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# contents

	Page
Glycine—A Pasture Legume For Queensland <i>G. H. Allen</i> .. .. .	273
Label Poison Bottles Correctly <i>P. D. Ranby</i> .. .. .	276
Buying a Farm? Then Be Guided By Tax Returns <i>E. O. Burns</i> .. .. .	277
Farmers' Questions .. .. .	279
Is A Used Milking Machine A Good Buy? <i>J. D. Elrington</i> .. .. .	280
Spikeleaf In The Banana <i>R. L. Prest and A. E. Smith</i> .. .. .	283
Breeding Fast Feathering Into Chickens <i>B. W. Moffatt</i> .. .. .	286
Herd Records Give Farm Guidance .. .. .	291
Pasture And Crop .. .. .	293
Silage On The Southern Downs <i>A. G. Martin</i> .. .. .	295
Stock And Station .. .. .	301
Growing Cowpeas For Seed <i>G. Verhoeven</i> .. .. .	303
Bucket And Bail .. .. .	309
Strawberry Fruit Rots Can Be Controlled <i>Barbara L. Winks and B. L. Oxenham</i> ..	311
Tuberculosis-Free Cattle Herds .. .. .	314
What The Fruit Grower Should Know About Quality and Maturity <i>T. Hope</i> ..	315
Solving Problems Of Flying Chickens To New Guinea <i>P. D. Ranby</i> .. .. .	319
Brucellosis-Tested Swine Herds .. .. .	322
Looking After Our Wildlife <i>C. Roff</i> .. .. .	323
Orchard And Garden .. .. .	331
For Women .. .. .	333

COVER PICTURE: Science Aids the Fruitgrower. Mr. T. Hope, Chemist in Horticulture Branch, uses a refractometer to determine the degree of maturity of fruits. (See article on page 315.)

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# GLYCINE—

## A Pasture Legume For Queensland

By G. H. ALLEN, Senior Agronomist.

Over the years much has been written about the value of legumes in pastures, and the need to obtain suitable species for Queensland conditions has been repeatedly stressed. Some useful legumes have already been tested and proved by the Queensland Department of Agriculture and Stock. Special attention is now directed to glycine, a legume which seems likely to play a useful part in the improvement of pastures in many areas on the coast and in some of the beef fattening districts of the State.

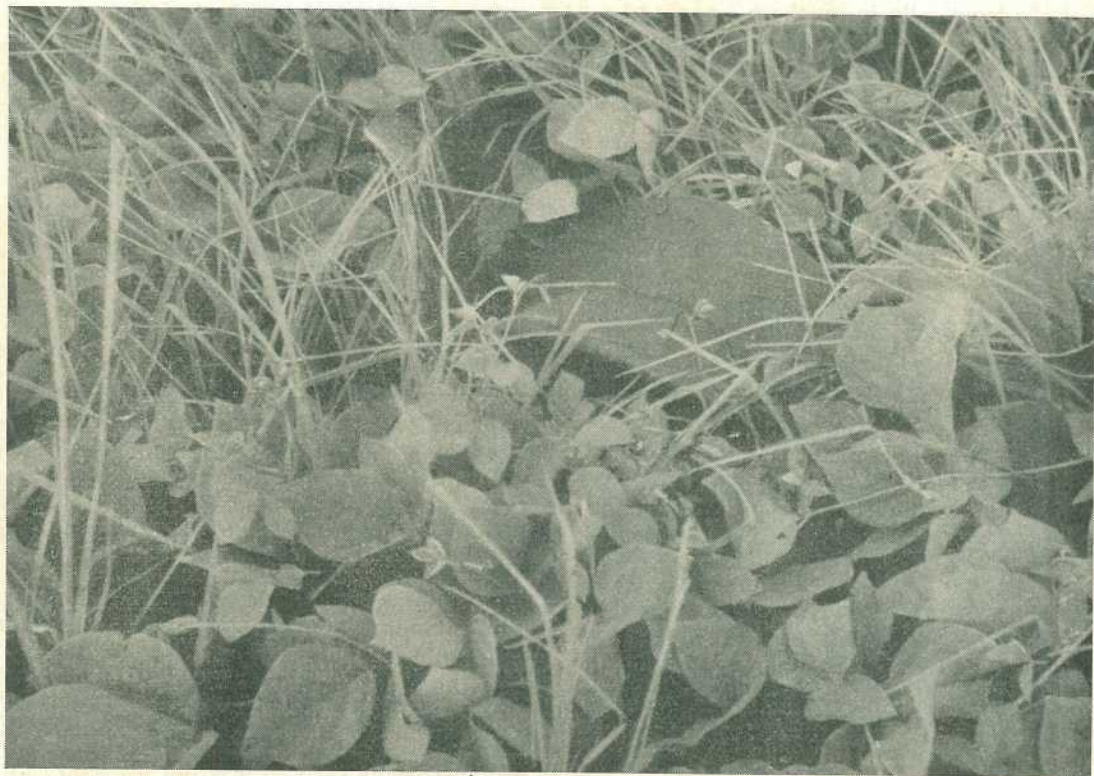


Plate 1

Glycine in Combination with Kikuyu Grass at the Kairi Regional Experiment Station.



Glycine (*Glycine javanica*) is a creeping, vine-like perennial which though slow in early growth has continued to produce well for at least nine years at the Kairi Regional Experiment Station.

Growth is prolific during the late spring and summer months and some production occurs in areas with mild winters. It is susceptible to frost and although leaf shedding follows low temperatures, regrowth occurs from stems and from the butt of the plant.

The species establishes readily from seed sown in autumn, spring or summer—depending on locality—it nodulates well and nodules occur on the main roots and on roots which develop readily from nodes on the vines when in contact with the soil.

Glycine is highly nutritious and though not extremely palatable it is well grazed by all livestock.

It combines well with a number of grass species and the benefit of the legume is clearly evident by more vigorous grass growth.

It seeds prolifically in northern areas and seed yields of up to 300 lb. to the acre have been obtained.

### Early Development

Glycine was introduced and grown by officers of the Department of Agriculture and Stock at the Bureau of Tropical Agriculture, South Johnstone. In 1947 seed was distributed for plantings

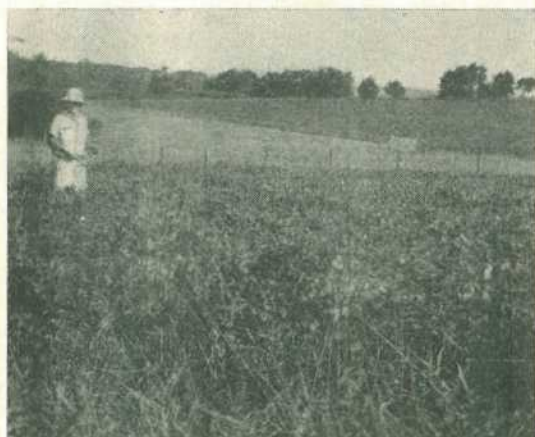


Plate 2

An Ungrazed Stand of Glycine Yielding 9 Tons of Green Material to the Acre.

on the Atherton Tableland, and one area was planted for a comparison with centro and other tropical legumes growing at the Kairi Regional Experiment Station.

Experiments were commenced in an area sown in 1949 and production from the glycine planting is still favourable and has greatly exceeded the other legumes in the trial. Though ungrazed, this stand carried 9 tons to the acre of green material in the August-December period (see Plate 2).

Heavy frosts in 1949 showed that heavy foliage loss could occur. However, stems and branches were not adversely affected by frost and regrowth was highly productive. Frost damage is not so serious in mixed pastures as the grass component affords some protection.

It was obvious that glycine had considerable value on the Atherton Tableland but testing of pasture combinations in larger areas was limited by seed supplies. A small amount of seed was harvested by hand.

In 1950, plantings were made at the Ayr Regional Experiment Station where it was hoped rapid growth would occur in the humid summer wet season to provide a large seed crop for harvesting in the following dry spring.

Growth and production at Ayr and in the Burdekin Valley districts have been excellent but do not surpass centro (*Centrosema pubescens*), the valuable legume component for pastures in frost-free high rainfall areas.

### Seed Production

However, the Ayr results indicated that seed production was excellent and a number of studies were undertaken to develop methods of production. Trials to develop machine-harvesting of the seed crop were undertaken by Mr. Verhoeven and other officers at the Ayr Regional Experiment Station.

This work has been reported in the February 1958 issue of the *Queensland Agricultural Journal*.

The glycine plant flowers profusely in June and July and pods ripen during September. Harvesting of fully formed but green pods will produce viable seed so it is not necessary to wait for all pods to dry in the field. Shattering occurs as they mature and much seed can be lost.





Plate 3  
Seed Pods on Glycine at Time of Harvesting.

Glycine seed is much larger than lucerne and about 73,000 seeds make up 1 lb., as against 216,000 for lucerne and 81,000 for linseed. Under favourable growing conditions, seed yields of 200-300 lb. to the acre have been obtained by machine harvesting at the Ayr Regional Experiment Station.

Experimental results and the practical use of glycine in dairy pasture have fully justified strong support for more widespread use of this legume, especially on the Atherton Tableland and areas of similar soil and climatic conditions.

In seeking to assist the development of this legume, seed has been distributed to a number of growers and is now produced at the Regional Experiment Stations at Millaroo, Ayr, Kairi and Biloela.

It is unlikely that large quantities will be on the market for some years but small quantities will be available, especially for potential seed growers.

Farmers located near the experiment stations may inquire from the officer-in-charge, and at a suitable time visit the centres during the August-

November period and collect seed from established areas of the legume.

In this way it is hoped that glycine will come into general use more rapidly and that greater benefit to northern pastures will result.

Apart from direct heading of seed, the legume can be mown before harvesting. A flail type forage harvester has also been used successfully. With this machine the whole plant is harvested when seed is fully formed, the material is dried and the seed removed by threshing through an All Crop Combine (see Plate 3).

For farm plantings, the chopped glycine as harvested could be broadcast or it could be dried before planting. This method saves cleaning, and the chopped leaves and stems permit easy distribution of the seed.

From one area harvested in this manner, 120 three-bushel bags of flail-harvested dry material yielded 140 lb. of glycine seed.

Further articles on glycine seed production and pasture management will appear in future issues of this Journal.



# Label Poison Bottles Correctly!

By P. D. RANBY,  
Veterinary Officer.

Two dead cows have impressed a Brisbane district dairy farmer with the need to label poison bottles fully and correctly. Loss of two cows is a big price to pay for the time it takes to put the right label on a bottle of poison!

This man's experience, unfortunately, is all too common in Queensland.

Last year the deaths were investigated of two cows from a herd of 20 milkers. Both cows had died on the same day after 12 to 24 hours' sickness. The cows were in good condition and had been milking well.

A post-mortem examination indicated that the animals had been poisoned. The owner discounted the possibility of arsenic, the commonest cause of stock poisoning, as he used another preparation for tick control. His theory was that thornapples were responsible as he had seen his cattle licking and eating the thorns.

An inspection showed that the thornapple plants were dying. The grass around each bush also was dead. The farmer explained that he had sprayed them with weedkiller from a bottle that had been in his dairy for many years. As the original label had fallen off the bottle, he had re-labelled it "weed-killer."

Chemical analysis of the residue in the bottle as well as the organs and paunch contents of the dead cows showed that arsenical weed-killer from the bottle caused the deaths.

Mistakes in handling farm poisons, especially preparations containing arsenic, have been

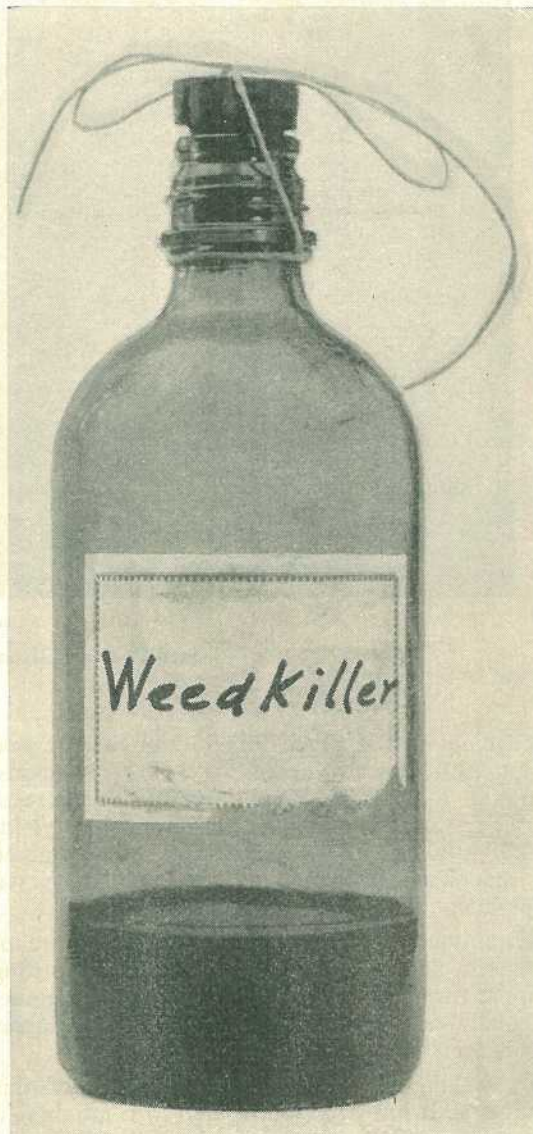


Plate 1

**This Was the Bottle Labelled by the Farmer.** Because there are poisonous and non-poisonous weed-killers, this bottle's label should have been marked "Poisonous Weed-killer (Arsenic)".

responsible for thousands of stock losses over the years. Always label poison containers fully and clearly, and when you spray with arsenical weed-killers, shut your cattle out of the treated area.



# Buying A Farm?

## Then Be Guided By Tax Returns

By E. O. BURNS, Agricultural Economist.

"Will the net income be sufficient to justify the purchase price?"

This is the question which every prospective buyer of a farm property asks himself. In some cases he takes a chance without waiting for a satisfactory reply—and his headaches begin!

The logical starting point in a financial appraisal of any business being sold as a going concern is in the books and accounts of the business. Farmers, however, are not noted for the completeness of their accounting records. Some have their accountants prepare annual Profit and Loss Accounts and Balance Sheets, but on most farms, taxation returns are almost the sole guide to the year's operations.

Taxation returns are not designed to show net income and profit in a business or accounting sense, but with a little adjustment, they can be made to serve the purpose.

The object of this article is to show a prospective buyer how to analyse the farm as a business proposition if he has access to the owner's taxation returns. The same principles can of course be adopted by any farmer who wishes to analyse his own business.

### Average Returns Over 3 Years

If you are thinking of buying a farm you will need to average at least the last three years' returns. Farming is an up-and-down business, and one year's figures could be quite misleading.

The first thing is to ascertain the gross income from the farm. This will be found on Page 2 of the taxation return, Item 5 at the bottom of the first column.

For farm expenses (other than depreciation), you will find in the second last line of the second column, Item No. 33, "Total Business Deductions." Take away from this figure the following items:—

- (1) *Interest paid on borrowed money* (Item 21).—You will have your own capital costs which we will look at later. In the meantime, this is one of the present owner's problems and has nothing to do with a prospective buyer.
- (2) *Depreciation* (Item 22).—This is deductible at concessional rates for taxation purposes, but more realistic rates should be used for our purpose.
- (3) *Primary production expenditure* (Item 30).—This is capital expenditure and not a current cost.

Depreciation can be calculated with sufficient accuracy in the following manner: You will undoubtedly have a list of assets and the values at which it is proposed to transfer them. If you are satisfied with these valuations take 10 per cent. of the value of plant and machinery, and 3 per cent. of the value of structural improvements, such as buildings and fences.

Add this figure to the other costs and you have Farm Expenses. There is one point to be noted here. This method assumes that depreciation has been the same for three years or whatever other period you are going to average. This will not be too far out unless there have been big changes in the assets during this period. In any case, there is seldom any alternative to this, as the assets will not have been valued annually except for taxation purposes, and these are useless because of the 20 per cent. depreciation provisions.

### Farm Income

By deducting Farm Expenses from Gross Farm Income we arrive at a figure which is called Farm Income. This is the reward for capital and the farmer's own labour, and is the key figure in a farm financial analysis.

The following example assumes certain gross incomes and costs for the last three years and shows the calculations up to this point:

	1956- 1957	1957- 1958	1958- 1959	Aver- age
	£	£	£	£
Gross Income from Farming (Item 5) ..	3,100	2,740	2,860	2,960
Business Deductions (Item 33) ..	2,410	1,540	2,200	
Less Interest (Item 21), Depreciation (Item 22) and Primary Production Expenditure (Item 30)	842	600	1,090	
Net Deductions ..	1,568	940	1,110	1,206
Depreciation (10% plant, 3% structures) ..				420
Farm Expenses ..				1,626
Farm Income (Gross Income minus Farm Expenses) ..				£1,274

In this example, the Farm Income averages £1,274 per annum. Out of this has to come compensation for your own labour and interest on your capital.

Suppose the farm was being offered at £13,000. What would be the position if you bought at this price? At 5 per cent. you would want your capital to earn £650.

	£
Farm Income .. ..	1,274
Interest on Capital ..	650
	—
Reward for own Labour ..	£624
	—

This would leave £624, or £12 per week for your own labour. This is less than the Basic Wage and probably at least £3 a week less than you can earn now without the worries of farm management.

Suppose you value your own labour at £15 per week, or £780 per annum.

	£
Farm Income .. ..	1,274
Own Labour .. ..	780
	—
Return on Capital ..	£494
	—

This would leave £494 as a return on your capital. If you expect your capital to earn 5 per cent., this would make the value of the farm to you £9,880.

$$\frac{£494 \times 100}{5} = £9,880$$

If the farm were bought for £13,000, the return of £494 works out at 3·8 per cent. You might be reasonably happy with this return if you had no need to borrow money to buy the farm. The return is not so high as for gilt-edged investment, but you might consider there are compensations.

### If You Have To Borrow

The situation could be a lot worse if you have to borrow money to buy the farm. In this case, interest charges will have to be met, and they will almost certainly be higher than 3·8 per cent.

Assuming you bought the farm for £13,000, with £3,000 of your own capital, and £10,000 borrowed at 6 per cent. In this case, interest on borrowed money will amount to £600. This is an actual cost which will have to be paid out of the farm income. In our example, this would leave £674 per annum, which is less than the Basic Wage. Repayments of your loan would have to



come out of this £674, and you would be getting no return at all on your own £3,000 sunk in the farm.

This example has been given to draw attention to some of the economic factors that should be borne in mind when considering farm purchase. There may be, and frequently are, other factors which would justify taking a risk.

The owner may be a poor farmer, or may be getting on in years. If this is so, you may feel justified in increasing your estimate of farm income. It is safer, however, to be conservative rather than unduly optimistic, even to the extent of reducing the estimate should you, for example, feel you are less experienced than the owner.

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## Farmers' Questions

*Phasey Bean.*—The use of phasey bean in pastures has been the subject of many recent inquiries.

*Answer:* Phasey bean is a useful legume which has a perennial root system and annual tops. It may grow to a height of 3 to 5 ft. and has an upright branching habit. When young, the leaves are a bright green to mid-green in colour and are usually slightly glossy on the top and dull underneath. As the plant ages, the leaves turn a darker green colour.

The flower heads are borne on the tops of the branches and the flowers are usually mid-purple in colour, pea shaped and may reach about  $\frac{1}{2}$  in. in diameter. After flowering the plant sets seed and the pods may reach about 4 in. in length and are usually about  $\frac{1}{4}$  in. in diameter. The seed is about half as long again as it is broad and is usually a dark mottled greenish brown in colour.

Phasey bean is a useful forage plant though, due to climatic condition, soil type or when young, it may occasionally be unpalatable to stock. Nevertheless, phasey bean is very useful in rain-grown pasture mixtures and is usually quite readily eaten by stock.

In coastal districts phasey bean is subject to bean fly damage which may seriously reduce seedling regeneration of this legume in subsequent years.

Nematodes can also be troublesome when this legume is planted in sandy soil.

In common with most legumes, phasey bean is a useful soil builder, and due to its high protein content it helps to raise the nutritive level of the pastures.

Machine harvesting is now being undertaken but care is necessary when harvesting, as the

pods split open readily, and as they split, the two halves curl with a quick twisting action which throws the seed over a large area. Hand harvesting is also undertaken and at present seed is readily available at approximately 22s. a lb.

Planting rates vary from as little as 2 oz. to the acre in inland districts, to 1 lb. to the acre in coastal areas. These seeding rates will usually ensure a good stand in subsequent years.

*Toowoomba Canary Grass.*—Several inquiries have been received recently about Toowoomba canary grass (*Phalaris tuberosa*).

*Answer:* Toowoomba canary grass is a valuable constituent in irrigated pasture mixtures for many parts of Queensland. As it is a native of the Mediterranean region it is not readily adapted to growing under Queensland conditions without the assistance of irrigation.

The grass is a deep-rooted perennial which produces short underground runners. During the winter and spring months this grass produces a good sward of palatable nutritious leafage. Under grazing conditions it produces only a limited number of seed stalks.

*Phalaris tuberosa* does best on a deep fertile well-drained soil, but is adapted to a fair range of soil types. It has a high nitrogen requirement and should be planted in soils having good nitrate levels.

Planting should be done in the autumn at the rate of 4 lb. of seed to the acre in association with legumes and grasses. It is highly desirable to allow this grass to become properly established before grazing is commenced. During the early stages of growth it is very sensitive to competition as it takes a fairly long period to establish its root system.

# Is A Used Milking Machine A Good Buy?

By J. D. ELRINGTON, Senior Adviser (Machinery)

*It might be all right to go shopping for used milking machines, so long as you examine carefully before buying. This article tells you what to look out for.*

Last year there were a large number of used milking machines installed on Queensland dairy farms, in fact, 41.5 per cent. of all the notified installations were used machines.

These were obtained from dairies which had ceased to operate, and from dairies in which new machines were installed. Unless care was shown in these purchases and the machines examined expertly for serious faults and inefficient operation, it is certain many producers bought themselves trouble.

A recent case was brought to notice of the Department. Because of a faulty pump, revealed following his purchase of a used milking machine, the buyer eventually had to appeal to a dairy machinery firm for help.

Fortunately he was able to buy replacements at a very reasonable price, but even so, when the cost of transporting and re-fitting the machine was added, the total cost was then more than the price of a new machine.

Good used machines, are, no doubt, available at a price much below that for a new article, and the man who can take advantage of this is fortunate.

However, it should not be assumed that every purchase is a bargain. Here are some of the things which can be done to ensure that a used milking machine is a wise investment.

## Replacement Parts

It is not a sound practice to buy a used milking machine if the manufacturer or the agent in this State is no longer in business, does not sell milking machines, or has changed the make of machine handled by him. Be sure that parts and service are available. The machine may be a discontinued line, so an effort to discover an identification for it (such as the name or number given it by the maker) followed by a 'phone call or letter to the agent to find out if parts are available, could save unnecessary expenditure.

## All Present and Correct

Before proceeding to examine each part, be satisfied that all the parts are there. A set of cups, a claw, or a pulsator drive bracket may be missing. Find out (a) if the releaser was on the right- or left-hand end of the machine, and (b) the width of the bails. Some machines are easily altered from right- to left-hand delivery, and vice versa, while others are difficult to install in the opposite direction.

If the original bails were narrower than those in which the machine is to be fitted, or if the sight glasses and milk taps were attached to the milk line and have to be moved, it is possible that new milk and air lines would be required.



If you are not able to fit the machine, make sure you can obtain the services of a competent milking machine fitter before you buy.

### Examine These Parts Closely

The parts to be carefully considered and closely examined are the vacuum pump, pulsators, pulsator drive, relief valve, vacuum gauge, interior surfaces of lines and rubberware.

**Vacuum Pump.**—Without the aid of an air-flow meter to check accurately the air-pumping capacity of a pump, the customer can only look at the outside of the pump and notice how much oil and dust is stuck to it. This tells him nothing—nor does the age of the pump tell him anything. Some very old pumps have shown themselves under test to be as good as new ones, and conversely there is an odd pump less than 12 months old that has been worn out.

Tight drive belts, grit, dirt and milk, as well as lack of or incorrect lubrication can quickly ruin a pump.

Any used milking machine should be bought with the thought that the pump may require servicing. This could cost between £12 and £20 for reconditioning. When the machine is installed into the new premises and working, the local Dairy Officer will be pleased to test it with an air-flow meter.

**Pulsators.**—Being a used machine, the pulsators are almost certain to show some wear. The type which consist of a hollowed-out block of metal, plastic or carbon, driven by a reciprocating rod and sliding back and forth on a metal base, are the most common. Examine the base, and if it is not perfectly smooth, that is, if it has any "humps" or ridges on or in it, allow the cost of refacing in the purchase price.

Refacing consists of filing and hand grinding and polishing to a perfectly smooth flat surface again.

The base of the moving block should also be smooth, flat and even, and if the block has been worn excessively the depth of the hollow in its base may not be sufficient to allow the free passage of air from the space behind the inflation in the teatcups, to the vacuum pump.

The more sets of cups per pulsator the more generous the hollow needs to be. There is no

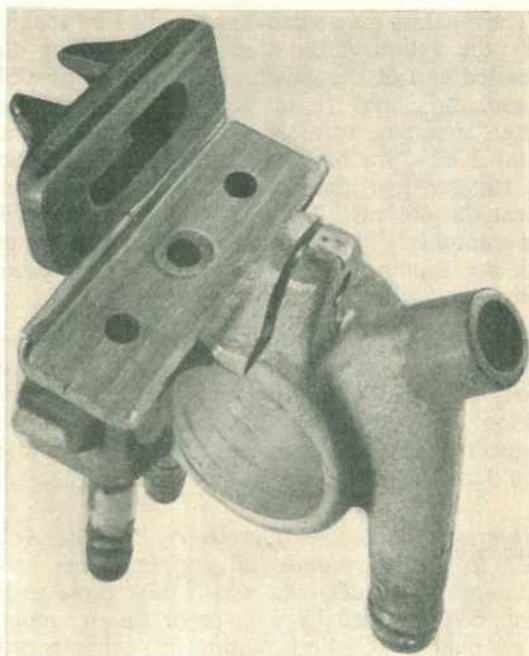


Plate 1

**A Pulsator Like This One Has Been in Use for a Long Time and Refacing is Now Required.**

point in having it exceed the size of the pulsator ports or the size of the air line, which in some cases is  $\frac{1}{4}$ -in. tube.

Pulsators have been observed which were so badly worn as to be almost flat on the under surface, leaving practically no space for the air to flow freely from one port to another.

**Pulsator Drive.**—A careful check of shafts and bearings, belts and elbow joints for wear would be advisable. Worn elbow joints could make pulsator adjustment impossible. Cast-iron V-pulleys are generally satisfactory, but aluminium ones wear on the sides of the V, allowing the belts to run on the bottom of the groove. This results in belt slip, and pulleys in this condition require replacement.

**Relief Valve and Vacuum Gauge.**—The relief valve will probably need a thorough cleaning before it can be inspected. The valve and the valve seat should be smooth and shiny, free from rust and mechanical damage. The spring should also be free from rust, and when compressed and/or expanded by hand should return to its original position.



The vacuum gauge can be examined by sucking with the mouth after thoroughly cleaning the threaded end of the gauge. It should be possible to suck up about 18 in. vacuum in easy stages using the tongue to assist. Suck out air until an initial 3 or 4 in. have been obtained, and place the tongue over the hole. Take a breath and repeat the process. The needle should rise easily and smoothly. Tapping on the body of the gauge with the forefinger should not alter the position of the needle (pointer).

Lift the tongue slowly, and allow air to seep past into the gauge. The needle should move slowly and smoothly to the zero mark. Any jerking or irregularity and any "zero error" means the gauge cannot be relied upon and it should be rejected.

*Interior Surfaces.*—"The Dairy Produce Acts, 1920 to 1959," require all copper, brass, iron and similar surfaces over which milk flows to be completely covered by a layer of tin or smooth nickel plating. Chrome plating in such places is an infringement of the Health Acts. It is also necessary for persons installing a milking machine or an engine to drive a milking machine, new or used, to notify the Division of Dairying of the Department of Agriculture and Stock of any such installation. Among other things, this is required so that faulty or unsatisfactory equipment is not installed.

Dairy Officers have been known to prohibit the installation of milking machine parts through which milk flows, the reason being that the tinning or plating had worn off. In one case the farmer found it necessary to buy a new milk line. If the tinning or plating has worn off the inside of the releaser, be suspicious of the milk pipes also. It is difficult to examine a milk pipe without some experience of the internal appearance of untinned lines. Therefore, be extremely cautious when examining used machines for tinning faults.

The downdrops should not be bent, the claws should be in good condition and free from repairs, and the teatcup shells and rings should still be in

their original shape and not corroded with rust. Any sharp edges in the teatcups will cut the inflations, and if the mouth of the cup is not perfectly circular, the mouthpiece ring cannot fit properly to make an airtight joint. An air leak anywhere between the mouth of the teatcup and the pulsator will cause faulty pulsation in one set (or all sets, depending on the type of pulsation system) of cups, resulting in slow milking and possibly mastitis.

*Rubberware.*—Generally a used milking machine will require complete refitting with new rubberware. Soiled, cracked and sticky rubber cannot be successfully reclaimed, so an allowance for new rubber should be made when considering the fair price for a used machine.

It is obligatory to notify the Dairy Officer of intention to install a machine or engine, and this applies whether the machine is new or used. A used machine must pass his inspection, and it would be as well to obtain approval to install before commencing the work. This approval could save much additional work.

These few pointers indicate how important it is to examine used milking machines carefully before purchasing them.

### Equipment for Testing

The Queensland Dairymen's Organisation, through the dairy associations, has provided special equipment for testing the efficiency of milking machines and vacuum pumps, and this is available to producers on request. Most machines cannot be checked until they are installed and working.

In many areas the local Dairy Officer has the responsibility of using the testing equipment, and therefore a request for him to check a newly-purchased used milking machine may prevent milking with an ill-adjusted and faulty machine.

And finally, those who install a milking machine of any kind should consider themselves morally bound to provide protection for children from the motor, shafting, pumps, and so on.





# Spikeleaf in the Banana

By R. L. PREST, Senior Adviser in Horticulture,  
and A. E. SMITH, Horticulture Branch.

Spikeleaf is the name given to a disorder in bananas which is usually only of minor importance. During the last few years, however, it has been rather widespread and in several Mons Mari plantations in 1959, loss of crop reached commercial proportions.



Plate 1

**Mons Mari Banana Plant Showing Symptoms of Spikeleaf.** Note the cluster of abnormal leaves at the crown with the leaf lamina absent or only partly developed.

The disorder makes its appearance in the October–December period but remains conspicuous much longer.

Typical symptoms of spikeleaf are the partial or complete absence of the lamina or leaf blade on either side of the mid-rib of the leaf. Several leaves—up to 18 have been recorded—may be affected on the one plant.

The term spikeleaf is an apt description of the disorder in large plants with five or more affected leaves; the bare or almost bare mid-rib extend outwards and upwards from the crown and resemble spikes.

## No Bunch in Acute Cases

In acute cases, normal leaf production is not resumed in summer and no bunch is thrown.

Plants with several affected leaves may subsequently produce normal leaves and mature a bunch but its size will be reduced.

Plants with only a few leaves showing spikeleaf symptoms may recover and produce both normal leaves and a normal bunch.

When affected plants are cut down and the pseudostem dissected, unfurled leaves which have not yet reached the throat of the plant show abnormalities in shape comparable with those of the adult spikeleaves. In addition, browning of the upper surface of the mid-rib is apparent. This discolouration may involve the tip of the unfurled leaf. Sometimes, a wet rot supervenes and the young leaf and/or bunch is unable to force its way up through the stem. When this happens,

no further development of the plant can then take place. The discolouration may extend back into the corm itself.

Sucker growth from spikeleaf plants is normal.

### **In Caboolture District**

Spikeleaf has been reported in several plantations near Caboolture during the past few years. The disorder is not confined to particular districts, however, nor to particular plantations.

The more spectacular outbreaks have occurred in irrigated plantations on the lower foothills of what is normally classed as forest country in which the soil is typically shallow and only moderately fertile. In non-irrigated plantations, spikeleaf is much less common than in irrigated plantations on similar soil types and in similar locations.

Sometimes the disorder follows the path of one or more spraylines used for irrigation in the plantations.

### **Association with Climate**

Spikeleaf appears to be due to cold injury at the apical meristem of the corm when the leaf initials of the affected leaves were laid down in winter or shortly afterwards. At the time of leaf initiation, these tiny embryo leaves are rolled one inside the other at the tip of the corm near ground level.

**The seasonal incidence of the disorder indicates that chilling of the corm during the winter months is the primary cause of spikeleaf. Nevertheless, field observations suggest that strong winds, soil erosion and other factors which injure the roots and slow down the rate of plant growth tend to prolong the spikeleaf symptoms in the plantation.**

Isolated cases of the disorder have been noted in leaves thrown outside the October–December period. These can usually be traced to mechanical injury to the corm caused by implements or, in hill-side plantations, by rolling stones and logs. This has no commercial importance.

Injury to the corm whether due to chilling or other causes does not become apparent until the affected structure, leaf or bunch, emerges at the crown of the plant some months later.

### **November Dump Fruit**

The more serious outbreaks of spikeleaf occur at or about the time that November dump bunches make their appearance in southern plantations. Such bunches are characterised by few hands, less than the normal number of fruits to each hand and “dumpy” fruit. These bunches are initiated in the corm of the plant in the July–August period and the phenomenon is ascribed to chilling at the time the bunch initials were laid down or shortly afterwards.

While spikeleaf seems to be another expression of winter chilling, the frequent association of spikeleaf symptoms with the more vigorous plants suggests that rapid growth before low temperatures is an important predisposing factor to injury.



Plate 2

**Stem Section (part) of Banana with Spikeleaf.** Tissue breakdown has occurred at the tip of the undeveloped leaf within the stem. When this occurs the plant cannot resume normal growth.



In irrigated plantations, land is selected for planting close to the water supply and, in practice, the plantation is usually sited on the lower foothills where chilling risks are greater than farther up the slope. In some plantations, the safe lower level for banana production has already been reached, if not exceeded. Nevertheless, many growers consider that the advantages derived from irrigation under marginal climatic conditions outweigh hazards such as proneness to spikeleaf.

It is worth noting, too, that fertilizing in irrigated plantations is invariably more liberal than in non-irrigated plantations and treatment schedules aim at keeping the dormant period in winter as short as possible. Fertilizers, therefore, are used in conjunction with irrigation to delay the onset of dormancy and to promote an early resumption of growth in spring.

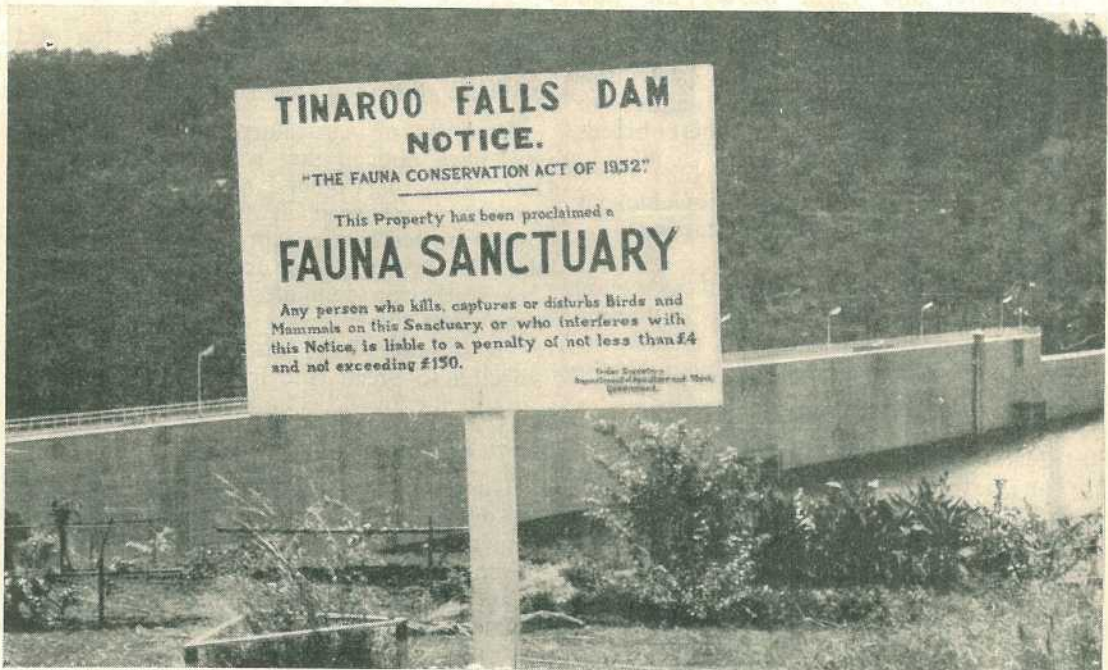
### Possible Remedies

The typical characteristics of the disorder suggest the adoption of certain precautionary measures in plantation management, at least in districts where spikeleaf has occurred or, by reason of location, is likely to occur. These are:

1. Select land for bananas with a warm slope, preferably with a north-easterly aspect.
2. Avoid planting at low elevations, especially on land where timber and other topographical features tend to impede the movement of cold air down the slope and away from the plantation.
3. Do not apply fertilizers, particularly those high in nitrogen, from the middle of April to early September. Plants making lush growth when a sharp drop in temperature occurs are very susceptible to cold injury.
4. Avoid over-watering during the cooler months of the year, especially on the heavier-textured soils which are normally classed as "cold."

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## Fauna Conservation In Action



A Fauna Sanctuary Notice at the Newly Constructed Tinaroo Falls Dam Warns Against the Killing, Capturing, or Disturbing of Fauna in the Area.



# Breeding Fast Feathering Into Chickens

By **B. W. MOFFATT, Poultry Adviser.**

*This article shows how to select chickens for fast feathering, which is a requirement of modern poultry breeding.*

Fast feathering chickens are essential for the broiler grower and desirable for the egg producer. Some breeds of fowls such as the White Leghorn are fast feathering, but others such as Australorp, New Hampshire, and Light Sussex are not. Experiments conducted on a farm in the Brisbane area and at the Poultry Section of the Rocklea Animal Husbandry Research Farm have now demonstrated that it is a simple matter to improve the rate of feathering in these breeds and make them fast feathering.

Why should the rate of feathering of chickens be so important? Here are some reasons:

- Table birds are being slaughtered as young as eight weeks. If they are slow feathering, the presence of pin feathers makes the work of plucking more difficult and the carcass less attractive.
- Fast feathering chickens are fully feathered at an early age and so the incidence of cannibalism in the flock is reduced because there are no bare areas of the body for other birds to pick.
- Chickens with a full covering of feathers are better able to withstand sudden drops in temperature, because of the insulating effects of the feathers. Their feed conversion may

also be improved slightly because they do not have to expend so much energy in maintaining their body temperature.

- It is possible that the incidence of breast blisters is lower in fast feathering broilers because of the cushioning effect of the feathers on the breast.

These are sufficient reasons why our breeders should improve the rate of feathering of their flocks. Fortunately the work can be handled by them after they have acquired a little practice.

Breeders of Australorps or New Hampshires will have noticed that while some chickens are fast feathering others are very slow. Often cockerels are seen at four weeks with practically no feathers except on their wings. These are the typical slow feathering birds. Their fast feathering penmates will be fully feathered soon after five weeks. Any flock that contains at least some fast feathering chickens can be selected to breed true for this character.

## How to Select

Once the birds are fully grown it is impossible to determine which are fast feathering and which are slow. For this reason selection has to be made while the chickens are young and still exhibiting the differences in rate of feather growth. For ease of handling and greater accuracy it is best to carry out the selection at day-old and check the birds when they are one week old.



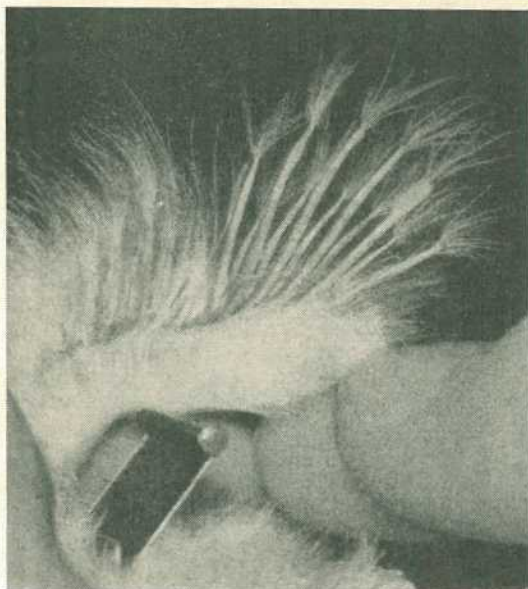


Plate 1

**The wing of a day-old fast feathering chicken.** Note that the primaries are much longer than the coverts.



Plate 2

**The wing of a day-old slow feathering chicken.** Both the primaries and coverts are short and about the same length.

Inheritance of this particular character is termed "sex linked" inheritance because the pullet inherits the rate of feathering from its father and not its mother. This makes selection rather simple. Selection need only be done on the cockerels for the pullet progeny of the sires will automatically be fast feathering. However, it must be carried out for two years to ensure all male and female progeny will be completely fast feathering. It would be wise to check the third year to eliminate any mistakes that have been made.

As most hatcheries keep only a few hundred cockerels, it is not a difficult matter to eliminate all slow feathering cockerels at day old and retain only fast feathering birds. When these birds are fully grown they can be selected on other characters if desired and so the normal routine of the farm is not interrupted.

### **Selection at Day-old**

At day-old the rate of feathering can be determined by examining the wing feathers, particularly the primaries and coverts. The primaries

are the feathers towards the end of the wing that grow into the long flight feathers. The coverts are smaller feathers placed between the primaries and a little above.

In the fast feathering day-old chicken the primaries are relatively long and the coverts are no more than two-thirds the length of the primaries. (See Plate 1.) The slow feathering chicken will have coverts as long as, or longer than, the primaries which will be relatively short, as shown in Plate 2. In very slow feathering birds the primaries are hardly visible and if care is not taken the coverts may be mistaken for the primaries. When examining the first few birds it is wise to pluck away some of the down so that the feathers are clearly visible. With a little practice the operator will soon become very proficient and can easily reach 100 per cent. accuracy.

To avoid errors it is wise to check the selected cockerels at one week old. At this age the fast feathering chickens will have at least some tail feathers and their primary wing feathers will be nearly the length of the body. The slow feathering



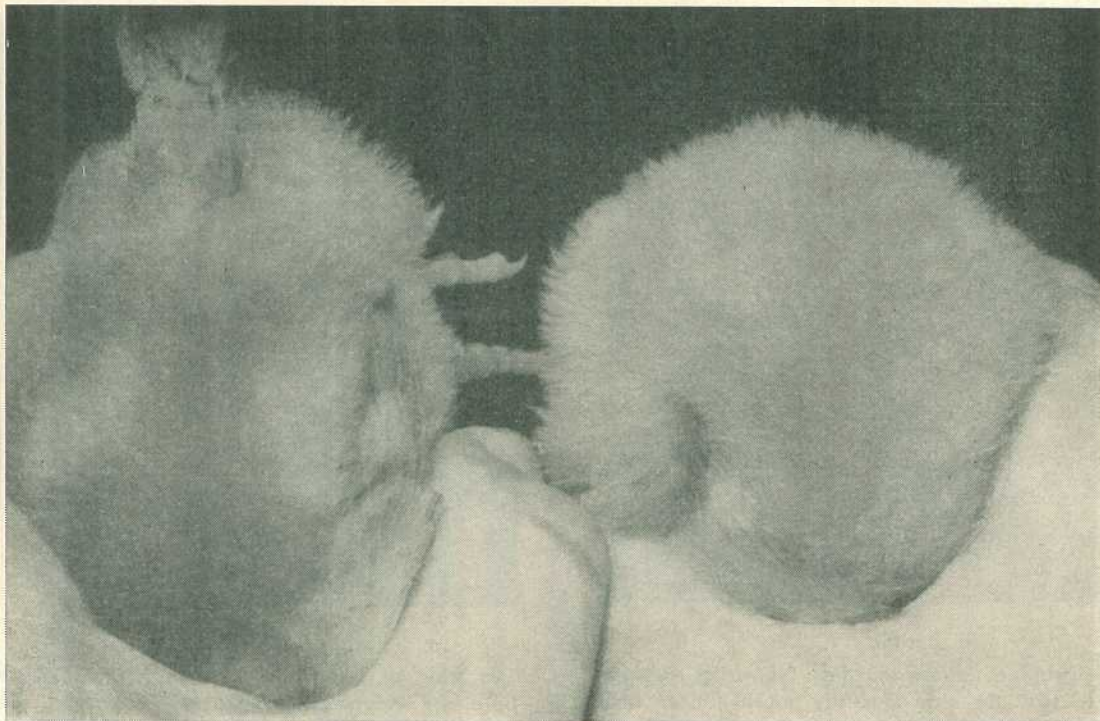


Plate 3

**Both of These Chickens Are One Week Old.** The fast feathering chicken on the left already has a tail whereas the slow feathering chicken has not.

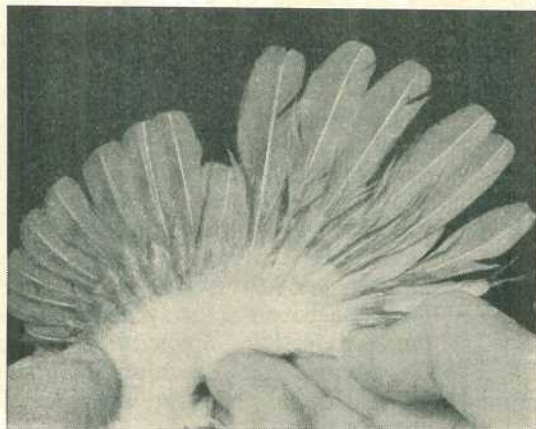


Plate 4

**In the week-old fast feathering chicken the wing feathers have grown considerably.** The primaries are still much longer than the coverts. Compare with the wing of a slow feathering week-old chicken in Plate 5.



Plate 5

**The wing of a week-old slow feathering chicken.** The primaries and coverts are still about the same length.



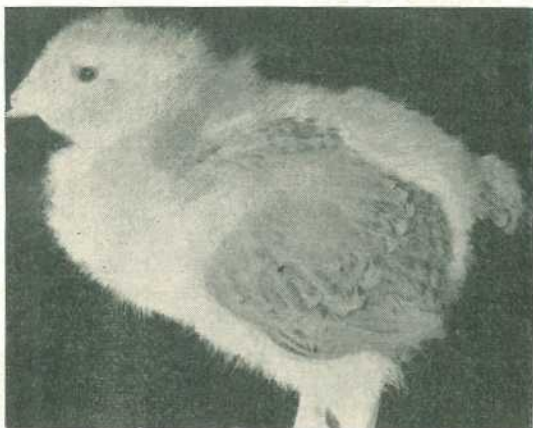


Plate 6

This two-week-old fast feathering chicken has wing feathers longer than the length of the body and a well developed tail.



Plate 7

A two-week-old slow feathering chicken. Note the short wing feathers and lack of tail feathers compared with the same age chicken in Plate 6.

chicken has no tail feathers (see Plate 3) and only short wing feathers. If there is any doubt it is better to discard the chicken. The length of coverts in relation to primaries is also a good guide at this age. Again the fast feathering birds will have long primaries with short coverts (see Plate 4) while the slow feathering bird will have coverts and primaries of about the same length (see Plate 5).

By two weeks of age, the fast feathering chicken has a good tail, and wing feathers longer than the body (see Plate 6). He is far advanced on his slow feathering penmate, who is seen in Plate 7. At this age the fast feathering bird is beginning to grow back feathers and by five weeks or soon after, he is fully feathered.

It is a wise precaution to check the selected birds at about eight weeks, and discard any that show signs of bare backs. This bare back condition can be inherited separately from the slow feathering condition. Fortunately bare backs are fairly rare.

If this method of selection is adopted for two years then the flock will be completely fast feathering and further selection is not required. It is wise, however, to check in the third year to make sure that all chickens hatched are fast feathering.

### In One Year

The flock can be made completely fast feathering in one year if the breeder is prepared to select both males and females. The selection procedure is still the same as outlined. It will be found however, that no very slow pullets are encountered. They will either be fast or intermediate between a fast and a very slow cockerel. Some of these intermediate birds will also be found among the cockerels.

### The Genetics of Feathering

The rate of feathering is governed by a single gene located on the sex chromosome. The male fowl carries two sex chromosomes and so two of these genes. The female has only one sex chromosome and so can only have one gene governing the rate of feathering. The gene on each chromosome can be either K for slow feathering or k for fast feathering. As males carry two genes their genetic makeup or genotype can be any of the following:

- KK slow feathering
- Kk intermediate
- kk fast feathering

Using the method of selection outlined, the intermediate birds have been classed as slow. As the slow feathering gene K is dominant,



the bird, male or female can only be fast feathering if no K gene is present. The females, as they only have one gene can only be K-intermediate or k fast feathering.

The female inherits its gene from its father only and none from its mother. The cockerel, however, inherits one gene from each parent. This explains why selection of males for two years will make the whole flock fast feathering.

It can also be clearly seen that females can never be as slow feathering as the slowest males. The female only has one gene so that two slow feathering genes can never be present. When only one is present the bird will be intermediate. However, if the fast feathering gene (k) is present, the female can feather just as fast as her brother with a genotype of kk.

The reason for checking the fast feathering birds at eight weeks of age is based on the fact that a separate modifying gene (causing bare backs) can be present which overrides the fast feathering genes.

## Our Progress So Far

In Queensland the original work of selection for fast feathering was carried out on a commercial Australorp flock on a hatchery at Rochedale. The cockerels on this farm have been selected for two years and only fast feathering birds have been kept.

The difference in the rate of feathering on this farm was very noticeable even after one year of selection. This work has now proved that our Australorp flocks can be made fast feathering.

Selection has also been carried out on New Hampshires and Light Sussex at the Poultry Section of the Rocklea Animal Husbandry Research Farm. In this project both females and males have been selected. This work has demonstrated that it is possible to have a fast feathering strain in one generation. In most of the selection carried out it has been found that the original unselected flocks contained about 30 per cent. of fast feathering birds.

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## Reduce Wear In Tractor Engines

Look out for abrasion and erosion—two of the main causes of wear in tractor engines! Long life and efficient performance depend on how well you reduce these sources of wear.

Abrasion is caused by dust getting into the engine through the induction manifold or through the crankcase ventilation system. When you think how hard it is to keep a tractor engine dust-free, you realise just how much abrasive dust is in the air.

In summer, a cubic mile of air may contain as much as four tons of dust. Each gallon of fuel a tractor burns requires no less than 10,000 gal. of air. This shows just how necessary it is to have an efficient air cleaner. A loosely-fitted cleaner or an empty oil bath will allow dusty air to be drawn into the cylinders. Then piston rings, cylinder walls and valve guides will wear excessively. These abrasives will eventually find their way past the piston rings and into the crankcase oil. In this zone, bearing wear will follow unless a full-flow oil filter is fitted.

The best air cleaners, when well maintained, have an efficiency of about 95 per cent. It is

clear, therefore, that some abrasive dust is bound to get in. You can reduce this by observing two practices. The first is to service your air cleaner regularly, using the correct grade of oil. If the oil is too light or if it foams, the dust will get in. Make sure the induction manifold is tight, as leaking gaskets allow dust-laden air to reach the cylinders. The second point is to change your crankcase oil precisely as instructed by the manufacturer. Dust-laden air will grind away the life of your engine.

Erosion wear is caused by metal-to-metal contact. Provided a sufficiently rugged oil film can be maintained, metal-to-metal contact between the rubbing surfaces of the engine will be prevented. Modern lubricants have greatly reduced erosive wear. But dilution of the lubricating oil with fuel can be a source of trouble. If a kerosene tractor runs too cold or an injector fault develops on a diesel, unburnt fuel may find its way into the crankcase. This thins out the lubricant and the oil film protecting the moving parts is less effective.

—C. G. WRAGGE, *Agricultural Engineer.*



## Herd Records Give Farm Guidance

Constant guidance in farm management . . . that's what herd recording figures give to successful Ayrshire breeder, Mr. T. F. Dunn, of Beaudesert.

Mr. Dunn declares that it's largely on these figures that he's built his high-producing herd. Recorded under the Agriculture Department's

group scheme since 1948, his has been the top herd in its group for the last four years.

Average production of the 50 cows that completed lactations in 1958-59 was 5,909 lb. of milk containing 217 lb. of butterfat. This bettered the group average by 1,369 lb. of milk and 47 lb. of butterfat.



**Mr. T. F. Dunn, a Beaudesert District Dairyfarmer, Had Good Reason to be Pleased with this 10-acre Paddock of Poona Cowpeas.** He estimated that this crop would yield about 8 to 10 tons an acre. He planned to graze it with his 50-cow pure-bred Ayrshire herd.



On this milk-supply farm, the aim is to produce the same quantity of milk each month. To do this, the cows are well-fed and calvings are arranged through the whole year, with some restriction in January, February and March.

Studied, the long lists of figures that comprise herd-recording reports unfold an enlightening story of each cow's worth.

### **This Was A Shock**

The first information Mr. Dunn got from herd recording was the identification of his best-yielding cows.

"This," he said, "was something of a shock. There are always a certain number of cows you just can't pick by observation at milking time. Cows that give the most milk don't always give the most butterfat. And often those with the lowest milk yield aren't those with the lowest butterfat."

This knowledge is valuable in feeding. The herd is fed concentrates almost the whole year, and care is taken to give the highest producers a bigger ration.

But, under the conditions on his farm, Mr. Dunn finds information on regularity of yield and lactation length the most valuable of all.

"It shows me which cows will 'hang on,' and those are the ones I want," he said. "Some of my cows give exactly the same yield for three or even four months, and the records identify them for me."

Average lactation length of this farm is 274 days, and Mr. Dunn hopes eventually to raise this to 300 days. The longest average lactation recorded was 280 days in 1956-57.

The culling programme is guided by production records. Cows marked for culling are disposed of as opportunities arise.

On this farm, the emphasis is on good feeding. Mr. Dunn believes that in his district it's best to give the herd supplementary feed from conserved or standing crops all the year round.

### **Can't Afford To Stop Feeding**

"In the autumn and winter especially, I find it's easier to keep the milk up than to get it up once it has dropped," he said. "When the milk production goes the cows lose bodyweight too, and you have to build up their condition before you can get the milk back. On my country, I'm satisfied you can't afford to stop feeding."

Sixty acres of cultivated creek flats provide all the roughages fed on the farm. About 17 acres of lucerne are spray irrigated from a creek, but the water supply fails in a drought. Remainder of the cultivation is given over to cowpeas and maize in the summer and oats in the winter. Cowpeas are regarded highly for summer grazing, and plantings are made to provide a continuous supply of this fodder until April.

Mr. Dunn has great faith in silage as a high-quality conserved roughage. He has put silage down "off and on" for the last 10 years, but now plans to make it his major fodder conservation effort. He has bought a forage harvester and has already put 175 tons of lucerne silage in trenches this summer. With a reserve of 100 tons from a previous season, he hopes to have 400 tons available for winter and spring feeding. It is planned to ensile crops of maize, lucerne and cowpeas.

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## **Common Weeds of Farm and Pasture**

by S. L. Everist, B.Sc., Government Botanist.

A handbook that contains brief descriptions of about 110 of the common weeds of Queensland with notes on their distribution and control.

Price to Queensland farmers .. .. .	5s.
To others .. .. .	7s. 6d.

Available from Department of Agriculture and Stock, Brisbane.



# pasture and crop

## **Lucerne Outstanding Pasture Legume.**—

Pastures of green panic, Rhodes and buffel grasses, all in combination with lucerne, have again shown their outstanding usefulness in Queensland's medium rainfall dairying districts.

In the Kingaroy, Monto, Biloela, Rockhampton and Darling Downs districts, these mixtures have proved their ability to carry at least twice as many stock as native pastures.

Trials last year showed that lucerne was still the most versatile pasture legume in Queensland. Although some of the tropical legumes were showing great promise in coastal districts, lucerne's climatic range was still greater.

On a black clay loam at Monto, green panic and lucerne and Gayndah buffel and lucerne have persisted well for two years. Elsewhere in this district, lucerne has been oversown into a long-established Rhodes grass paddock. Here the lucerne is competing successfully with the Rhodes grass. Similar observations have been made on trials at Etna Creek and Kalapa, near Rockhampton.

At Baking Board, near Chinchilla, on a red-brown sandy loam, seven years' persistence of green panic and lucerne and Rhodes grass and lucerne is outstanding. A contour row pasture of two rows of green panic alternating with one row of lucerne is performing well. With rows 42 in. apart, the pasture is producing from 60 to 100 per cent. more feed than similar pastures with row spacings of 7 to 14 in.

Combinations of Rhodes grass, lucerne, green panic and barrel medic in the Millmerran district are carrying one cow to three or four acres. In good seasons, these pastures carry a cow to two acres.

In 1959, 103 pasture trials were carried out under the direction of the committee. In addition to observations on the performance of different pasture species, trials were put down to study rotational grazing, the value of fertilizer and irrigated pasture.

Irrigated pasture trials at Kilkivan, Miva (Gympie district) and Byee (Kingaroy district) have demonstrated the suitability of these districts for pasture irrigation. Fourteen irrigated pasture trials were in progress during the year.

Seven nitrogen topdressing trials were in progress during the year on paspalum, mat grass and blue couch pastures. Once again it has been shown that nitrogenous fertilizers will give big increases in yields of summer forage.

At Cooran the forage yield was doubled during the warm summer months by applying 2 cwt. of sulphate of ammonia at a paddock cost of £4 an acre. The yield was almost 11 tons of green material an acre. In a season with ample moisture, the cost of producing additional grass forage is less than 13s. a ton.

A detailed grazing trial at the Rocklea Animal Husbandry Research Farm compared the effect of rotational grazing on animal growth and pasture productivity. Rotational grazing gave a pasture yield of 15.9 tons of green material an acre and constant grazing 13.6 tons of green material an acre. Over a two-year period, rotational grazing gave an increase of 25 lb. an acre in liveweight gain over constant grazing.

—W. J. S. SLOAN,

*Director of the Division of Plant Industry.*

**Safflower—A New Grazing Crop.**—The oil-seed crop safflower is likely to be added to the limited range of winter grazing crops in Queens-



land. Tested as a grazing crop at the Biloela Regional Experiment Station for the last two years, safflower has shown distinct promise.

This does not mean that safflower will replace oats and wheat as the State's main winter grazing crops. The preliminary trials at Biloela have shown merely that safflower is a valuable grazing crop in winter and spring, when shortage of fodder is always a problem.

In Queensland, safflower has been grown for seed for many years. The different varieties have been widely tested at the Agriculture Department's experiment stations, and seed of the Horowitz variety was increased for commercial plantings.

Grazing trials over two seasons indicate that safflower may be an even better fodder crop than oats. Safflower and oats are similar in actual feed value, but safflower stands up to both dry conditions and heavy grazing better than oats.

Crops of safflower have been shown to provide grazing for eight weeks compared with three to four weeks' grazing from oats. In addition, safflower regrowth continued for four weeks after oats, planted the same day, had died.

The Biloela trials showed that cattle did not immediately take to safflower when first introduced to the crop. But in a few days they acquired a taste for it and then accepted it readily.

—W. A. R. COWDREY,  
*Senior Experimentalist.*

**Check Your Flail Forager.**—The increasing popularity of the flail forager can be attributed to its simplicity of design and its rugged construction. These attributes, however, can lead to a disregard of routine maintenance which in turn can lead to unnecessary expense and possibly a serious accident.

You can't replace fingers! So be sure to disconnect the P.T.O. drive and switch off the tractor engine before attempting to carry out maintenance work.

Due to the high peripheral speed of the rotor it is most important to maintain rotor balance by checking all the flails or swinging hammers at every inspection. A missing or damaged flail can set up excessive vibration causing blockages, worn-out bearings and possibly a serious accident.

Where a shredder bar is fitted check the clearance of the flails with each swinging flail extended.

The three main parts to watch are the rotor or cutter drum, the countershaft and the V-belt drive.

Take care when greasing the sealed and self-aligning bearings on the two shafts. Over-greasing will damage the seals.

Check the tension of the V-belts which should have  $\frac{1}{2}$ -in. play between the pulleys on the top side. When making belt adjustments, keep the pulleys in line because mis-aligned pulleys cause worn sheaves and broken belts.

And remember, when replacing belts always replace the complete set and not merely the faulty one.

—C. G. WRAGGE,  
*Agricultural Engineer.*

**Wildlife on Tinaroo Dam.**—Wildlife conservation is assisted by water saving projects such as the Tinaroo Dam on the Atherton Tableland. This dam is a sanctuary and the impounded waters and adjacent lands are providing food, water and shelter for much wildlife including many of our native ducks.

Wildlife, particularly game species, are building up on the Tinaroo Dam. In order that an adequate number of these game birds will overflow into shooting areas it is important that they remain undisturbed. For this reason, shooting on the dam is not permitted and the co-operation of all local sportsmen is urged so that their interests will be preserved for future years.

C. ROFF, *Fauna Officer.*



### *Dairy Planning Now*

Prepare suitable calf paddocks for rearing young stock.

Commence training heifers to ensure good milk "let-down".

Tattoo calves for future identification.

Re-tin and repair cans during the winter months.

Ensure that cows have 4-8 weeks' dry period before calving.

Dehorn cattle.

# Silage On The Southern Downs

By A. G. MARTIN, Agriculture Branch.

The Southern Darling Downs is only one area in the whole of Queensland where silage making is being practised by farmers. Those farmers who have not yet made the decision to conserve fodder in the form of silage should, from this article, obtain some further evidence of silage's advantages and some additional knowledge on the steps involved in its production.

Each year an increasing number of Southern Darling Downs farmers are including silage making in their fodder conservation programme. Successes with drought feeding of silage which have been achieved by some district cattlemen are to a large extent contributing to this rapid expansion in silage making.

Forage harvesters have taken most of the hard work out of silage making and so these machines are becoming a common sight on district farms.

During the coming season it is anticipated that many more thousands of tons of valuable silage will be conserved by district farmers. Some of these farmers will be conserving silage for the first time.

## What are the Best Crops?

A wide range of summer crops can be used for silage. Because of the summer incidence of rain in this district there is a much better chance of having a surplus of crop for silage during the summer than during the winter.

Wheat, oats, barley, field peas, and vetches are all suitable for silage but very few such winter crops have been ensiled in the past mainly because much greater yields can be obtained from most summer crops.

The popularity of the different crops in this district can be easily gauged by examining the amounts of silage conserved in 1959 by 24 farmers:

Crop	Quantity Ensiled	Percentage of Total	Number of Farmers
	Tons		
Sweet Sorghum ..	800	38.3%	8
Sudan Grass ..	500	23.9%	5
Lucerne ..	450	21.5%	3
Grasses and Clovers	230	10.6%	3
Cowpeas ..	60	2.9%	3
Grain Sorghum ..	40	1.9%	1
Maize ..	10	0.5%	1
Total ..	2,090	..	24

Cowpeas grow exceptionally well on most types of soil in this district and are often grown either mixed with another crop or on their own for mixing with low protein crops. Because of the different times of maturity it is preferable to plant the cowpeas in separate strips and mix the crops when filling the silos. The cowpeas can then be planted at a different time from the other crop, if necessary, so that the two crops reach the correct cutting stage together.

Lucerne is grown on a large number of farms and is usually available for cutting and mixing with high sugar, low protein crops.



## SUMMER CROPS FOR SILAGE—SOUTHERN DARLING DOWNS

Crop	Time to Plant	Seed Rate/Acre (Drilled)	Row Spacing	Varieties	Type of Crop	Stage to Harvest	Average Yield/Acre	Quality Silage
Maize .. ..	November, early December	8-10 lb.	Just wide enough to cultivate	Q790, Q724, DS303	High sugar — low protein	Early dented stage	15-18 tons	Low in protein
Sweet Sorghum ..	November, early December	6-8 lb.	14 in.	Sugardrip Sumac Italian Saccaline	High sugar — low protein	Firm dough ..	15 tons	Low in protein
Sudan Grass ..	November, December	8-10 lb.	7 in.	Sweet	High sugar — low protein	Seed just forming ..	8-10 tons	Low in protein
Millet .. ..	November, December January	10-14 lb.	7 in.	White Panicum (Siberian) Japanese	High sugar — low protein	Before seed matures	6-8 tons	Low in protein
Cowpeas .. ..	November, December	8-10 lb.	7 in.—14 in.	Malabar, Poona Cristaudo	High sugar — low protein	When first pods form	8-10 tons	High in protein
Lucerne .. ..	April, May .. ..	6-8 lb.	7 in	Hunter River	High sugar — low protein	Early bloom stage ..	5-6 tons	High in protein
Irrigated Pastures	April, May .. ..	1 lb. Ladino Clover or 1 lb. Irrigation White broad- cast Clover 1½ lb. Phalaris arundinacea 1½ lb. Phalaris tuberosa 3 lb. Cocksfoot or 2 lb. Perennial Prairie 1 lb. H. 1 Rye Grass	7 in.	..	High sugar — low protein	When grasses flower— before pollen shed	8-10 tons	High in protein

Both cowpea and lucerne are low in sugar, and if being ensiled on their own, will require an additive such as molasses or crushed grain. The crop should be wilted to reduce the moisture content to below 70 per cent., if molasses is to be added. The moisture content of these high protein crops at the time of ensiling is important and should not exceed 70 per cent., otherwise low quality silage will result.

It is advisable to sow summer crops for silage during November and early December so that they are not ready to harvest until after the usual heavy summer rains have finished.

The most popular summer crops used for silage are obviously sweet sorghum and sudan grass. Yields of sweet sorghum as high as 15 tons to the acre are quite common on the Southern Darling Downs from areas where the rainfall is considered unreliable. Sweet sorghum is a high sugar crop and although it is very easy to make good silage out of such a crop, the result is only a medium protein silage that has to be supplemented with protein concentrates to provide a production ration.

Sudan grass is similar in these respects, the main difference being that sudan grass does not yield so heavily per cut, 10 tons to the acre being a good average yield. This crop does come away well after cutting, however, to produce either good grazing or a second lighter cut for silage. This crop is handled very easily by flail type forage harvesters and for this reason is very popular.

Maize is the heaviest yielding summer crop but can only be grown on the areas where rainfall is fairly reliable. Good crops could be grown for silage along the Eastern Darling Downs from Killarney to Headington Hill and at such centres as Nobby, Clifton and Freestone. Yields of 15 to 18 tons of green material to the acre could be harvested from maize crops during a normal season.

Millet crops have not been used to any extent for silage because of their low yields compared with maize and sweet sorghum. The grazing millets such as white panicum (Siberian) and Japanese millet are quite suitable for silage and can be used for this purpose during flush seasons.

All of these crops are relatively easy to harvest, and because of their high sugar content, there are no problems associated with ensiling

them. Because of their low protein content it is preferable to mix them, load for load, with a high-protein, low sugar crop such as cowpeas, lucerne or irrigated pasture during the filling of the silo.

To determine when the crop has wilted sufficiently an average sample of cut material should be examined. When at the correct stage the stem and leaves will be limp and the material cool and moist. The stems should be easily broken by twisting, and the broken ends should appear moist and dark in colour. A handful of chopped crop should not exude free sap when squeezed in the hand.

It is emphasised, however, that the crop must not be wilted too much. A moisture content between 65 and 70 per cent. should be the aim. This material can then be ensiled if 2 to 3 gal. of molasses mixed with equal parts of water is added to each ton of green material.

Alternatively lucerne or cowpeas may be ensiled without wilting providing a dry preservative such as crushed grain is added when filling the silo; 150 lb. of crushed grain of 12 per cent. moisture will reduce the moisture content of one ton of chopped green crop from 75 to approximately 70 per cent. The grain performs a dual purpose, reducing the moisture to a safer limit and, by adding fermentable starch, assisting in the rapid formation of the acids needed to make the material into silage.

Irrigated pastures have been ensiled on the Southern Darling Downs, too. Surplus growth during flush seasons can be converted into a high protein silage using those methods recommended for lucerne and cowpeas. Good quality pasture silage will provide more than a maintenance ration for cattle. Cattle will produce or fatten on such silage. Yields of 8-10 tons to the acre are quite common with irrigated pasture.

### Types of Silo Used

Trench and combination trench-clamp-stack silos have been used almost exclusively up to the present time. There is, however, a small percentage of silage stored in tower silos. The popularity of the trench silo in this district is due to the low cost of construction (£15 to £25 per 50 ton capacity), the short period required for construction and the suitability of this type of silo for long-term storage of drought reserves.



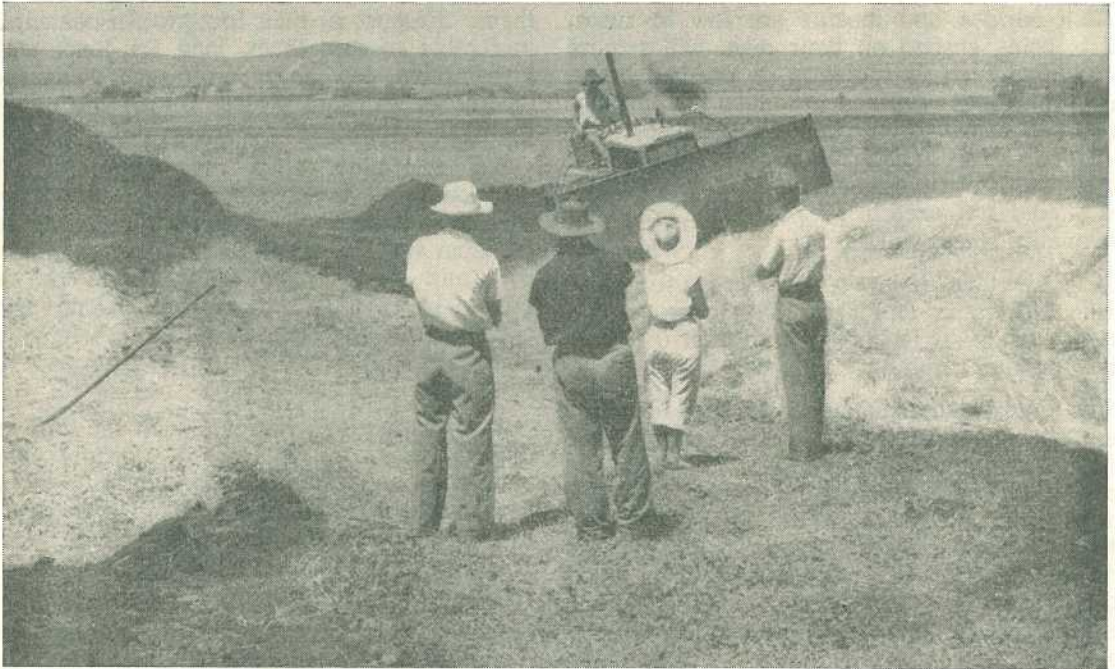


Plate 1: Two Trench Silos on Mr. S. Smith's Property, Nobby, Filled with Sweet Sorghum. Straw has been spread over the silo on the right in preparation for covering with a weather-proof layer of soil. Mr. Smith filled four 75-ton trench silos this year.

The practice of using a number of small trench silos, 50 to 60 tons capacity, is recommended in preference to using one larger trench of 100 to 200 tons capacity. Small trenches can be filled quickly and when feeding out it is usually possible to empty the silo completely during a dry winter period or a short summer drought. The remaining silage is still well protected in other trenches and the empty trench is available for refilling when crops become available. With large trenches there is the possibility that they will be only partly emptied when the summer rains come and this can cause wastage and other problems with trenches constructed on flat land.

On the Southern Darling Downs hardly a year goes by when silage could not be made during the summer and fed out to dairy cattle during the dry winter period. For this reason many district farmers are becoming interested in above-ground silos suitable for short-term storage. Circular weldmesh and clamp silos are creating considerable interest.

During the coming season both types of above-ground silos will be used in the district. Demonstrations will be conducted so that interested farmers can see these silos in use. These silos vary in price depending on the materials used. A 50-ton weldmesh silo would cost approximately £25 whereas timber and bolts for a 50-ton clamp silo may cost as much as £50.

By using second-grade hardwood timber, though, such a silo can be built fairly cheaply. Clamp silos can be either a fixture or portable. Portable clamp silos are built in movable sections and can be used on different sites handy to the crop being ensiled. The main advantage of above-ground silos is that the silage can be self-fed to stock more conveniently from them than from other types of silos.

### Harvesting

Forage harvesters are used on nine out of every 10 farms to harvest the crop. The number of forage harvesters in the district has more than





Plate 2

Mr. Wisemann Harvesting a Crop of Sugardrip Sweet Sorghum for Silage, Using a Combination Flail Type Forage Harvester and Self-Emptying Trailer. Mr. E. Wisemann's property is Headington Hill, near Clifton. Crops average yield 15 tons to the acre.

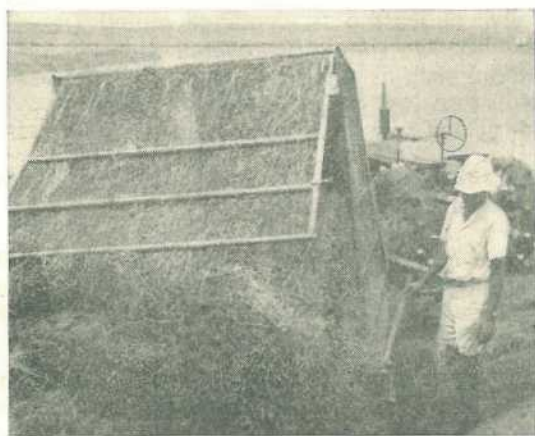


Plate 3

Mr. A. Crane, Elbow Valley, near Warwick, Unloading Chopped Lucerne and Grass from a Combination Forage Harvester-Trailer Unit into a 200-ton Trench-Clamp Silo.

doubled in the last year and contractors can now be hired without any difficulty.

Flail type forage harvesters are used almost exclusively mainly because of their lower cost and their ability to handle a wide range of silage crops without additional attachments. Flail machines are used to harvest everything from grass to maize, and, although they have their faults, they have proved very popular. The important points to observe when using flail

machines are to have the machine properly adjusted to cut the material into as short a section as possible, and to avoid setting the machine too low in an attempt to get all of the plant stalk. It is best to leave some stalk in order to avoid getting excessive quantities of dirt mixed in with the forage.

The machines do not produce as good a sample of chopped material as is obtained with other types of forage harvesters, where the length of cut can be adjusted down to as short as  $\frac{1}{4}$  in. The shorter cut is a distinct advantage when feeding out silage.

The types of forage harvester units vary from combination harvester, self-emptying trailer units to machines requiring separate trailers or trucks. With the latter type of forage harvesters, a self-emptying trailer is ideal to complete the unit. Such a unit can be used to harvest the crop, the trailer can then be unhitched when filled and taken and emptied into the trench without any manual labour being used. Some farmers use their farm tip truck with a wire mesh and hessian enclosed tubular steel frame for carting in the harvested crop material. This practice is only used as an emergency measure until suitable trailers can be obtained. The slow speed at which the truck must be driven, the blocking up of radiators with light crop material and the need for an extra man to drive the truck make this method much less satisfactory than others where a trailer is used.

### Filling and Covering Silos

#### (a) Trench and Clamp Silos

Trench and clamp silos are by far the easiest to fill. The material is simply emptied into the silo by running the trailer either through it or by backing it up to the side. The material can then be spread by handforks or by tractor-mounted implements such as light dozers, buckrakes, and so on. The first layer should be at least 3 ft. deep. When the material reaches a temperature of 90 deg. F. it can then be consolidated by rolling with a tractor.

Good silage can be made if the temperature is maintained at approximately 100 deg. F. Material rolled when it reaches 90 deg. will normally continue to heat until it reaches 100 deg. To control the temperature the amount



of air in the green material must be regulated. If the material is not heating sufficiently, rolling should be delayed. If it is overheating then rolling should be carried out immediately.

After the first layer has been rolled, filling can be continued in stages, checking the temperature, and rolling as required.



Plate 4

**Rolling Sweet Sorghum in a Trench Silo on Mr. E. Wissemann's Property at Headington Hill.**

The material was harvested with a flail type forage harvester. The trench held 75 tons of silage filled to 2 ft. above ground level. The silo was purposely constructed leaving one side clear of spoil to enable the forage harvester-trailer unit to be backed in at the side for emptying.

A very good system adopted by local farmers is to fill two small 50 to 75 ton trenches at the same time. Where suitable equipment is in use this practice enables large quantities of material to be conserved in a short time; the ensiling of 150 tons in less than a week is possible. While the first layer in the first trench is heating, filling of the second trench can be started, and little time will be wasted.

If ensiling lucerne, cowpeas or pasture on their own, the molasses and water, or crushed grain, should be applied to each load as it is spread.

Trench silos should be filled well above ground level so that when they are packed down and covered they possess a domed surface which will shed rain. Filled trenches should be covered with a layer of soft straw followed by a layer of soil at least 12 in. deep. The material should have been thoroughly rolled before filling and the covering soil should be rolled daily for a week to aid thorough compaction of the top layer of silage and to consolidate the soil covering. The covering soil may be planted to some annual crop or left bare. It should be inspected occasionally and any cracks which appear should be filled in to prevent water from reaching the silage.

*(b) Weldmesh Silos*

Weldmesh silos are filled using either an elevator or blower. The material is spread and trampled, with attention being paid to the temperature. These silos should be constructed to give at least 6 ft. depth of settled material. The filled silo should be covered with some light material such as soft straw, with a good layer of sawdust on top, or alternatively a heavy material such as soil may be used instead of sawdust.

This serves the same purpose, as in other silos, of keeping out air and water.

If silage is to be held for only a few months before feeding, a lining of a light grade of tar paper will be sufficient to restrict wastage on the sides.

Trials at present in process near Brisbane suggest that thin sheets of tempered pressed board may give long and economical service as lining material in arc mesh silos.

The first cost may be higher, but the ultimate annual cost is less than with more flimsy lining material.

It is well known that many other districts in Queensland are becoming alert to the value of silage. Further, it is most gratifying that mechanisation is able to encourage this valuable aid to prosperity and security.

Much more fodder conservation still is necessary in our livestock areas.



# stock and station

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**Faster Beef Gains with Lucerne.**—Grazing lucerne is showing promise as a cheap and practical supplement to native pasture in trials at the Brian Pastures Research Station. Cattle allowed winter and spring grazing on a small patch of lucerne in addition to native pasture gained up to 140 lb. more in a year than cattle on native pasture alone.

This was a feature of the first two years' results from a native pastures management trial.

In the trial, cattle running on 25 acres of native pasture were allowed grazing on 5 acres of lucerne during the winter and spring. During the remainder of the year, the lucerne was conserved as hay.

Two-year-old steers receiving lucerne in 1958 gained 71 lb. liveweight a head more than similar stock grazing on native pasture alone. In 1959, the lucerne-fed group gained 147 lb. a head more than those on pasture only. The cattle fed the supplement were ready for slaughter in the spring, a time when beef prices are usually high.

There is, however, a risk of bloat from uncontrolled grazing on lucerne. Prevention of bloat under these conditions requires further study.

Another early result from the native pastures study is the sensitivity of the composition of native pastures to different management methods. Black speargrass is becoming less prevalent on pastures grazed rotationally and on pastures that are spelled occasionally and treated with a rotary chain slasher. However, these treatments have not yet improved cattle growth.

Renovation with a chisel plough increased the density of native legumes in 1958, but not in 1959. In 1958, cattle on pastures treated with

the chisel plough gained 54 lb. more than cattle on untreated pastures. The margin in favour of the treated pastures was 15 lb. in 1959.

—*W. J. S. SLOAN,*  
*Director, Division of Plant Industry.*

**Veterinary Milage Scheme Success.**—The Murgon dairyfarmers' subsidised scheme to defray milage charges for veterinary aid has been a success. After a year's trial, it has been found that the assessment rate can be reduced. Milage charges for veterinary services by a private practitioner will now cost producers an average of little more than £1 a year.

Late in 1958, suppliers to the Murgon co-operative butter factory and their cheese factory at Goomeri considered the problem of veterinary milage charges. They felt that some method should be found to equalise the milage charges involved in having their stock treated by the local private veterinary practitioner.

After consultations between representatives of the Queensland Dairymen's Organisation, the Murgon butter factory and the Department of Agriculture and Stock, a scheme was worked out. It applied to suppliers in the whole area and commenced on December 1, 1958.

Under the scheme, milage charges made by the approved veterinary surgeon for the treatment of stock belonging to contributors are paid from a central fund. The scheme is financed by a special assessment on dairy produce and a Government subsidy of 10s. in the pound. Producers paid an assessment of one-twentieth of a penny on each gallon of milk and one-tenth of a penny on each pound of butter.

Collections and payments from the fund will undoubtedly fluctuate from year to year. However, careful consideration of the financial



position after the first year's operations has shown that the farmers' contributions can be reduced.

Under the scheme, producers will now have all milage charges for veterinary services to farm animals paid for an average cost of little more than £1 a year. It is hoped that the success of this scheme will stimulate the adoption of similar schemes by farmers' organisations in other areas.

**New Drugs Aid Chicken Rearing.**—New drugs for preventing coccidiosis in chickens could change the method of rearing broilers and grillers in Queensland.

With the aid of nicarbazin and zoalene, these chickens can now be reared on the ground as successfully as they can on wire floors. Ground rearing reduces the cost of housing the birds.

The drugs that prevent coccidiosis are supplied continuously, in the mash, until the birds are ready for slaughter. The drugs act by hindering the development of the coccidia in the intestines of the chickens so that coccidiosis does not occur.

Nicarbazin was the first really effective drug to combat coccidiosis, and has been used by poultry farmers here for about two years. More recently, zoalene has appeared on the market. Nicarbazin is a preventive only, but zoalene can be used either as a preventive or as a treatment once outbreaks occur.

In broiler chickens, prevention of coccidiosis outbreaks is preferred to treatment. Even though drugs used for treatment may reduce the number of deaths and check an outbreak, the birds still suffer a setback. A setback will reduce the small margin of profit.

Table cockerels have been reared largely on wire floors in south-eastern Queensland. This method of management has been adopted mainly to avoid coccidia and other internal parasites. On the central and far north coasts, ground rearing has been practised, but coccidiosis has always been a hazard. With the use of nicarbazin, however, several large broiler producers claim

complete success. Not only is coccidiosis prevented, but the broilers dress out much more evenly at slaughter.

The effectiveness of the new drugs has already started a trend back to rearing table chickens on the ground. With the market expanding, a further shift in the management method can be expected. Roundworm infestation will be a danger in broilers reared on the ground, but effective drugs are available to combat this parasite.

—P. D. RANBY,  
*Veterinary Officer.*

**Baby Pig Losses.**—Within half an hour of birth, the body temperature of normal piglets drops several degrees, and under favourable conditions takes about 48 hours to rise to the normal average of 102.5 deg. F. If the newly born pigs strike unfavourable conditions the return to normal body temperature is delayed. When exposure to cold and damp occurs or the pig lacks food, the temperature may continue to fall. This is the reason behind many of the losses before a litter is three days old.

You can avoid most of these very early losses by feeding the sow well from mating to farrowing and by keeping litters warm and dry for the first few weeks.

Warmth and comfort you can provide by building snug dry farrowing pens, fitted with a creep, and a hoverboard to conserve heat.

But how does feeding of the sow weeks before farrowing affect pigs after birth?, you ask. It's really quite simple. Thin light pigs lose heat faster than big fat pigs at birth. Strong heavy pigs can withstand cold better. Thin weak pigs are more often injured by the sow, and also frequently die of starvation.

Feeding the sow properly during pregnancy helps to secure a litter of heavy, vigorous pigs at farrowing. If there are no weak light pigs, you have therefore eliminated your likely losses.

—T. ABELL,  
*Senior Adviser, Pig Branch.*



# Growing Cowpeas for Seed

By G. VERHOEVEN,  
Experimentalist.

*Growing cowpeas for seed promises to become a profitable industry in the Lower Burdekin area. Results of work done at the Department's Ayr Regional Experiment Station are described:*

The practice of using cowpeas as a nitrogen-rich green manure or as a high-protein fodder crop is quite common on many Queensland farms. The recent introduction of stem-rot-resistant varieties is expected to stimulate this practice and in order to supply the demand, considerable quantities of seed will be required annually.

Commercial seed production of cowpeas, already a useful source of income for many farmers on the Atherton Tableland and in the Kingaroy and Darling Downs districts, is concerned mainly with the popular varieties Poona and Reeves which can be harvested readily by machines. These varieties are, however, highly susceptible to stem rot and therefore unsuited to humid areas.

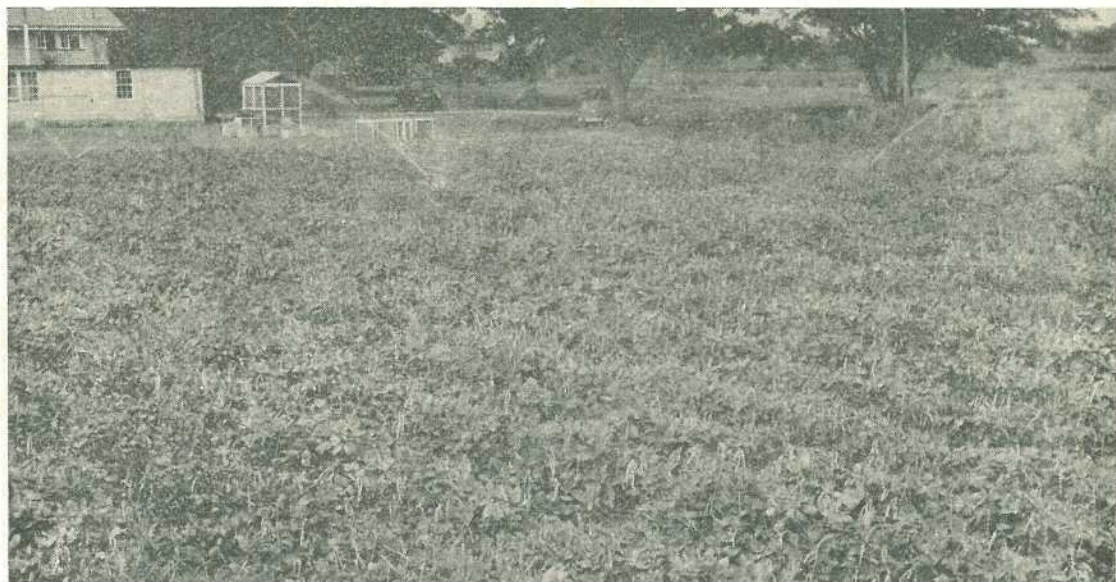


Plate 1

**A Crop of Santiago Cowpea at Ayr Regional Experiment Station, Four Weeks before Harvesting.**



New varieties resistant to this disease are more difficult to harvest mechanically on account of their prolific, prostrate vine growth and indeterminate fruit setting. Up to the present, techniques used for seed collection from these varieties are either not mechanised or only partly so, and this requires a considerable amount of expensive labour.

Trials have been carried out at the Ayr Regional Experiment Station in the Lower Burdekin Valley, to investigate the possibilities of mechanical harvesting, and results to date have been sufficiently encouraging to suggest that this crop could become a commercial proposition for farmers in the Burdekin district.

### Summer-Growing Annual

The cowpea is a vigorous, deep-rooting, summer-growing annual of tropical origin which does well on a wide variety of soils. It does best under warm, moist conditions but once established has a marked capacity to survive dry spells.

In the Burdekin the varieties discussed have a 4 to 5 week flowering period, which commences 3 to 4½ months after planting so that the crop matures in 4 to 5½ months. Pods are set throughout the entire flowering period. On this account seeds do not ripen uniformly, but loss of seed due to natural shattering does not readily occur.

The combination of a hot and humid period during late December-April, followed by a dry winter and early spring with associated low humidity and an ample supply of good quality irrigation water, as experienced in the Burdekin, has been found to be very favourable for the growing of cowpeas for seed production.

Because it is a leguminous crop it requires the presence of certain bacteria in the soil for maximum development. Areas in which cowpeas have not been grown previously may be deficient in the specific strain of bacteria. In such cases, the planting seed is best treated with inoculum. This can be obtained free of charge from the Department of Agriculture and Stock, Brisbane, or the Bureau of Tropical Agriculture, South Johnstone, stating the amount of seed to be treated. Cultures will retain their viability for several weeks if stored according to the instructions included.

### Disease Resistance

There are many different varieties of cowpeas, but on account of stem rot (*Phytophthora vignae* Purss), a disease which has threatened to eliminate the cowpea as an agricultural crop in the humid zones, the degree of resistance shown by a variety is of utmost importance.

Poona and Reeves are both highly susceptible and therefore entirely unsuited to areas where the disease occurs. Other varieties such as Malabar and Giant possess good field resistance but may be affected to varying degrees where conditions are particularly favourable for disease development. The varieties Blackeye 5, Havana and Santiago on the other hand have proven their resistance under all conditions.

It is obvious, therefore, that for an industry which has to find its markets in the wet tropics, the only suitable varieties at present available are Blackeye 5, Havana, Santiago and Malabar.

Investigations at Ayr were confined to the Malabar and Santiago varieties only, but the characteristics of Blackeye 5 and Havana are nearly similar.

### Establishment of the Crop

Cowpeas may be planted in the Burdekin district at all times of the year. The late December-March period, however, offers the best prospects on account of low production costs.

Later plantings require an increasing number of irrigations, while during the colder winter months of June and July restrictions in growth make young crops highly susceptible to bean fly and aphid attack, pests which at other times do not affect this crop. Frequent costly sprayings with DDT and/or nicotine sulphate are then required to keep the plants moving.

The wet season rainfall generally commences in this district during the second or third week of January but storm rains are likely from late November onwards. These rains, combined if necessary with a pre-planting irrigation, may be utilised to establish the cowpeas before the onset of the wet season rains. However, during the wet season, plantings may be carried out whenever dry spells of sufficient duration are experienced to allow the ground to be worked.



**Seedbed Conditions.**—Under the tropical conditions experienced in the Burdekin during the summer, extensive seedbed preparation is not essential for good growth, apart from that which is required to obtain a reasonably fine tilth free from weeds. Furthermore, cowpeas are largely self-supporting regarding nitrogen supplies and little or no time need therefore be allowed for the decomposition of the grass and stubble worked under during the seedbed preparation.

The main characteristics of the early and later plantings are summarised:

**December–January Plantings.**—These plantings have the advantage of a lower cost of production as they require little or no attention after establishment until harvesting time.

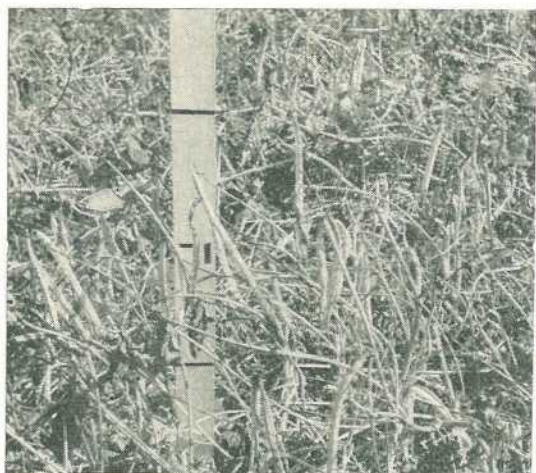


Plate 2  
**Santiago Cowpeas Ready for Harvesting.**

Following harvesting of the seed in May or June, irrigable land may be planted to a second cash crop like sorghum or maize as this crop then benefits considerably from the preceding legume crop. Volunteer cowpea seedlings do not cause great difficulty during the colder months, as growth is then extremely slow, giving the cash crop sufficient time to get away.

The tendency of cowpeas to produce excessive vegetative growth and a more indeterminate fruiting habit under conditions of high summer rainfall is a disadvantage. However, investigations are in progress in which the crop is sprayed with light

concentrations of phenoxy compounds for better fruiting.

Dry weather conditions are imperative for successful harvesting. Such conditions are found in the Burdekin district from late May onwards and plantings should therefore not be established earlier than late December. In general, the later the planting the greater the chance of securing dry harvesting conditions.

**February–March Plantings.**—The cost of production in these plantings is generally higher because of the additional irrigations and possible inter-row cultivations needed. Less vegetative growth is made, however, with a more determinate setting of fruit due to the influence of the cooler weather and the shorter days. Yields from 12 to 20 bus. an acre have been obtained.

At present it would appear that any planting during the December–March period should be suitable for seed production purposes, but that plantings from February onwards are to be recommended until further investigations have clarified the possibilities of fruit induction in the earlier plantings. These undoubtedly have higher seed potentialities.

### **Planting Techniques**

**Row Spacings and Seeding Rates.**—Sowing is best done with a seed drill or combine but satisfactory results may be obtained by broadcasting the seed and following this up with a light discing and harrowing. For row spacings of 21 in. and more, two or four row planters may be used.

For harvesting methods, which up to the present have involved handpicking of the pods or cutting the vines at ground level and threshing with a stationary harvester or modified corn-sheller, wide row spacings are practised. These row spacings vary between 30 in. and 42 in. at a seeding rate of 6–10 lb. an acre. Further experience has indicated that mechanical harvesting requires close row and plant spacing, to prevent undesirable pod setting on runners close to or on the ground in the inter-row space. These are impossible to harvest. Best results were obtained where a densely interwoven mat was obtained with the seed pods at an even height above the bulk of the vegetative matter. Successful mechanical harvesting is based on a spacing of 7 in. or 14 in. requiring 20–25 lb. of seed an acre when drilled or 25–30 lb. when broadcasted.





Plate 3  
Mower Knife Penetrating the Crop.

Such high seeding rates at the same time provide a quick soil cover which is essential under wet tropical conditions when summer grasses can be so prolific.

### Irrigation

Under favourable conditions, late February-early March plantings can mature without the need of additional irrigation but usually one or two irrigations are required for best results. Crops grown with the aid of spray or border check irrigation may still use the closer spacings, but where furrow irrigation is practised rows should be spaced at a minimum of 21 in. A seeding rate of 10-15 lb. per acre is then recommended. For best harvesting results it is advisable to keep the furrows small and maintain the ground as even as possible when inter-row cultivations are carried out.

For late-sown crops intended to be grown without irrigation, a minimum of 21 in. is advisable, to obtain better water utilisation and allow early weed control in the inter-row spaces.

### Harvesting

Because of the fleshy nature of the stalk and leaves, the prolific vine growth, rather prostrate habit and the indeterminate fruit setting and

ripening of the pods, these new varieties do not lend themselves readily to mechanical harvesting. Moreover, direct harvesting when the majority of the pods were dry and threshable but with the vines still in a green condition resulted in an unsaleable seed sample, heavily contaminated with trash.

Results after the crop was allowed to dry out completely in the field by withholding the irrigation water were equally unsuccessful due to excessive seed cracking. This was apparently due to the fact that during the long drying period the earlier pods dried out too much.

The procedure was therefore varied so that the plant would be either wholly or partially killed, to allow a quick drying of the succulent vines and the maturation of the fully developed green pods, before the actual threshing for seed was carried out.

A 5 ft. rear-mounted agricultural mower was used when approximately 75 per cent. of the pods were dry. An overlap of approximately 8 in. must be taken during the mowing as in this way the rear wheels of the tractor hold down the strip of cowpeas which has been previously mown. A protective cover under the driveshaft of the mower is needed to prevent the vines from wrapping around it. Both swathboard and shoe should be removed and only the bare cutterbar used. Plates 3 and 4 illustrate the method.

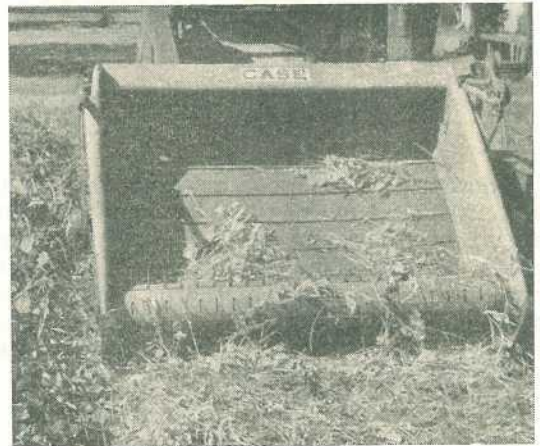


Plate 4  
Gathering the Crop for Threshing.



With the cutting width reduced to approximately 4 ft. because of the overlapping, the mower can cover 1 acre in 2 hours' mowing time. So as to minimise loss of seed due to the cracking of dry pods when driving the tractor over the vines, mowing during the early morning is recommended.

By leaving the vines undisturbed for 4 to 7 days, the green pods and vines dry out to the necessary brittleness and make efficient threshing possible.

Where the wider row spacings are practised the furrows required for irrigation as well as inter-row cultivation tend to make the ground uneven. The mower then has a tendency to cut up the plants into smaller portions which cannot be readily collected by the header. On very uneven ground the use of a cane ratoon disc cutter may be more successful as plants are cut below ground level and left intact.

In the closer spacings, where the vegetative matter usually forms a compact mat, an all-crop harvester has been found to be efficient. The use of the pick-up attachment should not be necessary as the dry mown strips can be picked up more easily by lowering the cutter bar as close to the ground as possible. In this operation the reel beaters must always be positioned in a forward position and close to the knives to assist in forcing the material up the canvas conveyor belt.

A more efficient method which, although higher in cost, may be more suitable for large-scale operations is offered by the use of chemicals. Various chemicals called desiccants have the ability to quickly kill off the aerial parts of plants without affecting the viability of the seeds. So far, best results with cowpeas have been obtained with PCP (sodium pentachlorophenate or pentachlorophenol), applied at the rate of 10 lb. active ingredient to the acre, together with 2 gal. of mineral oil in 50 gal. of water. When applied under dry, warm conditions, a maturing crop of Santiago cowpeas withered in less than 3 days, bringing mature green pods into a threshable state.

With closely grown crops where even pod-setting prevails it is often sufficient to have only the top leaves and stalks in a brittle state. This makes it possible to take the seed crop off with the cutter bar above the main body of vegetative

material. Costs might be reduced under such conditions.

### **Type of Harvester**

Some makes of all-crop harvesters have been found to be better than others for the harvesting of this particular crop. In nearly all cases slight modifications in the form of rubber beaters, smooth concaves and special sieves are also required. However, most of the later models give satisfactory results if the recommendations of the makers are carefully followed.

The peg-type threshing cylinder is better adapted to crops, the seeds of which are hard to separate from the seed cover. Best results have been obtained, however, with the rub-bar type drum, operated at the lowest possible speed and using a smooth concave.

The severity of the threshing and consequently the cracking percentage is largely governed by the peripheral speed of the drum. For a 20 in. drum the speed should be between 200 and 300 r.p.m. With such a low speed and a wide concave clearance no difficulty should be encountered in keeping the cracking percentage under the 5.25 per cent. which is the maximum allowed by Departmental standards. By using the correct sieves and finishing screens, little or no after-cleaning should be required.

### **Seed Storage**

Cowpea seed is very susceptible to attack by pests like bean weevils and mites and should be treated immediately after harvesting with BHC dust. Thorough cleaning of the harvester after use is strongly recommended as this machine can be a source of contamination.

### **Cost of Production**

Stocks of seed of stem-rot-resistant varieties are very small at the time of writing so that no sales price can be quoted.

On account of the more difficult and costlier harvesting methods involved compared with Reeves and Poona, it is expected that a price of £3 a bus. f.o.r. Ayr could be commanded until such times that harvesting techniques have improved and better yields can be obtained. Based on this price and a yield of 15 bus. to the



acre of cleaned seed, the following table gives an indication of the costs involved, and probable average returns an acre.

The figures have been based on farming as a family unit, with or without a permanent hand—as at present obtains in the sugar farms of the Burdekin Delta. Machinery depreciation has been included.

	£	s.	d.	£	s.	d.
Land Preparation (per acre)—						
One ploughing .. ..	1	0	0			
Two discings .. ..	15	0				
One harrowing .. ..	5	0		2	0	0
Planting—						
Planting (7 in. to 14 in.) ..	4	0				
Seed 20 lb. .. ..	1	0	0	1	4	0
Growing—						
Irrigations (3 in.) .. ..				15	0	
Harvesting—						
Mowing .. ..	1	10	0			
Harvesting .. ..	5	0	0			
Bags and twine .. ..	15	0				
Cartage to rail .. ..	1	0	0			
Extra labour .. ..	2	0	0			
				10	5	0
Total Costs ..	£14	4	0			
				£	s.	d.
Returns—15 bus. at £3 .. ..	45	0	0			
Less—Production costs .. ..	14	4	0			
Profit (per acre) ..	£30	16	0			

## Desiccants Technique

If desiccants are used, the cost would be approximately £3 10s. an acre higher than if mowing were done. However, this would be partly compensated for by less seed loss, and more efficient handling.

## Good Demand for Seed

The demand for seed of stem-rot-resistant varieties of cowpeas is quite good. This is instanced by the fact that in the sugar-growing areas north of Maryborough it has been estimated that about 7,000 bus. of cowpea seed together with 12,000 bus. of velvet bean seed were sold in 1958. This would be sufficient seed to plant more than 50,000 acres and most of it would have been planted by sugar growers for green manuring purposes.

Several districts in Queensland seem to be suitable for the production of cowpea seed, but growing and harvesting conditions in the Burdekin district are ideal. Moreover, there is a considerable acreage of suitable land that could be used to supply the growing need for seed. Other legumes might also be considered for seed production in this area.

Production of legume seed is not an enterprise which may be taken up by all farmers, but those who feel interested in a branch of agriculture which offers ample scope for initiative and resourcefulness may be confident that the returns will compare more than favourably with those from most other crops.

## Vitamin A For Pigs

Many pig raisers find that most of their setbacks occur in the spring months, when weather conditions are mild. When the causes of these setbacks are examined closely you will see that a number of them are due to lack of vitamin A.

Under our seasonal conditions green feed supplies start to decline, both in quantity and quality, during the autumn months. During winter and spring, pigs normally get little green feed of good quality, and as a result the vitamin A stored in their bodies tends to be used up. As vitamin A is essential for good growth and health, exhaustion of the supply is reflected in slower growth, the onset of infertility troubles, and lowered resistance to disease so often seen during dry spring months.

To avoid these troubles, make sure your pigs get enough vitamin A during the winter and spring. If your pig pastures are poor during this period, try growing oats for grazing. A small paddock of lucerne for cutting and hand feeding is invaluable.

If you can't readily supply green feed, good quality leafy lucerne hay is an excellent substitute, as it builds up the vitamin content of the ration.

When no natural supplies of vitamin A are available, specially manufactured vitamin A supplements may be bought and used to avoid a deficiency.

—T. ABEL, Senior Adviser, Pig Branch.

# bucket and bail

**Dairy Breed for the Tropics.**—Plans to develop a new tropical breed of dairy cattle in Queensland will get under way this year. Foundation breeding stock are available, and the former Ayr Regional Experiment Station is being re-organised for dairy production.

One of the Indian or Zebu dairy breeds and European cattle are to be used for this purpose.

The aim is to combine the ability of the Sahiwal to thrive in the tropics with the high production of European dairy cattle.

Development of an adapted tropical dairy breed could prove of major importance to dairy farming in central and northern Queensland.

For its breeding programme, the Agriculture Department has a purebred Sahiwal bull and two half-Sahiwal half-Jersey bulls. These animals are the progeny of Sahiwals introduced into Australia in 1952 and held permanently in quarantine in Melbourne. The bulls were given to the Department by the C.S.I.R.O.

First step in the breeding scheme will be to mate the Sahiwal and Sahiwal crosses with Jersey, Friesian and A.I.S. cows. The object will be to obtain progeny that combine most of the desirable qualities of the two types.

This work will then be followed by selection for production to give a type of animal capable of high milk yields in the tropics.

Sahiwal cattle originated in the Montgomery district of Pakistan and are also called Montgomery cattle. As a breed, the Sahiwal is about equal in bodyweight to the Guernsey. Sahiwal cattle are usually a reddish dun-colour, while dark brown and black points are common.

Occasionally there are white patches on the body, but whole whites or greys are rare. This is in contrast to the beef-type Zebus in Australia. Like most Indian cattle, Sahiwals have a distinctive hump over their shoulders.

The Sahiwal is adapted to a hot climate and is one of the highest milk producers of all the Indian or Zebu breeds. Selected cows have produced up to 1,200 gal. of milk in a lactation. Butterfat content of the milk is reported to range from 4.3 per cent. to 6 per cent.

Tropical conditions in Australia adversely affect cattle in three ways. High temperatures may lead to a reduction in grazing time. On hot days, European cattle prefer to remain in the shade than to feed. External parasites, especially cattle ticks, cause production to drop, and constant dipping is necessary. The summer-growing grasses lose their protein content quickly after a brief growing season.

Work with Zebu crosses of beef cattle in Queensland's tropical areas indicates that cross-breeds are better adapted to tropical conditions than pure European breeds.

The breeding scheme is a long-term project since it will take about three years to breed each new generation. But as the work progresses, the value of Zebu-cross dairy cattle in Queensland's tropical regions will be tested thoroughly.

**Tropical Legumes in South, too.**—Trials with tropical legumes last year indicated that some species may be suitable for districts far south of the actual tropics.



Six tropical legume trials were carried on during the year. The behaviour of these plants was studied in districts as far apart as the Atherton Tableland and Currumbin. The trials were under the direction of the Queensland Dairy Pasture Improvement Advisory Committee.

Townsville lucerne was showing promise as a legume component in bunch-type pastures like bunch spear grass. Its performance in pastures of this type was being studied in the Rockhampton, Gladstone, Bundaberg, Maryborough, Lower Wonga and Gatton districts.

This valuable legume can extend the grazing season well into the late autumn and early winter months. It is an annual summer legume, but its ability to come up from self-sown seed will ensure its spread on suitable coastal soils.

At Currumbin, near the Queensland border, four tropical legumes have given excellent summer forage yields. A centro-molasses grass pasture gave 13,068 lb. of air dry hay to the acre; stylo-molasses grass 11,616 lb.; Townsville lucerne-molasses grass 8,349 lb.; and Glycine javanica-molasses grass 6,534 lb. These yields point to the value of these legumes for frost free coastal ridges with medium levels of soil phosphate. Stylo has seeded freely in this trial and is spreading to other parts of the trial area. This spread is occurring without the help of fertilizers or cultivation.

The value of Glycine javanica for the red soils of the Atherton Tableland has already been amply demonstrated. But expansion in sowings is retarded by lack of commercial seed supplies.

Ample stocks of centro seed are now available and this legume is being widely used in dairy pastures in the Innisfail and Mackay districts. Centro is also being studied in the lower rainfall region around Rockhampton. On the high rainfall slopes at Cooroy and Nambour, excellent growth has been recorded in combination with molasses grass.

Important pioneer work with *Desmodium uncinatum* has been continued in the Gympie district. Four seed increase blocks and a grazing area have been established. Propagation by cuttings and locally harvested seed will permit widescale testing next season.

—W. J. S. SLOAN,  
*Director, Division of Plant Industry.*

**Purebred Herd Testing Rise.**—More purebred dairy herds than ever before are now being production recorded in Queensland. In all, 331 purebred herds are under test. Under the purebred production recording scheme, 145 herds are being recorded, compared with 118 last year. A recent survey shows that a further 186 purebred herds are being production recorded under the group scheme.

In last year's 118 purebred herds, 1,936 cows were production recorded. This year, about 2,400 cows will be recorded under this scheme. The number recorded under the group scheme cannot be calculated until the season ends on September 30.

Of the stud dairy cattle breeders in Queensland, 27 per cent. are now production recording their herds. Of these, 12 per cent. are recording under the purebred scheme and 15 per cent. under the group scheme.

This shows that these breeders have recognised the value of production recording.

Herd recording is an accurate means of measuring each cow's yield in a particular season. It provides the information for comparing the merits of animals within a herd. This helps the studmaster in selecting his breeding stock and in planning breeding programmes. At the same time, it gives commercial dairy farmers selecting herd sires an accurate measure of a bull's production backing.

The increase in the number of stud breeders recording their herds is an encouraging sign. As greater use is made of the information coming from herd production records, the rate of improvement in the studs will be accelerated. This improvement will be passed on to the commercial herds using bulls from progressive studs.

**Care of Leather Belting.**—Leather machinery belts are still giving good service on many farms, despite the increased use of rubber, canvas and balata. The life of leather belts can be greatly prolonged if they are treated with castor oil every six months. This makes the leather supple, prevents mildew, discourages insects and vermin and reduces the tendency to slip. Before applying the oil, clean off any accumulated dirt or belt stick with petrol. Allow the petrol to evaporate completely.

—C. G. WRAGGE, *Agricultural Engineer.*

# Strawberry Fruit Rots Can Be Controlled

By BARBARA L. WINKS, Pathologist,  
and B. L. OXENHAM, Senior Pathologist.

Strawberries are affected by several fungal fruit rots in South Queensland but grey mould and *Gloeosporium* ripe fruit rot are by far the most serious.

The fungus (*Botrytis cinerea*) causing grey mould attacks a number of crops such as beans, tomatoes, lettuce and grapes. Cool, moist weather hastens the spread of the disease, and strawberry flowers, fruit stalks and fruit may all be affected.

The rot on the fruit first appears as a light brown, soft area which may extend to cover the whole fruit. If the weather remains humid the grey, fuzzy masses of spores are produced on the affected tissues, and these are readily spread by wind or on the pickers' hands.

Eventually only a dry leathery mummy remains of the fruit, and small, black, fungal resting bodies known as sclerotia may be formed. These fall to the soil where they remain until conditions again favour the spread of the disease.

Both the green and ripe fruit may be attacked, particularly if they are sheltered under the leaves and in close contact with old, rotting fruit, flowers and leaves. The fungus can also spread by contact from fruit to fruit once they have been harvested and packed.

Although moist, showery weather during winter and spring is required to start a grey mould

outbreak, once there is an abundance of rotting material under the bushes the disease may progress even during subsequent dry weather. Dews and irrigation water apparently provide enough moisture to continue the infection cycle. Close planting and poorly-drained soil shaded by adjacent trees will also tend to increase grey mould.

## **Gloeosporium Ripe Fruit Rot**

*Gloeosporium* ripe fruit rot is also caused by a fungus (*Gloeosporium* sp.) and like grey mould attacks the flowers and fruit. The leaf and flower stalks may also be infected and dark sunken areas produced.

Although the fungus may infect green fruit it does not produce symptoms until the fruit ripen. Circular, brown to dark-brown patches then develop on the fruit. These may be up to half an inch in diameter and are firm, somewhat shrivelled and slightly sunken. Some white fungal growth may develop on the spots during moist weather. Small pink masses of spores develop on the surface of the spots and these are splashed about by rain and spray irrigation, or distributed during picking.

Warm weather favours the development of *Gloeosporium* fruit rot and it does not become common until the spring and early summer. It usually reaches a peak in October-November.



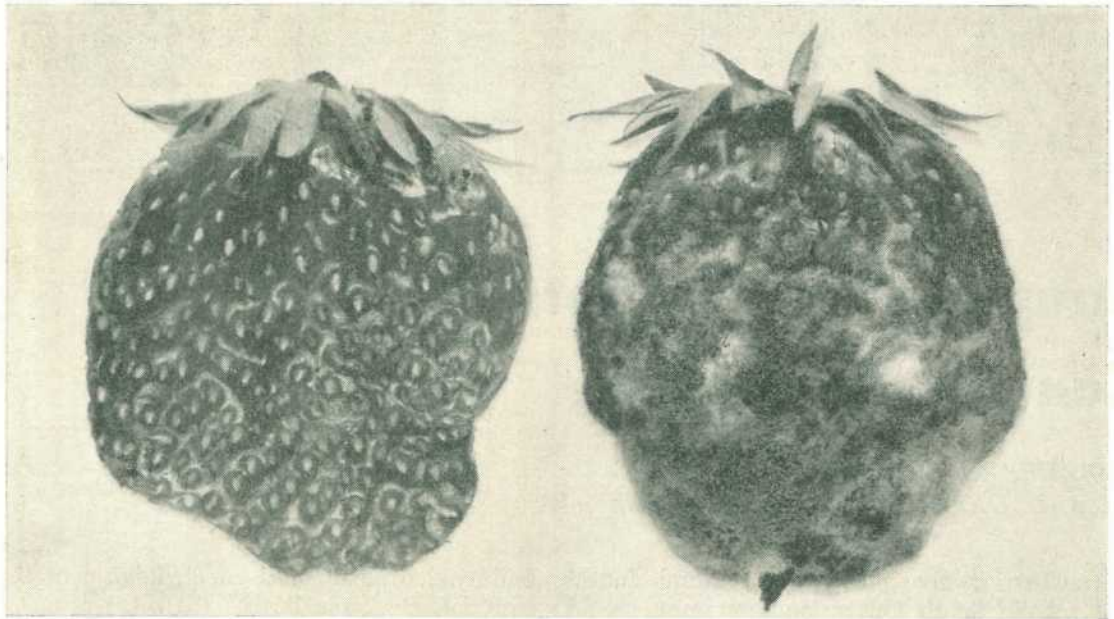


Plate 1

Healthy Fruit on Left, Fruit with Grey Mould on Right. Note the fuzzy masses of spores on the fungal growth.

### Control

An experiment conducted at the Redlands Experiment Station in 1959 showed that good control of grey mould and *Gloeosporium* fruit rots can be obtained by regular, fortnightly spraying with a fungicide, captan. Zineb, maneb and copper oxchloride were also tested but captan was outstanding.

Weather conditions during the winter and spring of last year particularly favoured fruit rot development, and a 50 per cent. increase in yield of marketable fruit over the unsprayed plots was obtained by the use of captan. This may be attributed, not only to protection of the developing fruit, but also to the prevention of flower blight. There was also a general reduction in the amount of rotting plant material in the captan treated plots.

In this experiment the plants were sprayed every two weeks from the commencement of fruiting. It may be possible in practice, however, to delay spraying until the first sign of grey mould

development and then to spray at 10-14 day intervals while weather conditions favour the disease. On farms where *Gloeosporium* fruit rot is a problem, regular captan spraying should be carried out from early September until the end of the main fruiting season.

The concentration of captan used is 2 lb. of the 50 per cent. product to 100 gal. of water. This is the equivalent of 1 oz. to a 3½ gal. knapsack sprayer.

The strawberry is a close-growing plant and it is important to direct the spray under, as well as on top of, the foliage, so that a complete cover is obtained. Regular spraying is important while weather conditions favour disease development. Such fungicides as captan are protective in nature and a constant deposit is necessary on the plant to prevent infection.

In addition to spraying it is also important to practice crop rotation, select a well-drained site

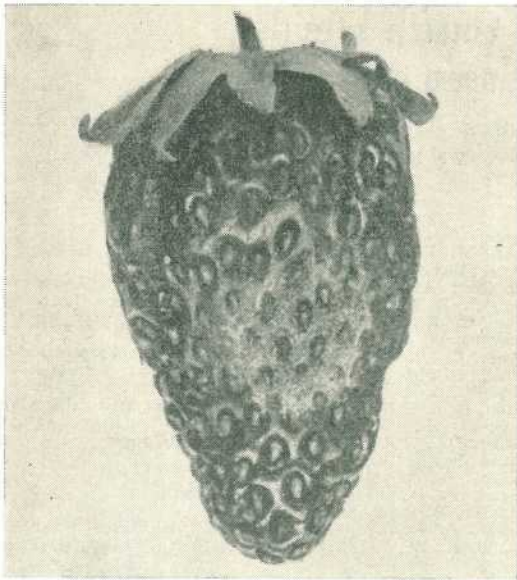


Plate 2

**Gloeosporium Ripe Fruit Rot.** A little white fungal growth may develop on the brown spots during moist weather.

for planting and carry out bedding, mulching and hygiene. Rotting fruit should be promptly removed from the patch and any blemished fruit should be excluded during packing.

Control measures may be summarised as follows:

1. Regular and thorough spraying with captan (2 lb./100 gal.) at 10-14 day intervals.
2. Land selection.
3. Crop rotation.
4. Bedding and mulching.
5. Suitable plant spacing to avoid over-crowding.
6. Hygiene during picking and packing.
7. Prompt marketing.

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Crooke, J., Arolla A.I.S. Stud, Fairview, Allora  
Davis, W. D., "Wamba", Chinchilla  
Dennis, L. R., Diamondvale A.I.S. Stud, Mundubbera  
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Green, D. B., Deloraine A.I.S. Stud, Fairdale  
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Henschell, W., "Yarranvale", Yarranlea  
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McShane, A. H., Handford Road, Zillmere  
Mears, G. S. & E., "Morden", M. S. 755 Toogoolawah  
Moore, S. R., "Sunnyside", West Wooroolin  
Neale, D. G., "Groveley", Greenmount  
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Queensland Agricultural High School & College, Lawes  
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Roche, C. K., Freestone, Warwick  
Sanderson, W. H., "Sunlit Farm", Mulgildie  
Schloss, C. J., "Shady Glen", Rocky Ck., Yarraman  
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Sokoll, A. H., "Sunny Crest", Wondai  
Sperling, G., "Kooravale", Kooralgin, Cooyar  
Sullivan Bros., "Valera", Pittsworth  
Sullivan, D., "Bantry", Pittsworth  
Sullivan, F. B., "Fermanagh", Pittsworth  
Thompson, W. H., "Alfavale", Nanango  
Webster, A. H., "Millievale", Sabine, via Oakey  
Wieland, A. W., "Milhaven", A.I.S. Stud, Milford, via Boonah

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Dunn, T. F., "Alanbank", Gleneagle  
Goddard, B., Inverell, Mt. Tyson, via Oakey  
Holmes, L., "Benbecula", Yarranlea

Mathie, E. & Son, "Ainslie", Maleny  
Scott, J. N., "Auchen Eden", Camp Mountain  
Zerner, G. F. H., "Pineville", Pie Creek, Box 5, Post Office,  
Gympie

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Macdonald, S. E. G., "Freshfields", Marburg  
Naumann, C. H., "Yarrabine", Yarraman

Pender, D. J., Lytton Road, Lindum  
Stumer, A. O., Brigalow, Boonah

## Guernsey

Doss, W. H., Degilbo, via Biggenden  
Fletcher, A. B., "Cossart Vale", Boonah  
Holmes, C. D. (owner Holmes L. L.), "Springview", Yarraman  
Johnson, G. L., "Old Cannindah", Monto  
Miller, G., "Armagh Guernsey Stud", Armagh, M.S. 428,  
Grantham

Ruge, A. & Sons, "Woowoonga", via Biggenden  
Sanderson, N. H., "Glen Valley", Monto  
Scott, C., "Coralgrae", Din Din Rd., Nanango  
Swendson, A. C., Coolabunia, Box 26, Kingaroy  
Wissemann, R. J., "Robnea", Headington Hill, Clifton

## Jersey

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Birt, W. C. M., Pine Hill Jersey Stud, Gundiah  
Borchert, Mrs. I. L. M., "Willowbank" Jersey Stud, Kingaroy  
Burrows, R. N., Box 23, Wondai  
Bygrave, P. J. L., The Craigan Farm, Aspley  
Carpenter, J. W., Flagstone Ck., Helidon  
Conochie, W. S. & Sons, "Brookland", Sherwood Rd., Sherwood  
Crawford, R. J., Inverlaw, Kingaroy  
Farm Home For Boys, Westbrook  
Fowler, P. & Sons, "Northlea", Coalstoun Lakes  
Harley, G., "Hopewell", M.S. 189, Kingaroy  
H.M. State Farm, Palen Creek  
Hutton, D. R., "Bellgrath", Cunningham, via Warwick  
Johnson, H. G., Windsor Jersey Stud, Beadesert  
Lau, J. F., "Rosallen", Goombungee, Toowoomba

Matthews, E. A., "Yarradale", Yarraman  
McCarthy, J. S., "Glen Erin", Greenmount, Toowoomba  
Meier, L. E., "Ardath Stud", Boonah  
Noone, A. M. & L. J., "Winbirra", Mt. Esk Pocket  
Porter, F., Conondale  
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Ralph, G. H., "Ryecombe", Ravensbourne  
Scott, Est. J. A., "Kiaora", Manumbar Rd., Nanango  
Sengreen, A. L., "Tecoma", Coolabunia  
Seymour, B. T., "Upwell" Jersey Stud, Mulgildie  
Smith, J. A. & E. E., "Heatherlea" Jersey Stud, Chinchilla  
Tatnell, W. T., Cedar Pocket, via Gympie  
Toowoomba Mental Hospital, Willowburn  
Verrall, F. W., "Coleburn", Wallon  
Weldon Brothers, "Gleneden" Jersey Stud, Upper Yarraman

## Poll Hereford

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Hutton, D. R. & M. E., "Bellgrath", Cunningham, via Warwick  
Maller, W., "Bore View", Pickenjinnie

Maller, W., "Bore View", Gowrie Junction  
McCambley, E. W. G., "Eulogie Park", Dululu  
Wilson & McDouall, Calliope Station, Calliope

## Poll Shorthorn

Leonard, W. & Sons, Welltown, Goondiwindi

Yamburgan Pastoral Company, Noondoo

# What The Fruit Grower Should Know About Quality And Maturity—I

By T. HOPE, Chemist, Horticulture Branch.

**This discussion on fruit quality and maturity is designed to help the grower to harvest his fruit at the most favourable stage of maturity. All growers should have some knowledge of fruit quality, the process of maturation and how these are affected by environment, particularly the environment which can be controlled.**

Quality is used to describe the characteristics of fruit that pertain to edibility and refers to fruit eaten in a fresh or cooked condition. For instance, certain varieties of apples may have good cooking but poor eating quality or vice versa.

Chemical determinations of the sugar and acid content of fruit can be made, but such measurements are rarely indices of quality; for example, one variety of apple may have more sugar than another but may be sour to the taste because it has a greater acid content. The acid-sugar ratio is of some importance in determining eating quality, but flavour, odour and crispness, outweigh this factor. The kind of sugar present could have some bearing on taste, as cane sugar is sweeter than glucose. Astringency is important; very astringent fruit has a harsh acid taste, while fruit with a low astringency has a milder and sweeter taste. Perhaps the most important attributes of eating quality are flavour and odour due to certain esters, essential oils and other chemical compounds. The pleasant fruity smell can influence the taste buds, and an apple with a pleasant aroma will have a more pleasant taste than one devoid of smell. Packing in unseasoned cases with a strong pine smell, and storage in sheds containing fertilizers, in badly ventilated and musty rooms or with products

such as potatoes or onions, cause contamination which will completely mask the natural flavour of the fruit.

The actual water content of fruit can affect eating quality, as badly shrivelled fruit lacks crispness and juiciness.

The cells of fruit are cemented together with pectin compounds and the insoluble pectin fraction gradually breaks down to soluble pectin as the fruit matures. If there has been little breakdown of insoluble pectin the cells are kept together until the fruit is crisp and juicy. When much of the insoluble pectin is broken down the cells tend to separate readily. This, for example, is the cause of a floury or mealy texture in apples. Some fruits have thick cells, some large cells, while others contain fibre, pith, or cork, which influence crispness.

The amount of colour, bloom and other attributes of appearance are psychological factors which influence taste considerably. A bright red apple will have more appeal than a dull green-yellow one, which is generally associated with cooking.

Edibility can only be determined satisfactorily by taste, which may vary with the individual concerned; it is, however, a more reliable index of



fruit quality than any chemical or physical measurement. Such factors as leaf surface, light, water supply, temperature, leaf-fruit ratio, fertilizers, hormones, weather conditions and cultural methods all influence fruit quality prior to harvesting. Handling treatments, transit, marketing and storage conditions, affect quality after harvesting.

### **Maturity**

Much produce reaching the market each season is greatly impaired in quality because it has been picked at the wrong stage of maturity. Varietal characteristics, seasonal variation, cultural practices and other factors affect the date at which the crop becomes mature. The optimum stage of maturity at which the crop should be

picked varies from type to type and depends largely on the variety, the speed and method of handling and the ultimate disposition of the crop.

Fruits such as grapes, oranges, pineapples and passion fruit, which contain no starch, will not ripen after picking, and in consequence they must be harvested in a firm ripe condition. Peaches, plums, apples and papaws, which contain some starch, can be picked in a slightly immature condition but must reach the market nearly ripe enough for eating but firm enough to be handled through the normal channels of trade. Bananas and pears contain considerable starch which is converted into sugar on ripening; these fruits are picked when they are fully grown but still hard and firm.

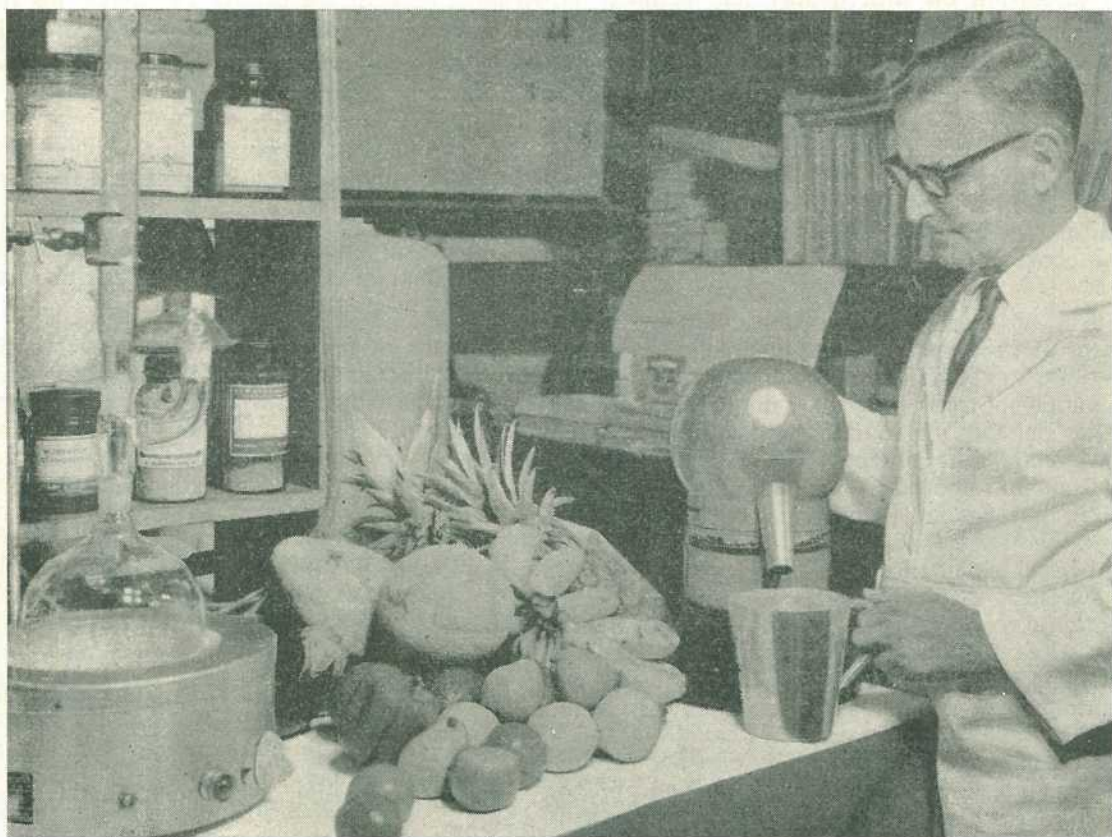


Plate 1

**Mr. T. Hope, Chemist in Horticulture Branch of the Department of Agriculture and Stock Uses a Juice Extractor in His Work on Fruit Quality.**



If fruit is to be sold on the fresh fruit market soon after harvesting it can be picked in a mature condition. If it is destined for distant markets or transit temperatures are high, it has to be picked less mature. If long storage is intended, then maturity becomes a very important factor, as immature fruit is susceptible to skin blemishes and over-mature fruit is subject to mould and breakdown. Fruit to be used for canning should have developed its maximum flavour. Slight over-ripeness may not be a disadvantage. For quick freezing the stage of maturity is critical, as abnormal flavours will develop if the fruit is slightly immature or over-mature.

The grower has to judge largely by his own experience when fruit is sufficiently mature for market or factory and must take into consideration pre-and post-harvesting conditions. Deterioration proceeds more rapidly after harvesting than before it and is greatly increased by high temperature. In selecting the actual stage of maturity for market the grower should take into account the prevailing temperatures, the period of time between harvesting and the final point of sale. Deterioration is much faster in summer than in winter and transit temperatures in tropical zones are usually much higher than in temperate and sub-temperate zones.

Fruit is composed of a mass of living cells, each its own chemical laboratory, where food and nutrients from the parent tree are converted by means of complex chemical processes to the substance of the fruit. Factors such as soil type, climate, cultural practice and incidence of disease, determine whether the tree will bear fruit, the time it will bear, the extent of the maturation period, and the yield and quality of the crop.

### **Influence of Climate**

For most types of fruit the period between bloom and full maturity is shorter the higher the temperature during that period. The degree to which maturation is accelerated by high temperatures varies with the variety or species.

The duration of temperatures sufficiently high for normal growth determines whether fruit will mature and subsequently ripen. If the period of high temperatures is short and is followed by one of low temperature, the fruit is lacking in flavour.

The green ground colour of apples is due to chlorophyll. During the late stages of maturation if temperatures remain high the green ground

colour tends to persist, whereas when lower temperatures prevail apples of the same variety begin to lose ground colour earlier. In fruits where an orange colour indicates ripening, there is more orange colour in fruits allowed to remain on the tree than in those picked early and allowed to ripen subsequently.

In some fruits the red colour will not develop without direct sunlight; consequently this colour is very deep in fruit on the sunny side of the tree. Where fruit is shaded from the sun by leaves or other fruit, there is little development of red colour in some species. Excessive nitrogen can cause a profuse growth of leafy shoots which will shade the fruit and thus delay development of red colour.

Some varieties of apples and peaches tend to develop a greater amount of red colour if the weather conditions during maturation are cool and sunny.

Where ultra-violet light is necessary for the development of red colour, winds producing dust, or a hazy atmosphere, both of which absorb ultra-violet light, will delay its development.

Palatability is influenced by rainfall. If the fruit tissue is deficient in moisture, the cell walls may be thick and therefore coarse to eat. Adequate rainfall produces more juicy and translucent fruit.

### **Soil Type and Cultural Practices**

Fruits have a tendency to mature earlier on trees growing in sandy and gravelly soils than on those growing in clay soils. Deficiency of nitrogen causes an early cessation of growth and hastens the process of fruit maturation.

Old trees tend to cease summer growth and produce mature fruit earlier than younger trees of the same variety.

Where a species of tree requires sunlight to develop the red colour of its fruit, thinning to prevent fruits from shading one another will often accelerate maturation. Deep red colour is usually associated with high sugar content. Sometimes the deep red colour will not develop rapidly in some fruits because the tree has a large crop in proportion to its leaf surface and is therefore incapable of producing an adequate supply of sugar by photosynthesis. Delay in maturation and development of red colour may also be due



to excessive nitrogen. Trees with an abundance of nitrogen, but growing on shallow soils, or under conditions which prevent the development of foliage, may still fail to develop red colour. Trees growing on clay soils which are too compact for root production may be deficient in leaf growth, in spite of an abundance of nitrogen, and thus fail to produce the sugars essential to anthocyanin development and mature flavour.

Nitrogen supply and soil quality may affect the aromatic constituents of certain types of apples. These fruits tend to have a more aromatic flavour if the trees are in deep, well-aerated soils than when grown on a clay soil which is badly aerated. In such cases fully developed fruit fall before they are sufficiently palatable and there is a tendency to harvest prematurely. Sweetness and flavour will therefore be lacking.

### Process of Maturation

In the first stage of cell division the amount of acid produced increases to a maximum, sugar content remains rather low, and the final size of the fruit is determined to a large extent.

The next stage of cell enlargement is concerned with a gradual increase in moisture, juice and sugar. During this period external colour remains constant except for negligible improvements in shade.

In the next stage of development—the maturation phase—external and internal colour changes

rapidly, the cells containing the juice sacs increase in size, sugars continue to increase at the expense of acids, and there is a gradual increase in the tenderness of the flesh. Flesh which was coarse and opaque assumes a more delicate and translucent appearance. Probably the most important feature during this stage is a rapid development of the aromatic constituents which give the particular aroma and flavour to a variety or type of fruit.

### Type of Fruit Popular with Consumer

The consumer prefers fruit at that stage of maturity where flavour and quality are excellent. In some fruits this stage can only be reached while the fruit is on the tree. The grower cannot always allow fruit to ripen on the tree because considerable deterioration in quality will occur during transit and the ripe fruit would not withstand the normal handling of distribution. In such cases fruit should be allowed to remain on the tree until it acquires good quality but is in such a condition to withstand handling and transport.

The degree of ripeness for harvesting will depend upon whether the fruit is intended for local or distant markets, climatic conditions, the nature and quality of the fruit during a particular season, and other factors which affect keeping quality.

[TO BE CONTINUED]

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## Hints For The Farm Wife

Stop steel wool rusting by keeping it in a jar of water to which half a teaspoonful of bicarbonate of soda has been added.

Dip mint in vinegar before chopping for mint sauce and it will keep its bright green colour.

Remember raw rice trebles its bulk when cooked, so if a recipe needs one cup cooked rice, only use one-third cup raw rice.

Laundry blue in the washing-up water will make glassware sparkle.

Try using onion juice to restore lustre to tarnished silver.

To give whitewashed walls a glossy finish dissolve a pound of soap in a gallon of hot water and add to five gallons of whitewash.

### Best Recipe of The Month

**Chili Con Carne (with beans).**—Brown Beauty beans, beef suet, onion, garlic, beef, tomatoes, chili, cumin.

Soak 2 cups of Brown Beauty beans in water overnight. The next morning, drain them, cover with fresh water, and simmer them gently until they are almost tender.

Melt 3 tablespoons of chopped beef suet in a deep, heavy pot and add 1 large chopped onion and 2 minced cloves of garlic. When the onion begins to brown, add 1 lb. of lean beef, cut in  $\frac{1}{2}$  in. cubes and brown the

meat quickly to seal in the juices. Blend 1 tablespoon of flour and add  $2\frac{1}{2}$  cups of tomatoes and 1 cup of water in which the beans were cooked. Add 1 teaspoon of salt, 1-3 tablespoons of chili powder to taste (or 2 to 4 ground chili peppers), simmer the chili, covered, for 1 hour; then mix in the beans, drained, and taste for seasoning. Cook the chili for another 30 min., stirring occasionally, but do not let the beans get soft or broken.

Chili con carne, like a good stew, improves in flavour if it is set aside for about 12 hours and is reheated before serving. Serves four to six.

# Solving Problems Of Flying Chickens To New Guinea

By P. D. RANBY,  
*Veterinary Officer.*

Over 50,000 chickens are transported by air from Queensland to New Guinea each year. These chickens were formerly carried by D.C.4 aircraft, but now Superconstellations are used. After leaving the Australian mainland, the Superconstellations stop first at Port Moresby and then continue over the range to Lae. Chickens sent on to other centres in New Guinea must then transfer to D.C.3 and D.C.4 aircraft, the cargo lockers of which are influenced by outside air temperatures.

The day-old chickens are packed into two-unit cardboard boxes, each box holding 50 birds (see Plate 1). Only new, unused boxes are used—as required by the New Guinea authorities. The boxes are packed in stacks of five or six in the locker of the aircraft, and the lid of each box bears two ridges to support the next box above, thus allowing an air-space between them.

Although air-transport of day-old chickens to New Guinea has been generally satisfactory, some problems have arisen as follows:

- Ill-effects of air-travel on the chickens as a result of temperature changes, poor ventilation and oxygen lack.
- Discomfort to passengers caused by foul odours originating from the packed chicken boxes.
- Prevention of certain transmissible diseases.
- Irregular bookings in relation to hatching dates.

## Ill-effects on the Chickens

Possible ill-effects of air-transport on the chickens are rapid temperature changes in unpressurized aircraft, poor ventilation in the locker and oxygen lack due to low air pressure.

The main season for the New Guinea chick trade lasts from March to September, and it is the occasional batch of chickens sent after September or October that suffers ill-effects from temperature changes. Batches of these late chickens have arrived at Lae in a "groggy" condition. Heavy losses have then followed, mainly on the second and third day after arrival.

A check by the air-transport authorities showed that these chickens always arrived in good condition at Port Moresby, yet they would show ill-effects at Lae. It was then suspected that chilling of the chickens in the luggage locker might occur during the aircraft's "hop" over the Owen Stanley Ranges after leaving Port Moresby.

It is of interest here that overheating of the chickens would be likely during the aircraft's one-hour stay at the airport in Port Moresby. During the later months of the year, high temperatures prevail and the aircraft becomes a "sweat box" while on the ground. Temperatures up to 130 deg. F. are possible in the aircraft under these conditions. Then within 15 min. of take-off, cold temperatures in the locker would be expected, as the aircraft gained altitude to cross



the mountain range. The Owen Stanleys form a high plateau at 9,000 feet or more. The air-temperatures at these higher altitudes are variable, but occasionally cold streams of air are encountered.

Thus we would have, firstly *overheating* of the chickens on the ground, followed by *chilling* in the air. The rapid fall in temperature could bring about congestion of the chicken's lungs, with ill-effects lasting a few days.

Lack of oxygen at higher altitudes is probably not serious to the chickens in unpressurized aircraft, since the D.C.3's and D.C.4's do not fly much above 7,000 feet. This altitude is not distressing to man. However, the slight shortage of oxygen in the atmosphere could aggravate poor ventilation of the chickens.

Poor ventilation in the locker could be brought about by suitcases and other luggage being packed too closely around the chick boxes. Poor ventilation will itself result in a shortage of oxygen as well as an accumulation of moisture from the breaths of the chickens.

The following case which occurred some years ago points to poor ventilation effects:

One consignment of 500 chickens from Brisbane arrived at Rabaul, New Britain, in a collapsed state. It was reported that the aircraft was forced to fly at high altitude over a storm between Port Moresby and Rabaul.

The consignee unloaded the chickens as soon as they arrived at the airport. They were consigned in 10 boxes each holding 50 chickens.



Plate 1

**Chickens Packed for the Air Journey to New Guinea.** Each of the two-unit cardboard boxes contains 50 chickens. At the bottom of the picture can be seen the two ridges which, when the box is stacked in the locker of the aircraft, support the box above, thus allowing an air space between them. Note also the large number of holes in the lid of the box, held by Mr. R. Fox, T.A.A. Despatch Officer, at right. On the left is Mr. P. D. Ranby, Departmental Veterinary Officer.



When the consignee discovered the condition of the chickens, he quickly removed the lids from all boxes. Only a few "groggy" chickens showed any signs of life. The remainder were collapsed as if in a state of coma. After a short time, however, signs of life reappeared and many of the chickens recovered. In all, 65 of the 500 chickens had died (13 per cent.).

Most of the dead ones were in the lower boxes, which were arranged in two stacks of five. Faulty ventilation may have resulted in the boxes at the bottom of the two stacks. The lower oxygen supply at the higher altitude was probably only a contributing factor. Ventilation could have been hindered by the placement of bags and other luggage too close to the chick boxes.

Air-freight authorities are now conscious of the need for good ventilation in respect to chickens. With the recent use of Superconstellation aircraft for transporting chickens to New Guinea, the dangers of overheating, chilling, and oxygen lack should be greatly reduced. These aircraft are pressurized, while the luggage lockers of a number of them are heated and ventilated.

It is wise to increase the number of air-holes in the lids of chick boxes going to New Guinea in order to increase ventilation. Some exporting poultry farmers carry out this measure.

### **Odour Problem**

Fortunately, foul odour trouble in air-transported chickens is uncommon. Odour trouble originating from the chickens is only likely to be troublesome on certain aircraft, particularly D.C.3's, and on the interstate runs, the Fokker "Friendships". The latter type of aircraft has not been used for flying chickens to New Guinea but is now the chief one used for carrying chickens interstate in Australia.

Occasional bad odour consignments have come to notice. The following are examples:

One consignment from Sydney to New Guinea was off-loaded at Brisbane due to a foul smell. On opening the boxes, the chickens were found to be wet as if "sweated". Many were weak and some of them had died. Pieces of egg-shell were still attached to several of the birds, one having a piece nearly covering its back. Without doubt, the chickens had been packed into the boxes while still wet after hatching. This consignment was sent back to Sydney.

On several occasions, chickens affected by omphalitis (or yolk-sac infection) have caused a foul odour. Baby chickens affected by this disease have a notorious foetid smell and putrefy very rapidly after death.

In one such batch of chickens consigned to New Guinea, the odour penetrating the cabin caused the birds to be unloaded at Brisbane. About 10 per cent. of the chickens appeared to be sick and several were dead. To avoid inconvenience by returning this cargo, the airport authorities removed affected chickens and sent the boxes on to New Guinea with a covering letter for the consignee.

Another consignment for New Guinea having an unpleasant smell was found to be packed in previously used chick boxes. The boxes contained collections of excreta from previous chickens and were dirty inside. Moisture from the chickens had dampened the dried excreta, thus producing the odour. This shipment was returned to the hatchery concerned.

Bad odours in chickens transported by air are easily avoided where the hatchery of origin exercises reasonable care. Boxes should be clean. The chickens should be dry and fluffy before packing them. Sick or dopey chickens should be removed in case they are affected by omphalitis.

### **Transmissible Diseases**

Chickens sent by air to New Guinea must comply with requirements in regard to certain diseases, notably pullorum disease and epidemic tremor (avian encephalomyelitis). Both these are egg-borne infections.

Since the breeding stock of all poultry hatcheries in Queensland are tested each year for pullorum disease, the prevention of this disease is relatively easy. Few hatcheries would fail to meet the requirements for the New Guinea trade as a result of this disease.

### **Irregular Bookings**

Air-bookings for the New Guinea day-old chick trade are usually made months ahead. In fact, at the present time (February, 1960) the season has been almost booked out for the year. These bookings tend to be irregular, in that certain days are much more heavily booked than others. Hatchings, therefore, should be made to fit in with bookings and consequent luggage space available.



# Brucellosis-Tested Swine Herds

(As at 1st May, 1960)

## Berkshire

Clarke, E. J., Mt. Alford, via Boonah  
Cochrane, S., "Stanroy", Felton  
Cook, F. R. J., Middle Creek, Pomona  
Crawley, R. A., Rockthorpe, Linthorpe  
Edwards, C. E., "Spring Valley" Stud, Kingaroy  
Farm Home For Boys, Westbrook  
Fletcher, A. C., "Myola" Stud, Jimbour  
French, A., "Wilson Park", Pittsworth  
H. M. State Farm, Numinbah  
H. M. State Farm, "Palen" Stud, Palen Creek  
Handley, J. L., "Meadow Vale", Lockyer  
Handley, G. R., "Lochlyn" Stud, Lockyer  
James, I. M. (Mrs.), "Kenmore" Stud, Cambooya  
Kimber, E. R., Block 11, Mundubbera  
Law, D. T., "Rossvill" Stud, Aspley  
Lees, J. C., "Bridge View" Stud, Yandina  
Ludwig & Sons, A. R., "Beau View" Stud, Beaudesert

O'Brien & Hickey, J., "Kildurham" Stud, Jandowae East  
Orange, L. P., "Hillview", Flagstone Creek  
Pfrunder, P. L., Pozieres  
Potter, A. J., Ascot, via Greenmount  
"Tayfield" Stud, Taylor  
Q.A.H.S. & College, Lawes  
Regional Experimental Station, Hermitage  
Rosenberger, N., "Nevrose", Wyreema  
Schellback, B. A., "Redvilla" Stud, Kingaroy  
Smyth, E. F., "Grandmere" Stud, Manyung, Murgon  
Stark, H. L., "Florida" Stud, Kalbar  
Thomas & Sons, F., "Rosevale" Stud, Laravale  
Traves, G., "Wynwood" Stud, Oakey  
Weier, V. F., "La Crescent", Clifton  
Wolski, A., "Carramana", Warra  
Young (Jnr.), W., Kybong, via Gympie

## Large White

Assenbruck, C., Mundubbera  
Barron Bros., "Chiltern Hill", Cooyar  
Bell & Son, E. J., "Dorne", Chinchilla  
Butcher, Dr. B. J. & Parnwell, A. J., Plunkett, via Tamborine  
Clark, L. D., Greens Creek, Gympie  
Duncan, C. P., "Colley", Flagstone Creek  
Fowler, S., "Kenstan", Pittsworth  
Franke, H. J., "Delvue" Stud, Cawdor  
Garawin Stud Farm Pty. Ltd., 657 Sandgate Rd., Clayfield  
Gibbons, A. E. H., Mt. Glorious  
Gibson, H., "Thistleton" Stud, Maleny  
H. M. State Farm, Numinbah  
Hall, M., "Milena" Stud, D'Aguliar  
Heading, J. A., "Highfields", Murgon  
Horton, C. J., "Mannuem Brae" Stud, Mannuem, Kingaroy  
Hutton, G., "Grajea" Stud, Cabarlah  
Jensen, S., Rosevale, via Rosewood  
Jones, K. B., "Cefn" Stud, Clifton  
Kahler, J. & S., "Karajoy", East Nanango  
Kanowski, A., "Exton", Pechey  
Kennard, R. B., "Collar" Stud, Warwick  
Larsen, H. L., "Oakway" Stud, Kingaroy

Law, D. T., "Rossvill" Stud, Aspley  
Lees, J. C., "Bridge View", Yandina  
Lobegeiger, L. C., "Bremer Valley" Stud, Moorang, via Rosewood  
Mack, A. J., Mundubbera  
Neilsen, L. R., "Sunny Hill," Ascot, via Greenmount  
Neilsen, A. R., Ascot, via Greenmount  
Palmer, V. P. & Son, "Remlap", Greenmount  
Pampling, G., Watch Box Rd., Goomeri  
Postle, R., "Yaralla" Stud, Pittsworth  
Powell, R. S., "Kybong", Gympie  
Q.A.H.S. & College, Lawes  
Radel, V. V., Coalstoun Lakes  
Radel, R. M., Coalstoun Lakes  
Regional Experimental Station, Biloela  
Robinson, O. R. & O. J., "Linvale", Argoon, Biloela  
Skyring, G. I., "Bellwood" Stud, via Goomeri  
Stanton, H. R., "Tansey" Stud, via Goomeri  
Stewart, L., Mulgovia, via Laidley  
Stumer, K. F., French's Creek, Boonah  
Wharton, C. A., "Central Burnett" Stud, Gayndah  
Wieland, L. C. & E., Lower Cressbrook, Toogoolawah  
Zahnaw, W., Rosevale, via Rosewood

## Tamworth

Armstrong, H. J., "Alhambra", Crownthorpe, Murgon  
Booth, J. D., Swan Creek, Warwick  
Campbell, P. V., "Lawnhill" Stud, Lamington  
Coller, R. H., Tallegalla, via Rosewood  
Fletcher, A. C., "Myola" Stud, Jimbour  
Herbst, L., "Hillbanside", Bahr Scrub, Beenleigh  
Kanowski, S. E., "Miecho", Pinelands  
Potter, N. R., "Actonvale" Stud, Wellcamp

Regional Experimental Station, Kairi  
Salvation Army Training Home For Boys, "Canaan" Stud,  
Riverview  
Skerman, D. F. L., "Waverley", Kaimkillenbun  
Stephen, T., "Withcott" Stud, Helidon  
Thomas & Sons, F., "Rosevale" Stud, Laravale  
Wieland, L. C. & E., Lower Cressbrook, Toogoolawah

## Wessex Saddleback

Ashwell, J., "Green Hill", Felton South  
Cooper, G. J., Neungua  
Douglas, W., "Greylight" Stud, Goombungee  
Dunlop, J. B., "Kunawyn", Acacia Rd., Kuraby  
Kruger & Sons, "Greyhurst" Stud, Goombungee

Law, D. T., "Rossvill" Stud, Aspley  
Mack, A. J., Mundubbera  
Scott, A., Wanstead Stud, Grantham  
Smith, C. R., "Belton Park", Nara  
"Wattledale" Stud, 432 Beenleigh Rd., Sunnybank

## Large Black

Pointon, E., Goomburra

## Landrace

Grayson, D. G., Killarney  
Neilsen, A. R., Ascot, via Greenmount  
Orange, L. P., "Hillview", Flagstone Creek

# Looking After Our Wildlife

By C. ROFF, Fauna Officer.

Interest in native animals and birds is deeply rooted in the minds and emotions of a broad cross-section of people. It manifests itself in such widely different individuals as those who enjoy indiscriminate shooting and those who are ardent naturalists and desire total protection for all living creatures. In a normal community a course between these two extremes is desirable.

Queensland has developed rapidly. Consequently, swamps which are the home of the waterfowl have been drained and natural haunts of other fauna have been destroyed. The numbers of hunters and trappers have increased, faster transport is available to remote areas, and generally there is more leisure time. All these have affected our wildlife.

*Native fauna is at all times the property of the State*, and the Department of Agriculture and Stock is responsible for conserving this fauna. However, the best commercial use should be made of our animals and birds and the legitimate needs of sportsmen must be met, but at the same time aesthetic values cannot be ignored. Furthermore, some of our wildlife may at times be a nuisance, others are pests in industries, and a few are carriers of disease of man and domesticated animals.

Obviously, fauna conservation is a complex subject covering several inter-dependent aspects such as wildlife studies, education and legislation. This article, however, will deal only with the legislative requirements of fauna conservation in Queensland.

## Fauna Legislation

Originally, the right of man to hunt animals for food and sporting purposes was a natural one wholly unrestrained by law. With increases in human population it became necessary to abridge or restrict this natural right to ensure an adequate supply of animals for food. This early change in

outlook was not sudden and over the centuries has evolved still further. To-day, in all civilised countries the taking of native fauna is, for most people, a controlled privilege and not an inherent right.

Fauna legislation was first introduced in Queensland in 1877, when certain game and insectivorous birds were protected. In 1898, further legislation was passed to provide for the introduction, acclimatisation and preservation of birds and animals deemed to be of economic value to the State.

In 1906, legislative provision was made partly protecting koalas and possums, and in 1910 greater restrictions were placed on the taking of these animals.

The first comprehensive Fauna Act was "*The Animals and Birds Acts, 1921 to 1924*," which listed the fauna to be covered by the Act, fixed periods of protection, prohibited the sale of, and prescribed open seasons for specified animals and birds, and declared lands to be sanctuaries.

This Act was replaced by "*The Fauna Protection Act of 1937*," which in due course was consolidated as "*The Fauna Conservation Act of 1952*." This current legislation was drafted to meet present-day requirements and was proclaimed on 1st January, 1954. It is divided so that interlocking provisions are combined under suitable part headings. This will facilitate administration and should help the public towards a clearer and therefore better understanding of fauna legislation. The Act will be discussed here under the various divisions.

## Definitions

It is provided that all actions, proceedings, sanctuaries and appointments made under the repealed "*Fauna Protection Act of 1937*," are legally continued under "*The Fauna Conservation Act of 1952*."



Various terms are defined and it is particularly important to note the following definitions:—

*"Appliance"*—Any means whatsoever used or capable of being used for the taking of any fauna or for facilitating or assisting in the taking of any fauna (including, but without limit to the generality thereof, any prohibited gun, air gun, firearm, other gun of any description, catapult, or other weapon from which any shot, bullet, or other missile whatsoever can be discharged, and any trap, snare, net, boat, vehicle or other conveyance, animal, bird, decoy, poison, bird-lime, explosive, implement, gear, or apparatus, and any lamp, flashlight, torch, or other artificial light of any description, and any shot, bullet, cartridge, or other ammunition of any description): Where any appliance is carried or otherwise kept in parts by two or more persons in company, each and every one of those persons shall for the purposes of this Act be deemed to carry, or, as the case may be, otherwise keep the appliance.

*"Bird"*—Any bird wild by nature, whether native, migratory, or introduced: The term includes any such bird notwithstanding that it is in captivity or tamed, and any species and individual members of birds within the meaning of this definition, and also the whole or any part of the skin, feathers, carcass, eggs, nest, young and offspring of any bird.

*"Mammal"*—Any mammal wild by nature, whether native, migratory, or introduced: The term includes any such mammal notwithstanding that it is in captivity or tamed, and any species and individual members of mammals within the meaning of this definition, and also the whole or any part of the skin, carcass, eggs, nest, young, and offspring of any mammal: The term does not, however, include any marine mammals or any mice or any rats (other than water rats).

*"Take"*—Used in relation to any fauna, includes hunting, shooting, killing, poisoning, netting, snaring, spearing, trapping, catching, pursuing, disturbing, stupefying, disabling, taking, plucking, injuring, destroying, or damaging that fauna, or attempting, causing, or permitting or assisting in any of those acts: (Where a person is liable under this Act to punishment for taking any fauna and that taking is constituted by that person having done, or having attempted to do, or having caused or permitted to be done, or having assisted to do, in relation to that fauna, any of the acts hereinbefore specified in this definition, then it is immaterial that the fauna in question shall not have been taken into possession either by the offender or by any other person whomsoever).

For legislative purposes fauna have been divided into the following classes:—

(a) Permanently protected fauna.

(b) Protected fauna (during certain open seasons specified protected fauna may be taken).

(c) Pest fauna.

The Act clearly indicates that all fauna until legally taken or kept are the property of the Crown.

Marine mammals, mice, rats (other than water rats) and domestic cats gone wild are not subject to this legislation.

### Administration

The Minister for Agriculture and Stock and certain officers of the Department of Agriculture and Stock are responsible primarily for administering the Act, and in addition other fauna officers and as many persons as deemed necessary for the conservation of fauna in any locality may be appointed as honorary protectors.

The credentials of a person desiring appointment as an honorary protector are important and accordingly it is necessary for each applicant to supply certain personal details and a suitable reference.

All members of the Police Force and persons occupying the following offices are, by virtue of their office, fauna officers.

- (i.) Senior Adviser, Adviser, Assistant Adviser, Senior Inspector, District Inspector, or Inspector, in the Department of Agriculture and Stock, Queensland.
- (ii.) Land Commissioner, Assistant Land Commissioner or Land Ranger in the Department of Public Lands, Queensland.
- (iii.) Forest Officer under or for the purposes of *"The State Forests and National Parks Acts, 1906 to 1948."*

Fauna officers have right of entry to property and subsequent search. They may investigate and enquire, examine and seize and detain appliances and fauna, remove appliances and fauna, request names and addresses and verification thereof, stop any conveyance and request assistance from other appointed officers. Only members of the Police Force have power of arrest.



In respect of any person committing or suspected of committing an offence, an honorary protector may

- (a) Require him to state his name and address.
- (b) Require him to deliver up fauna or appliances.
- (c) Take possession of fauna or appliances delivered up.
- (d) Inspect licenses and permits.
- (e) Request assistance from other appointed officers if necessary.

As far as honorary protectors are concerned, powers of interrogation only are provided. There is no provision for right of entry to property or for the primary seizure of fauna, weapons, etc., which may be received only if delivered up on demand.

It is an offence for any person to assault, obstruct, threaten, abuse, insult, or intimidate an officer or honorary protector when carrying out duties under the fauna legislation.



Plate 1

**Sketch Map Showing the Approximate Boundaries of the Various Fauna Districts.**

All kinds of fauna are not generally distributed throughout Queensland and therefore the State has been divided into six fauna districts (Plate 1).

This allows conditions such as open seasons to be applied to a part or parts of the State without involving the whole.

### Pest Fauna

Pest fauna includes species which are serious pests of the agricultural and pastoral industries. These can be destroyed throughout the State at any time of the year subject to restrictions relating to sanctuaries and some specified districts as listed below.

### LIST OF PEST FAUNA

#### BIRDS

- Wedge-tailed eagle.
- Grey (white) goshawk.
- Australian goshawk.
- Collared sparrow-hawk.
- Cormorants (shags).
- Eastern swamphen (bald coot).
- Falcons except the nankeen kestrel.
- White cockatoo.
- Silvereyes.
- Crows and ravens.
- Pied currawong.
- Sparrow.
- Starling.
- Turtle dove.
- Rose-breasted cockatoo (galah).
- Bee eaters (Pest fauna only within the Brisbane and East Moreton Pest Destruction Board areas).

#### MAMMALS

- Dingoes.
- Rabbits.
- Foxes.
- Hares.
- Flying foxes (Pest fauna only within the Brisbane and East Moreton and Toowoomba Pest Destruction Board areas).
- Wild pigs.

### Permanently Protected Fauna

The koala (Plate 2), platypus and echidna are permanently protected on account of their unique place in Australian and world fauna. Power to extend the list of permanently protected fauna is provided.



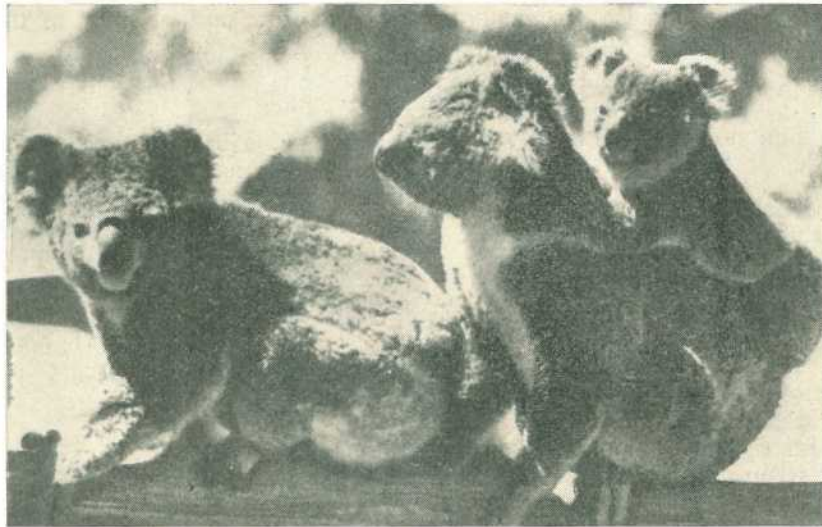


Plate 2

Koalas (*Phascolaretos cinereus* Goldfuss). Permanently protected fauna in Queensland.

Permanent protection means that animals so declared are protected in perpetuity and accordingly penalties in this part of the Act are higher than those provided for in other sections.

### Protected Fauna

Although special provision is made for permanently protected fauna and pest fauna, all other fauna are deemed to be protected fauna, that is, fauna for which a close season exists throughout the whole year. It should be noted that for certain protected fauna an open season may be declared from time to time. It is an offence to take protected fauna.

Special permission may be granted for the taking of protected fauna that are causing serious damage or injury to any property, including crops or livestock, or are otherwise causing serious personal loss to the owner or occupier of any holding or are causing or likely to cause an injury to any person.

Special provision is made also for the taking of protected fauna likely to cause trouble on an aerodrome.

In all special permits issued, the general conditions under which fauna may be taken are specified; and the disposal of the fauna is subject to provisions that may be imposed.

### Open Seasons

For commercial and sporting purposes the fauna outlined in the following table have fixed open seasons and any person in possession of an "open season fauna permit" may hunt or trap them during the periods indicated. An "open season fauna permit" is not required, however, to take wild duck or quail during an open season.

During open seasons "bag" limits may be imposed and the following table outlines the maximum number of fauna which any one person may have in possession during an open season, within the period specified.

Number	Name of Fauna	Period
15	Wild duck	24 hours
15	Quail	24 hours
2	Scrub turkey	24 hours

## BIRDS

Common Name	Open Season	District(s)		
Black-throated finch	1st July to 30th September in each year inclusive	Nos. 1, 2, 3, 4, 5, and 6		
Chestnut-breasted finch (bull finch)				
Diamond firetail (diamond sparrow)				
Banded finch (double-bar finch)				
Longtailed finch (grass finch)				
Masked finch				
Plum-headed finch				
Red-browed finch (redhead finch)				
Star finch (redfaced finch)				
Zebra finch				
All introduced birds including— Java sparrow Non-pareil finch Nutmeg finch Strawberry finch Goldfinch			1st January to 31st December in each year inclusive	Nos. 1, 2, 3, 4, 5, and 6
King parrot Rainbow lorikeet (Blue Mountain parrot) Red-winged parrot			1st May to 30th September in each year inclusive	Nos. 1, 2, 3, 4, 5, and 6
Rosellas (all species)			1st January to 31st December in each year inclusive	Nos. 1, 2, 3, 4, 5, and 6
Budgerigah or shell parrot				
Cockatiel (cockatoo parrot or quarrian)	1st May to 30th November in each year inclusive	Nos. 1, 2, 3, 4, 5, and 6		
Brush or scrub turkey	1st June to 30th September in each year inclusive	Nos. 1, 2, 3, 4, 5, and 6		
Grey duck (black duck) Maned goose (wood duck) Quail (all species) (NOTE.—In districts 1, 2, 3, an open season for wild duck and quail is declared from time to time by Order in Council)	1st January to 31st December in each year inclusive	Nos. 4, 5, and 6		
Australian snipe Pin-tailed snipe Knot Great knot Sandpiper Stint Tattler Whimbrel	14th November in each year to 15th March in the following year inclusive	Nos. 1, 2, 3, 4, 5, and 6		

Common Name	Open Season	District(s)
Grey kangaroo Red kangaroo Eastern or dusky wallaroo North Queensland wallaroo Red-necked, scrub or eastern brush wallaby Black-striped wallaby Whiptail, grey-face or pretty face wallaby Black-tailed or swamp wallaby Sandy wallaby Red-legged pademelon Water rat	1st January to 31st December in each year inclusive	Nos. 1, 2, 3, 4, 5, and 6

## Hunter's Licence

The following fees are payable for permits—

	£	s.	d.
Open season fauna permit (for personal use)	0	10	0
Open season fauna permit (taken for sale)	1	0	0

Unless specifically indicated, an open season fauna permit does not authorise entry by the permit holder onto any land the property of another. Additionally, although an open season may be declared, fauna may not be taken in a sanctuary.

## Sanctuaries

Protection from molestation does not alone ensure the survival of some birds and animals. Hence the legislation makes provision for the creation of sanctuaries (that is, areas in which all birds and animals except declared pests are totally protected and free from interference at all times).

All islands that form part of the State of Queensland, all National Parks, State Forest Reserves, and many other areas and private properties have been declared sanctuaries. Sanctuary notices may be displayed and the unauthorised removal of these notices is an offence.

Within the boundaries of their properties, landholders and their authorised agents are permitted to take without restriction pest fauna within a sanctuary.



Persons may be ordered by authorised officers to leave a sanctuary and it is an offence not to quit a sanctuary when so ordered.

### Prohibited Appliances

The use of cyanide and adhesive substances such as bird-lime is prohibited, and other poisons,

materials and appliances may also be prohibited from time to time.

The use of flashlights or torches or other artificial light of any description is illegal, as also is the use of certain "prohibited guns" defined in the Act.

Dogs may be used only to take fauna during an open season.

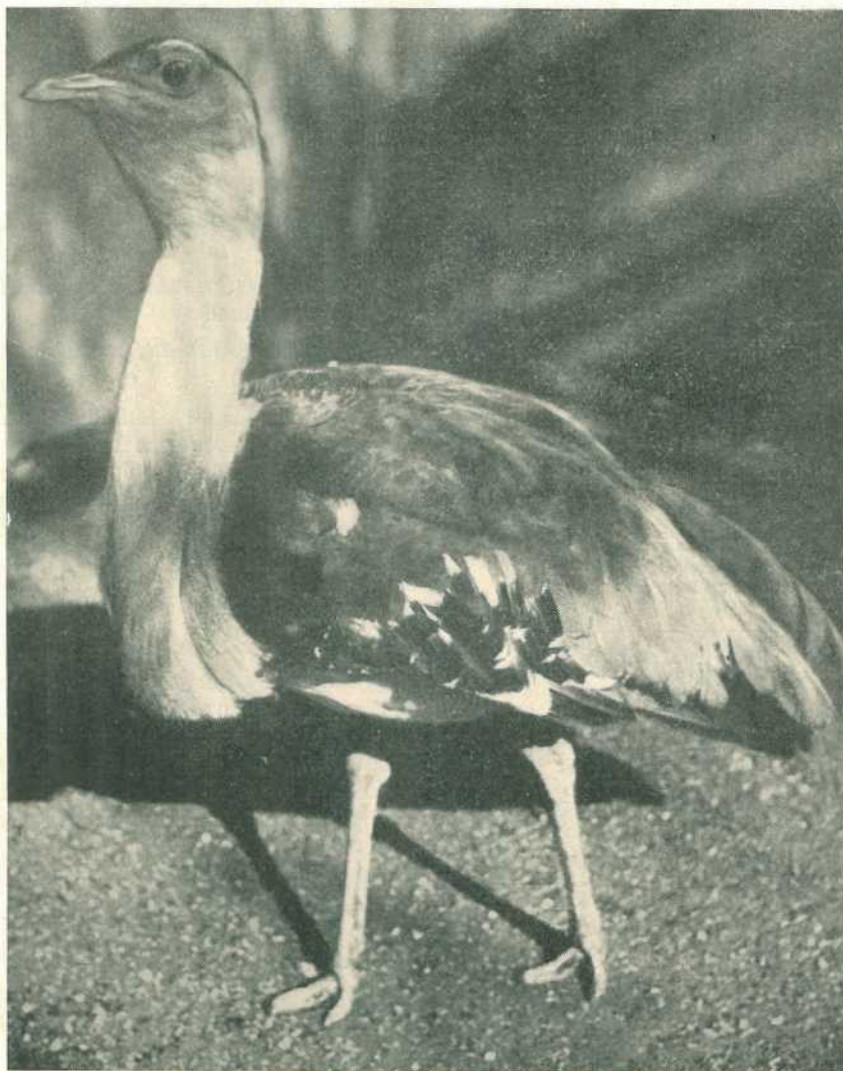


Plate 3

**Australian Bustard or Plain Turkey (*Eupodotis australis* Gray).** A protected bird in Queensland. (Photo by courtesy of the Director of the Queensland Museum).

### **Fauna for Particular Purposes**

For certain purposes, principally scientific and educational, the taking and keeping of fauna may be permitted. The conditions, provisions and restrictions under which a permit is granted are indicated on the permit. It is illegal to keep fauna in captivity unless authorised by the Act. It is not an offence, however, to keep open season fauna or fauna lawfully held prior to the inception of this Act.

A circular outlining the conditions and requirements relating to the construction of cages and enclosures in which it is proposed to display fauna for public exhibition purposes is available.

Enclosures, cages and aviaries where fauna are confined whether privately, for public exhibition purposes, or for sale, must be kept clean and in

a sanitary condition. Further, all captive fauna must be regularly fed and watered.

All aviaries containing 20 or more birds must be registered annually, and no fauna shall be sold or otherwise disposed of from premises, including enclosures, cages and aviaries, unless disposal is approved and until any necessary royalty due is paid.

### **Fauna and Skin Dealers**

A person engaged in fauna or skin dealing is required to take out a licence and all premises must be registered. A permit, licence or certificate to deal in fauna or skins does not authorise the holder of such to take fauna. Permanently protected fauna cannot be handled by fauna or skin dealers.



Plate 4

**Minnamoolka Waterfowl Sanctuary, via Mount Garnet, North Queensland.**



Licence fees payable by fauna and skin dealers are as follows:—

	£	s.	d.
Fauna dealer .. .. .	2	0	0
Skin dealer .. .. .	10	0	0

Fauna may be removed only by permit within Queensland. It is also provided that fauna shall not be exported to another State unless an export permit has been obtained and an import permit granted by the proper authority in the place outside Queensland to which the fauna are being introduced.

All crates, bags or bales containing skins must be branded with identifying marks.

The introduction of fauna not found naturally in this State is subject to special permission. This clause guards against the introduction and liberation of noxious fauna.

The sale of permanently protected fauna is prohibited although the sale of protected fauna (including open season fauna) legally taken and held may be permitted.

### Royalty

Royalty at the prescribed rates is chargeable on all fauna taken in Queensland. The rates for open season fauna are outlined below.

OPEN SEASON BIRDS		s.	d.
Black-throated finch .. .. .		0	6
Chestnut-breasted finch .. .. .		0	1
Diamond firetail .. .. .		0	3
Banded finch .. .. .		0	1
Longtailed finch .. .. .		0	6
Masked finch .. .. .		0	6
Plum-headed finch .. .. .		0	1
Red-browed finch .. .. .		0	1
Star finch .. .. .		1	0
Zebra finch .. .. .		0	1
All introduced aviary birds .. .. .		Nil.	
except—			
Java sparrow .. .. .		0	3
Non-pareil finch .. .. .		0	3
Nun finch .. .. .		0	3
Nutmeg finch .. .. .		0	3
Strawberry finch .. .. .		0	3
Goldfinch .. .. .		0	3
Budgerigah or shell parrot .. .. .		0	3
King parrot .. .. .		1	0
Rainbow lorikeet (Blue Mountain parrot) .. .. .		2	0
Red-winged parrot .. .. .		2	0
Rosellas .. .. .		0	3
Cockatiel (cockatoo parrot or quarrian) .. .. .		0	3
Brush or scrub turkey .. .. .	No royalty payable during open season. General rate of 5s. per bird to be paid when taken under special permit during close season.		
Wild duck and quail .. .. .			
Snipe .. .. .			
Sandpiper .. .. .			
Stint .. .. .			
Tattler .. .. .			
Whimbrel .. .. .			
Knot .. .. .			

### OPEN SEASON MAMMALS

	s.	d.
† Grey kangaroo .. .. .	0	6
Red kangaroo .. .. .	0	6
Eastern or dusky wallaroo .. .. .	0	3
North Queensland wallaroo .. .. .	0	3
Red-necked scrub, or eastern brush, wallaby .. .. .	0	3
Black-striped wallaby .. .. .	0	3
Whiptail, greyface, or pretty face wallaby .. .. .	0	6
Black-tailed or swamp wallaby .. .. .	0	3
Sandy wallaby .. .. .	0	3
Red-legged pademelon .. .. .	0	3
Water-rat .. .. .	0	1

The person who takes the fauna, the fauna dealer and the skin dealer are liable jointly or severally for the payment of royalty, provided that royalty shall not be paid more than once upon any fauna. Power is given for dealers to deduct royalty from monies held as a result of the sale of fauna. It is an offence not to pay royalty and provision is made for the recovery of unpaid royalty. Fauna, including skins, may be seized if royalty is unpaid.

### General

It is obligatory for holders of authorities issued under the Act to abide by any conditions contained therein and such authorities must be carried when engaging in the business allowed in the permit.

For humane reasons all traps must be inspected at intervals of not more than 36 hours.

A person in possession of fauna can be required to supply proof that the particular fauna was taken or is kept lawfully under the Act.

The forging of permits and similar actions which may be used to circumvent the true purposes of the Act constitute offences for which a heavy penalty is provided.

*Fauna, weapons or other things seized may be detained for a period of twelve months unless it is established at an earlier date that no offence has been committed. Upon conviction for an offence all weapons or fauna seized are automatically forfeited to the Crown.*

Unless expressly provided, right of entry to land is not granted by the issuance of any permit. The owner or occupier of land may demand the name and address of any person trespassing upon a holding and may require the trespasser to quit the holding. It is an offence to remain on the holding if ordered to leave.

† Royalty on grey and red kangaroos has been suspended from 1st April, 1960, to 31st March, 1961.



# orchard and garden

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**Tomato Mosaic.**—Mosaic is still one of the most important diseases of tomatoes in Queensland. The reason for this is that many growers fail to understand just how the trouble is spread about the farm.

Mosaic is a virus disease and is highly contagious. During every operation in the establishment of new tomato plantings, this fact should be remembered. Handle young tomato plants as little as possible, and always wash the hands first with plenty of soap or detergent.

The virus is carried over from one crop to the next in the soil, or on posts and trellis wires and implements used for cultivation.

Experiments have shown that a 10 per cent. solution of tri-sodium phosphate (that is, 1 lb. to 1 gal. of water) is most effective in destroying the mosaic virus. It is therefore suggested that this preparation be applied with a knapsack sprayer to old tomato wires, posts, and implements for this purpose and, of course, the rule of no smoking around young tomato plants still stands.

—J. C. JOHNSON,  
*Plant Pathologist.*

**Raising Seedlings in the North.**—The raising of seedling plants for the early vegetable or flower crop can present a serious problem in districts with high summer rainfall such as that experienced in North Queensland. The best method is to use seed trays or boxes that can be readily moved under cover or into the sunlight or shade as weather conditions and the state of growth of the plants indicates.

Flat plum or grape cases make suitable seed trays as they are large enough to hold a reason-

able number of plants but not too heavy when filled to move about. If the boxes have been used before, it is wise to avoid risk of disease contamination by spraying or brushing them with a 2 per cent. solution of formalin in water. Leave them to air out a few days after treatment.

When filling the seed trays, don't forget a layer of cinders or gravel to provide drainage in the bottom of the boxes. And stand the boxes off the ground on a couple of pieces of timber so they can drain freely. If they are placed directly on the ground the cracks between boards that should allow drainage quickly becomes clogged with soil.

Seeding loam should not be too heavy or it cakes and retards root development. When dry it absorbs water with difficulty, and when wet it often becomes waterlogged and drowns the roots of the seedlings. If on the other hand, the loam is too light and sandy it dries out too rapidly and will not hold to the roots when transplanting the plants. A good seeding loam is a mixture of loamy soil, sharp sand and well-rotted leaf mould or manure that has a spongy texture when moistened.

For early seedlings some time can be saved by avoiding the set back that transplanting always gives a plant. To do this the seed box should be packed with small cardboard or tarred paper cylinders which are filled with the seeding loam and then have a couple of seeds sown in each. These tubes are made from sheets of card about 6 in. by 4 in. rolled and fastened with paper clips, string or rubber bands to make cylinders 4 in. high and about 1½ in. in diameter. When transplanting seedlings grown in this fashion, the tube containing a growing seedling is lifted from the box, the fastening is taken off and the paper



peeled away without disturbing the soil. Then the plant in its undisturbed cylinder of soil is set out in the field row and will go straight ahead without any check.

—F. W. BUTCHER,  
*Horticulture Branch.*

**Children Learn to Pack Fruit.**—The Agriculture Department gave instruction in fruit packing to nearly 600 school children in three of Queensland's main fruit-growing districts last year. The boys and girls were taught the correct methods of packing apples, tomatoes and oranges for sale.

Correct packing increases growers' returns. Good packing improves the market appearance of fruit and reduces wastage. Instruction of school children had been operating for some years with the full co-operation of the Education Department, and was raising the standard of packing and presentation of Queensland fruit and vegetables.

Children who received fruit packing instruction last year were drawn from 30 State schools. On the Granite Belt, apple packing classes were held at 14 schools in May and June. Classes in tomato packing were held in nine schools in the Cleveland-Redland Bay area during July and August. At the same time, orange packing classes were held in four Maroochy district schools. At each school, the children were given an hour's instruction a week for six weeks.

A special advanced class in tomato packing was held at the Victoria Point, Redland Bay and Thornlands schools. In these, the 61 advanced students were given one hour's instruction a week for four weeks.

In all, 239 children were given lessons in apple packing, 263 (including the 61 advanced students) in tomato packing and 72 in orange packing. Classes were conducted by Agriculture Department officers in association with the Education Department.

All the children were keenly interested in the course, and the standard of packing was particularly high. There was keen competition among the schools for prizes awarded at the Stanthorpe, Cleveland and Nambour agricultural shows.

—S. A. TROUT, *Director of Horticulture.*

**Early Planting for Strawberries.**—Several years' research work on time of planting for strawberries has given precise information for southern Queensland. It has shown that late planting will inevitably result in poor plant performance and lowered yields.

In trials at the Redlands Experiment Station, plantings of the Phenomenal variety extended from mid-February until late April. The plots received normal fertilizer treatment and were mulched with 1 in. of tanbark. Harvesting extended from May 9 to December 11.

Reporting on the work, Mr. J. C. Elich, Assistant Experimentalist, said that the time of planting influenced plant growth, flower production and total yield. Early plantings (mid-February and early March) produced large, vigorous plants in which flowering commenced about 13 weeks, and fruit harvesting 19 to 20 weeks after planting.

Mid-season plantings (the second and third weeks of March) and late plantings (late March to late April) produced their first mature fruit only nine weeks after establishment. However, this rapid fruiting is of no great importance, for only a very small proportion of the crop was produced before the end of June.

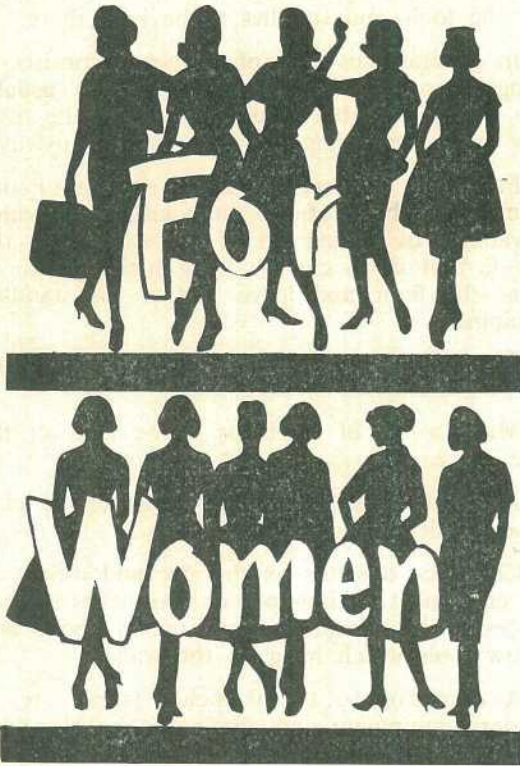
In July, all plantings showed a big increase in production, but late-planted crops produced only half as much fruit as the earlier plantings. This yield pattern continued through August, with the late plantings falling still further behind. All crops reached a peak of production in the first half of September. A steep falling off occurred in October, followed by a substantial rise in November by the early plantings. Late plantings did not show this rise.

It is clear that late-planted crops do not produce vigorous, productive plants, and consequently, their yield is greatly depressed. Early plantings produced 77 per cent. more fruit than the late.

From these experiments, it is evident that strawberry runners should not be planted after the third week in March. It is far more profitable to err on the side of earliness than lateness. But nothing is gained by planting earlier than the fourth week of February. So, the best planting time is between February 21 and March 20.

—K. M. WARD,  
*Senior Horticulturist.*





**Altering Shoulder Seams.**—Few women who buy ready-made dresses are fortunate enough to find one that fits perfectly.

From experience and “shopping around,” most women find a store, or a make, supplying a garment requiring only a minor alteration to make the dress fit correctly.

Adjustments to the total length, to bodice or sleeve length, to waist or shoulder are some of the alterations which, *if minor*, can be made without altering the basic line of the whole frock.

One of the faults in ready-made dresses may be a too-long shoulder line which is uncomfortable, in addition to spoiling the hang and fit of the bodice and the sleeve.

A too-long shoulder seam gives a droopy appearance which is not smart.

It would not be wise to attempt to shorten a shoulder seam by more than one inch. Much more than that could affect the hang of the sleeve

to the point where loss of smartness from drooping shoulder lines would be replaced by loss of smartness from badly hanging sleeves.

Alterations may be made thus:—

Carefully unpick the shoulder seam.

Take up a dart on the back shoulder on the neckline side of the centre of the shoulder seam.

Taper the dart off to nothing at an average of about 3 in. in length. Be careful not to change the width of the blouse back.

Shorten the front shoulder not more than half an inch by making a dart if there is not one there already. If there is one it is better to make a second one-half to three-quarters of an inch away.

If the style and/or fabric are suitable, gathers or tucks may be used to take out the unwanted length of the shoulder seam.

If there is a collar the dart may be placed to come under it.

If the front shoulder is still longer than the back when restitched unpick the front armhole to about 5 in. below the shoulder seam. Trim the extra from the armhole by starting from nothing at this point to the shoulder seam.

If the shoulder seam was taped be sure to cut the tape to the correct length and restitch to shoulder seam.

**Roasting Poultry.**—Those who have tried cooking poultry in aluminium foil will be interested to compare their opinions and results with those of the British Good Housekeeping Institute.

The Institute conducted a test to find out which method of roasting poultry—conventional uncovered or in aluminium foil—was preferable.

Here are the results of this test where two birds of the same weight were seasoned and placed on the same shelf in two similar dishes; with a cooking time of 20 minutes to the pound.

At end of one hour forty minutes:—

Open method—cooked; good attractive brown appearance.

Foil method—further cooking needed; very slight, pale-brown colour.

The bird in the foil was given another twenty minutes cooking with the foil left open and turned back. Comparisons were then made.



The general appearance and colour of bird cooked by open method was very good, with a crisp skin. The bird cooked in foil also had a good general appearance and colour, but the skin was not as crisp and attractive as on the other bird.

A difference of 3½ oz. loss in weight in favour of the foil method.

While hot both white and dark meat of bird in foil had more flavour and was moister: the bird cooked by open method had a good flavour, the breast was drier and crumbly but the skin tasted better.

When cold there was not such a noticeable difference in flavour between dark meats, but meat cooked by the foil method was moister. The breast, foil method, definitely had more flavour and was moister.

Selection of cooking method is very much a matter of personal taste and preference governed by moistness and texture of flesh. Oven is cleaner when foil method is used, as the small amount of juices is collected in the foil.

Cooking time for foil method twenty-five minutes to the pound.

**Better Broom Cupboards.**—Cleaning equipment and supplies are not the easiest items to store, and too often provision of such storage is inadequate—or even not provided.

The main things to keep in mind when planning this particular storage are, “where” and “how much.”

Again the golden rule for any storage—store where *first* needed—should be the guide.

A central location for what is usually referred to as a broom cupboard is most convenient for the storage of cleaning tools used in all parts of the house.

In addition to this central storage, what may be termed “local” or “on the spot” or “where wanted” storage should be provided in the bathroom, at the sink, and in the laundry for materials wanted there.

The fact that this will result in duplication of some equipment and supplies is immaterial—the convenience of, say, a jar of cleanser in each of three places outweighs the initial “treble” purchase price.

The fault with most broom cupboards is that they are not large enough and/or not designed for the tools and supplies to be kept there.

In general, this type of cupboard consists of hanging space below a shelf which is usually too high to be able to use more than the front few inches, providing you can reach it anyway.

Far better is a set of shallow shelves on one side or the back of the cupboard. An added advantage of getting rid of the shelf from the top is that items can be hung high enough to clear the floor and leave it free for standing equipment.

The following suggestions may act as a guide for more efficient storage space:

Make a list of all items to be kept in the one place.

Assemble these items, and measure and plan space to fit sizes and shapes.

Clearance depends on the size and weight of the equipment. Allow one or two inches between pieces of equipment and two inches above and below tools which hang on the wall.

A depth of 16 to 20 inches takes care of modern equipment and eliminates reaching and the need for putting one piece of equipment in front of another.

A sturdy door will allow adjustable holders, hooks, to be attached to it, as well as to the walls, for hanging brooms, mops, brushes.

Doors should open easily and be wide enough for equipment to be easily seen and removed.

Adjustable shelves in the centre back of the cupboard provide easily accessible space for supplies.

Rounded corners and smooth washable finishes are desirable.

Provide good ventilation.

Allow ample height in one section for brooms and mops.

Keep vacuum cleaner and attachments together.

Place vacuum cleaner so it is easy to slide out and slip back in.

Keep instruction books for tools, also cleaning hints, handy.



## History-Making Wool



Australian tennis player, Miss Jan Lehane, showing one of the "Sironized" woollen tennis frocks which she will wear at the Wimbledon Championships. The wardrobe of Miss Lehane, her chaperone and her partner, will feature these wash-non-shrink tennis frocks of lightweight wool, with gold kid belts.



Australian-made fine wool "Sironized" fabric made history as the first Australian-made wool fabric to be shown at the Royal Command parade by London's Top Ten, held at Osterley Park in the presence of the Queen Mother and Princess Margaret. The frock and jacket in Prince of Wales miniature check was designed by WORTH and is worn in this picture by Australian model June Massey.

A simple lock placed high may keep children's fingers out; but cleaning agents which are poisonous should be kept well out of children's reach.

Keep cupboard well organised and tools and supplies easily accessible.

**Kitchen Floor Coverings.**—Realising that recent advances in the manufacture of floors and floor coverings have made it increasingly difficult for householders to decide which type

of floor treatment will answer their needs best, two organisations in Great Britain have been carrying out investigations.

The two organisations concerned are the Council for Scientific Management in the Home, and the Consumers Association Limited.

The investigation was conducted in two parts, namely: finding out, mainly from manufacturers, what was available; while the second took the form of a questionnaire sent to a group of housewives, and to local housing authorities.



## Housewives' Preference

Two hundred and seventeen English housewives listed the desired qualities of a kitchen floor covering in what they considered the proper order of importance.

The rating was as follows:—

It should—

- be easy to clean.
- be durable, that is, retain its original appearance for a considerable period of time.
- not be slippery when wet.
- be resistant to water, oil, heat, abrasion, dusting, chipping, cracking, and denting.
- have a bright, cheerful appearance.
- not feel too cold.
- not be noisy.
- be reasonably resilient.

The report of these investigations goes on to state that the ideal kitchen floor covering, possessing all desired qualities, has yet to be made. The housewife, therefore, has to decide on the qualities she considers of most importance, and choose flooring accordingly.

In addition to cost, other factors which will also influence her choice will be the number and ages of the family group, whether she lives in the country or the city, a house or a flat.

**Books Are Valuable.**—Most people can still make time to read and, as time passes, gather a library of good friends; perhaps on a single shelf, perhaps in a number of bookcases. But sometimes their accommodation is a problem.

It is good to see that book storage is frequently included as a necessity in the furnishing of homes today. The wide range of packet unit furniture—which can be home assembled—makes it easy for such parts of a home as corners and closed-up doorways to be used for book storage.

Opinions differ regarding closed or open shelves. Those who feel that books should be as accessible as possible prefer open shelving,

and so have more dusting to do to preserve their treasures. Probably the best solution is to provide some open and some closed storage.

The positioning of a bookcase or a shelf in a room is important.\* Those points which must be checked include:

The ease with which books can be taken from the shelves. This is influenced by the height of the shelf, the placing of other furniture, and the free swing of doors—if a thing is hard to get at it is not used so often.

Books should be stored where they will be wanted, for example, keeping recipe books anywhere but in the kitchen doesn't make sense.

In almost every home a place for books is needed in every room. (Magazine racks have been suggested for bathrooms!)

Protection from direct sunlight to prevent bindings fading, but still with enough light (day and night) to make it easy to select a book.

In addition to the necessary regular dusting, books should be removed from the shelf once a year and each one gone over thoroughly with a vacuum cleaner or a clean cloth. (If kept on open shelves more frequent attention is desirable.)

Valuable leather-bound books are improved by rubbing lightly with white shoe cream.

Protection for the many good paper-bound books which form a large part of today's collection may be provided by special covers or holders. Most stationers carry a range from which suitable covers may be selected, in some cases large enough to take a collection on a topic, or the twelve monthly issues of a year. Those who make a hobby of bookbinding can always have their covers tailored to measure and coloured to taste.

—New South Wales Department of Agriculture's  
"Press Notes."