFFE, Milman, Q., 4702 ..	SIRE: Oakview Proud Lad 198 Q.A.R. 461 DAM: Oakview Cheryl 202				
	472	638	54	56	110
K. N. MATHIESON, Naiken Stud, Box 138, Gayndah, Q., 4625	SIRE: Naiken Field Marshall 102 Q.A.R. 480 DAM: Naiken Dream 91				
	384	635	72	72	144

S. G. Reid, Government Printer, Brisbane

Angular Leaf Spot in Beans

ANGULAR leaf spot *(Isariopsis griseola)* is a common disease of French beans in coastal districts of Queensland and is responsible for serious losses.

The disease, which is caused by a fungus, may be particularly severe if prolonged periods of wet weather occur during the bean-growing season. The fungus is seed-borne.

Symptoms

All the above-ground parts of the plant may be affected by angular leaf spot. In identifying the disease, it is important to remember that the symptoms on the primary (shield) leaves are quite different from those on the secondary (or trifoliate) leaves.

Spots formed on the shield leaves are quite large, up to 10 mm or more in diameter, and circular. These spots often possess a zonate or target appearance.

On the trifoliate leaves, however, the spots are small, generally no more than 2 to 3 mm across, and angular, It is from this symptom that the common name of the disease is derived.

Tiny, black clusters of bristles, the fruiting structures of the fungus, may be visible on the lower surfaces of both types of spots.

Pods may also be affected by this disease, with dark, sunken patches of varying size being formed. When severe, the disease may cause appreciable defoliation of affected plants with consequent reduced yields.

Spread

The seed is the most common agent carrying the fungus from one season to the next and of introducing the disease into a new area. The fungus may be carried internally within the seed or on the seed surface.

Most seed infestation occurs as a result of direct pod penetration or of contamination of the seed coat by plant debris during harvesting.

The disease is favoured by cool, showery weather, and its spread is quite rapid during periods of wind-driven rain.

The fungus may survive for up to 2 years on infected crop trash and, if not decomposed, it may provide a source of the disease for future crops.

Control

French bean cultivars resistant to this disease are available and should be used wherever possible.

Where known susceptible cultivars are grown, it is possible to control angular leaf spot with fungicides. Applications are made at 10 to 14-day intervals if conditions are favourable for the development of the disease.

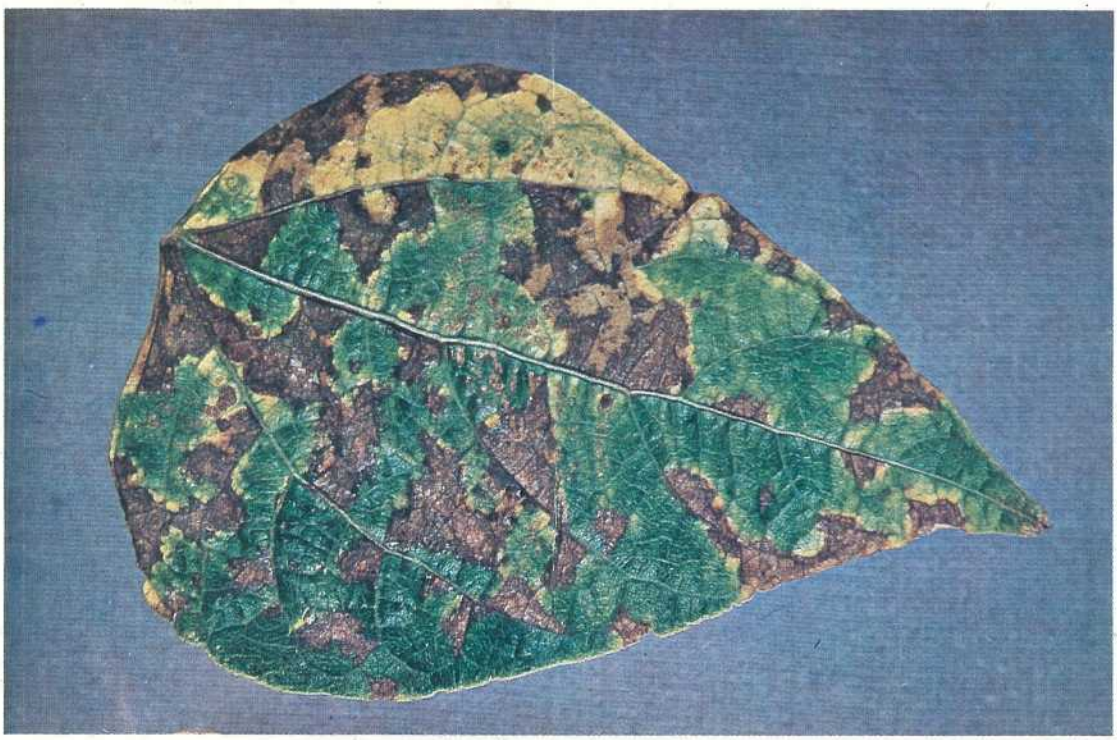
Refuse from infected crops should be destroyed as soon as possible after harvesting has finished.

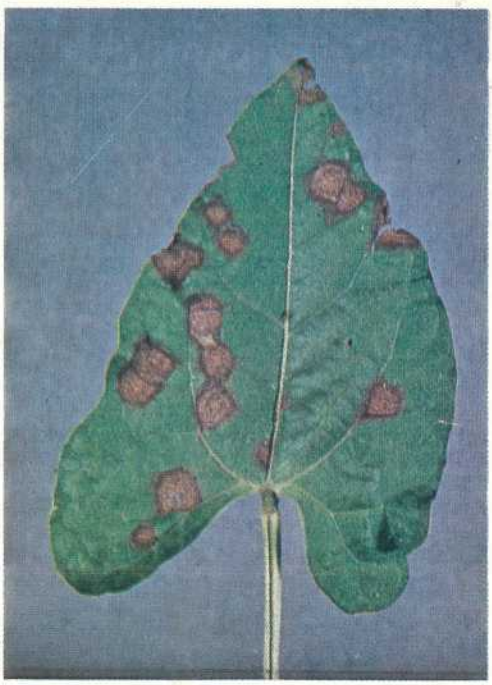
— Plant Pathology Branch

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

DPI

Diseases of French Beans - 4





ANGULAR LEAF SPOT – Upper: spots on trifoliate leaflet. Lower left: spots on primary leaf. Lower right: pod symptoms.