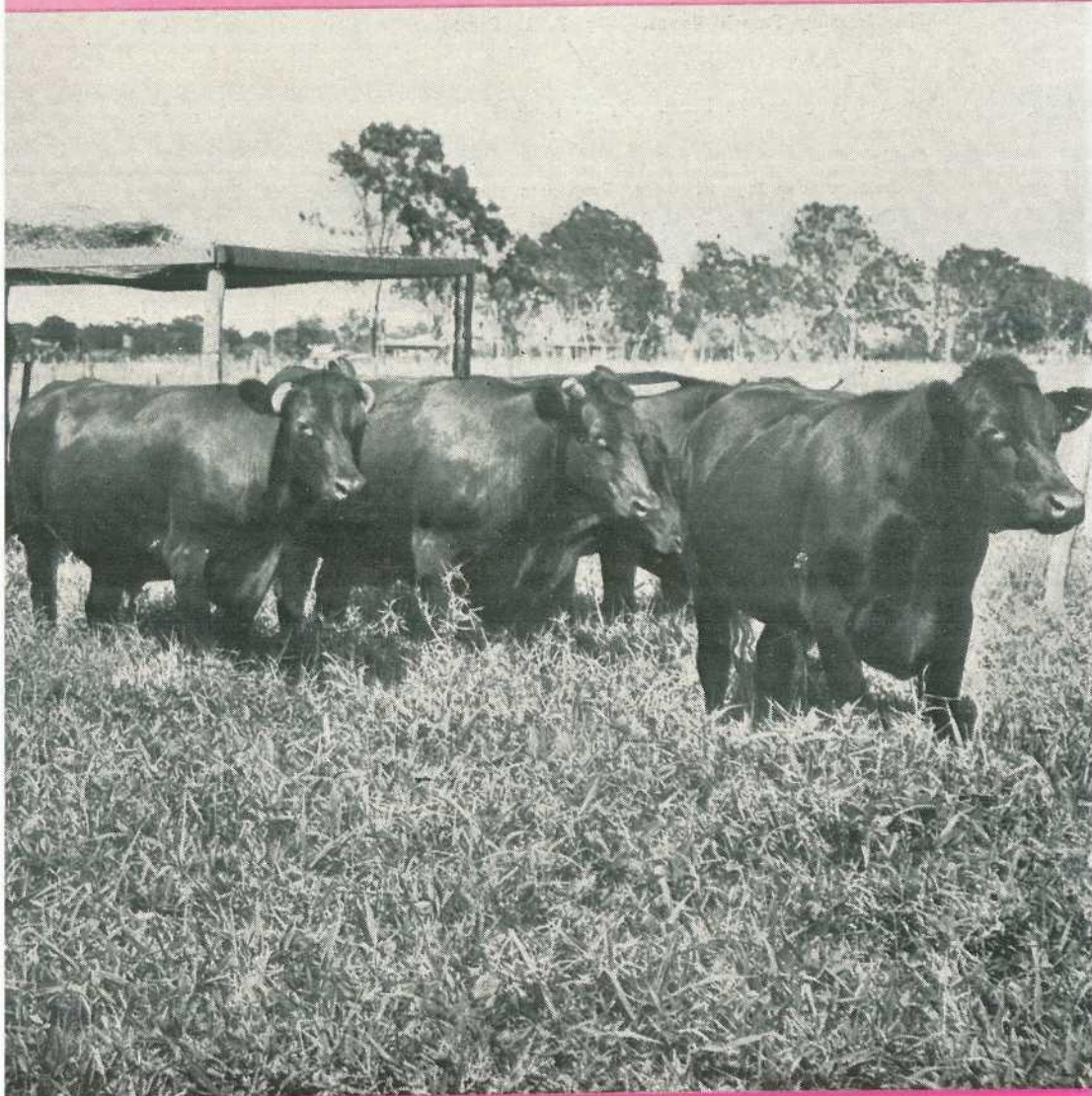


*Queensland*  
**AGRICULTURAL  
JOURNAL**



FATTENING ON IRRIGATED PASTURE, AYR REGIONAL EXPERIMENT STATION.

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Editor: C. W. Winders, B.Sc.Agr.

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# Brucellosis-Tested Swine Herds

(As at 30th June, 1956).

## Berkshire.

- A. P. and N. Beatty, "Deepdene," Barambah road, Nanango  
S. Cochrane, "Stanroy" Stud, Felton  
G. Handley, "Handleigh" Stud, Murphy's Creek  
J. L. Handley, "Meadow Vale" Stud, Lockyer  
O'Brien and Hickey, "Kildurham" Stud, Jandowae East  
G. O. Traves, "Wynwood" Stud, Oakley  
Westbrook Farm Home for Boys, Westbrook  
M. K. Collins, "Kennington" Stud, Underwood road, Eight Mile Plains  
H.M. State Farm, "Palen" Stud, Palen Creek  
A. R. Ludwig and Sons, "Beau View" Stud, Beaudesert  
H. H. Sellars, "Tabooba" Stud, Beaudesert  
D. T. Law, "Rossvill" Stud, Trouts road, Aspley  
R. H. Crawley, "Rockthorpe" Stud, *via* Pittsworth  
F. R. J. Cook, Middle Creek, Pomona  
Mrs. I. M. James, "Kenmore" Stud, Cambooya  
H. L. Stark, "Florida," Kalbar  
J. H. N. Stoodley, "Stoodville," Ormiston  
H.M. State Farm, Numinbah  
N. F. Cooper, Maidenwell  
R. H. Collier, Tallegalla, *via* Rosewood  
E. J. Clarke, "Kalcon" Stud, Templin  
M. G. and R. H. Atkins, "Diamond Valley" Stud, Mooloolah
- W. F. Rühle, "Felbrie" Stud, Kalbar  
L. Puschmann, "Tayfield" Stud, Taylor  
Dr. B. J. Butcher and A. J. Parnwell, "Hartley Grange" Stud, 684 Logan Road, Greenslopes  
C. E. Edwards, "Spring Valley" Stud, Kingaroy  
G. McLennan, "Murcott" Stud, Willowvale  
H. M. Wyatte, "Cumberland Vale," Cooyar  
C. F. W. and B. A. Shellback, "Redvilla" Stud, Kingaroy  
R. J. Webber, "Webberberry" Stud, 35 Caxton st., Petrie Terrace  
J. C. Lees, "Bridge View" Stud, Yandina  
F. Thomas, "Rosevale" Stud, M.S. 379, Beaudesert  
A. C. Fletcher, "Myola" Stud, Jimbour  
Q.A.H.S. and College, Lawes  
E. F. Smythe, "Grandmere" Stud, Manyung, Murgon  
The Marsden Home for Boys, Kallangur  
M. F. Callaghan, Lower Mount Walker, *via* Rosewood  
E. R. Kimber, Coalstoun Lakes  
K. B. Jones, "Cefn" Stud, Pilton  
A. J. Potter, "Woodlands," Inglewood Regional Experiment Station, Hermitage  
L. Pick, Mulgeldie  
J. W. Bukowski, "Secreto" Stud, Oxley  
R. Astbury, "Rangvilla," Pechey.

## Large White.

- H. J. Franke and Sons, "Delvue" Stud, Cawdor  
Garrawin Stud Farm Pty. Ltd., 657 Sandgate road, Clayfield  
J. A. Heading, "Highfields," Murgon  
K. B. Jones, "Cefn" Stud, Pilton  
R. Postle, "Yarralla" Stud, Pittsworth  
B. J. Jensen, "Bremerside" Stud, Rosevale, *via* Rosewood  
E. J. Bell, "Dorne" Stud, Chinchilla  
L. O. Lobegeiger, "Bremer Valley" Stud, Moorang, *via* Rosewood  
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G. I. Skyring, "Bellwood" Stud, *via* Pomona  
O. J. Horton, "Manneum Brae" Stud, Manneum, Kingaroy  
O. B. Vidler, Manneum, Kingaroy  
K. F. Stumer, French's Creek, Boonah  
Q.A.H.S. and College, Lawes  
R. S. Powell, "Kybong" Stud, Kybong, *via* Gympie  
C. Wharton, "Central Burnett" Stud, Gayndah  
S. Jensen, Rosevale, *via* Rosewood  
Kruger and Sons, "Greyhurst," Goombungee  
V. V. Radel, Coalstoun Lakes  
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L. Stewart, Mulgowie, *via* Laidley

## Tamworth.

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N. R. Potter, "Actonvale" Stud, Wellcamp  
D. F. L. Skerman, "Waverley" Stud, Kaimkillenbun  
A. C. Fletcher, "Myola" Stud, Jimbour  
Salvation Army Home for Boys, "Canaan" Stud, Riverview  
A. J. Surman, "Namrus" Stud, Noble road, Goodna  
Department of Agriculture and Stock, Regional Experiment Station, Kairi  
E. C. Phillips, "Sunny View," M.S. 90, Kingaroy  
F. N. Hales, Kerry road, Beaudesert  
T. A. Stephen, "Withcott," Helidon
- W. F. Kajewski, "Glenroy" Stud, Glencoe  
L. Herbst, "Hillbanside" Stud, Bahr Scrub, *via* Beenleigh  
H.M. State Farm, Numinbah  
Dr. B. J. Butcher and A. J. Parnwell, 684 Logan road, Greenslopes  
G. H. Sattler, Landsborough  
F. Thomas, "Rosevale" Stud, M.S. 373, Beaudesert  
H. J. Armstrong, "Alhambra," Crownthorpe, Murgon  
Q.A.H.S. and College, Lawes  
R. H. Collier, Tallegalla, *via* Rosewood  
A. J. Potter, "Woodlands," Inglewood  
P. V. Campbell, "Lawn Hill," Lamington

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C. R. Smith, "Belton Park" Stud, Nara  
H. H. Sellars, "Tabooba" Stud, Beaudesert  
D. T. Law, "Rossvill" Stud, Trouts road, Aspley  
J. B. Dunlop, "Karrawyn" Stud, Acacia road, Kuraby  
F. K. Wright, Narangba, N. C. Line
- R. A. Collings, "Rutholme" Stud, Waterford  
M. Nielsen, "Cressbrook" Stud, Goomburra  
G. J. Cooper, "Cedar Glen" Stud, Yarraman  
"Wattledale Stud," 492 Beenleigh road, Sunnybank.  
A. J. Hicks, M.S. 98, Darlington, *via* Beaudesert  
Kruger and Sons, "Greyhurst," Goombungee

## British Large Black.

- H. W. Naumann, "Parkdale" Stud, Kalbar

## Tuberculosis-Free Cattle Herds.

The studs listed below have fulfilled the conditions of the Department's Tuberculosis-free Herd Scheme to 30th June, 1956.

Breed.	Owner's Name and Address.	
Aberdeen Angus A.I.S. .. ..	The Scottish Australian Company Ltd., Texas Station, Texas	
	M. E. & E. Scott, "Wattlebrae" A.I.S. Stud, Kingaroy	
	F. B. Sullivan, "Fermanagh," Pittsworth	
	D. Sullivan, "Bantry" Stud, Rossvale, via Pittsworth	
	W. Henschell, "Yarranvale," Yarranlea	
	Con. O'Sullivan, "Navillus" Stud, Greenmount	
	H. V. Littleton, "Wongalea" Stud, Hillview, Crow's Nest	
	J. Phillips and Sons, "Sunny View," Benair, via Kingaroy	
	Sullivan Bros., "Valera" Stud, Pittsworth	
	Reushle Bros., "Reubydale" Stud, Ravensbourne	
	H. F. Marquardt, "Chelmer" Stud, Wondai	
	A. C. and C. R. Marquardt, "Cedar Valley," Wondai	
	A. H. Sokoll, "Sunny Crest" Stud, Wondai	
	W. and A. G. Scott, "Welena" A.I.S. Stud, Blackbutt	
	G. Sperling, "Kooravale" Stud, Kooralgin, via Cooyar	
	C. J. Schloss, "Shady Glen," Rocky Creek, Yarraman	
	W. H. Thompson, "Alfa Vale," Nanango	
	S. R. Moore, Sunnyside, West Wooloolin	
	H.M. State Farm, Numinbah	
	D. G. Neale, "Groveley," Greenmount	
	Edwards Bros., "Spring Valley" A.I.S. Stud, Kingaroy	
	A. W. Wieland, "Milhaven" A.I.S. Stud, Milford, via Boonah	
	W. D. Davis, "Wamba" Stud, Chinchilla	
	Queensland Agricultural High School and College, Lawes	
	C. K. Roche, Freestone, Warwick	
	Mrs. K. Henry, Greenmount	
	D. B. Green, "Deloraine" Stud, Durong, Proston	
	E. Evans, Wootha, Maleny	
	T. L. and L. M. J. Cox, "Seafeld Farm," Wallumbilla	
	J. Crooke, "Arolla A.I.S. Stud" Fairview, Allora	
	M. F. Power, "Barfield," Kapaldo	
	A. H. Webster, "Millievale," Derrymore	
	W. H. Sanderson, "Sunlit Farm," Mulgildie	
	R. A. and N. K. Shelton, "Vnagon" A.I.S. Stud, Hivesville, via Murgoon	
	R. R. Radel & Sons, "Happy Valley," Coalstoun Lakes	
	Ayrshire .. ..	L. Holmes, "Benbecula," Yarranlea
		J. N. Scott, "Anchen Eden," Camp Mountain
Friesian .. ..	"St. Christopher's" and "Iona" Studs, Brookfield road, Brisbane	
	E. Mathie and Son, "Ainslie" Ayrshire Stud, Maleny	
	C. E. R. Dudgeon, "Marionville" Ayrshire Stud, Landsborough	
	G. F. H. Zerner, "Pineville," Pie Creek, Box 5, P.O., Gympie	
	T. F. Dunn, Alanbank, Gleneagle	
Guernsey .. ..	C. H. Naumann, "Yarrabine" Stud, Yarraman	
	D. J. Pender, "Camelot," Lytton road, Lindum	
	S. E. G. Macdonald, "Freshfields," Marburg	
	C. D. Holmes, "Springview," Yarraman	
	A. B. Fletcher, Cossart Vale, Boonah	
	W. H. Doss, Degilbo, via Biggenden	
	A. C. Swendson, Coolabunia, Box 26, Kingaroy	
	C. Scott, "Coralgrae," Din Din road, Nanango	
	R. J. Wissemann, "Robnea," Headington Hill, Clifton	
	G. L. Johnson, "Old Cannindah," Monto	
Jersey .. ..	A. Ruge & Sons, Woodwoonga, via Biggenden	
	G. Miller, Armagh Guernsey Stud, Armagh, M.S. 428 Grantham	
	Queensland Agricultural High School and College, Lawes	
	J. S. McCarthy, "Glen Erin" Jersey Stud, Greenmount	
	J. F. Lau, "Rosallen" Jersey Stud, Goombungee	
	G. Harley, Hopewell, M.S. 189, Kingaroy	
	Toowoomba Mental Hospital, Willowburn	
	Farm Home for Boys, Westbrook	
	F. J. Cox and Sons, "Rosel" Stud, Crawford, Kingaroy Line	
	R. J. Browne, Hill 60, Yangan	
	P. J. L. Bygrave, "The Craigan Farm," Aspley	
	R. J. Crawford, "Inverlaw" Jersey Stud, Inverlaw, Kingaroy	
	P. H. F. Gregory, "Carlton," Rosevale, via Rosewood	
	E. A. Matthews, "Yarradale," Yarraman	
	A. L. Semgreen, "Tecoma," Coolabunia	
	L. E. Meier, "Ardath" Stud, Boonah	
	A. M. and L. J. Noone, "Winbirra" Stud, Mt. Esk Pocket, Esk	
	W. S. Conochie and Sons, "Brookland" Stud, Sherwood road, Sherwood	
	Estate of J. A. Scott, "Kiaora," Manumbar road, Nanango	
	F. W. Verrall, "Coleburn," Walloon	
	C. Beekingham, Trouts road, Everton Park	
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	G. H. Ralph, "Ryecombe," Ravensbourne	
	Mrs. I. L. M. Borchert, "Willowbank" Jersey Stud, Kingaroy	
	W. and C. E. Tudor, "Boree" Jersey Stud, M.S. 498, Gayndah	
	Weldon Bros., "Gleneden" Jersey Stud, Upper Yarraman	
	D. R. Hutton, "Bellgarth," Cunningham, via Warwick	
	J. W. Carpenter, Flagstone Creek, Helidon	
	H. G. Johnson, "Windsor" Jersey Stud, Beaudesert	
	W. S. Kirby, Tinana, Maryborough	
	S. A. Cramb, "Trecarne Stud," Lockyer	
	G. & V. Beattie, "Beauverna," Antigua, Maryborough	
J. A. & E. E. Smith, "Heatherlea" Jersey Stud, Chinchilla		
W. C. M. Birt, "Pine Hill" Jersey Stud, Gundiah		
T. Nock, Dallarnil		
P. Fowler & Sons, "Northlea," Coalstoun Lakes		
F. Porter, Conondale		
H.M. State Farm, Palen Creek		
W. Maller, "Boreview," Pickanjinne		
J. H. Anderson, "Inverary," Yandilla		
D. R. and M. E. Hutton, "Bellgarth," Cunningham, via Warwick		
E. W. G. McCamley, Eulogie Park, Dululu		
Wilson and McDouall, Calliope Station, Calliope		
Poll Hereford .. ..		



# Nutrient Disorders in Plums

By T. J. BOWEN, Assistant Horticulturist.

The natural topography and climate of the Granite Belt are suitable for the culture of most deciduous fruits. In this district, the plum is second only to the apple in economic importance and more than 130,000 half-bushel cases are harvested each year. Both European and Japanese varieties are grown, but the latter are by far the more popular.

The cropping season extends over a relatively short period from the end of November to the end of January.

The future of the industry will depend very largely on the standard of orchard management, particularly insofar as tree nutrition is concerned. This presumes the regular application of balanced fertilizers and prompt action to correct any nutrient disorders which may be responsible for either slow or abnormal tree growth.

The soils of the Stanthorpe area are relatively infertile, with little organic matter, and are subject to



Plate 1.

**Zinc Deficiency in the Wilson Plum.** The main symptoms are narrow, rigid and mottled leaves and restricted growth in one or more leaders.

rapid leaching during periods of heavy rain. It is not surprising, therefore, that during the past few seasons deficiency symptoms of various kinds have been noted in many plum orchards.

### Susceptible Varieties.

As in other crops, the several varieties of plum differ in their susceptibility to nutrient deficiencies, and on the same soil type a particular deficiency may be apparent in one variety but not in another. Deficiencies recently recorded at Stanthorpe include:—

- (a) Zinc in Wilson plums.
- (b) Magnesium in Angelina Burdett plums.
- (c) Sulphur in Santa Rosa and Wilson plums.

### Zinc Deficiency.

Zinc deficiency symptoms in the plum (Plate 1) are commonly described as "little leaf." They are most evident in the Wilson plum but may occur in other varieties though in a less severe form.

Zinc assists in the complex processes by which plant foods are used in the tree, and a deficiency is characterised by abnormalities in the leaves and restricted shoot growth.

The symptoms are most conspicuous in spring, when new growth develops from the leaders. The leaves are small and the internodes short, producing a rosetted type of growth near the terminals. The leaves become mottled, with some lightening of the green colour between the veins, and when fully developed are narrow and rigid. In severe cases death of the tissue occurs. The buds tend to burst later than those in healthy leaders and leader growth is reduced or entirely suppressed.

In the early stages of this disorder only a few leaders may be affected, but finally the whole tree shows typical symptoms.

Current recommendations for the control of little-leaf in apples are also applicable to stone fruits such as the plum. These require the use of a zinc sulphate spray (20 lb. zinc sulphate to 80 gallons of water) in July or early August for two successive years.

Foliage sprays applied during the growing period are of little value as a remedy for the disorder.

### Magnesium Deficiency.

Magnesium is an important constituent of the green colouring matter in plants, and consequently paling is the first symptom of a deficiency in most plants. Later symptoms are the death of tissue between the veins and premature leaf-fall.

In the Angelina Burdett plum, symptoms resembling those normally associated with magnesium deficiency are not uncommon (Plate 2). Quite early in the season, when the fruit is half-grown, the leaves on the older wood of the leaders develop a reddish-brown colour, with some lightening of the green between the veins, and subsequently die. Defoliation of the leader begins at the base and extends gradually upwards towards the growing point until only small tufts of leaves remain at the terminals. Sometimes, small shoots develop from axillary buds on the current season's wood. The fruit on the affected leaders fails to mature normally and may drop from the tree prematurely; that which remains may be suitable only for factory purposes.

Magnesium may be added to the soil in the form of dolomite (a mixture of calcium carbonate and magnesium carbonate) or Epsom salts (magnesium sulphate), but the response of affected trees to such treatment (dolomite 1 to 1½ tons per acre; Epsom salts 5 lb. per tree) is usually very slow. It may, therefore, be worth while supplementing the prescribed



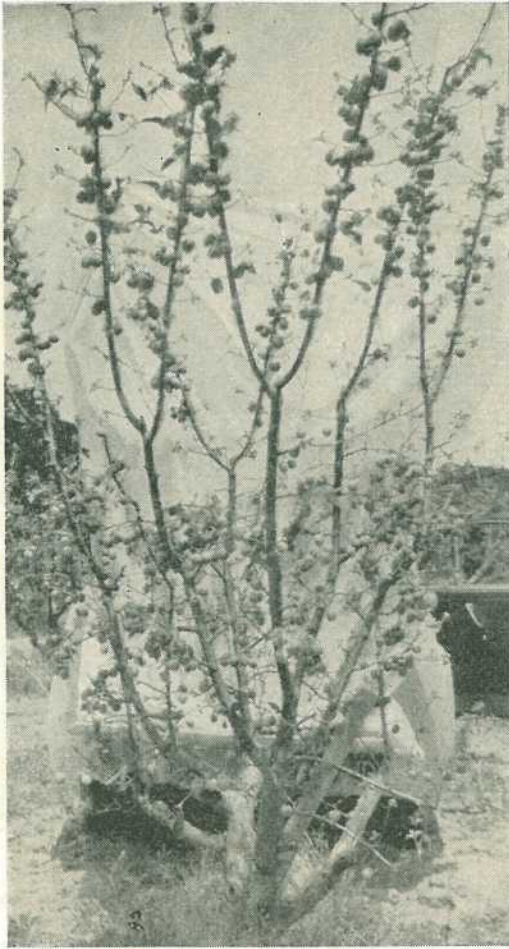


Plate 2.

**Magnesium Deficiency in Angelina Burdett Plum.** The distinctive features of this disorder are the reddish-brown colour of the leaves and premature defoliation commencing at the base of the leaders.

soil dressing with foliage sprays containing magnesium sulphate (2 lb in. 100 gallons) and a casein spreader.

The first spray could be applied about three weeks following bud burst; subsequent applications may be made at monthly intervals for three or four months. This schedule has given fairly satisfactory results up to date. It should be realised, however, that

tree response to sprays is only temporary; permanent correction of the deficiency must be effected through the soil.

It may also be beneficial to increase the amount of nitrogen in the fertilizer applied to the trees, for magnesium deficiency symptoms are usually most acute when the trees are short of nitrogen.



Plate 3.

**Sulphur Deficiency in Plums.** This disorder occurs in young trees which have not received adequate amounts of fertilizer. The trees are stunted, with loss of green in the leaves, those near the growing point being almost white.

### Sulphur Deficiency.

Sulphur is a constituent of protein in the plant tissues and of some compounds which regulate plant growth. The symptoms of a deficiency in plum trees are generally similar to those associated with nitrogen deficiency, the leaves being pale-green in colour and shoot growth restricted.

Young Santa Rosa and Wilson plums in some parts of the Granite Belt appear to be suffering from a sulphur deficiency (Plate 2). The trees are stunted, with a broom-like appearance. At first the leaves are mottled, but the yellow colour gradually extends, although the veins remain

green for some time. Eventually dead areas develop between the veins and along the margin. The younger leaves near the growing point are usually yellow to white in appearance, with turned-up edges of dead tissue. Little or no secondary growth takes place.

This disorder is frequently seen in young trees which have not received adequate amounts of fertilizer after planting, and can usually be remedied by an application of a fertilizer mixture containing superphosphate, which contains a certain amount of calcium sulphate (gypsum). A rapid response is also obtained from soil applications of copper sulphate (2-4 oz. per tree).



# Side Dressing French Beans

By R. L. PREST, Senior Adviser in Horticulture.

The French bean is a fairly adaptable plant and can be grown on a wide range of soils. However, in most areas where the crop is grown commercially in Queensland, a marked response is obtained from fertilizers.

It is therefore usual to supply a basal fertilizer at the time of planting so that soluble nutrients will be available as soon as the plants germinate and appear above the ground.

The main constituent of all such fertilizers is phosphorus in the form of superphosphate and ground bone. Nitrogen is supplied in moderate

amounts as sulphate of ammonia, and in some soils potassium may also be helpful. However, potassium in the fertilizer has seldom increased bean yields in Queensland, and most of the mixtures recommended for the crop contain only about 2 per cent. of potash. The formula for the standard bean planting mixture is 4:15:2.

## When Are Side Dressings Applied?

Some years ago, many growers supplemented the basal fertilizer with a side dressing of sulphate of ammonia applied when the plants were in the

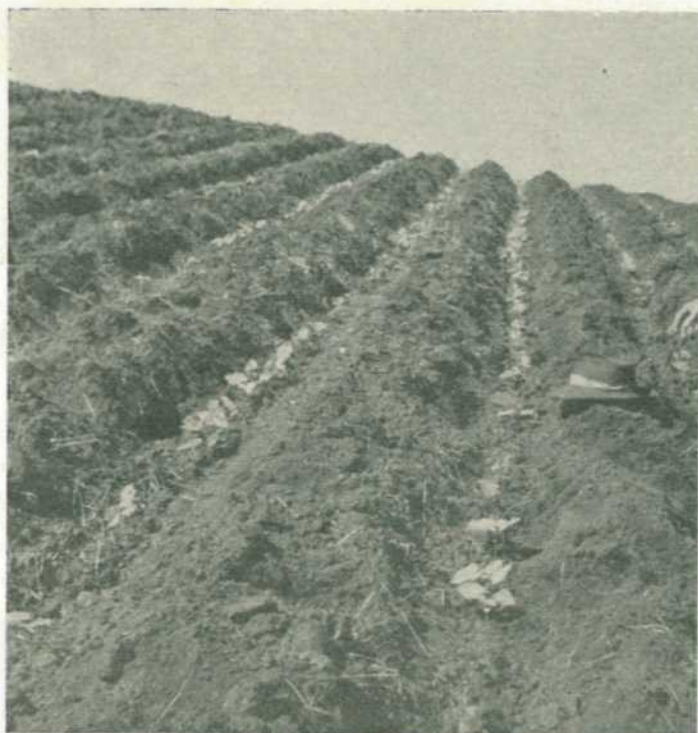


Plate 1.

**French Bean Crop at the Correct Stage for Side Dressing Two Weeks after Germination.** The crop has been furrow-planted and the sulphate of ammonia will be placed in a band on the upper side of the row.

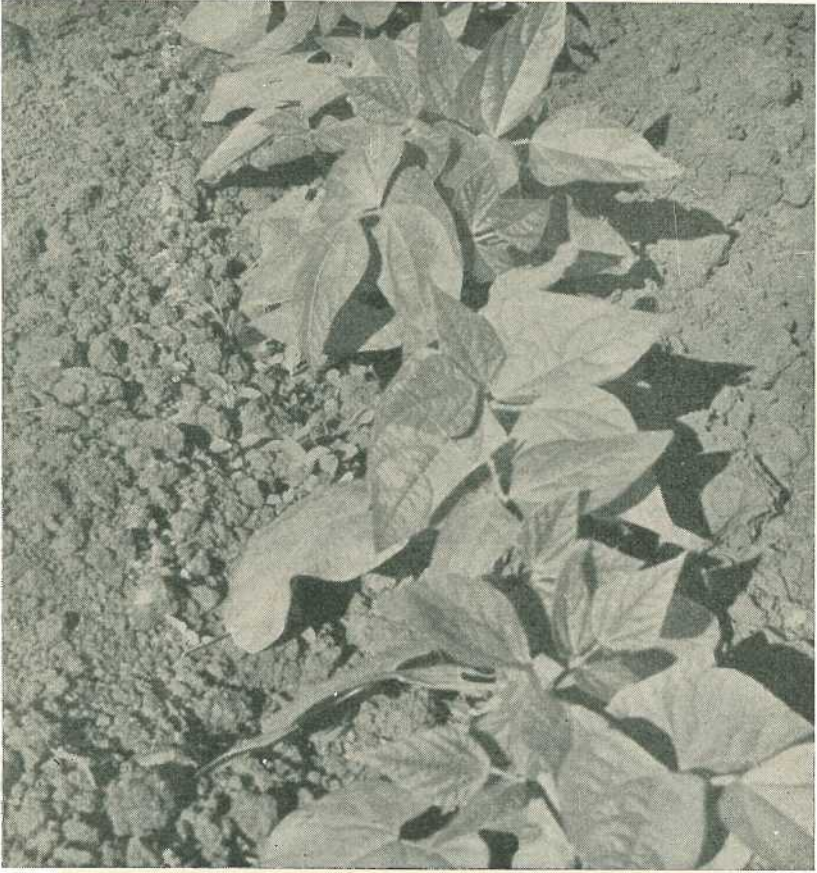


Plate 2.

**French Bean Plants about One Month Old.** The side dressing should have been applied at an earlier stage of growth.

“white-bud” stage and just about to flower. This practice undoubtedly improved the colour of the plants but its effect on yield and pod quality was doubtful.

Fertilizer trials were later conducted to test the efficiency of nitrogenous side dressings when applied at different times during the growing period.

From these trials, it was established that the maximum benefit is obtained when the side dressing of sulphate of ammonia is applied early in the growing period—that is, about two weeks after the bean seed germinates.

A side dressing applied at the commencement of flowering improved the colour of the crop but produced no significant increase in yield, although the harvesting period was extended a little. This is perhaps not surprising, because the bean plant develops very quickly, and by the time a crop begins to flower some 8-10 weeks after planting its fruiting potential is already fixed. It is then rather late to get a full response from the fertilizer, as some time must necessarily elapse before the added nutrients become available to the plant.



### Forms of Nitrogen.

Nitrogen in the side dressing should be in a water-soluble form, such as sulphate of ammonia. The fertilizer is applied at the side of each row in a band approximately two inches wide, and preferably on the upper side when the crop is established on sloping ground. The amounts required are small—only 1 cwt. per acre or  $\frac{1}{2}$  lb. per chain-row. Little or no benefit is obtained by increasing the rate of application beyond this level.

Dried blood has sometimes been advocated as a substitute for sulphate of ammonia in the side dressing. This fertilizer appears to prolong the life of the crop and perhaps gives an extra picking, but this is not necessarily an advantage in commercial practice, where a short harvesting period is desirable. So far as yields and quality are concerned, better results have been obtained with sulphate of ammonia as the source of nitrogen.

Occasionally, increased yields have been obtained by including superphosphate in the side dressing, but these are not sufficiently widespread to warrant its use, except perhaps where the amount of basal fertilizer applied is below requirements or the soil is extremely deficient in available phosphorus.

### Amounts of Nitrogen.

The need for a side dressing in bean crops varies somewhat with the fertility of the soil and with the amount of fertilizer used in the basal dressing. Instances have been noted where side dressings produced excessive vegetative growth; obviously the initial soil fertility was high and additional fertilizer during the growing period was unnecessary.

On the other hand, where a cover crop or weed growth is turned under prior to planting, part of the nitrogen in the basal dressing may be immobilised by the organisms which break down the raw organic matter. Where

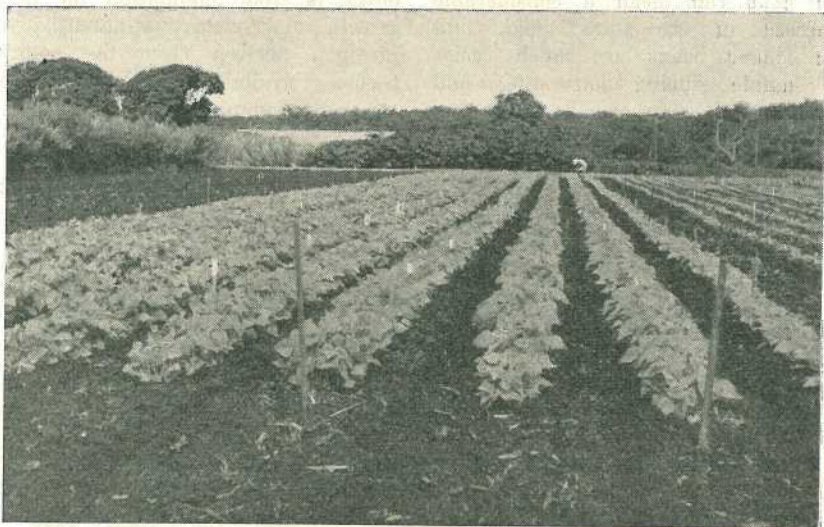


Plate 3.

**A Well-grown Crop of French Beans.** With a basal dressing of 4-15-2 mixture at 8 cwt. per acre and a side dressing of sulphate of ammonia at 1 cwt. per acre, crops of this kind on red-brown clay loams should yield about four tons of green beans per acre.

the amount immobilised is large, the crop may show the yellow leaf colour which is a symptom of nitrogen deficiency.

Increasing the amount of nitrogen in the basal dressing is not a reliable or economic method of overcoming the ill effects of raw organic matter in the soil, as it increases the risk of fertilizer injury to the germinating seed. The remedy is to plough in the cover crop or weed cover at an early date—at least six weeks before the actual time of planting. Decomposition will then be complete or nearly so by the time the seed germinates.

#### **Effect on the Crop.**

The fertility of a soil is reflected in plant growth, and consequently in the yield and quality of the bean crop.

A well-timed side dressing with sulphate of ammonia not only increases the over-all size of the plant but has a considerable influence on pod length, appearance and texture. Even an additional half-inch in the average length of the pods can mean a considerable increase in the total yield, and the longer beans are much easier to handle during harvesting and packing.

In addition, the skin colour is darker, the skin texture is finer and the crispness of the flesh is greatly improved. Market values for the produce are enhanced by the dark-green colour of the pods, possibly because of the apparent freshness of the beans. Similarly, fine skin texture gives an appearance of succulence to the pods, while crispness and ease of "snapping" are indicative of the fresh and tender quality of the product.

#### **Nodulation.**

The French bean, like other leguminous plants, often has nodules on the roots. These contain bacteria which synthesise nitrogen from the air and ultimately make nitrogenous compounds available to the host plant.

It may therefore seem an odd practice to apply a side dressing of sulphate of ammonia to the bean crop. However, the French bean is a short-term crop which is harvested within 12 weeks after planting. This may explain the absence of any marked effect of root nodulation on plant growth and yield; apparently the nitrogen derived from the nodules becomes available too late to have commercial significance.

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# Bacon Curing on the Farm

By F. BOSTOCK, Officer in Charge, Pig Branch.

Bacon curing on the farm is entirely different from factory curing and the following notes are designed for the guidance of farmers situated where there is no factory to which pigs may be sent to be cured. The home product, provided it is properly handled and the necessary attention given to important details, can be just as satisfactory as any the farmer can buy.

On the farm, curing should be conducted during the winter months, during frosty weather and in a moist atmosphere, as in a cellar, rather than in a dry atmosphere. Extremes of temperature are unfavourable.

The pigs selected for slaughter should be free from disease and in a healthy condition, gaining and not losing weight. They should be properly finished and free from bruises, cuts, sun-scald, etc.

The liveweight should be about 175 lb. at approximately six months old, giving a dressed weight of about 125 lb., which is a desirable weight to produce first-class bacon. Some prefer pigs of much heavier weights for farm use, but excessively fat carcasses are not desirable.

The breeding of animals plays an important part in producing suitable carcasses, and the use of purebred sires of outstanding type and quality is necessary to produce ideal bacon pigs. Selection, careful handling and intelligent feeding are also necessary.

## PRE-SLAUGHTER CARE.

As with other animals, pigs should be kept off their food for about 24 hours before slaughter and allowed all the water they will drink. Should an animal be particularly restless, it

is desirable to allow a small quantity of food. A well rested and fasted animal will give a better carcass, as the muscle is in good condition and the blood stream will not be gorged with nutrient substances from the digestive system. It is also claimed that the intestinal wall of a fatigued animal is less resistant to the passage of bacteria. In ordinary circumstances, most of the contamination that takes place at slaughter is of intestinal origin, and for this reason the intestinal content should be reduced to a minimum.

Careful handling of the pig prior to slaughter is essential to the production of good bacon.

## SLAUGHTERING.

Every care should be taken to avoid excitement and bruising at slaughter. Ordinarily, it is not necessary to stun or shoot the pig before sticking; although it is sometimes done, this method may not give the best results in bleeding. More thorough bleeding is assured if the pig is hung up by the hind leg for sticking, but care must be taken that the pig is held properly so that bruising or shoulder sticking does not occur.

Blood provides an ideal medium for the growth and multiplication of putrefactive organisms and it supplies a vehicle for their distribution throughout the animal. Thorough bleeding therefore has a profound influence on the keeping quality of a carcass.

Sticking without stunning, which is the common commercial practice, is not considered to be more cruel than other methods. However, for the beginner it may be a wise practice to

stun the pig and get it into the proper position for sticking. This is on its back, and the man holding should stand astride the pig with feet against the shoulders, and take a firm hold of the front legs.

The man doing the sticking takes a position squarely in front of the pig, holds down the snout and opens the skin for a distance of about three inches in front of the breast-bone. He then inserts the knife, edge upwards, taking a line with the base of the tail, for about four or five inches, lowers the wrist, which brings the point of the knife upwards, and withdraws the knife.

Care should be taken to hold the pig squarely on its back and to keep the knife in the centre so as not to stick the shoulder. It is both difficult and unwise to stick the heart. Let it pump out the blood as long as possible.

### SCALDING AND DEHAIRING.

Soon after sticking the pig is ready for scalding, in either a barrel or a tub large enough for the purpose. The temperature of the water for a pig of about 175 lb. liveweight should be 140° to 145° F., or approximately two parts of boiling water to one of cold. The work should be carried out in a sheltered place, as weather conditions will affect the scald. A slow scald is better and much safer than a quick scald.

While in the water, the pig may be held by a hook through the snout, and the carcase should be kept moving, so that all parts get a uniform scald and a clean white skin is produced.

After the pig has been lifted from the scald and placed on a bench or table, scraping must be done as quickly as possible, as the hair will again adhere if allowed to cool. All tools necessary should be on hand before a start is made. The hind legs should be firmly grasped with both hands and the hair twisted off; the

forelegs are treated in similar manner; then the dew claws and hoofs pulled off with a hook and the hair scraped from the body.

After scraping, the carcase is washed down with cold water and gone over again, using a sharp knife, to see that all hair that may have been missed in the scalding is removed.

### DRESSING.

There are many variations of dressing methods employed, but the following outline indicates the general procedure.

The tendons of the hind legs should be exposed by making a cut down the trotter between the foot and the hock. The gambrel is inserted in each leg and the carcase hung ready for dressing.

Stand at the back of the carcase and grasp the tail, then cut around the pelvic arch to loosen the bung, care being taken to keep the point of the knife against the pelvic bones.

With the belly facing the operator, make a shallow cut from between the back legs to the throat; cut deep to the bone between the back legs and open the abdominal cavity, care being taken not to puncture the bladder; insert the left hand and keep back the intestines and stomach and continue the cut through to the breast-bone; the knife may be pointed downwards and inserted into the chest cavity in order to continue the cut through the centre of the breast-bone and throat.

Now pull the bung through the pelvic cavity and ease the intestines down by severing the attachments to the backbone; cut around the skirt or diaphragm and pull out the lungs and heart; cut through just below the gullet. The carcase is then thoroughly washed both inside and out, a short stick being inserted to keep the ribs apart, while a stone or potato is placed in the mouth to keep it open to allow drainage and more rapid cooling. To



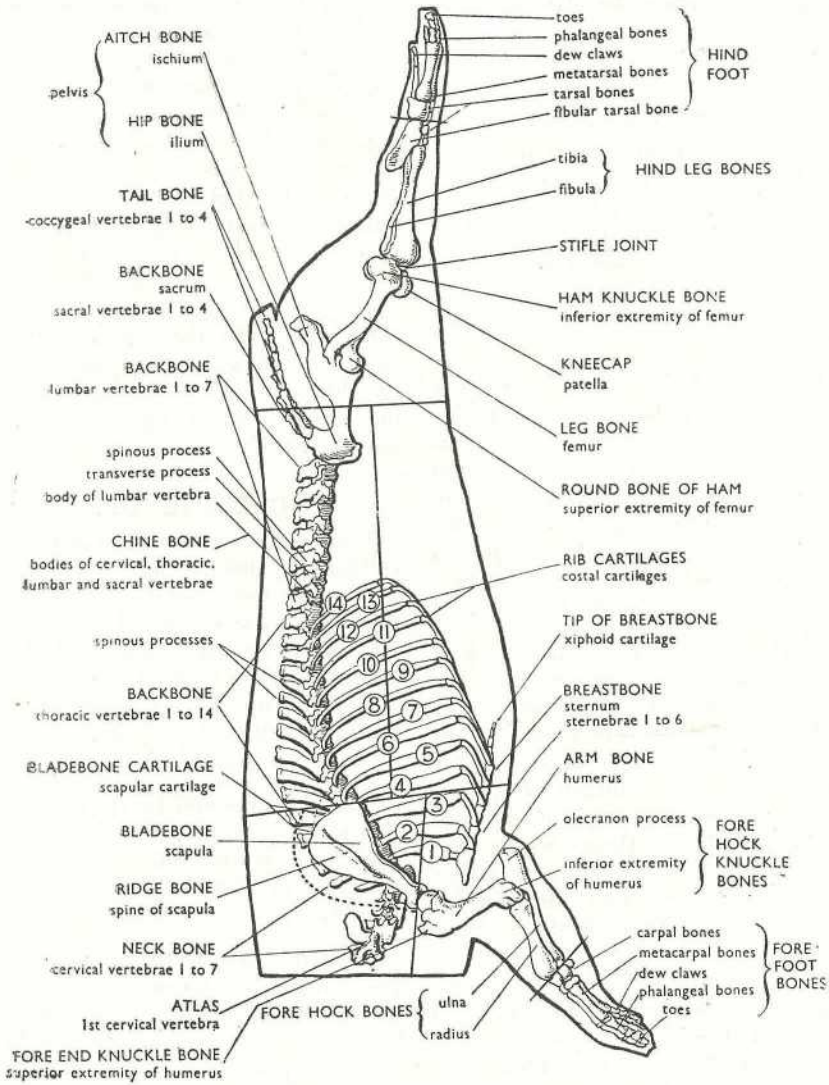


Plate 1.

**Location of Bones and Cuts in a Side.**

(From a Bulletin of the Ministry of Agriculture and Fisheries, England.)

assist in cooling, the carcase may be backed down while hot—that is, cut into the backbone from the butt of the tail to the head. The kidneys and leaf fat are also removed and the carcase left neat and trim, then allowed to cool thoroughly.

Before proceeding further all animal heat must have left the carcase.

Cleanliness in all these operations is of the utmost importance.

**INSPECTION OF CARCASE.**

Although legal requirements apply only where meat is offered for sale or intended for sale for human consumption, it is strongly recommended that the carcases of pigs killed for

farm consumption be examined, if possible, by a qualified meat inspector to ensure that they are fit for human consumption.

However, this may not be possible, and it is desirable that the person handling such products should be familiar with the normal and healthy tissues. This knowledge can only be acquired by experience and observation, but the following brief outline may prove a guide to the main points to look for.

The lymphatic system ramifies throughout the body somewhat like veins, and at intervals there are enlargements which are termed lymphatic glands, sometimes referred to by butchers as "kernels." They can be considered as filters which serve to prevent bacteria, etc., from penetrating further into the animal body.

Most people are familiar with a swollen gland under the armpit arising from a poisoned hand, or sore throat causing an enlargement of the glands in the neck. Thus the meat inspector can usually find evidence of disease in an enlarged, discoloured gland more easily than in the tissues which have been primarily infected. A knowledge of the position and normal appearance of these glands is therefore of utmost importance in meat inspection. Their size varies considerably, some of the glands being as small as a millet seed while others may be as large as a walnut. The outer wall of the gland consists of a strong fibrous coat, and in the gland proper two regions can be recognised—an inner portion somewhat pink in colour and a lighter outer part. Some glands, particularly those found in the intestinal organs, may have a somewhat greyish colour.

As mentioned, glands act as filters to remove germs from the general circulation; they are, however, very sensitive and are found to be inflamed should there be inflammation in the region they drain.

In the case of tuberculosis, the changes that take place in infected glands (the most important of which are the submaxillary and cervical in the neck, and the precrural in the flank) may be observed in one of the following forms:—(1) swelling; (2) small cloudy spots; (3) formation of larger tubercles; (4) caseation (cheesy formation); (5) calcification (gritty formation). In the pig, tuberculosis is generally contracted by ingestion, and consequently the digestive system and its glands will usually be involved. Should the disease become generalised, the lungs, liver, spleen, and kidneys are usually affected.

### CUTTING UP.

There are various methods of cutting up, but a good plan is to remove the head and front feet, then split the carcase down the centre of the backbone, making two full sides. The backbone is then taken out in two pieces, and used with other trimmings for the making of pies, etc.

Each side is now divided into shoulder, middle and ham; or the full side may be cured; or again the ham may be taken off, leaving the shoulders and middle together (called the flitch).

All parts are neatly trimmed and any scrap pieces taken off. A sharp-pointed knife is used to release the joint oil in the ham and shoulder joints. Strong string is put in convenient places on the hams, flitches, etc., to enable the pieces to be easily handled and hung up.

### CURING.

The curing of bacon should be conducted in a somewhat moist atmosphere with a regular temperature of from 40° to 45° F.—or during winter weather on farms. The curing room should be perfectly clean and as far removed as possible from any source of contamination, such as drains, heaps of manure, rubbish, dust, etc. There



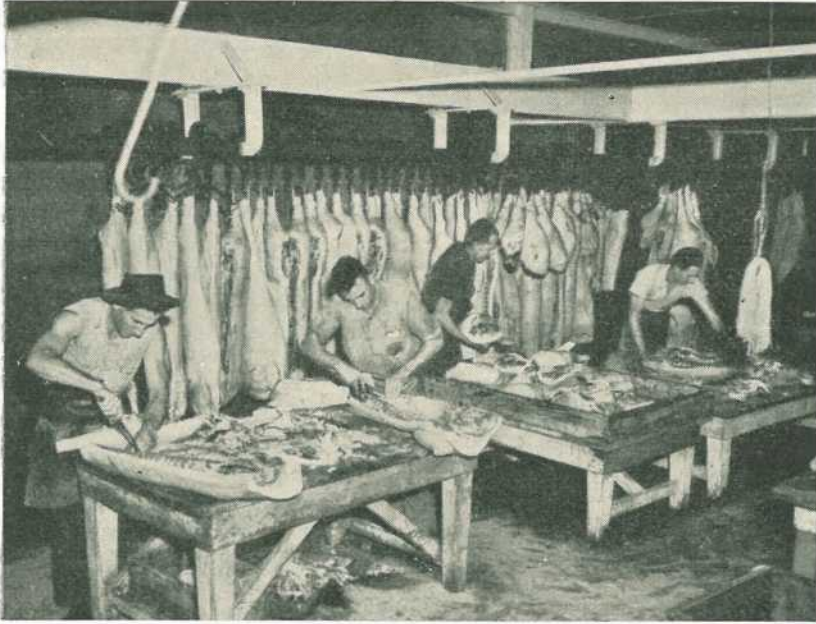


Plate 2.

**A Cutting Room in a Bacon Factory.**

should be efficient ventilation, so that the carcase or pieces may be exposed only to pure air, and the floor of the room must be such (concrete for preference) that it can be readily cleaned.

Curing may take the form of dry salting or pickling, or a combination of the two methods, although for the farmer dry salting is the more convenient, and possibly less troublesome. The carcase must be thoroughly cooled and drained of blood before any attempt is made to cure the meat, otherwise it may decompose in parts and give objectionable flavours or taints.

### Combined Method of Pickling and Dry Curing.

Although the dry cure method later described is recommended for farm use, there are numerous pickling mixtures to select from, as used in bacon factories, where the brine is tested by

means of a salinometer and is used at a standard density of 95°, but the following formula will be found useful. For each pound of meat use—

Water .. ..	1/14 gal.
Salt (lb.) ..	No. of gallons of water $\times$ 3.2
Sugar (lb.) ..	1/10 of salt
Saltpetre (lb.)	1/10 of salt
Flavouring—all- spice (lb.)	1/10 of salt- petre

Therefore pickle or brine for 280 lb. of meat would be—

Water .. ..	20 gal.
Salt .. ..	64 lb.
Sugar .. ..	6.4 lb.
Saltpetre .. ..	6.4 lb.
Flavouring (allspice) ..	0.64 lb.

Should saltpetre not be available, 7.5 lb. sodium nitrate could be used.

Always use the best brands of ingredients, and dissolve them through cheesecloth or a fine sieve. The use

of sugar in a pickle or brine is a matter for the discretion of the curer; it may cause slime or set up a fermentation and not produce the mild flavour anticipated. The meat should be placed in a tub or cask, flesh side up, and care taken that it is well covered with brine.

The meat is left in the brine from four to six days, and then removed, salted, and stacked on a table or bench flesh side up for seven days. Use approximately  $1\frac{1}{2}$  lb. of salt per side. The pieces are then re-salted, using  $\frac{3}{4}$  to 1 lb. per side, and if desired 10 per cent. sugar added. They are then stacked for a further seven days flesh side up. The changing of the stacking at seven days is to reverse the pieces in order to get an even distribution of the curing mixture.

The pieces are soaked for 8 to 12 hours in clean water, which is drained off, and then washed in clean water at about 110° F.

When the pieces are clean, they are hung up to dry. If possible, this should be done in the smoke house at a temperature of 85° to 90° F.; proper drying will take from 8 to 10 hours, after which they may be smoked (taking approximately 12 to 14 hours depending on the colour desired, usually a light tan), then rubbed lightly with olive oil after smoking.

### Pickling.

If pickling only is desired, the following recipes are suggested:—

(1) For 125 lb. of meat.

Water .. .. .	15 gal.
Salt .. .. .	50 lb.
Saltpetre .. .. .	$1\frac{1}{2}$ lb.

(or 2 lb. sodium nitrate)

The meat is placed in a cask and well covered with the pickle. It remains in the cask for 21 days, and is then taken out, washed, dried, and smoked.

(2) For 500 lb. of meat.

Clean rain water ..	20 gal.
Fine dairy salt .. ..	50 lb.
Brown sugar .. .. .	5 lb.
Saltpetre .. .. .	2 lb.
Allspice .. .. .	$\frac{1}{2}$ lb.

Dissolve the salt, sugar and salt-petre in the water and immerse the allspice, tied in a calico bag. Boil for one hour and skim off any frothy matter rising to the surface while boiling. Allow the solution to come down to the temperature of the curing room before placing in the pickling tub.

The meat should be rubbed with salt and stacked for two days before being immersed in the pickle. If it is necessary to place weights on the meat in order to keep it immersed, see that clean pieces of hardwood are used, and soak them well in waste pickle before use.

The time the meat is in pickle will be determined by the size of the pieces but is usually three weeks.

### Dry Curing.

When dry curing is practised, as is usually the case on farms to save possible trouble with brine, there are many different curing mixtures that may be used, but the following, using the best qualities of salt, sugar and saltpetre available, will give good results. For every 125 lb. of meat, use—

9 lb. salt
5 lb. sugar
$\frac{1}{4}$ lb. ground allspice
$\frac{1}{2}$ lb. ground saltpetre or sodium nitrate.

After the carcass has been cut and trimmed into the desired pieces and the joint oil has been released from the ham and shoulder joints with a sharp-pointed knife, the pieces are placed flesh side up and sprinkled with two parts of salt to one part of saltpetre (finely ground) or sodium



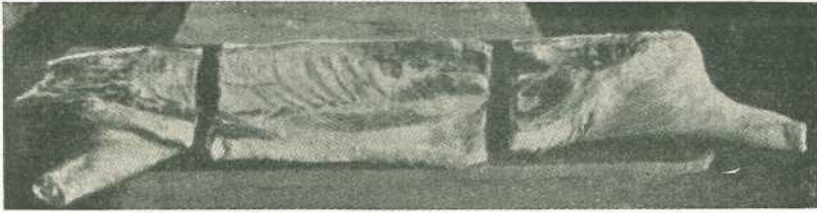


Plate 3.

**Side Divided into Shoulder, Middle and Ham.**

nitrate and allowed to stand for 24 hours; this will draw off the surface blood and help retain the colour of the meat. The pieces are then turned and allowed to drain before applying the curing mixture.

Curing by this method takes approximately three to four weeks according to the size of the pieces. The pieces are placed on a clean table or concrete floor, flesh side up, for the application of the mixture, and are then stacked. They are re-stacked differently every second day for two weeks, and then once a week for the balance of the time; the changing of the stacking is necessary to ensure an even distribution of the curing mixture. Extra salt should be placed along the bones and thick parts of hams and shoulders.

The pieces are next washed in water at a temperature between 100°F. and 110°F., dried, and smoked.

Much farm-cured bacon becomes rancid through being hung in places where the temperature is variable, and bacon may be attacked by flies unless some preventive measures are taken. The pieces of bacon can be dusted over with pepper and then placed in a calico or flour bag, but should be kept in a dry place and examined periodically.

**Smoking.**

In addition to having a drying and preserving action on meat, smoking imparts a flavour which adds to the value of the bacon. It has been ascertained that in smoking bacon there is no loss of nutriment and the finished product is as digestible as fresh meat. The smoke has a distinct antiseptic or preservative action and provides a protective cover which checks the action and growth of putrefactive organisms and their processes and retards decomposition.

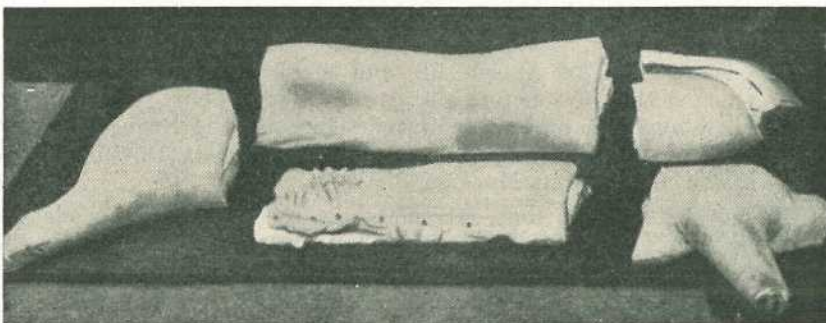


Plate 4.

**Right Side as Cut to a Standard English Method.**

(From a Bulletin of the Ministry of Agriculture and Fisheries, England.)

The effect of all is nullified if the meat has not been properly dried before being placed in the smoke house. The aim is to surround the bacon pieces with a dense smoke at a comparatively low temperature, which should never exceed 90°F. during the period of smoking.

Construction of a properly designed brick or iron smoke house may be worth while in some cases, but where a farmer only wishes to smoke one or two pigs at a time an old galvanised iron tank (say 600 or 800 gallons) would meet his requirements. The top of the tank is cut out, battens on which to hang the bacon pieces placed across the top, and the whole covered with bags or tarpaulin.

A well-spread sawdust fire about three inches deep is made in the bottom of the tank or smoke house. Many methods of creating smoke are applicable; sawdust (dried) with a few corncobs will answer to kindle the fire, with a good development of smoke without too much heat. Direct heat should be prevented from reaching any bacon that is hanging over the fire by having a sheet of galvanised iron placed on a column of loose

bricks or stones. The smoke must be conveyed to the bacon cool, for if direct heat reaches the bacon the fat will melt and run and may cause loss of flavour, or fire.

### Colour.

In deciding the length of time to leave the bacon in the smoke house, the colour desired must be considered. This is usually light brown or tan, and to obtain it smoking may occupy any period from one to two days. The character of the flesh, its thickness, &c., require to be estimated in order to obtain perfection in colour and flavour. When the desired colour is obtained, the tank should be uncovered or the door of the smoke house opened and the meat allowed to cool down before handling; from this time onwards the meat should be handled as little as possible, as the "bloom" may be rubbed off.

Smoked bacon will hang well in a smoke house until required, provided reasonable care is taken to exclude insects and keep the place very dry, dark and cool. Any degree of dampness or moisture in the atmosphere in which bacon hangs will result in the development of mould.

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## CIRCULAR PIG FARROWING PENS.

### MOULDS TO BE MADE AVAILABLE.

The Department of Agriculture and Stock is having moulds made for the construction of concrete circular farrowing pens. These moulds will be made available on loan to farmers through Pig Branch Advisers in the Atherton Tableland Central Queensland, Burnett, Darling Downs, South-eastern Downs and Moreton districts.

It will be recalled that extremely good results for this class of farrowing pen were reported in this Journal for February last. In trials at the Regional Experiment Station on the Atherton Tableland, losses of piglets from trampling or overlying by the sow were only 1.5 per cent., compared with 8 per cent. in a conventional farrowing pen.

Applications for the loan of moulds should be made to the nearest district officer of the Pig Branch.



# Subdivision Fencing of Beef Properties in Forest Country of North Queensland

By A. C. HASSALL (Meadowbank Grazing Company) and W. F. MAWSON  
(Senior Adviser in Cattle Husbandry).

Subdivision of a beef cattle property allows the owner or manager to separate his cattle into their various classes. His bullocks can be placed in a special bullock paddock, his steers in another, breeders in another, and so the different classes of stock are kept separate from one another. This makes for speedier mustering and saves much laborious drafting.

Other paddocks which can be provided and which are very important are the bull paddock and the heifer paddock. With the provision of these two paddocks, mating time and the age of mating can be controlled.

## ADVANTAGES OF PASTURE CONTROL.

Subdivision of a property or of a paddock does not automatically produce more grass. But it certainly does



Plate 1.  
The Completed Fence, Showing Typical Vegetation.



Plate 2.

Running Out the Barbed Wire, Using the Specially Constructed Frame. Note the "blaze" on the tree which is to be used as a strainer.

permit better use to be made of the existing grass and provides other advantages as well. Here are a few ways in which you may obtain advantage from subdivision.

### (1) Tick Control.

We all know what a drain ticks are on the industry.

Recently it has been shown that if paddocks can be spelled for three to four months during the summer, the tick population on the ground drops to a low level. It is then some time before cattle are heavily reinfested.

If cattle are dipped or sprayed just before they are put into such a spelled paddock, the interval between dippings can be lengthened considerably. That saves time and money.

### (2) Controlled Grazing.

Cattle tend to concentrate on and eat out the better grasses under unrestricted grazing conditions. With more

paddocks the cattle can be shut off from different paddocks in turn. This allows the better grasses to seed and rejuvenate.

### (3) Better Use of the Poorer Areas.

The poorer areas of most properties are quite capable of maintaining cattle during the favourable pastoral conditions of the first few months of each year. Natural water is usually abundant at this time, also. A fence which keeps cattle on the poorer areas for a few months serves two purposes. It makes the best use of those areas and allows the better areas to be reserved for the time when they are most needed. The dry late winter and spring is the critical time of the year and any management practice which allows good country to be reserved for this time is very valuable.



### THE ANIMAL AND THE FENCE.

Have you ever considered the effect which a fence has on the average animal? Is not its main purpose to prevent animals from wandering—a wandering from which they are easily diverted? Paddock fences act more as a bluff than a sheer physical restraint. A paddock fence which is effective as a sheer physical restraint would be economically unsound.

In the case of stockyards, fences must be strong and able to withstand lots of strains and bumps, but such fences are neither practicable nor necessary for subdivision work.

Two points are important. One refers to the training of calves and the second to the maintenance of fences.

When calves are being handled at close quarters it is essential that the yard fences be absolutely stock-proof.

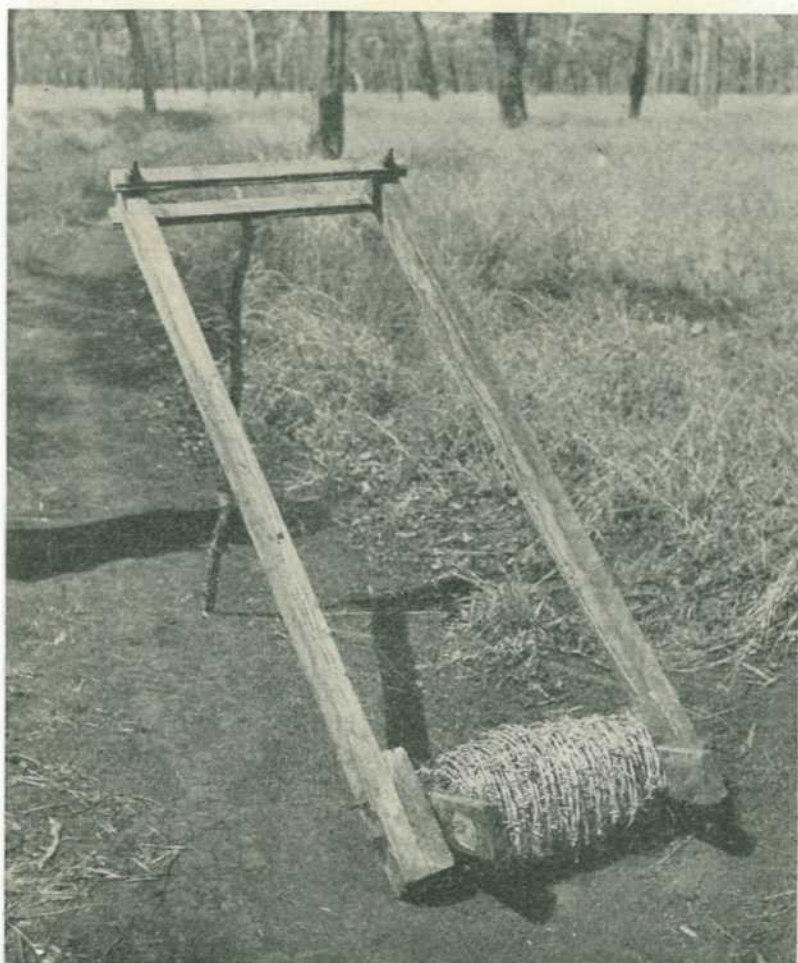


Plate 3.

**The Wire-running Frame.** This frame is easily made by a handyman. Use light-weight timber.



Plate 4.

When the Coil is Nearly Exhausted It Can be Easily Carried to Run Out the Remainder.



Plate 5.

Straining the Barbed Wire. Note that plain wire is attached for straining purposes.



By this means the young animal learns to respect a fence and accept the imposed restraint. Paddock fences need to be well maintained with wires kept tight.

Bad training of the young animal and or poorly maintained paddock fences encourage roguishness in stock. Rogue animals are a constant source of irritation and loss of time and effort. They can be largely avoided by good management and good fences.

At all times try to avoid giving the animal a desire to break through a fence. It is foolish, for example, to put bulls in a paddock alongside one with empty cows in it.

If the subdivision can be accomplished along a line well away from watering places and the more attractive feeding areas, where cattle would regularly congregate, the desire to get to the other side would largely disappear.

### FENCING IN THE NORTH.

Much of the forest country in North Queensland is of volcanic origin. It is open forest of ironbark, gum and bloodwood. The ground is extremely stony over large areas, being covered with basalt rocks. Much of it is level or rolling and broken by banks of basalt rock.

By careful driving, a sturdy motor vehicle may be taken over quite large areas, but considerable clearing would be involved if one desired to drive exactly along a line, as would be necessary if barbed wire were to be run out by truck. This fact had a bearing upon the construction of a wire-running frame to be described later.

Most of the fences which have been erected in the past demanded a lot of time, labour and material. Split wooden posts were erected about four to the chain, with a strainer round post about every five chains. In stony basalt

country there is a lot of work entailed in digging the holes.

Much of this fencing work was done by contractors. To-day, competent and reliable fencing contractors are hard to obtain.

Also, a heavy toll of wooden posts is taken by bush fires and white ants. Some timbers are also susceptible to rotting when placed in the ground.

### A NEW APPROACH TO FENCING.

With all the foregoing facts in mind, one of the writers (A. C. Hassall) set out to streamline the job of fencing. What follows is a description of what has been done and the methods which have been used. The fence described is a subdivision one.

As an alternative to the old type fence, it was decided to use iron posts exclusively at a spacing of three to the chain. Their fire-resistant nature and speed of erection are important factors. Where possible, trees were used as strainers at distances up to 10 chains apart. It was found that by the use of a lever-type mechanical strainer wires could be well tightened over a length of 10 chains over level ground. There was then no point in having shorter strains.

In this fence, round posts were used only when required as gate posts. You have to be very lucky to find two suitable trees in the right spot and the right distance apart to act as gate-posts!

Wire gates have been used. In appearance these are similar to the fence and have no sections that cannot be easily repaired or replaced. The gateways are wide (18 ft.) to allow easy passage for mobs of cattle.

The iron posts are 5 ft. 6 in. long and driven 18 in. into the ground. Three wires are used; plain wires of No. 8 gauge are used at the top and bottom and a barbed wire in the centre.



Plate 6.

**Driving the Iron Post.** Sufficient height is obtained by standing on the empty drum.

Wire spacings are as follows:—

Top wire 3 ft. 11 in. from the ground.

Distance between top and centre wires = 13 in.

Distance between centre and bottom wires = 11 in.

Bottom wire 23 in. from ground level.

#### (1) Method of Erection.

(1) It may be necessary to use a compass in order to plot the general line. When using trees for strainers, you are obviously not going to stick to a dead straight line.

(2) From the starting point, sight along the line and select a suitable tree for a strainer. The ideal tree is iron-bark, about 1 ft. diameter, but any sound growing tree has a potentially longer life than a cut strainer. Cut a blaze mark in the suitable tree in order to distinguish it.

(3) The barbed wire is run first because it automatically provides the guide line for the position of the iron posts. It is later tied to the side of the iron post.

(4) Tie the free end of the barbed wire around the tree at the starting point and run out to the next straining point. If a vehicle cannot be taken



along the line, a specially constructed frame is used.

(5.) When near the strainer, cut the barb and attach about 10 ft. of plain wire for straining purposes.

(6) Strain the barbed wire, having someone lift the wire and place in line during the operation of straining over long distances.

(7) Distribute the iron posts at stepped intervals of seven yards along the line.

(8) Drive in iron posts. A 3 in. loaded pipe can be use in ground free from stones, but a 12 lb. hammer was

found to be better suited in stony conditions. A 4-gallon drum with the top removed and a handle affixed is used as a stage on which to stand to drive the post. If desired, the hammer can be carried in the drum when moving along. A measuring stick may be used to measure the correct depth to which the post is driven. Holes in the post are a good guide.

(9) When all the iron posts in the strain are in position, the barbed wire is tied to each post. This holds the post very firmly.

(10) Both plain wires are then run through the respective holes in the posts and then strained.



Plate 7.

**The Fixed End of the Wire Gate.** The wires turn easily through the holes in the iron post, thus avoiding breakage at this point.



Plate 8.

**The Fastening of the Wire Gate.** The lever pivots round the point on the gate post and slips under a bolt on the strut to hold the gate tightly closed.

It is estimated that this method cuts labour costs by about a quarter and time by half.

### (2) What are the Costs?

*Material per mile of fence (landed cost).*

	£	s.	d.
Iron Posts, 230 at 4s. 6d. each .. .. .	51	15	0
Barbed Wire, 4 coils at £4 1s. 6d. coil .. .. .	16	6	0
Plain Wire, 6 coils at £4 12s. 6d. coil .. .. .	27	15	0
	£95	16	0

### *Labour.*

Four men erected 7 miles in 14 working days each of 8 hours. This time includes the transport of all material from the homestead to the fence line—a distance of 4-11 miles. A 30 cwt. truck was used for transport purposes.

### (3) Points Worth Noting.

The trees which are used as strainers are not ringbarked. Dead trees are more susceptible to both fire and white ant attack. Perhaps in 10 years' time the trees will have grown sufficiently to warrant replacement of the wire round them. That is not a big job, as strainer trees average only 9-10 to the mile.



A small clearing is made round the base of all strainers as a protection against fire.

Short strains are unnecessary provided the wires can be properly tightened. Trees which are used as strainers do not require struts.

To avoid the unravelling of the wire round the tree the following tie is effective. Pass the free end of the wire around the tree, then make a single half hitch on the main wire. Finally twist around the main wire in the usual fashion.

Mechanical lever-type wire strainers are necessary—a forked stick used as a roller will not do the job satisfactorily.

#### (4) The Barbed Wire Frame.

This frame is simply made and efficient. It is most useful in country which is too rough for a motor vehicle and is efficiently operated by one man.

The barbed wire coil acts as a wheel and runs easily without unwinding too rapidly. The whole coil can be run out in one operation, if desired. When the coil is nearly expended the frame may be carried comfortably, as it is constructed of lightweight timber. The accompanying photographs illustrate its construction and use.

#### (5) Maintenance.

Having constructed a durable fence, very little maintenance is needed. That is not to say maintenance can be neglected. In fact, it is most important in order to keep the fence effective.

Wires should be checked periodically and maintained in a tight condition. Any trees or limbs which may have been blown over the wires should be removed. The base of all strainers needs to be kept free from limbs or fallen trees, as these are a big fire hazard. Likewise dry grass should be



Plate 9.

Cleaning Away Dried Grass from the Base of the Tree Lessens Risk of Fire Damage.

cleared away from the base of trees when there is a likelihood of fire.

In order to speed up maintenance it is most desirable that the fence line be accessible by motor vehicle. It is worth while keeping clear the track which was used in the transport of materials during construction.

The idea of long strains may not be easily accepted, unless one realises that a fence, at any rate around large paddocks of 10 square miles or so, is essentially a bluff. So long as wires are tight and posts not too far apart,

cattle which have been used to such a fence during weaning seldom try to get through. In fact, the distance between strains has no bearing on the security of the fence for stock, so long as the wires can be strained tightly.

This particular fence was completed in mid-September and straightaway stocked with 80 head of bought steers and 150 head of male cattle that previously had the run of the whole block. No cattle got out, but they had worn a pad along the fence for most of the seven miles, proving they had accepted the bluff.

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## DAIRY BULL PROVING SCHEME.

Five young Jersey bulls are now being prepared for testing in the second year's operation of Queensland's dairy bull proving scheme which makes use of artificial breeding methods and aims at identifying herd-improving sires. Matings with the first draft of bulls were commenced in October 1955, and completed in January 1956.

The Minister for Agriculture and Stock (Hon. H. H. Collins, M.L.A.) said recently that in the coming spring, artificial breeding will re-commence in about 60 commercial herds in the Nambour, Kenilworth, Maleny and Mooloolah districts. It will be continued until about 1,500 cows have been mated.

The bulls, all of which are Queensland bred, are Brookland Jubilee Lorenzo, Gem Constant, Keystone Page, Tecoma Larry and Westbrook Royal Monarch 54th.

Heifer calves from the matings will be reared on the farms where they are born and will be production recorded during their first lactation. From the production records of those daughters, an assessment of the breeding value of the bulls will be made.

It is planned to test a draft of bulls each year. With artificial breeding methods, a proven sire can be used to breed many hundreds of daughters. He can thus make a large-scale contribution to raising dairy production.

The first calves from the 1,300 artificial matings in 1955 are expected to be born during July. The bulls which sired these calves will not again be used in the project. Should any of these bulls prove of outstanding merit, based on their daughter's performance, they would then be made available for wider use in the industry.



# Lambing Losses

By G. R. MOULE (Director of Sheep Husbandry), and M. N. S. JACKSON and R. B. YOUNG (Senior Advisers in Sheep and Wool).

(Continued from page 354 of the June issue.)

## WHAT CAN BE DONE TO REDUCE LAMB LOSSES?

Lamb losses are an important problem. They help keep your flock numbers down; they retard the rebuilding of flocks reduced by drought. Worse still, they make you keep unproductive sheep. High lamb losses mean that fewer maidens come forward each year for classing. So you can't cull very heavily. Therefore, you may have to keep some sheep that are not so profitable.

But what can be done to reduce lamb losses? There is no easy way out. There is no single thing that can be done to reduce them to a level at which they will no longer be a serious problem. Reducing lambing losses is an intricate problem involving almost every aspect of the management of breeding flocks.

The time of lambing is probably the most important single thing influencing the survival of lambs. To survive and grow quickly lambs need special conditions. Briefly, these are:—

- (1) Moderate weather—not too hot and not too cold.
- (2) Shade and protection.
- (3) Drinking water that is easy to obtain without walking great distances.
- (4) Adequate food.
- (5) Protection from predators.
- (6) A reasonable birth weight.

Now let us see what are key points in management that will help fulfil these requirements.

### Weather and Lambing.

Midsummer in Queensland is invariably hot—even far hotter than you think. Our temperatures are usually measured in the shade—on the verandah or in those small white louvred boxes you see behind most post offices. These do not give a real indication of how hot it is out on an open plain. Here direct heat from the sun, as well as air temperatures, affect the sheep. In addition, air temperatures one or two feet above unshaded ground are often 10 or 12 deg. F. higher than they are five feet or so above the ground. Young lambs do not stand high air temperatures as well as grown sheep. This all means that you may be ill-advised to lamb in midsummer. The young lambs can't keep up with their mothers and losses may be heavy.

Similarly you may be ill-advised to lamb in midwinter. On the more elevated country in southern Queensland, around Stanthorpe, Karara and Roma, as well as near Tambo in the central west, it may be too cold for lambs to survive in the winter. This is likely to be the case if cold rain falls or if strong dry winds blow.

From the point of view of the two climatic elements of heat and cold, spring and autumn are the safest times to lamb.

In southern Queensland, spring is usually preferred. Winter rains are more reliable in the south; relief storms fall earlier in the summer than they do in the north. Lambing at this

time usually means that the lambs drop on to a "green pick". In most years there is sufficient surface water to ensure lambs do not have to walk long distances. More important, the ewes are in-lamb during the winter. Pregnant ewes generate a good deal of heat in their own bodies. As a result they are rather disinclined to eat as much as they otherwise would. Their decreased appetite, coupled with the other effects of hot weather, commonly results in small light lambs.

This problem is extremely important in north-western Queensland. A spring mating to drop lambs on green feed in the late summer means the ewes are pregnant during the hottest part of the year. The survey made by officers of the Sheep and Wool Branch showed lambs born as the result of a summer pregnancy were small and light. In fact, the average birth weight of all summer lambs was only 5 lb.—the average birth weight of lambs born in the spring following a winter pregnancy was 7 lb. This finding is rather surprising. Most people would think the lambs dropped on to green feed in the autumn would weigh more than lambs dropped on drier feed in the spring. This difference in birth weight is largely due to the effects of hot weather. A summer pregnancy, therefore, may get lambs away to a bad start.

The final decision on the best time to lamb is one every woolgrower must make for himself. In doing so he will have to compromise between the conditions that will favour high conception rates at mating time and the survival of resulting lambs. In many parts of tropical Queensland it is difficult to select times suited to both requirements.

### Shelter and Water.

In any case, hold the shadiest and best watered paddocks in reserve for lambing. Be careful, however, of river channels—they provide suitable conditions but a sudden flood can

mean disaster. Drying waterholes can also account for heavy losses. A number of watering points in the lambing paddocks ensures that the ewes break up into smaller flocks. This has many advantages. Lambs are not so likely to lose their mothers.

### Milk Supply of Ewes.

The amount of milk the ewe produces governs the growth rate of lambs. The lambs of ewes that milk well grow faster than those whose mothers are poor milkers. Quite large differences occur between the amounts of milk produced by ewes. Ewes that are well fed give more milk than those that are poorly fed. The difference may amount to nearly 10 ounces a day. The amount of milk the ewes produce influences the growth rate of their lambs. Lambs whose mothers produce 28-30 ounces of milk a day may gain over a third of a pound a day; those whose mothers give only 14-16 ounces a day gain less than one fifth of a pound a day.

Single lambs of ewes with one blind teat grow more slowly than those born to ewes with sound udders. However, if a ewe has two blind teats her lambs have little chance of survival.

The main things to do, therefore, are:—

- (a) Cull any ewes with two blind teats.
- (b) Be certain that the lambing ewes have the best feed. Try to ensure they are well fed for the month before, during and a month or so after lambing.

### Destruction of Predators.

Wild pigs, crows, foxes and dingoes all prey on lambs. In some districts eagle hawks are also considered to cause heavy lamb losses. The control of predators is basic to high lambing-marking percentages. Most woolgrowers have their own approach to



this problem—unfortunately, few organised “district” approaches have been followed.

Adequate fencing is the only real answer to the invasion of dingoes that periodically sweeps some sheep lands. While this work is proceeding, trapping is usually an effective way of catching a few dingoes that follow “a beat” on your property. Trapping is expert work and a subject wool-growers are always ready to discuss. Fortunately, foxes are easier to catch, either in traps or with poison baits. The latter are not popular, as useful sheep dogs might be poisoned.

Strychnine is the poison most commonly used against foxes. Nembutal anaesthesia is the best way of treating dogs that take a strychnine bait. Inject the nembutal into the dog's abdominal cavity. The dose rate is 1 gr. for every 5 lb. liveweight. This will put the dog to sleep—while he is under the anaesthetic he excretes the strychnine through his kidneys.

Crows can also be poisoned with strychnine. It is as well to poison around waterholes and wherever large numbers of sheep collect.

Wild pigs can be an extremely important cause of loss amongst lambs. Pigs travel quite large distances. They frequent channels and other places where there is shade and surface water—that is, the most suitable paddocks for lambing. Active campaigns against wild pigs during midwinter will pay handsome dividends. By then they have usually concentrated on the main waterholes and the main farrowing time has not commenced. An effective campaign to kill pigs at this time means few pigs are about at lambing time.

Shooting and poisoning are the most effective methods of killing pigs. Both are necessary. Phosphorus is

the most effective poison—as pigs eat pigs that have died from poisoning, the phosphorus has a snowball effect. The danger of fire is the main drawback in using phosphorus. This can be overcome by dissolving the phosphorus in carbon bisulphide. Pour approximately one pint of carbon bisulphide into a jug or other vessel, taking care to keep lighted cigarettes, matches or any flames away, as the liquid is highly inflammable. Into the carbon bisulphide pour 3-4 oz. of water and place five sticks of phosphorus, each of about 1 oz., into the jug containing those liquids. The important point to remember in doing this is that the phosphorus stick must be exposed to the air only momentarily, because if kept out of water for long it may “go on fire.” See that the stick is thoroughly immersed in the liquid and stir well until dissolved. Then pour the poison into a strong container. Because of its inflammable nature, do not store it in a wooden building.

The approximate quantity of poison to be injected into a sheep carcass is 2 oz., into a cattle or horse carcass, 6-9 oz. It is much better to allow the carcass to cool before injecting the poison. This should not be injected into one portion only, but in quantities of about  $\frac{1}{3}$ - $\frac{1}{2}$  oz. into all parts of the forequarters and hind-quarters, abdomen and lung cavity. At least eight injections should be made. If some poison should fall on the wool and a small flame appears, a little mud plastered on will put it out. Don't be alarmed by this flame. There is no chance of a carcass baited in this way setting fire to your pastures.

Injections are most easily made with an automatic syringe equipped with a long heavy needle.

### DAIRY PRODUCTION IMPROVEMENT COMPETITION.

The following are the prizewinners in the dairy farm competition conducted among members of herd recording groups whose herds were tested in 1953-54 and 1954-55. The prizes were awarded for the most creditable increases in total butterfat production over 1953-54.

- Biloela Herd Recording Group.*—1st, D. H. & G. A. Britten, Thangool; 2nd, H. J. Mann, Thangool; 3rd, Cook Bros., Lawgi.
- Boonah Herd Recording Group.*—1st, A. A. Huth, Roadvale; 2nd, F. M. Bell, Mount Alford; 3rd, R. & F. Johnston, Wyaralong.
- Cedar Pocket Herd Recording Group.*—1st, L. A. Jenkinson, Green's Creek; 2nd, W. T. Tatnell, Cedar Pocket; 3rd, D. G. & E. Lyon, East Deep Creek.
- Chinchilla No. 1 Herd Recording Group.*—1st, A. & J. Clarke, Chinchilla; 2nd, W. J. C. Washington, Mandanyi; 3rd, B. Jeffrey, Rywung.
- Chinchilla No. 2 Herd Recording Group.*—1st, W. D. Davis, Wamba Creek, Chinchilla; 2nd, F. A. & T. F. Davis, 16 Mile Creek, Chinchilla; 3rd, E. Trebilco, Hopeland, Chinchilla.
- Cooroy No. 1 Herd Recording Group.*—1st, C. G. Duke, Cooroy Mountain; 2nd, A. V. Cramb, Cooroy; 3rd, L. W. Bassett, West Cooroy.
- Cooroy No. 2 Herd Recording Group.*—1st, N. V. Gilliland, Cooroy; 2nd, C. E. Hooper, Bollier; 3rd, J. A. Hooper, Imbil.
- Dalby Herd Recording Group.*—1st, D. F. L. Skerman, Kaimkillenbun; 2nd, C. H. Beardmore, Woodlawn, Bell; 3rd, A. Johnstone, Bell.
- Esk No. 1 Herd Recording Group.*—1st, V. & H. K. Dargusch, Toogoolawah; 2nd, A. J. Worthington, Toogoolawah; 3rd, D. C. McConnell, Toogoolawah.
- Esk No. 2 Herd Recording Group.*—1st, N. Sippel, Lowood; 2nd, H. E. Tweedale, Lynford; 3rd, W. C. Tapsall, Mount Tarampa.
- Goomeri Herd Recording Group.*—1st, H. I. Penny, Nanango; 2nd, Mrs. L. G. Jefferies, Goomeri; 3rd, G. R. Pearson, Nanango.
- Landsborough-Caboottle Herd Recording Group.*—1st, R. G. Breton, Peachester; 2nd, C. E. Robertson, Upper Caboottle; 3rd, A. B. Shuttlewood, Peachester.
- Malanda No. 1 Herd Recording Group.*—1st, K. M. & R. Laws, Malanda; 2nd, Leinster & Langlands, Malanda; 3rd, F. P. Farr, East Barron.
- Malanda No. 2 Herd Recording Group.*—1st, Stephenson Bros., Jaggan; 2nd, D. K. Creedy, Malanda; 3rd, D. Muncie, Malanda.
- Malanda No. 3 Herd Recording Group.*—1st, J. F. Evans, Malanda; 2nd, E. Soley, Chilverton, Ravenshoe; 3rd, G. Jensen, East Evelyn, Kaban.
- Mapleton-Kureelpa Herd Recording Group.*—1st, J. Macintyre, Dulong; 2nd, T. V. Brockhurst, Flaxton; 3rd, E. J. Sommer, Mapleton.
- Merrimac-Mudgeeraba Herd Recording Group.*—1st, Rosin & Herse, Numinbah Valley; 2nd, C. L. Parr, Carrara; 3rd, J. J. Hoy, Merrimac.
- Miles Herd Recording Group.*—1st, J. S. Genge, Kowguran; 2nd, G. A. Stiller, Guluguba; 3rd, Reading & Williams, Miles.
- Millaa Millaa Herd Recording Group.*—1st, L. T. Wallwork, Millaa Millaa; 2nd, P. N. Rooney, Millaa Millaa; 3rd, C. Baldwin, Millaa Millaa.
- Miva-Theebine Herd Recording Group.*—1st, R. J. Sexton, Kanyan; 2nd, C. W. B. Young, Calico Creek; 3rd, M. G. Lean, Chatsworth.
- Mundubbera No. 1 Herd Recording Group.*—1st, J. & F. Sedgwick, Mundubbera; 2nd, F. G. & J. E. Sedgwick, Mundubbera; 3rd, W. W. & M. Kusay, Mundubbera.
- Pomona No. 1 Herd Recording Group.*—1st, K. F. & K. M. Bunney, Cootharaba; 2nd, W. J. Blackwood, Kin Kin; 3rd, H. J. Grady, Kin Kin.
- Proston Herd Recording Group.*—1st, H. A. & M. C. Finn, Proston; 2nd, F. E. Barton, Brigooda; 3rd, F. McCosker, Proston.
- Tansey Herd Recording Group.*—1st, A. E. Pampling, Goomeri; 2nd, G. C. Quinn, Goomeri; 3rd, Heathwood & Sons, Goomeri.
- Toowoomba Herd Recording Group.*—1st, S. & I. M. Hart, Westbrook; 2nd, A. & F. Althaus, Sheppard; 3rd, C. Polzin, Cambooya.
- Wallaville Herd Recording Group.*—1st, W. Pitt, Childers; 2nd, G. T. Stehbins, North Kolan; 3rd, F. W. Walters, Booyal.



# The Speckled Cockroach and its Control

By A. R. BRIMBLECOMBE, Senior Entomologist.

The speckled cockroach (*Nauphoeta cinerea* (Oliv.)) occurs in most parts of Queensland and sometimes is troublesome. Whilst well-known household species may prefer food scraps, this cockroach infests hay, straw and cereal products. Large numbers may be found in hay sheds, barns, produce stores and feed sheds.

Where hay is stored as a drought reserve, the speckled cockroach may breed without interruption for some years, and the enormous numbers foul the hay, which is then rejected by stock. This fouling, however, is objectionable only when living cockroaches are present; when these are killed and the hay loosened and tossed, stock will feed normally.

## Habits and Appearance.

The speckled cockroach is active mainly during the night. Adults of both sexes are winged, but crawling is the more common means of moving about. The forelegs are short and this species is not as agile as the commoner cockroaches. Although the speckled cockroach is occasionally seen in the home, breeding within the house is unlikely.

The body of the adult (Plate 1) is mostly a speckled fawn colour, the head being slightly darker and the legs paler. Females measure more than an inch in length; the males are smaller. Nymphs also have a speckled appearance, although the main colour varies from greyish brown to mid-brown.

## Life History.

Unlike most other species, the speckled cockroach does not lay eggs but produces living young.

Actually the eggs when formed are arranged in an egg-mass similar to that of other cockroaches and this is retained within the body of the parent until the young are ready to hatch.

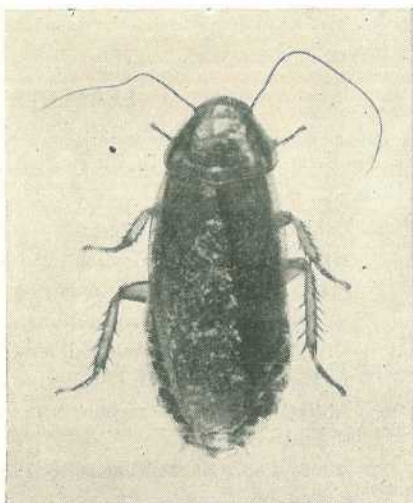


Plate 1.

## Adult Female of the Speckled Cockroach.

The incubation period, though not definitely known, is indicated by the time elapsing between female maturity and the appearance of the first batch of young. This period may be a few months, and the four or five "hatchings" each of 30-40 eggs occur at intervals of about two months.

Development through the nymphal stages to the adult takes place by a series of moults and may require six to 10 months, depending on the seasons. The total period for a generation therefore may vary from seven to 12 months, although adults can then live for as long as three years.

### Control.

Chlordane as a 2.0 per cent. spray is effective in combating the speckled cockroach amongst hay and in buildings. The amount of spray used will vary but for most purposes a liberal application is necessary. For hay-stacks this should be free-dripping from the vertical faces and the top surface should be left fairly damp.

Before treated hay is fed to stock it should be loosened for a few days

and tossed to dislodge the dead cockroaches.

In barns, produce stores and feed sheds this cockroach usually lives between the bags rather than in the food itself. A certain amount of restacking is often necessary to ensure a thorough spraying.

Usually one thorough spraying results in an adequate control. If after a few months, however, the pests are still noticeable, a repeat application should be made.

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### LEAFLETS AVAILABLE.

The following recent additions to the Department's advisory literature are available free of charge to Queensland primary producers:—

- The Tomato Mite.
- Control of Tobacco Pests.
- Hybrid Vigour in Horticultural Crops.
- Maize Growing on the Atherton Tableland.
- Queensland Fauna Legislation.
- Drawbar Hitch for Ganged Mowers and Side-delivery Rake.
- A Home-made Land Leveller or Smoother.
- A Timber Rake Attachment for a Bulldozer Blade.
- Guinea Grass.
- White Cedar is Poisonous to Pigs.
- Successful Hatching.
- Infectious Laryngo-tracheitis of Poultry.
- Seasonal Calving for Dairy Cows.

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### WORLD CATTLE NUMBERS.

World cattle numbers are reported to have risen from 911,600,000 at the beginning of 1955 to 917,600,000 at the beginning of 1956. They are now about 22 per cent. higher than in the immediate pre-war years.

Approximate figures for various countries are:—

	million.		million.
U.S.A. .. ..	97	Canada .. ..	10
Brazil .. ..	64	New Zealand .. ..	6
Argentina .. ..	44	Japan .. ..	3
France .. ..	17	Denmark .. ..	3
Australia .. ..	16	Austria .. ..	2
Mexico .. ..	16	Belgium .. ..	2
Western Germany .. ..	11	Greece .. ..	1



## CROP PLANTING TABLES

Showing Times of Planting and Rates of Sowing for Field Crops.

BY OFFICERS OF THE AGRICULTURE BRANCH.

(Continued from page 330 of the June issue.)

In the concluding instalment of these crop planting tables, some tables of general information are presented first and are followed by a planting table for the northern districts of the State.

### Irrigated Pasture Mixtures.

#### ANNUAL PASTURES—WINTER PRODUCTION.

	Per Acre.
Subterranean clover .. ..	2 lb.
Wimmera ryegrass .. ..	4 lb.
Addition of the following is optional :—	
Lucerne .. ..	$\frac{1}{2}$ to 1 lb.
Phalaris .. ..	1 to 2 lb.

#### PERMANENT PASTURES.

	Per Acre.
White clover .. ..	2 lb.
Red clover .. ..	1 lb.
H.I. ryegrass .. ..	2 to 4 lb.
Phalaris .. ..	2 to 3 lb.
Cocksfoot .. ..	2 to 3 lb.
Paspalum .. ..	4 to 6 lb.

(For coastal areas cocksfoot may be omitted)

#### PASTURE FOR WET, POORLY DRAINED AREAS.

	Per Acre.
Strawberry clover .. ..	2 lb.
Reed canary grass .. ..	4 lb.
OR	
Strawberry clover .. ..	2 lb.
Paspalum .. ..	6 lb.
OR	
Strawberry clover .. ..	2 lb.
Para grass .. ..	Planted by cuttings.

#### PASTURE FOR INTERMITTENT IRRIGATION.

	Per Acre.
Lucerne .. ..	1 lb.
Phalaris .. ..	3 lb.

#### TROPICAL IRRIGATED PASTURES.

	Per Acre.
PERMANENT PASTURE FOR SUB-TROPICAL COASTAL AREAS.	
Paspalum .. ..	6 to 8 lb.
White clover .. ..	2 lb.
TROPICAL IRRIGATED PASTURES.	
Guinea grass .. ..	4 to 5 lb.
Centro .. ..	2 to 4 lb.
OR	
Para grass .. ..	Planted by cuttings
Centro .. ..	2 to 4 lb.

## Approximate Numbers of Seeds per Pound.

FIELD CROPS.		SUMMER GRASSES.	
Barley (Cape) .. ..	10,500	Buffel (W.A.) .. ..	201,398
Barley (Skinless) .. ..	14,060	Buffel (Q.) .. ..	158,760
Beans (Navy) .. ..	1,360	Blue panic .. ..	658,000
Broom millet .. ..	21,000	Green panic .. ..	884,500
Canary seed .. ..	64,420	Rhodes .. ..	1,533,168
Cotton .. ..	4,540	Molasses .. ..	5,896,800
Cowpeas (Giant) .. ..	1,760	Paspalum .. ..	256,000
Cowpeas (Groit) .. ..	3,750	Scrobie .. ..	168,285
Cowpeas (Poona) .. ..	6,800		
Linseed .. ..	81,210	WINTER GRASSES.	
Lucerne .. ..	216,650	Perennial ryegrass .. ..	276,000
Lupins .. ..	3,170	Italian ryegrass .. ..	248,500
Maize .. ..	1,360	H.I. ryegrass .. ..	266,263
Mangel .. ..	26,300	Wimmera ryegrass .. ..	248,000
Mauritius bean .. ..	450	Cocksfoot .. ..	448,000
Millet (French) .. ..	88,450	Phalaris .. ..	317,500
Millet (Japanese) .. ..	113,850	Prairie .. ..	49,442
Millet (Setaria) .. ..	194,240	Reed canary grass .. ..	562,464
Millet (White Panicum)	143,800		
Oats .. ..	14,520	SUMMER LEGUMES.	
Onion .. ..	131,900	Phasey bean .. ..	55,800
Peas (field) .. ..	1,810	Centro .. ..	17,700
Pumpkin .. ..	2,360	Lucerne .. ..	215,000
Rape .. ..	156,940	Native vetch .. ..	38,300
Rice .. ..	18,140	Townsville lucerne .. ..	213,192
Rye .. ..	21,320		
Sorghum (grain) .. ..	22,690	WINTER LEGUMES.	
Sorghum (sweet) .. ..	27,670	Cluster clover .. ..	864,108
Soybean .. ..	2,800—6,960	Crimson clover .. ..	119,750
Sudan grass .. ..	47,180	Red clover .. ..	252,000
Sunflower .. ..	7,260	Strawberry clover .. ..	360,612
Turnip .. ..	214,020	White clover .. ..	720,000
Vetches .. ..	6,350	Barrel medic .. ..	122,500
Wheat .. ..	14,520	Black medic .. ..	281,200
		Burr medic .. ..	303,900
		Subterranean clover .. ..	46,000—70,000

## Pasture Establishment.

APPROXIMATE NUMBER OF SEEDS PER SQUARE FOOT AT SOWING  
RATE OF 1 LB. PER ACRE BROADCAST.

Summer Grasses.	Seeds Per Sq. Ft.	Summer Legumes.	Seeds Per Sq. Ft.
Buffel (W.A.) .. ..	4.6	Phasey bean .. ..	1.2
Buffel (Q.) .. ..	3.6	Centro .. ..	0.4
Blue panic .. ..	15.0	Lucerne .. ..	5.5
Green panic .. ..	20.3	Native vetch .. ..	0.8
Rhodes .. ..	35.0	Townsville lucerne .. ..	4.8
Molasses .. ..	135.0		
Paspalum .. ..	5.8	WINTER LEGUMES.	
Scrobie .. ..	3.8	Cluster clover .. ..	19.8
		Crimson clover .. ..	2.7
		Red clover .. ..	5.8
		Strawberry clover .. ..	8.2
		White clover .. ..	16.6
		Barrel medic .. ..	2.8
		Black medic .. ..	6.4
		Burr medic .. ..	7.0
		Subterranean clover .. ..	1-1.6
Winter Grasses.	Seeds Per Sq. Ft.		
Perennial ryegrass .. ..	6.4		
Italian ryegrass .. ..	5.6		
H.I. ryegrass .. ..	6.0		
Wimmera ryegrass .. ..	5.6		
Cocksfoot .. ..	10.2		
Phalaris .. ..	7.2		
Prairie .. ..	1.2		
Reed canary grass .. ..	12.8		



## Germination Percentages.

Kind of Seed.	Prescribed Minimum Germination Standard.	Germination that can be expected from a well grown crop matured and harvested under good conditions.	Kind of Seed.	Prescribed Minimum Germination Standard.	Germination that can be expected from a well grown crop matured and harvested under good conditions.
	Per cent.	Per cent.		Per cent.	Per cent.
Barley .. ..	80	95	Molasses grass ..	20	35
Beans .. ..	75	95	Oats .. ..	80	95
Beet .. ..	55	85	Onion .. ..	60	80
	(of clusters)		Paspalum .. ..	60	80
Canary seed ..	65	90	Peanuts .. ..	80	90
Couch grass ..	60	80	Peas .. ..	75	90
Cowpea .. ..	70	95	Prairie grass ..	65	90
		Including all hard seeds.	Rhodes grass ..	20	50
Green panic ..	15	30	Rye corn .. ..	75	80
Japanese millet	75	95	Setaria .. ..	75	95
Linseed .. ..	65	90	Sorghum .. ..	70	90
Lucerne .. ..	80	95	Sudan grass ..	65	90
		Including all hard seeds.	Sunflower .. ..	65	90
Maize .. ..	80	95	Tares .. ..	60	90
Mauritius beans	70	90	Turnip .. ..	65	95
			Wheat .. ..	80	95
			White French millet ..	75	95
			White panicum ..	75	90

Rapid loss of germination can occur during times of high humidity. Seeds for sowing should be stored under dry conditions and well protected against dampness at all times.

## Number of Plants Required to Plant an Acre of Ground at Given Distances.

Plant Spacing.	Number of Plants.	Plant Spacing.	Number of Plants.
3 in. x 12 in. ..	174,240	18 in. x 42 in. ..	8,297
6 in. x 6 in. ..	174,240	18 in. x 48 in. ..	7,260
6 in. x 9 in. ..	116,160	20 in. x 24 in. ..	13,068
6 in. x 12 in. ..	87,120	20 in. x 30 in. ..	10,454
9 in. x 9 in. ..	77,440	20 in. x 36 in. ..	8,712
9 in. x 12 in. ..	58,080	20 in. x 42 in. ..	7,467
12 in. x 12 in. ..	43,560	20 in. x 48 in. ..	6,534
12 in. x 15 in. ..	34,848	2 ft. x 2 ft. ..	10,890
12 in. x 18 in. ..	29,040	2 ft. x 3 ft. ..	7,260
12 in. x 24 in. ..	21,780	2 ft. x 4 ft. ..	5,445
12 in. x 30 in. ..	17,424	2 ft. 6 in. x 3 ft. ..	5,808
12 in. x 36 in. ..	14,520	3 ft. x 3 ft. ..	4,840
12 in. x 42 in. ..	12,446	3 ft. x 4 ft. ..	3,630
12 in. x 48 in. ..	10,890	3 ft. 6 in. x 3 ft. ..	4,148
15 in. x 18 in. ..	23,232	4 ft. x 5 ft. ..	2,178
15 in. x 24 in. ..	17,424	4 ft. x 6 ft. ..	1,815
15 in. x 30 in. ..	13,939	4 ft. x 8 ft. ..	1,361
15 in. x 36 in. ..	11,616	4 ft. x 10 ft. ..	1,089
15 in. x 42 in. ..	9,956	4 ft. x 12 ft. ..	907
15 in. x 48 in. ..	8,712	6 ft. x 6 ft. ..	1,210
18 in. x 18 in. ..	19,360	6 ft. x 8 ft. ..	907
18 in. x 24 in. ..	14,520	6 ft. x 10 ft. ..	726
18 in. x 30 in. ..	11,616	6 ft. x 12 ft. ..	605
18 in. x 36 in. ..	9,680		

Table of Equivalent Quantities of Fertilizer.

Per Acre.	Per Square Perch (Approx.)	Per Square Yard (Approx.)
1 ton ..	14 lb. ..	7½ oz.
10 cwt. ..	7 lb. ..	3¾ oz.
5 cwt. ..	3½ lb. ..	2 oz.
4 cwt. ..	2¾ lb. ..	1½ oz.
3 cwt. ..	2 lb. ..	1 oz.
2 cwt. ..	1½ lb. ..	..
1 cwt. ..	11¼ oz. ..	..
84 lb. ..	8½ oz. ..	..
56 lb. ..	5½ oz. ..	..
28 lb. ..	2¾ oz. ..	..

1 dessertspoonful equals about 1 oz.

Legal and Suggested Bushel Weights.

Seed.	Lb. Per Bushel.
Barley .. .. .	50
Beans .. .. .	60
Broom Millet .. .. .	60
Buckwheat .. .. .	50
Canary seed .. .. .	60
Clovers—including Lotus	60
Cowpea .. .. .	60
Grass seeds .. .. .	20
Lucerne .. .. .	60
Lupins .. .. .	60
Linseed .. .. .	60
Maize .. .. .	56
Mangels .. .. .	20
Millets—all kinds (except Broom millet)	50
Oats .. .. .	40
Panicum .. .. .	50
Peas .. .. .	60
Rape .. .. .	56
Rice .. .. .	45
Rye grain (rye corn) ..	60
Ryegrasses .. .. .	20
Setaria .. .. .	50
Sorghum—Grain .. .. .	60
Sorghum—Sweet .. .. .	60
Sudan grass .. .. .	50
Sunflower .. .. .	35
Tares .. .. .	60
Turnip .. .. .	56
Vetches .. .. .	60
Wheat .. .. .	60
White panicum .. .. .	50



NORTHERN DISTRICTS.  
SOWING AND PLANTING TABLE FOR FIELD CROPS.  
(This Table requires to be adapted to suit individual circumstances.)

Crop.	Main Purpose for Which Grown.	When to Sow or Plant.			How Sown or Planted.				Approximate Period of Growth of Crop in Months.	Remarks.
		Coastal Districts.	Tableland Districts.	Inland Districts.	Distance Between Rows in Apart.	Distance Between Plants.	Quantity of Seed per acre if Drilled.	Quantity of Seed per acre if Broadcast.		
Arrowroot ..	Flour and pig food..	Aug. to Nov.	Sep. to Dec.	Sep. to Dec.	5 0	2 0	10 to 12 cwt. of bulbs	..	8 to 10 ..	Suited best to coastal districts
Artichoke ..	Pig food ..	July to Aug.	Aug. to Oct.	Aug. to Oct.	3 6	1 6	4 to 5 cwt. of tubers	..	4 to 5 ..	Difficult to store; will keep better in soil
Barley (Cape and Skintess)	Grazing and green feed	Apr. to June	Feb. to June	Mar. to June	Drilled	..	1 bus. ..	1½ bus. ..	2 to 4 ..	..
Beans, Lima	Seed ..	Mar. to May	Nov. to Jan.	Nov. to Jan.	2 6	0 9	20 to 25 lb.	..	3½ to 4 ..	..
Beans, Navy or Canning	Seed ..	Mar. to May	Dec. to Jan.	Dec. to Jan.	2 4	0 4	15 to 24 lb.	..	3 to 3½	Wider rows for fertile soils
Beet, Silver ..	Green feed for poultry	Mar. to June	Feb. to June	Feb. to June	2 6	1 0	4 lb. ..	..	3 to 4 ..	..
Broom Millet	Brushware ..	Mar. to July	Nov. to Jan.	Nov. to Jan.	3 6	0 9	3 to 4 lb. ..	..	4½ to 5 ..	..
Buckwheat ..	Nectar for bees; grain for poultry	Mar. to July	Dec. to Apr.	Dec. to Apr.	2 0	0 3	25 to 30 lb.	40 to 45 lb.	1½ to 2½	Produces a valuable nectar crop within 6 weeks of planting ..
Carrot, Field	Stock food ..	Apr. to June	Mar. to June	Apr. to June	1 9	..	2 to 3 lb. ..	..	4 to 5 ..	..
Cassava ..	Pig food ..	Aug. to Dec.	Sep. to Jan.	Oct. to Jan.	5 0	2 0	Cuttings used	..	8 to 10 ..	Boil tubers before using; discard water
Cotton ..	Fibre..	Mar. to Apr.	Oct. to Nov.	Oct. to Nov.	3 6	1 0	15 to 20 lb. delinted seed	..	5 to 7 ..	..
Cowpeas ..	Green feed ..	Apr. to Sep.	Oct. to Jan.	Oct. to Jan.	5 0	1 6	2 or 3-eyed setts used	..	7 to 9 ..	Suitable for several ratoons
Cowpeas*	Seed, grazing and hay	Mar. to Apr.	Nov. to Jan.	Nov. to Jan.	3 0	0 6	6 to 10 lb.	15 to 20 lb.	3½ to 4½	For green manure purposes, see under "Leguminous cover crops"
Garlic ..	Market ..	Mar. to May	Apr. to May	Apr. to May	1 6	0 6	Small bulbs ..	..	6 ..	..
Grasses (see Pastures)										

\* The use of bacterial inoculum with most leguminous plants is recommended. Supplies are obtainable free from the Department of Agriculture and Stock, Brisbane, Gympie or Warwick.

NORTHERN DISTRICTS—continued.  
 SOWING AND PLANTING TABLE FOR FIELD CROPS.  
 (This Table requires to be adapted to suit individual circumstances.)

Crop.	Main Purpose for Which Grown.	When to Sow or Plant.			How Sown or Planted.			Approximate Period of Growth of Crop in Months.	Remarks.
		Coastal Districts.	Tableland Districts.	Inland Districts.	Distance Between Rows Apart.	Quantity of Seed per acre if Drilled.	Quantity of Seed per acre if Broadcast.		
					Ft. in.	Ft. in.			
Leguminous Crops—	Cover								
Blue Lupin	Green manure	Autumn	Autumn	Autumn	Drilled	1 bus.	1½ bus.	5	Erect growth
Calopo	Green manure	Summer	Summer	Summer	..	..	3 lb.	18 or more	Long-term cover; creeping growth
Centro	Green manure	Summer	Summer	Summer	..	..	3 lb.	18 or more	Long-term cover; creeping growth
Cowpeas	Green manure	Summer	Summer	Summer	Drilled	20 to 25 lb.	25 to 30 lb.	3½ to 5	Creeping growth
Cusara Pea	Green manure	Summer	Summer	Summer	Drilled	5 lb.	10 lb.	5 to 6	Erect growth
Field Pea	Green manure	Autumn	Autumn	Autumn	Drilled	1 to 1½ bus.	1½ to 2 bus.	3 to 4	Creeping growth
Gambia Pea	Green manure	Summer	Summer	Summer	Drilled	5 lb.	10 lb.	5 to 6	Erect growth
Mauritius (Velvet) Bean	Green manure	Summer	Summer	Summer	3 0	2 0	40 to 60 lb.	3 to 4	Creeping growth
Poona Pea	Green manure	Summer	Summer	Summer	Drilled	20 to 25 lb.	20 to 30 lb.	3½ to 4	Semi-erect growth
Puerto	Green manure	Summer	Summer	Summer	..	..	3 lb.	18 or more	Long-term cover; creeping growth
Rice Bean	Green manure	Summer	Summer	Summer	Drilled	15 to 20 lb.	20 to 25 lb.	4 to 5	Creeping growth
Soybean	Green manure	Summer	Summer	Summer	Drilled	20 to 30 lb.	25 to 35 lb.	3 to 4	Semi-erect growth
Tangier Pea	Green manure	Autumn	Autumn	Autumn	Drilled	10 lb.	12 lb.	5	Creeping growth
Vetches or Tares	Green manure	Autumn	Autumn	Autumn	Drilled	¾ to 1 bus.	1 to 1½ bus.	3½ to 4½	Creeping growth
Linseed (Flax)	Seed for oil	Apr. to June	Apr. to June	Apr. to June	Drilled	20 to 25 lb.	..	4½ to 5	..
Lucerne*	Hay and grazing	Apr. to May	Apr. to May	Apr. to May	Drilled	10 to 12 lb.	14 to 18 lb.	8	For grazing in drier areas 4 to 6 lb.; in grass mixtures 1 to 3 lb.
Maize	Grain and green feed	Mar. to Aug.	Nov. to Jan.	Nov. to Jan.	4 0	1 3	56 lb. for green feed	4 to 5	For green feed closer row and plant spacing with increased seed rate
Pop Corn	Grain	Mar. to Sep.	Nov. to Jan.	Nov. to Jan.	3 6	1 0	5 to 7 lb.	4	..
Sweet Corn	Market	Mar. to Sep.	Nov. to Jan.	Nov. to Jan.	3 6	1 0	6 to 8 lb.	3	..



Kangel and Beet	Stock food	Mar. to May	Mar. to May	Mar. to May	2 6	1 0	4 to 6 lb.	6 to 7	..
Millet (French)	Seed	Mar. to Aug.	Nov. to Feb.	Drilled	..	..	20 lb.	2 to 2½	..
Millet (Giant and Dwarf Setaria)	Seed, hay and grazing	Mar. to Dec.	Nov. to Feb.	Drilled	..	..	20 lb.	2½ to 3	Can be grazed earlier if required
Millet (Japanese)	Hay, green feed and grazing	Mar. to Dec.	Nov. to Feb.	Drilled	..	..	20 lb.	2 to 3	Can be grazed earlier if required
Millet (White Panicum)	Grain, green feed, hay and grazing	Mar. to Dec.	Nov. to Feb.	Drilled	..	..	20 lb.	2½ to 3	Can be grazed earlier if required
Oats	Grazing, green feed and hay	Mar. to June	Feb. to June	Drilled	..	..	1½ bus.	3 to 5	..
Onion	Market	Apr. to May	Apr. to May	1 2	3 to 6 in.	..	1½ to 3 lb.	5 to 6	..
Panicum (see Millets)									
Pasture Grasses— Buffel	Pasture	..	..	..	..	..	2 to 3 lb.	Perennial; summer grower	Suitable for sandy soils in dry areas
Elephant	Pasture and green feed	Sep. to Jan.	Oct. to Jan.	5 0	2 6	..	Root and stem cuttings used	Perennial; summer grower	Grazed or cut frequently to prevent woody stems developing; ratoons vigorously
Green Panic	Pasture	..	Oct. to Feb.	..	..	..	2 to 4 lb.	Perennial; summer grower	Planting rate may vary according to germination of seed
Guinea (Common and Purple Top)	Pasture	Aug. to May	Oct. to Feb.	4 0	3 0	..	Root cuttings may be used	Perennial; summer grower	Provides best pasture if excessive stem development is prevented
Kikuyu	Pasture	Aug. to May	Oct. to Feb.	3 0	3 0	..	Runner cuttings used; or plough or disc in chopped runners	Perennial; summer grower	Does best on well drained uplands in higher rainfall areas
Mitchell	Pasture	..	..	..	..	..	2 to 3 lb.	Perennial; summer grower	..
Molasses	Pasture	Aug. to May	Oct. to Feb.	..	..	..	2 to 4 lb.	Perennial; summer grower	Used on scrub burns; needs careful management
Para	Pasture	Aug. to May	Oct. to Feb.	6 0	6 0	..	Runner cuttings used; or plough or disc in chopped runners	Perennial; summer grower	..

\* See footnote on page 409.

NORTHERN DISTRICTS—continued.

SOWING AND PLANTING TABLE FOR FIELD CROPS.  
(This Table requires to be adapted to suit individual circumstances.)

Crop.	Main Purpose for Which Grown.	When to Sow or Plant.				How Sown or Planted.				Approximate Period of Growth of Crop in Months.	Remarks.
		Coastal Districts.		Inland Districts.		Distance Between Rows Apart.	Distance Between Plants.	Quantity of Seed per acre if Drilled.	Quantity of Seed per acre if Broadcast.		
		Coastal Districts.	Inland Districts.	Coastal Districts.	Inland Districts.						
Paspalum ..	Pasture ..	Sep. to Mar.	Oct. to Feb.	Oct. to Feb.	..	Ft. in. ..	..	8 to 12 lb.	Perennial; summer grower	Does not thrive in extreme dry heat; best results from sowing in prolonged showery weather	
Prairie ..	Pasture ..	Mar. to May	Mar. to May	Mar. to May	..	..	..	20 to 25 lb.	Annual; winter and spring grower	..	
Rhodes ..	Pasture ..	Sep. to Mar.	Oct. to Feb.	Oct. to Feb.	..	..	2 to 4 lb.	8 to 12 lb.	Perennial; summer grower	Best results from sowing in prolonged showery weather	
Pasture Legumes*— Calopo ..	Pasture mixtures ..	Sep. to Dec.	..	..	..	..	..	3 lb. in mixtures	Perennial; summer grower	Less palatable than other tropical legumes	
Centro ..	Pasture mixtures ..	Sep. to Dec.	..	..	..	..	..	2 to 4 lb. in mixtures	Perennial; summer grower	Stock must acquire a taste for this legume	
Puero ..	Pasture mixtures ..	Sep. to Dec.	..	..	12 0	6 0	..	3 lb. in mixtures	Perennial; summer grower	Very palatable	
Stylo ..	Pasture mixtures ..	Sep. to Dec.	..	..	..	..	..	2 lb. in mixtures	Perennial; summer grower	Palatability uncertain; stock must acquire a taste	
Townsville Lucerne ..	Pasture mixtures ..	Sep. to Mar.	Sep. to Mar.	Sep. to Mar.	..	..	..	3 to 4 lb.	Annual; summer grower	..	
White Clover ..	Pasture mixtures ..	..	Mar. to May	..	..	..	..	2 lb. in mixtures	Perennial; winter and spring grower	..	
Pea, Field* ..	Green feed and grazing	Apr. to June	Feb. to June	Feb. to June	..	Drilled	1 to 1½ bus.	1½ to 2 bus.	3 to 4 ..	When sown in combination with a cereal, ½ to ¾ bus. per acre. For green manure purposes, see under "Leguminous cover crops."	



Peanut	..	Kernels	..	Mar. to Aug.	Nov. to Jan.	Nov. to Jan.	3 0	1 3	25 to 30 lb. of kernels	..	4 to 5	..
Potato	..	Market	..	Apr. to May	July and Jan.	July and Jan.	3 6	1 0	6 to 8 cwt. of tubers	..	3 to 4	..
Pumpkin	..	Market and stock food	..	Mar. to Aug.	Nov. to Jan.	Nov. to Jan.	8 to 12 feet	3 to 4 feet	2 to 3 lb. ..	..	5 to 6	..
Rape ..	..	Stock feed	..	Mar. to June	Mar. to June	Mar. to June	Drilled	..	5 to 6 lb. ..	6 to 8 lb. ..	2½ to 4	..
Rice, Swamp	..	Grain	..	Nov. to Jan.	Nov. to Jan.	Nov. to Jan.	Drilled	..	80 to 120 lb.	..	4 to 5	..
Rice, Upland	..	Grain	..	Nov. to Jan.	Nov. to Jan.	Nov. to Jan.	Drilled	..	60 to 90 lb.	..	4 to 5	..
Rye ..	..	Grain and grazing	..	Mar. to June	Feb. to June	Feb. to June	Drilled	..	¾ to 1 bus.	1 to 1½ bus.	3 to 5	..
Sorghum, Grain	..	Grain; stubble grazing	..	Mar. to Aug.	Nov. to Jan.	Nov. to Jan.	14 to 42 in.	..	4 to 12 lb.	12 to 20 lb.	3½ to 5	..
Sorghum, Sweet	..	Green feed	..	Mar. to Aug.	Nov. to Jan.	Nov. to Jan.	3 6	0 4	5 to 6 lb. ..	12 to 15 lb.	3½ to 5	..
Sudan Grass	..	Grazing and hay	..	Aug. to Dec.	Nov. to Feb.	Nov. to Feb.	Drilled	..	8 to 10 lb.	10 to 14 lb.	2 to 4	..
Soybean*	..	Seed, grazing and hay	..	Apr. to Sep.	Nov. to Jan.	Nov. to Jan.	2 6	4 to 6 in.	15 to 20 lb.	25 to 35 lb.	3½ to 4½	..
Sunflowers	..	Seed for oil and bird seed	..	Apr. to Sep.	Nov. to Jan.	Nov. to Jan.	3 0 or 3 6	1 0	4 to 6 lb. ..	..	4 to 5	..
Sweet Potato	..	Market and stock fodder	..	All seasons	Oct. to Feb.	Oct. to Feb.	4 0	2 0	Cuttings used	..	4 to 5	..
Tobacco	..	Leaf	..	Mid-May and June	July to Oct.	July to Oct.	4 0	1 6 to 2 0	½ oz. in seed-beds	..	3 to 4	..
Turnip Swede	(including)	Market and stock food	..	Apr. to Aug.	Mar. to June	Mar. to June	2 0	1 0	1½ to 2 lb.	3 to 4 lb. ..	4 to 5	..
Vetches or Tares*	..	Grazing	..	Apr. to June	Mar. to June	Mar. to June	Drilled	..	30 to 40 lb.	40 to 60 lb.	3 to 4	..
Wheat	..	Grazing and hay	..	Apr. to June	Mar. to June	Mar. to June	Drilled	..	¾ to 1 bus.	1 to 1½ bus.	3 to 4	..

Requires constant flooding during growing period

Immature growth of any member of this group may contain poisonous properties; care should be exercised in grazing

Unsuitable for very wet coastal areas

Unsuitable for very wet coastal areas; wider spacing and less seed per acre where hand harvesting adopted

Plant in wet coastal areas usually after wet season; useful for pig raising

Plants must be reared in specially prepared seed-beds and transplanted when strong enough

For green manure purposes, 6% under "Leguminous cover crops"

Fodder purposes only; rust-resistant varieties recommended

\* See footnote on page 409.

# Official Test of New Fordson Major (Kerosene Model) Tractor

## 1. THE TESTS.

(1) After twelve hours of running-in, two types of tests were carried out, in order to measure *the performance of the engine*, as measured by the power in the belt driven by the belt pulley, and *the performance of the tractor as a whole*, as measured by drawbar pull, tractor speed, wheel slip, and drawbar horsepower (d.b.h.p.) with the tractor running on a bitumen test track.

The main results of these tests are given in Sections 2, 3, and 4. Other measurements and observations were made of various features of the tractor; these are given in Section 5.

(2) GOVERNOR CONTROL.—For maximum loads the throttle was full open; for part loads the governor control was set to give rated speed at the desired loads.

(3) FUEL.—Power Kerosene, Octane No. 56; Specific Gravity 0.829; weight per Imperial gallon 8.29 lb.

### (4) EXPLANATORY NOTES.—

- (a) Corrected maximum h.p. for carburettor engines is calculated by a suitable formula from observed maximum h.p. corrected to 60° F. and 29.92 in. (sea level) barometric pressure.
- (b) Engines are not expected to run indefinitely at full or maximum power output. But they can be expected to run continuously for some hours at *rated* output, which is less than maximum, defined as follows:—
  - (b1) Rated b.h.p. is defined as 85 per cent. of corrected maximum d.b.h.p.
  - (b2) Rated d.b.h.p. is defined as 75 per cent. of corrected maximum d.b.h.p.
- (c) Fuel consumption in gallons/hr. may be a simple unit, but it has little meaning unless we also quote the corresponding h.p. output.
- (d) This is the "specific fuel consumption", the weight of fuel consumed per unit of energy developed by the engine; the unit of energy here is the h.p.-hr., similar to the electrical "unit", the kilowatt-hr. When this figure is least the engine is giving its best economy or efficiency. It is easy



to change column (c) to column (d) in Table 1, e.g., as follows:—

2.75 galls./hr. while developing 31.8 h.p. means  $2.75 \div 31.8$  gall./b.h.p./hr. = 0.087 gall./b.h.p./hr.

0.087 gall./b.h.p./hr.  $\times$  8.29 lb./gallon for this fuel = 0.72 lb./b.h.p./hr., as shown in column (d).

- (e) Line 7, Table 1, represents the average performance one might expect from the engine while driving a variety of belt loads, from light to heavy. In terms of average fuel consumption, it means about 2 to 2 $\frac{1}{4}$  gallons an hour.
- (f) D.B.H.P. is the product of pull (lb.) and speed (m.p.h.) divided by 375.
- (g) Wheel slip can be measured by noting that, in travelling a given distance, the back wheels make more turns when working under load than when running with no load on the drawbar. The difference in these revolution counts divided by the former count gives the slip as a ratio, which can be written as a percentage (quoted in these tables to the nearest whole number).
- (h) These are not the maximum pulls available in the gears (i.e., not the maximum sustained pulls), but the pulls at maximum d.b. power, i.e., at full throttle at rated engine speed.

## 2. BELT TESTS.

The belt tests show the power (belt horsepower, b.h.p.) that the tractor may be expected to deliver when driving a machine by the belt. (see Table 1.)

TABLE 1.

BELT TEST RESULTS.

If there is only one fuel setting, no mention will be made of mixture settings in this table.

	B.H.P.	Engine Speed.	Fuel.	
			Gall./hr. (c).	lb./b.h.p. hr. (d).
1. Rated engine speed, 1,600 r.p.m.				
2. Fast idling speed, about 1,720 r.p.m.				
3. Observed maximum b.h.p. at rated speed .. .. .	31.8	1,599	2.75	0.72
4. Corrected maximum b.h.p. rated speed (a) .. .. .	32.3	Observed maximum value corrected for atmospheric temperature and pressure at time of test.		
5. Calculated rated load (b1) .. .. .	27.5			
6. Test at approximately rated load*	27.0	1,603	2.54	0.78
7. Average reading under governor (e)	17	1,640	2.1	1.0
8. Equivalent engine torque at full throttle	104 ft. lb. at maximum power and rated speed 125 ft. lb. (maximum) at 986 r.p.m.			

\* Governor set to run this test at approximately rated speed.

## 3. DRAWBAR TESTS.

Tables 2-4 show the drawbar performance of the tractor, on the bitumen test track, wearing rear tyres 14 x 28, carrying standard weight (1,930 lb. front, 5,380 lb. rear; total, 7310 lb.), working in the gears named in the tables. Height of drawbar 14½ in.

TABLE 2.  
MAXIMUM POWER IN RATED (3RD) GEAR.

1. Rated engine speed, 1,600 r.p.m.	D.B.H.P. (f).	Pull	Speed	Wheel Slip (g).
2. Observed maximum d.b.h.p., at rated engine speed .. ..	29.2	lb. 3,160	m.p.h. 3.46	% 7
3. Corrected maximum d.b.h.p., at rated engine speed (a) ..	29.0	Observed maximum value above corrected for atmospheric conditions at time of test.		
4. Calculated rated load, (b2) ..	21.8			

TABLE 3.  
PULL AT MAXIMUM D.B.H.P.—ALL GEARS, RATED ENGINE SPEED  
(SEE NOTE (h)).

Gear.	D.B.H.P.	Pull.	Speed	Wheel Slip
1 .. .. .	24	lb. 5,400	m.p.h. 1.7	% 20
2 .. .. .	29	4,170	2.6	10
3 .. .. .	29	3,160	3.5	7
4 .. .. .	29	2,190	5.0	4
5 .. .. .	28	1,500	7.1	2
6 .. .. .	20	580*	13.0	½

\* The accuracy of the drawbar dynamometer at this load is suspect.

TABLE 4.  
VARIOUS LOADS IN RATED (3RD) GEAR.\*

Pull.	Speed.	D.B.H.P.	Per cent. of Maximum d.b.h.p.	Slip.	Fuel.	
					Gall./hr.	lb./d.b.h.p. hr.
lb.	m.p.h.			%		
1,320 ..	3.50	12	42	2	1.9	1.25
1,830 ..	3.54	17	60	3	2.1	1.00
2,320† ..	3.55	22†	76†	3	2.3	0.87
2,820 ..	3.54	27	92	4	2.6	0.79

\* Governor set to run these tests at approximately rated engine speed.

† Approximately the rated drawbar load.



### Interpretation of Drawbar Tests.

(i.) Drawbar tests are carried out on a hard prepared surface. Most field conditions present higher resistance to the tractor's motion, so that, in the field, the maximum drawbar pulls available in any gear will usually be less than those shown in the tables.

(ii.) Wheel slip may also be greater in the field; to that extent, tractor speeds in miles per hour in the field will be less than those shown in the tables.

(iii.) Because of (i.) and (ii.) above, the drawbar horsepowers available in any gear in the field will usually be less than those shown in the tables.

### 4. SUMMARY OF POWER OUTPUT.

	At the Belt.	At the Drawbar.
Rated engine speed, r.p.m. .. .. .	1,600	1,600
Corrected maximum power (a) .. .. .	32.3	29.0
Rated power (b) .. .. .	27.5 (b1)	21.8 (b2)

NOTE.—Letters in brackets inside the tables refer to explanatory notes.

### 5. OTHER OBSERVATIONS.

(1) DURATION OF TEST.—68 hours, including running-in.

(2) REPAIRS AND ADJUSTMENTS.—It was necessary to bend arm from governor to throttle valve to ensure extreme throttle opening.

(3) ENGINE.—

*Fuel settings*—one only.

*Heat controls*—radiator; hand-controlled shutter; vaporiser.

*Radiator water used*—none.

*Lubricating oil*—type used:—S.A.E. 30.

Weight to engine, 15.4 lb.;

Weight from engine after tests, 17.7 lb.

(4) INSPECTION OF ENGINE AND TRANSMISSION AFTER TEST.—After testing, the tractor was partly dismantled and inspected and found to be in a satisfactory condition.

(5) TRACTOR WEIGHTS (lb.).—

	Front.	Rear.	Total.
*Minimum weight, unballasted .. .. .	1,910	4,420	6,330
Added weights .. .. .	..	..	..
Water ballast .. .. .	..	980	980
†Standard weight, as usually supplied and recommended .. .. .	1,930	5,380	7,310

\* This weight, less driver, was used in finding centre of gravity.

† Weight of tractor in drawbar tests quoted in this report.

## (6) WHEELS AND TYRES.—

Tyres.	Front.	Rear.
Type .. .. .	Rib .. .. .	Open centre bar tread
Size .. .. .	7.50 x 16 x 6 ply ..	14 x 28 x 6 ply
Pressure .. .. .	25 psi. .. .. .	14 psi.

(7) STEERING, with track widths, front 54in., rear 60in.—

*Turning circles:* Without brakes, 28½ft. L.H., 27½ ft. R.H.; with brakes, 25½ft. L.H., 25ft. R.H.

*Comment:* The tractor was easy to steer with the steering wheel while under load.

(8) CENTRE OF GRAVITY, with tractor in minimum weight less driver.—Height above ground, 2ft. 4in. Distance forward of rear axle, 2ft.

The tests were carried out on behalf of the Australian Tractor Testing Committee.

## HAVE YOUR SEEDS TESTED FREE

The Department of Agriculture and Stock examines FREE OF CHARGE samples representing seed purchased by farmers for their own sowing.

The sample submitted should be representative of the bulk and a covering letter should be sent advising despatch of the sample.

### MARK YOUR SAMPLE

Sample of ..... seed  
 Drawn from ..... bags  
 Representing a total of .....  
 Purchased from .....  
 Name and Address of Sender  
 Date.....

### SIZE OF SAMPLE

Barley - 8 oz. Oats - 8 oz.  
 Beans - 8 oz. Peas - 8 oz.  
 Grasses 2 oz. Sorghum 4 oz.  
 Lucerne 4 oz. Sudan - 4 oz.  
 Millets 4 oz. Wheat - 8 oz.  
 Vegetable Seeds - ½ oz.

SEND YOUR SAMPLE TO—STANDARDS OFFICER,  
 DEPARTMENT OF AGRICULTURE AND STOCK, BRISBANE.



# Refrigeration Defeats Isolation

Reported by J. A. HINDS, Senior Dairy Adviser, Rockhampton.

Once-a-week delivery to the factory and all choice cream is the achievement of a Central Queensland dairyman. He lists two things as being mainly responsible for these results—farm refrigeration and a high standard of dairy hygiene.

The farmer concerned is Mr. Alan Mylrea, of "Wattlebank," Canoona, the rail centre of a grazing district approximately 40 miles north of Rockhampton. Several of the Canoona property owners, including Mr. Mylrea, have carried on dairying for a number of years.

Cream has been picked up by the mailman twice weekly and delivered to rail at Canoona. As a result of isolation and poor cream transport, cream quality has been poor, a large percentage of the cream from the district being second grade.

Mr. Mylrea was particularly disappointed with the quality of his product. During the middle of 1955 he took steps to remedy this position, and as a result a farm refrigerator was installed during June.

With an eye to costs and to overcome unsatisfactory transport conditions, Mr. Mylrea commenced holding cream for a week on his farm. Since installing the refrigerator he has been able to deliver his cream personally to the factory on his weekly visits to Rockhampton for supplies.



Plate 1.

The Dairy Building is Substantial But Not Elaborate. Shed cleanliness is emphasised.

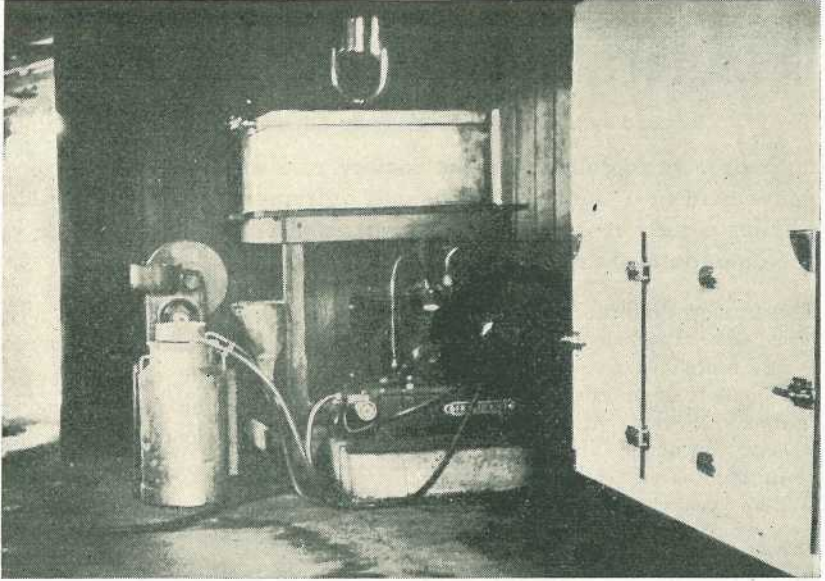


Plate 2.

View of the Separator Room. Note the refrigerator cabinet, compressor unit, shock cooler and milk vat.

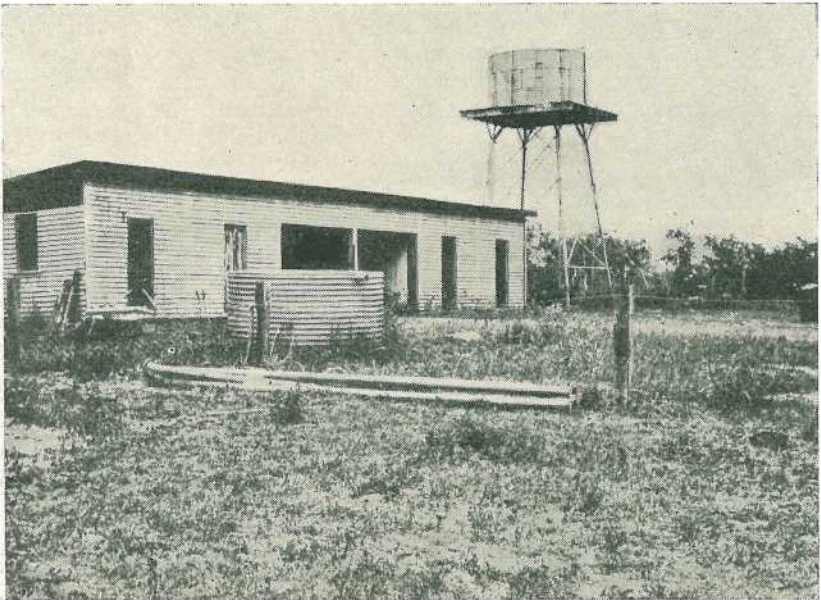


Plate 3.

Machinery Shed and Elevated 2,000 Gallon Tank.



On a few occasions he has held his cream for 10 days on the farm. Such a case occurred during the heat-wave conditions over the Christmas period last year. This cream was graded 100 per cent. choice under these conditions.

It has been stated by Departmental officers that Mr. Mylrea's cream ranks with the best cream they have graded at any factory in Queensland.

Mr. Mylrea stresses that a high standard of dairy hygiene is necessary to achieve these results. The combined dairy building on the farm is a substantial structure but not elaborate. A 2,000 gallon elevated tank ensures adequate water for cleansing and hosing down of floors. A steam sterilizer is used to sterilize all equipment. The cleanser used is caustic soda with a wetting agent.

On this farm, it has been found that the shock cooler is an essential piece of equipment. It ensures that the cream is cooled immediately after separating and the cream remains in a viscous condition during storage.

The refrigerator brine is kept between 20 deg. and 30 deg. F. This

is achieved by running the refrigerator 6½ hours a day in the hot weather and 5 hours a day in cooler weather.

Another point stressed by this farmer is that he stirs each can of cream at least once a day.

With the reduction in cartage costs and the extra income derived from improved grades, the refrigerator is paying for itself. However, Mr. Mylrea takes much satisfaction in knowing that he is supplying a good product to the factory. He maintains that it is essential in the interests of the industry to place the best possible article before the consumer.

The achievements of this farmer in overcoming isolation and poor transport undoubtedly will be of interest to other farmers so placed. Looking further into the facts it could be that refrigeration will alter our present system of delivery of cream to factories. Refrigeration is capable of reducing the number of deliveries to a factory and at the same time improving quality, provided a high standard of hygiene is maintained.

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### QUEENSLAND POCKET YEAR BOOK.

The 1956 issue of this publication is available from the Government Statistician's Offices at Brisbane, Toowoomba, Townsville, and Rockhampton at six pence a copy, plus three pence postage.

This statistical booklet will be of value as a handy reference to all persons interested in the political, business, and social life of Queensland. Its 128 pages cover the main subjects in every section of the State's statistics. Most of the tables are for 20 years, concluding generally with the financial year 1954-55 or the calendar year of 1955.

One of the most popular features of the booklet has proved to be the population figures, which are given for the chief towns of Queensland, the six capital cities, and the Australian States.

The following are a few samples of the wide range of information about Queensland which can be found in its pages:—

Population grew from 1 million before the last war to 1½ million to-day.

Queensland has 53.6 per cent. of Australia's beef cattle, and produced over 98 per cent. of its sugar.

Tractors on farms have increased from 23,727 to 39,969 in five years.

Casualties resulting from traffic accidents have increased from 4,973 to 8,694 in five years.

Telephone calls made have more than doubled in twenty years.

# The Cream Separator as Used on Dairy Farms in Queensland

By J. D. ELINGTON, Senior Adviser (Machinery), Division of Dairying.

(Continued from page 372 of the June issue.)

## VII. MAINTENANCE AND PERIODICAL CHECKING.

It is essential for the separator to receive proper maintenance, periodical checking and replacement of worn parts if it is to give effective service for its full life.

A periodical check every 8-12 weeks is recommended, and could be done in a few minutes, in the following way:—

### (1) Firm Foundation.

Grasp the separator frame firmly with both hands and endeavour to move it in any direction. Correct any looseness.

### (2) Level.

Place a spirit level on the frame in the position shown in Plate 5. Turn the spirit level 90 deg.; the machine should be level in both directions.

The bowl as previously mentioned travels at approximately 7,500 r.p.m. and any machine travelling at that speed must be firm and level. Any variation, however slight, from these conditions will cause excessive wear of bearings, bowl wobble, shorter effective life of the machine and general inefficiency. Even though the machine was level when installed, it is advisable to try it at each periodical check with a spirit level known to be true.

### (3) Lubrication.

The separator requires very little lubrication and therefore this important point in its care is frequently neglected. Most separators are lubricated by the splash system from a well of oil located in the sump. Separator oil is a very light grade and the correct grade of oil must be used. This oil is packed in convenient containers of  $\frac{1}{2}$  or 1 gallon size. The oil must be kept up to the correct level and changed every 8-12 weeks. After a period of time, a deposit of sludge appears in the oil, so periodically the back plate should be removed and this sludge flushed from the sump with petrol. When draining the oil, the drain plug should be removed immediately after the machine has been used and before the sludge settles.

There are three "don'ts" regarding separator lubrication:—

*Don't* use thick oil thinned with kerosene.

*Don't* use a large quantity of water to flush out any milk from the bowl chamber, as this water may find its way down the spindle tube and into the oil.

*Don't* forget to change the oil every 8-12 weeks.



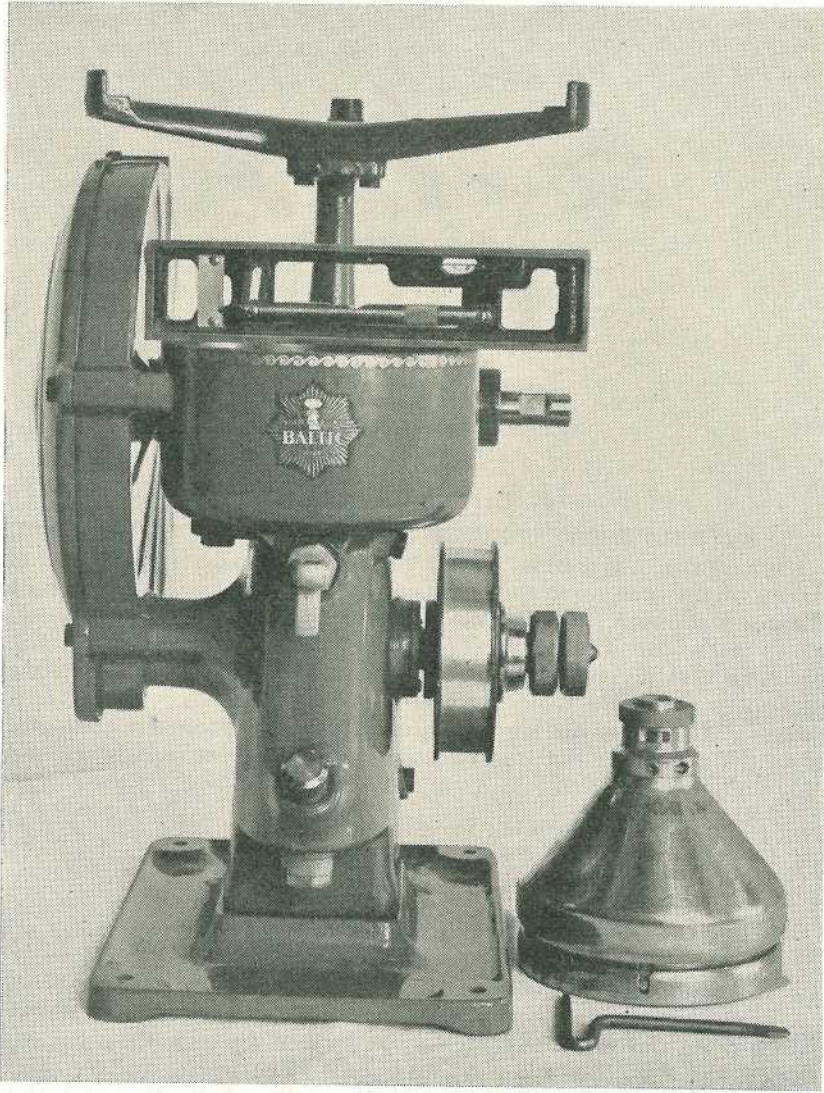


Plate 5.

**Checking for Level.** The spirit level should be placed across the bowl compartment and should read level wherever it is placed on the compartment.

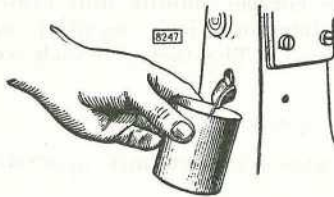


Plate 6.

**Draining Used Oil from a Separator.**

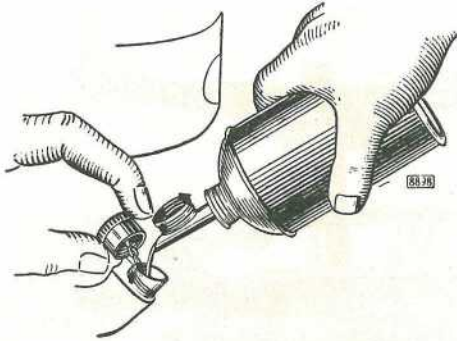


Plate 7.  
Adding Oil to a Separator.

#### (4) Driving Mechanism.

Examine the engine and the two countershaft pulleys for looseness on their shafts. Examine and lubricate countershaft bearings, and examine engine and separator belts for correct tension. A shiny pulley indicates a slipping belt, and the belt will slip if the separator becomes stiff to turn for any reason. The friction clutch needs attention occasionally. One make of separator has an in-built automatic clutch. This separator should reach top speed in four minutes. If it does not do so, consult the instruction book and adjust the clutch screw (opposite side to the motor) so that the bowl does reach correct separating speed in four minutes.

To test the manual clutch for slip, hold the bowl with one hand and with the clutch screwed up tight attempt to turn the pulley. This should be very difficult to do.

This clutch consists of a pulley clamped between two plates with a fibre washer between each plate and the pulley. These fibre washers wear and must be replaced periodically, otherwise the clutch will slip. To replace them, remove the end screw in the centre of the shaft with a screwdriver and remove the parts one by one, keeping them in order. Notice which way the ball races come off. The worn washers can be removed and replaced with new ones; the pulley, ball races and plates are then replaced so that they are in their original positions and the end screw replaced. This operation will only occupy a few minutes and is very simple.

Table 1 shows the correct handle and clutch speed for various makes and models of separators; it is essential for the separator to be driven at the correct speed. The factors which would cause this speed to vary are:—

Incorrect engine speed.

Difficult speed ratio—countershaft to separator pulley.

Slipping belts.

Slipping clutch.



### (5) Spindle and Neck Bearing.

The spindle on which the bowl is placed should be grasped firmly and moved sideways in all directions. Spring resistance should be felt. If this resistance is less than usual in any direction, suspect a broken neck bearing spring. To extract the spindle and neck bearing, remove the bolts which hold the top bearing and/or cover plate in place. These bolts are located around the spindle in the bowl chamber, and are in a vertical position. Unscrew the brake and locking bolt below the bowl housing (if fitted) and draw the spindle and neck bearing out. Examine the neck spring, and also the teeth of the worm gear.

### (6) Bowl.

Assemble the bowl, examining each part carefully.

(a) *Bowl bottom.*—Examine the plug in the central tube for looseness, and the bar on which the bowl sits for wear, and the whole assembly in case it has warped. If the threads are worn, it is not advisable to cut off portion of the central tube and weld another threaded piece in its place, because the weld may break and allow the bowl to burst. This fault can be successfully repaired by removing all of the central tube and replacing it with a complete new tube having a flange around the base, the tube being pushed through the base from the bottom, or by carefully building up the worn thread with weld, machining and re-cutting a new thread.

(b) *Rubber ring.*—Examine and replace if it is worn or stretched.

(c) *Distributor.*—This part must fit snugly over the bowl stem, otherwise there is a likelihood of a mixing of cream and skim-milk, or cream and wholemilk.

(d) *Conical plates or discs.*—See that they are in correct order, as the bottom disc is usually different from the rest. It has distance pieces or caulks on both the upper and lower surface, and sometimes three small lugs on the outer circumference. The other discs have caulks on the upper surface only. These caulks gradually wear down, causing the plates to become loose when the bowl is assembled. An additional plate or plates should then be added, but after approximately four have been added the bowl becomes almost solid metal and cannot separate efficiently because there is not sufficient space between the plates for the milk to flow freely. A new set of plates should then be fitted to the bowl.

Separator companies will not, as a rule, supply a farmer with a full set of plates because this may throw the bowl seriously out of balance. Generally, the procedure to obtain a new set of plates is:—

- (i.) Write to the company distributing the separator, setting out the make, model, capacity and number of the separator.
- (ii.) The company will forward a loan bowl on receipt of a deposit from the farmer.
- (iii.) Send the faulty bowl to the company, which will then assess the cost of repairs and advise the farmer.
- (iv.) If the farmer decides the cost is economical, he is required to pay in advance for the repairs, the job is done and the bowl is returned to him.

- (v.) When the loan bowl is returned the company will refund the deposit, less freight and hiring charges.
- (vi.) Should the farmer decide not to proceed with the repairs the company will return his bowl and on receipt of the loan bowl will refund his deposit, less freight and hiring charges.

*Note.*—The above procedure is a guide. The actual procedure is determined by individual company policy.

(e) *The false top.*—This part must fit closely over the centre tube, and if fitted with a cream screw, notice the position of this screw. If the screw appears to be “in” further than normal, then suspect—

- (a) Low butterfat test milk.
- (b) Slipping belts or other reasons for slow speed.
- (c) Too much milk entering the bowl (for example, vat tap too high above the float).

If the screw appears to be “out” further than normal, suspect—

- (a) High butterfat test milk.
- (b) Speed too high.
- (c) Bowl starved for milk, due to the vat tap being too low or there being a constriction in the feed tube from the milk reservoir to the bowl.

The actual position of these screws is governed by the required cream test.

(f) *Bowl top or bowl hood.*—This part must fit neatly into place and be placed in position carefully each time the separator is assembled. Ill treatment will damage its shape, loosen the locating pin, and cause the bowl to leak. A loose pin should only be re-sweated in place by a competent man, as the placing of a large piece of solder on the outer rim of the bowl will seriously upset the balance.

The pieces of solder located inside the bowl top should not be altered, as this solder is actually the balance weight, which is accurately placed and of a specific size for each bowl.

Scrubbing the bowl cover with abrasives such as steel wool will wear these weights and throw the bowl out of balance.

If the bowl top is fitted with screws in the skim-milk outlet to adjust the percentage of butterfat in the cream (cream test), remember that they are adjusted in the opposite direction from cream screw adjustments. If these screws appear to be “out” or “in” further than normal, then examine the factors mentioned above under the sub-heading “false top.”

(g) *Bowl nut.*—The nut is made of softer material than the bowl stem for the following reasons. It is cheaper to replace; it will not “bind” into place when screwed down and will wear before the bowl stem. The threads then “strip,” as a result of this wear. For safety, the nut should be examined closely at frequent intervals and replaced when the threads show signs of wear. The wear occurs on the side of the thread rather than the tip.

Finally, place the bowl into position on the spindle and start the separator. When the bowl reaches top speed, notice its behaviour. It should rotate with very little vibration. If vibration is excessive, the bowl requires rebalancing.



### (7) Cream and Milk Spouts.

Occasionally, due to rough handling, a crack develops around the edge of the dish to which the actual spout is attached. If the skim-milk spout is cracked, then skim-milk can drip through and issue from the drain hole in the bowl compartment of the frame. This drip is frequently caused by a leaking bowl, but in this case the skim-milk spout needs to be re-soldered. A similar crack in the cream spout allows cream to drip through into the skim-milk. This fault is serious, causing financial loss, and should receive immediate attention.

### (8) Height of the Bowl.

The separator bowl must be the correct height relative to the cream and skim-milk spouts. If it is too high, some skim-milk will be delivered into the cream spout and difficulty will be experienced in keeping the test high enough. The bowl is also likely to damage the tinware.

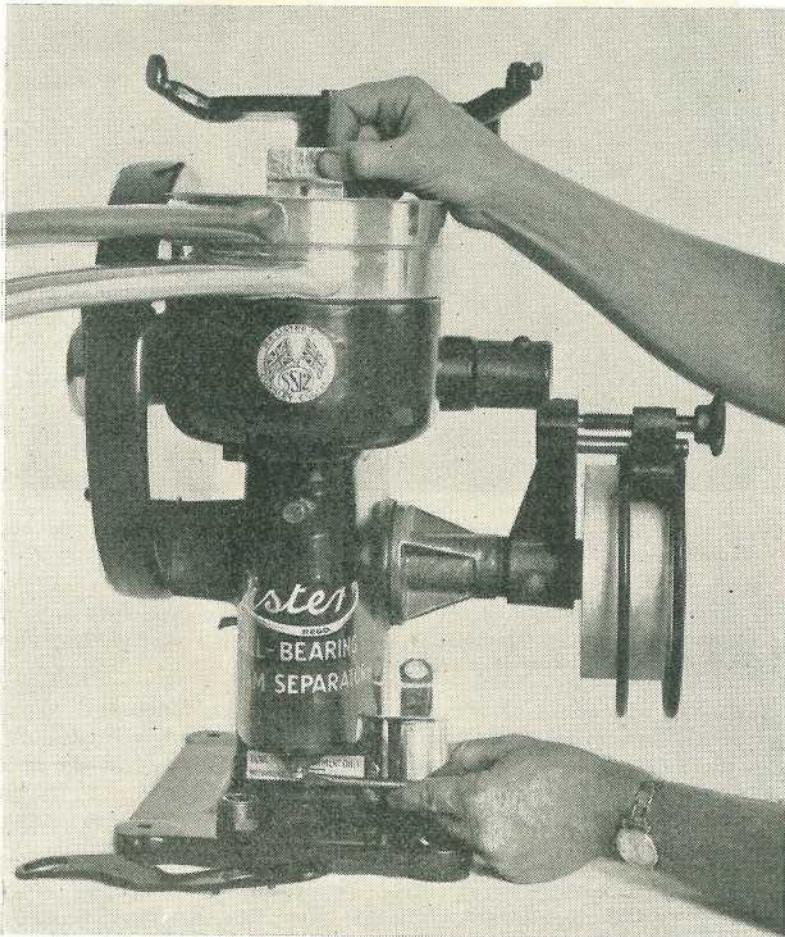


Plate 8.

Adjusting the Bowl Height of a Lister Separator.



Plate 9.

**Correct Height of an Alfa Separator Bowl.** The measurement is  $\frac{1}{24}$ th inch

If it is too low, some of the cream will be delivered into the skim-milk spout and lost, and some of the skim-milk will spray underneath the spout and drip from the frame of the machine.

With the exception of the suspended-bowl machines and one new model of an American separator, all machines have an adjustment for setting the bowl at the correct height. This adjustment is at the bottom of the bowl-supporting spindle. Plate 8 shows an adjustment being made, while Plate 9 shows the correct height for another make of machine.

This adjustment is frequently found to be incorrect and is responsible for a considerable loss of butterfat in many separators. It should be checked at least every six months. The instruction manual supplied by the manufacturer with every separator will give directions on adjusting the height of the bowl.



**(9) Milk Supply System to the Separator Bowl.**

The controlled supply of milk to the separator bowl is necessary for efficient separation. Faults which cause inefficient separation are:—

- (a) *Vat bottom bulged.*—When the vat is in position on the vat stand, press the bottom of the vat by hand and watch the gooseneck. If the gooseneck kicks up, then some thin flat rectangular pieces of material should be placed under the vat so that there is a firm foundation for the bottom. When the vat has milk in it the weight of the milk cannot then cause the bottom to bulge down and the gooseneck to kick up.
- (b) *Tap adjustment.*—When the vat has a quantity of milk in it, the tap should be cut back so that the float can control the amount of milk entering the separator. As separation proceeds, the tap can be opened further and at the end of separation the vat should be tilted to deliver the last of the milk quickly to the bowl, keeping the float up to the tap right to the end of separation.
- (c) *Float clearance.*—The gooseneck must be the correct height above the float. Table 2 shows this height for various makes of separators.

TABLE 2.

## HEIGHT OF THE GOOSENECK ABOVE THE FLOAT.

<i>Alfa Separators</i> —	<i>Baltic Separators</i> —
Distance between gooseneck and float—	Distance between gooseneck and float— $\frac{3}{8}$ in.
75 and 100 g.p.h. models— $\frac{3}{8}$ in.	<i>Lister Separators</i> —
120 g.p.h. and over models— $\frac{3}{8}$ in.	Distance from a line across the top of the float chamber to the end of the gooseneck, in all models— $\frac{3}{8}$ in.

Faults which can develop within the separator itself may interrupt the supply of milk to the bowl. Each part should therefore be examined critically.

The float must be in good condition and in its original form. Removal of one or two of the fins fitted to some floats will cause the float to tilt to one side and then it cannot control the milk flow properly. Floats which leak are not satisfactory. Damaged floats should be repaired or replaced immediately.

The tube leading the milk from the float chamber or milk reservoir to the bowl plays a very important part in cream separation. The height of the milk tap and the size of this tube govern the amount of milk fed to the bowl. This tube should not be "rebored" or altered in size in any way.

Frequently the tip of the tube becomes burred over due to misuse during washing, and this burring appreciably reduces the amount of milk fed to the bowl. A rat-tail file can be used to remove this ledge.

During the last war, tubing of correct size was not always available and an oversize tube was then used and drawn in for the last half inch of its length to the correct diameter. This drawing in should not be confused with the burring mentioned in the previous paragraph.

[TO BE CONTINUED].

# White-eyed Drones

By C. ROFF, Adviser in Apiculture.

Recently, specimens of white-eyed drones (Plate 1) were found in one colony of a seven-hive apiary at New Farm, Brisbane. The number present was approximately half the drones in the colony.

This genetical abnormality is rare in Queensland and is of no local economic importance. Overseas, experimental breeding has shown that the condition is transmitted by queenbees in which it is a latent factor.

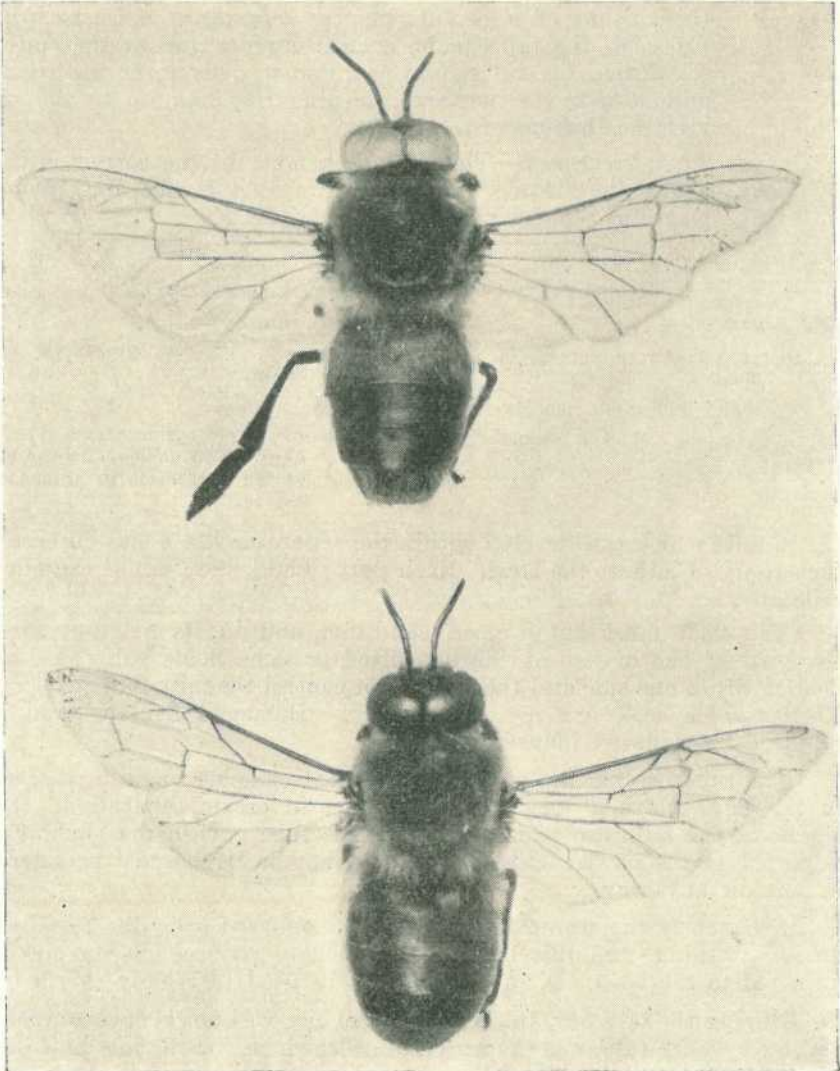


Plate 1.

White-eyed Drone Compared with a Normal Drone.



# The Honey Flora of South-eastern Queensland

By S. T. BLAKE (Botanist) and C. ROFF (Adviser in Apiculture), Science Branch.

(Continued from page 344 of the June issue.)

## TURPENTINE.

*Botanical Name.*—*Syncarpia glomulifera* (Sm.) Niedenzu.

*Other Botanical Name.*—*Syncarpia laurifolia* Ten.

*Distinguishing Features.*—Tree with thick, long-flaky, light-grey bark, leaves in clusters at the ends of the twigs and white flowers united in dense clusters with five petals and numerous stamens longer than the petals (Plates 156–157).



Plate 156.

Turpentine (*Syncarpia glomulifera*). Leaves, flowers and seed-capsules.

*Description.*—This is a tree up to 100 ft. high with thick, long-flaky bark, ashy grey outside and brown underneath. Often the trees are branched from low down, producing a long narrow crown. The leaves are arranged in clusters of 3 or 4, chiefly at the ends of the twigs; they are oval or narrowly oval in shape, blunt or somewhat pointed, much paler underneath, about  $2-3\frac{1}{2}$  in. long and  $\frac{3}{4}-1\frac{3}{4}$  in. wide, about 2-3 times as long as wide. The flowers are white and borne in very dense stalked clusters about an inch wide at the ends of the twigs. There are about seven flowers in each cluster and they



Plate 157.

**Turpentine (*Syncarpia glomulifera*).** Cootharaba.



are partly joined to one another by their ovaries. Five small sepals are placed on top of the ovary and inside these are five small rounded petals and a number of longer stamens. The seed-capsules are also joined together in a cluster about  $\frac{3}{4}$  in. diameter.

*Distribution.*—Moreton and Wide Bay Districts in forest country in higher rainfall areas, on hillsides or near creeks. It is found along much of eastern Australia as far south as Sydney.

*Usual Flowering Time.*—October.

*Colour of Honey.*—Light amber.

*Importance as Source of Honey.*—Minor.

*Importance as Source of Pollen.*—Minor.

*General Remarks.*—This species is an unreliable source of nectar and pollen. The honey has a strong, bitter and most unpleasant flavour; and when present even in small quantities in natural blends adversely affects the sale value of better grade honeys.

### MINTWEED.

*Botanical Name.*—*Salvia reflexa* Hornem.

*Other Common Name.*—Wild mint.

*Other Botanical Name.*—*Salvia lanceolata* Brouss. non Lam.

*Distinguishing Features.*—A strong smelling, grey-looking, weedy plant about 1-1 $\frac{1}{2}$  ft. high with square stems, relatively narrow leaves in pairs along the branches and spikes of light-blue or white flowers (Plate 158).

*Description.*—This is usually a bushy plant about 9-18 in. high, strong smelling when crushed, with a grey appearance and 4-angled stems. The leaves are arranged in pairs along the branches; they are greyish or yellowish green above, grey beneath, with relatively long stalks, mostly  $\frac{3}{4}$ -1 $\frac{3}{4}$  in. long, about  $\frac{1}{2}$ - $\frac{1}{4}$  in. wide, about 4-6 times as long as wide, with blunt tips and wavy or shortly toothed margins. The flowers are borne in spikes at the ends of the branches and are light-blue or white in colour. The calyx is somewhat bell-shaped but split along the sides. There are five petals joined to form a tube with 5 lobes at the top of various sizes and shapes. There are two stamens and a style protruding from the tube formed by the petals. The "seeds" are quite small, four to each flower. The plants start flowering when only a few inches high.

*Distribution.*—Widely spread as a weed of agricultural land in south-eastern Queensland and particularly abundant in parts of the Darling Downs and Burnett Districts. It is a native of North America.

*Usual Flowering Time.*—November-December.

*Colour of Honey.*—Light amber.

*Importance as Source of Honey.*—Minor.

*Importance as Source of Pollen.*—Major.

*General Remarks.*—This plant stimulates the quick build-up of colonies, and during seasons in which mintweed flowers heavily, swarming is not readily controlled.

The honey is bright, first grade and with a pleasing flavour. The granulating qualities are unknown.

Mintweed-lucerne honey was once famous in Queensland for table qualities, but only small quantities of this blend are produced at the present time.

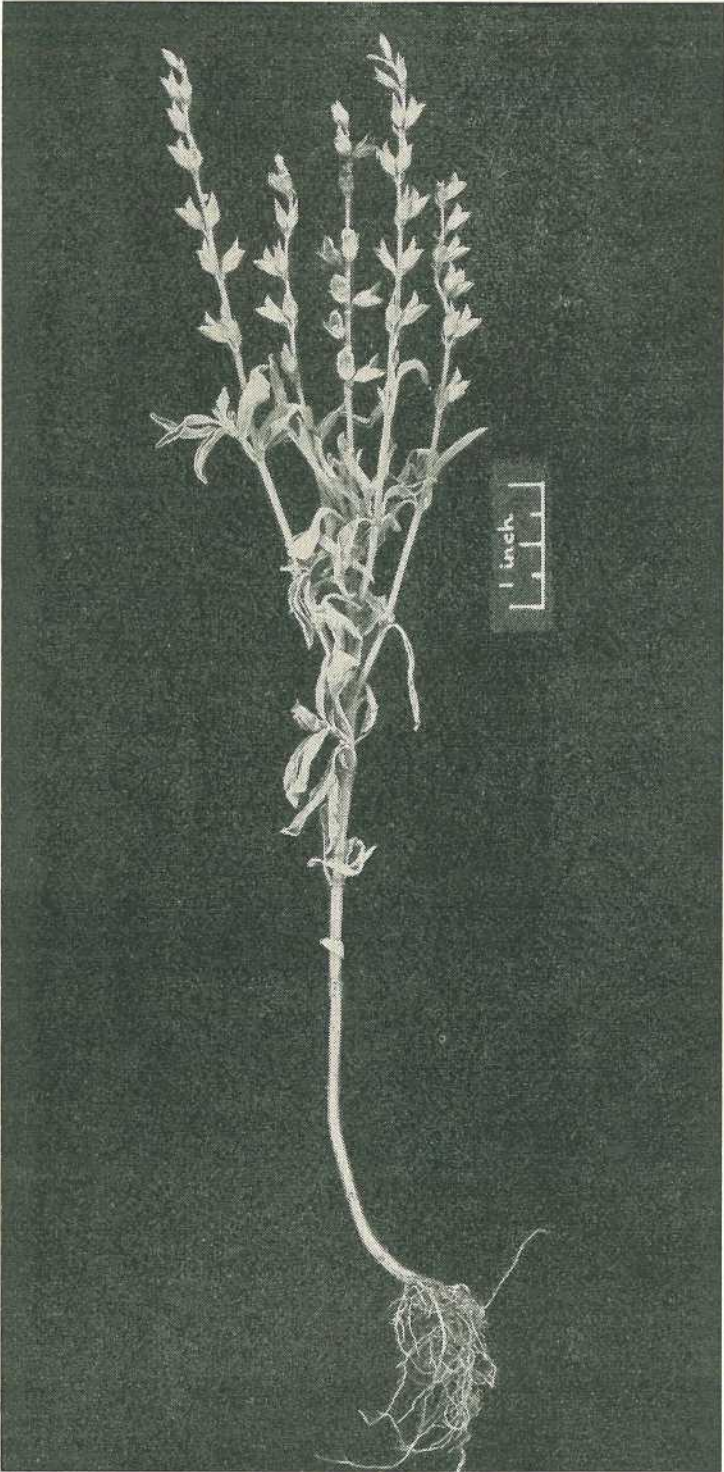


Plate 158.

Mintweed (*Salvia reflexa*). Plant, showing leaves and flowers. Warwick.

[TO BE CONTINUED.]