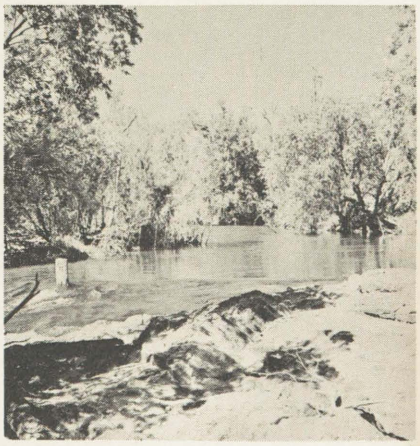
Queensland
# AGRICULTURAL JOURNAL

DECEMBER, 1972 Vol. 98 No. 12

# DEPARTMENT OF PRIMARY INDUSTRIES





A river scene at Ban Ban Springs in the Gayndah district.


Editor: A. E. FISHER

Vol. 98 DECEMBER, 1972 No. 12

Published monthly by the Department of Primary Industries, William Street, Brisbane, Q., 4000.

Telephone: 24 0414

QUEENSLAND AGRICULTURAL JOURNAL

DECEMBER, 1972

# A Long-lost Boronia

by BERYL A. LEBLER, Botanist.

WHEN the article on the Boronias of south-eastern Queensland (*Queensland Agricultural Journal,* April, 1972, Vol. 98, No. 4) was prepared, one species was omitted.

It had not been seen for more than 60 years and it was not then known whether it was extinct or not. A small area of this plant has now been rediscovered in the region where it was originally collected by James Keys in 1909.

Keys was the head teacher of Norman Park State School from 1900 to 1911, and was greatly interested in natural history. According to his grand-daughter, Mrs. Margaret Thorsborne, who is also a very active conservationist, he liked Tewantin and often stayed there. He was a frequent correspondent of F. M. Bailey, who was then Colonial Botanist in Queensland.

The plant was not described until 1926 when Dr. Karel Domin, a Czech botanist, included it in part 3 of his monumental work on Australian plants published in Bibliotheca Botanica. This contained an account of the new and unusual plants he had collected or had been given during the course of his travels.

It is not clear how Domin obtained his specimen of the plant. It could have been given to him by Bailey during his visit to Brisbane in 1910, or it could have been one of a consignment of Queensland plants sent to him at a later date. In any case, he named the plant *Boronia keysii* in honour of the man who first found it.

From 1909, it was not collected again until September 9, 1971. Dr. Arthur Harrold, of Noosa, an ardent and active conservationist, while driving to Cooloola along a disused section of an old road, noticed an unusual flowering plant on the roadside. The specimen, which he sent to the Queensland Herbarium for identification, proved to be the long-lost *Boronia keysii.*

Part of the original collection made by Keys was in the herbarium, and comparison of Dr. Harrold's specimen proved beyond doubt that the two plants were identical.

Superficially, *B. keysii* looks more like the Wide Bay boronia than any of the others in south-eastern Queensland. Both are shrubs of open habit, and both have axillary inflorescences with flowers in groups. Both have pinnate leaves, and grow in similar habitats. In fact, Wide Bay boronia was also collected by James Keys from the Lake Cootharaba area.

Our plant, which may be called Key's boronia, differs from Wide Bay boronia in having simple as well as pinnate leaves, in which the terminal leaflet is conspicuously longer than the lateral ones. It also has shortly hairy stems which are slender but straight and not arching downwards towards the tips. The rhachis is also straight, not arching as in Wide Bay boronia, so the leaves look quite different.

DESCRIPTION. It is a shrub with an open branching habit which can grow to a height of 6 to 7 ft. (1·8 to 2·1 m.). The branches are ascending with the secondary branches more or less in one plane. Very short, golden-brown stellate hairs cover the young stems. The leaves are opposite and on the one plant it is possible to find every type of leaf from simple leaves to pinnate leaves with three, five, seven, and sometimes nine leaflets.


Key's boronia (*Boronia keysii*).

Simple leaves are found usually on the lateral flowering branches. On these branches, all the leaves can be simple or the upper leaves trifoliate and the lower ones simple. These lateral branches usually arise from the axils of pinnate leaves with five or more leaflets.

On the terminal 6 to 10 in. (15 to 25 cm) of the main stems, there are no axillary flowering branches. These are replaced in the leaf axils by inflorescences. The petioles of simple leaves are about $\frac{1}{8}$ in. (0·3 cm) long and are bordered on each side by a narrow wing, which is widest at the top.

The leaf is lanceolate in shape, widest at the middle, and tapers to the base and to the blunt tip. It can be $1\frac{1}{2}$ in. (3 cm) long and $\frac{1}{2}$ in. 0·8 cm) wide. The upper surface is dark green, the lower is a much paler colour. Both surfaces are glabrous, and the margins

are very slightly recurved. The only visible venation is the midrib. This is sunken on the upper surface and raised on the lower.

Although the petiole appears to be glabrous, the stellate hairs found on the stems are sparsely scattered over its lower surface. This can be seen under magnification.

In the petioles of pinnate leaves, these hairs are densest at the point of insertion of the lateral leaflets. At this point the wing is constricted and the leaflets are inserted on the upper side. The terminal leaflet of the pinnate leaves is the same shape as the simple leaves and at least twice the size of the lateral leaflets.

Although the leaves are actually decussate, because of a twist in the petioles and also to some extent in the stem, they appear to be distichous with all the leaves and leaflets lying in the one plane.

The deep, rose-pink flowers form axillary umbels of from two to six flowers. Each flower opens out to the characteristic flat, four-pointed star seen most clearly in Wide Bay boronia and forest boronia. Both pedicel and calyx are reddish-brown in colour. They are covered with the same tomentum found on the stems.

In the bud stage, all the pedicels are very short, and about the same length as the peduncle. Usually one pedicel in each umbel elongates first to a length of $\frac{1}{3}$ in. (0·8 cm) while the others remain unchanged, so that one flower is open while the rest are still buds. Sometimes before the first has faded, the second flower has opened and the pedicel of the third has begun to elongate. As in all boronias, the colour is most vivid in the freshly opened flower and fades as the flower ages.

The sepals are $^1/_{10}$ in. (0·25 cm) long, $^1/_{20}$ in. (0·12 cm) wide and the tips, which are pointed, can just be seen between the bases of the valvate petals. The petals are $\frac{1}{2}$ in. (0·8 cm) long, and are broadest just above the base, $\frac{1}{8}$ in. (0·4 cm). Down the centre of each petal a prominent midvein can be seen forming a raised ridge on the outer surface. This is also found in forest boronia and in both flowers gives an angular appearance to the buds.

Golden stellate hairs are found on the outer surface, and are densest along the midvein. Under magnification, short, white, loose hairs can be seen scattered on the inner surface of the petal, particularly in the marginal areas.

All of the eight stamens are fertile. The filaments are the same colour as the petals. A fringe of long, white, silky hairs is found along each side of the lower portion. Magnification shows colourless glandular hairs scattered over the upper club-shaped portion, beneath the heart-shaped apiculate anthers. In the centre of the ring of stamens is the four-lobed, red ovary with a short, thick rose-pink style ending in a yellow stigma.

The petals persist in the old flower and the four smooth, olive-green mature carpels separate from one another and spread outwards, each cupped by a dead petal. Each carpel, when ripe, splits along its straight inner edge and along most of the curved outer edge to release a single smooth dull black seed $\frac{1}{8}$ to $\frac{1}{6}$ in. (0·3 to 0·4 cm) long.

FLOWERING TIME. As far as can be told from the limited collections it flowers from late winter to early spring.

HABITAT. From our present knowledge, it appears that this plant grows in sandy soil fairly rich in humus with the water table only 2 or 3 ft. (0·6 to 0·9 m) below the surface. It grows in moist eucalyptus forest, mainly tall bloodwood and white mahogany, with a dense understorey of mixed trees and shrubs, one of which is *B. keysii.*

Observations indicate that, in a narrow strip of the original forest which was cleared a few years ago, *B. keysii* was not destroyed but was well represented in the regrowth along the cleared line.

DISTRIBUTION. It appears to have a very restricted distribution in the Lake Cootharaba area. A preliminary examination of similar forests in the vicinity has failed to reveal any of the plant.

The accompanying illustration was drawn by Mr. S. L. Everist, Director, Botany Branch.

# Meat Inspection An Aid To Pig Farmers

WHAT happens to my pigs after they go to market? Do they grade well? Do they suit the present-day market requirements? Do I lose any carcasses or parts of carcasses that are condemned because of disease? If so, can I do anything about preventing these losses?

by D. HILL, Slaughtering and Meat Inspection Branch.

The answers to these questions are keenly sought by all growers. They can be obtained in either of two ways:—

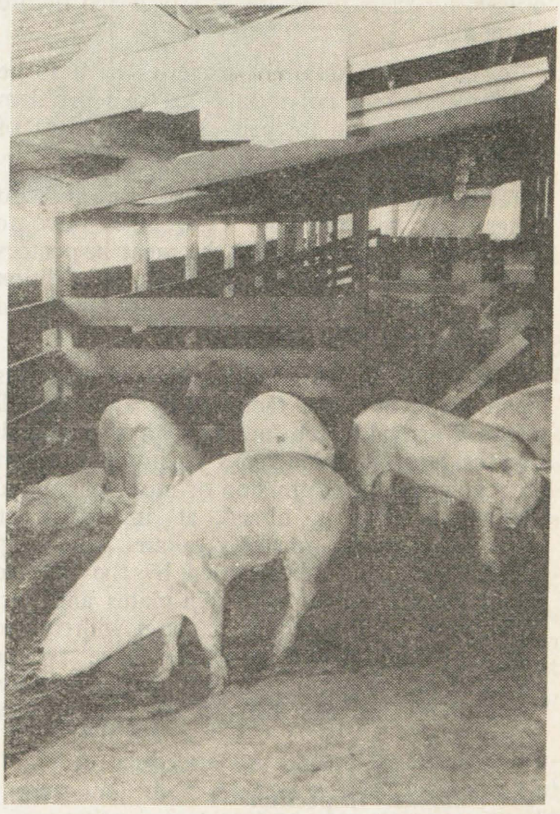
1. Visiting the meatworks at which your pigs are being slaughtered and following them through their slaughtering and grading procedure and studying your problems at first hand. The management of most meatworks today both allow and encourage growers to do this, if prior arrangements are made.

2. By careful study and analysis of any condemnation certificates issued by the Queensland Department of Primary Industries for carcasses or parts of carcasses condemned for disease conditions, and by careful study of the grading results of your pigs, issued by the meatworks.

Careful analysis of these results by the grower can be of invaluable assistance when planning future production programmes.

In Queensland, meatworks either come under the full control of the Commonwealth Department of Primary Industry (Export) regulations or State Department of Primary Industries Slaughtering Regulations or, as with most meatworks throughout the State, both sets of regulations apply.

The main aim of an efficient meat inspection service is, of course, to protect the consumers from obtaining meats unfit for human consumption. This applies to both the local market and overseas countries importing our meat products. It is also



Suspect pigs held in the "suspect pen" for slaughter at the end of the kill.

necessary to ensure that animals are slaughtered in accordance with regulations. Meat and meat products must be prepared and handled under strict hygiene standards to meet the requirements of both the local market and importing countries.

Another important role of the meat inspection service is the early detection of animal diseases, and passing on this information to disease control officers for the benefit of the livestock industry. It is this role that possibly most interests the grower.

Commonwealth and State slaughtering regulations lay down certain requirements for livestock handling facilities and holding accommodation at meatworks.

On arrival at the meatworks, pigs are housed in fully paved and covered pens. They must arrive at the meatworks in sufficient time, in the opinion of the inspecting veterinary officer, for them to be adequately rested before slaughter.

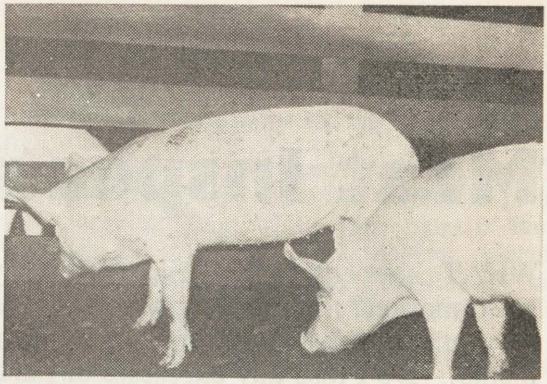
As pigs from different piggeries have to be held together in common pens, one problem confronting bacon factories is the problem of pigs' fighting.

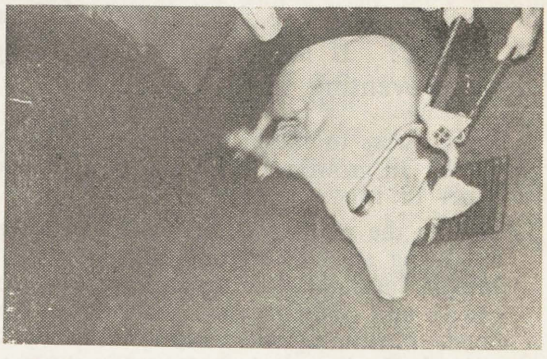
This can cause carcass bruising and, at times, can be extensive. Carcasses have to be extensively trimmed by the meat inspectors to remove the bruised area. Thus, in addition to a weight loss, carcasses are disfigured and their market value reduced.

Some attempt to combat this problem has been made by some factories by spraying all pigs on arrival at the factory with a chemical. As the sense of smell plays an important part in regulating the expression or mode of animal behaviour, this is aimed at imparting an over-riding odour, masking odours which, up to this time, have been used by the pigs to associate themselves with pen-mates and surroundings. This practice has met with mixed success, and would probably have to be applied at frequent intervals depending on how long the pigs had to be held before slaughter.

**Pre-slaughter Inspection**

All pigs are subjected to a pre-slaughter inspection by a veterinary officer.



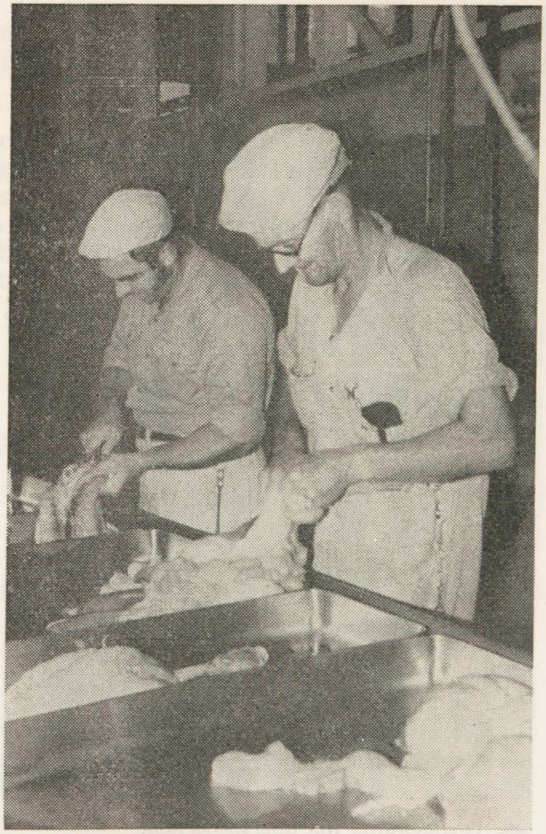


UPPER. A suspect pig showing "swine pox" lesions.
LOWER. Stunning pigs before sticking.

At this inspection, all pigs showing evidence of disease can be segregated, held in suspect pens, and slaughtered last to avoid possible contamination of other carcasses and equipment. Animals showing evidence of transit fatigue can be held, treated and rested before slaughter.

Animals that are considered by the inspecting veterinary officer to be unfit for slaughter for human consumption can be destroyed and disposed of away from the immediate premises.

Pigs, along with other food animals, are slaughtered and dressed under strict Commonwealth and State slaughtering regulations. These regulations are designed to provide for the humane slaughter of these animals and to ensure that the carcasses are dressed under hygienic conditions. They also ensure that



Viscera inspection.

Head inspection.

all slaughtering procedures are under the direct control of the meat inspection service at all times.

It further provides for an adequate and thorough inspection of all carcasses and internal organs by qualified meat inspectors before the carcasses are either condemned or passed as fit for human consumption. It also provides for the control of the handling, storage and sale of these carcasses and all meat products.

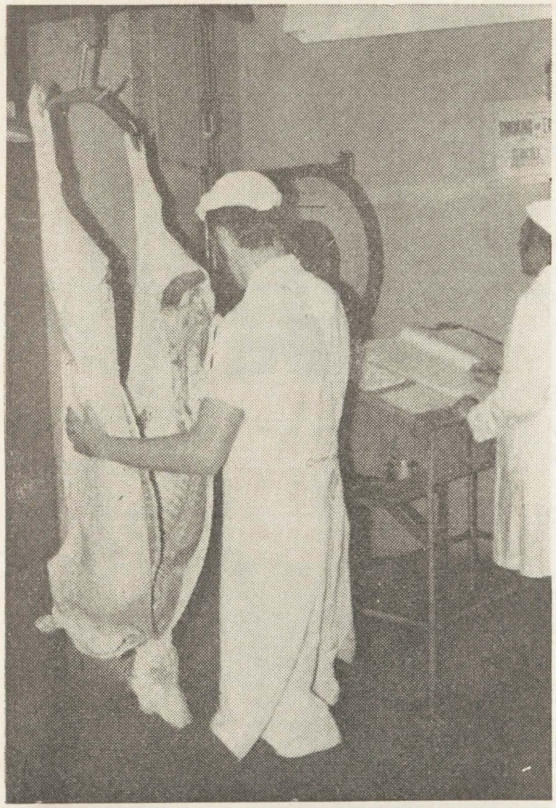
Pigs are electrically stunned before sticking and bleeding. This is done by applying electrically-charged tongs or prongs to the pig's head, about the base of the ear, for approximately 2 to 3 seconds. This is usually sufficient, if correctly applied, to make the pig completely unconscious.

If the pig is not slaughtered after stunning, it will revive in approximately 2 minutes and after 5 minutes will show little or no effect from the stunning.

After bleeding, the pig carcasses are scalded and completely dehaired and washed before they are eviscerated by the slaughterman. They are then subjected to the first post-mortem inspection by the meat inspection staff.

Here the meat inspectors note the general appearance of the viscera and carcass for any abnormal conditions, as well as the examination and slicing of the lymph nodes to ensure that the carcass is disease-free and fit for human consumption.

As carcasses are passed for human consumption, they receive a final washing and inspection before passing over scales for weight recording and carcass grading.



Weighing and grading carcasses after the final inspection.

Grading after the final inspection.

Carcass grading is carried out by meatworks staff. It is a system worked out and agreed to by the various bacon factories whereby the fat measurement at three points on the carcass is directly related to the carcass weight. Each grade, Prime, 1st Grade, 2nd Grade and 3rd Grade, has three weight ranges, which are directly related to a maximum allowable fat measurement, taken at the loin, middle back and shoulder of the carcass.

## Disease Conditions

ARTHRITIS. Arthritis is by far the greatest single cause of both total condemnation and partial condemnation of pig carcasses.

At one large bacon factory where 70,000 pigs were slaughtered in a year, figures show that, of the total number of carcasses condemned, 45·7% were condemned for arthritis, representing 8,351 lb. weight. Of the total number of legs condemned, 80·8% were condemned for arthritis, representing 11,591 lb. weight, giving a total of 19,942 lb. weight of pork lost to the industry.

Arthritis could be a condition resulting from a number of diseases such as swine brucellosis, Glasser's disease or swine erysipelas. However, it appears that there are other causes of the arthritic condition seen in pigs at slaughter. At many piggeries, inoculation programmes against swine erysipelas and other diseases have been in operation for many years, yet arthritis still remains a problem in the piggery. Several different bacteria have been isolated from arthritic joints forwarded to laboratories.

The fact that some piggeries have very little trouble with arthritis while in others it is considered a major problem suggests that perhaps

management could play an important part in the incidence of arthritis in the piggery.

ABSCESSES. Abscess lesions in pork carcasses is another disease condition causing severe loss to the pig industry. The survey showed that during a 12-month period, a total of 4,500 lb. weight of pork was condemned because of abscesses. It further showed that the abscess lesions were mainly caused by:—

1. Badly infected "tail-bite" lesions, giving rise to abscess formation along the spinal column, pelvic region and other parts of the carcasses.
2. Badly infected castration wounds.
3. Abscess lesions at inoculation and antibiotic injection sites.

Thus it appears that management can play a major role in reducing the incidence of this disease condition in pigs.

HEAD ABSCESSES. Today, growers appear to take for granted that at least some of their pigs will have the head condemned because of abscess lesions. Figures showed that during the 12-month period, a total of 1,638 pig heads were condemned for abscess lesions, representing 2·3% of the total kill. By law, under the Pig Industry Act, this represents a loss to the grower of 2½% of the total purchase price of the pig. On a prime grade baconer weighing 140 lb., at a purchase price of 28c per lb., this would mean a loss to the grower of almost $1.00 (98c).

Surveys have shown that, in Queensland, up to 94% of these lesions are the result of the presence of the micro-organism *Corynebacterium equi.* A small percentage appears to be due to sundry miscellaneous organisms.

As this organism lives a saprophytic existence in the soil, it is considered that young pigs acquire the infection when they are running with the sow or when they are on free range and have access to earth.

BRUISING. The bruising found in pigs' carcasses varies extensively from small lesions involving a small area of the skin and underlying tissue to extensive lesions requiring the removal and trimming of large areas of the skin and deeper muscular tissue. At times, bone fractures are involved. In such cases, the area around the fracture will be suffused with clotted blood and the surrounding tissues show a jelly-like infiltration requiring extensive trimming by the meat inspector.

Bone fractures and carcass bruising are usually the result of mishandling the pigs at some stage before slaughter. This occurs either on the property, in loading on to transport at the property, in transit to the meatworks, or at the meatworks itself. In any case, it does not seem possible at any stage to lay the complete blame at anyone's feet. However, the shame of it is that this loss is largely unnecessary.

It should be remembered by all persons handling pigs that they are handling an animal which bruises easily, and, although at times tempers can be strained to their limit when handling livestock, the utmost care should be exercised at all times.

## Skin Conditions

SARCOPTIC MANGE. This disease condition of the skin of pigs is caused by a parasitic mite (*Sarcoptes scabiei*) which burrows into the skin causing severe irritation, leading to scratching and rubbing by the pig. This causes widespread damage to the skin and the affected areas tend to become thickened, wrinkled, hairless and covered with scales.

It is a disease of considerable economic importance, the irritation causing loss of condition, and the skin lesions lowering the value of the dressed carcass, as large areas of the skin may have to be trimmed off. Even though this disease can be controlled reasonably easy in the piggery with modern spray solutions, it is still quite often seen in pigs submitted for slaughter.

DEMODETIC MANGE OR FOLLICULAR MANGE. This is another disease condition of the skin which is quite often seen in pigs submitted for slaughter. This skin condition is caused by a parasitic mite (*Demodex phylloides*) which invades and lives in the hair follicles and sebaceous glands setting up a chronic inflammation with loss of hair and thickening of the epidermis. Secondary

staphylococcic infection usually occurs with the formation of pustules and abscesses (yellowish in colour).

A common site of infection is the face, but it does extend to the flanks, ventral surface of the body and inner surface of the thighs. Lesions may be extensive and necessitate complete removal of the skin, thus resulting in a weight loss, as well as lowering the value of the dressed carcass. As this disease can be difficult to control in the piggery, it is suggested that veterinary assistance should be sought.

**Other Diseases**

Only the diseases causing the greatest loss to the industry, and most commonly seen on the pig slaughter floor have been mentioned. However, evidence of other diseases is seen including internal parasite infestation, pneumonia, and fevered conditions of non-specific origin. While no direct loss to the industry can be attributed to many of these diseases, it is obvious that their effects must cause loss of condition, retarded growth, and bad weight gains, thus indirectly affecting the industry.

It is therefore essential for every grower to study and analyse carefully the results of all his pigs forwarded to meatworks. Disease conditions resulting in total or partial condemnation shouuld be referred to a veterarian (Government or private) or local Stock Inspector for further investigation and advice. He cannot hope to improve his product or plan future production programmes unless he knows how his pigs grade, and what losses, if any, are caused by disease conditions.

# Rubber Vine Control

THE Biological Section of the Lands Department is investigating methods of controlling rubber vine.

While the weed can be controlled with chemicals, the economics of this method are questionable. For this reason, the Department is looking into all means of control, particularly biological. It is also examining chemicals that can be used effectively in aerial spraying. At present, only individual plant treatment is effective. Overall spraying of large clumps is not usually satisfactory.

Individual young plants up to 4 ft. high and growing vigorously can be controlled by overall spraying with 2,4-D amine at a concentration of 0·2% (1 part of 2,4-D amine in 250 parts of water). All foliage and young stems should be wetted thoroughly. It may be necessary to add extra wetting agent or household detergent to achieve this. Tordon 50-D at 1 part in 100 parts of water is effective when applied as a wetting spray.

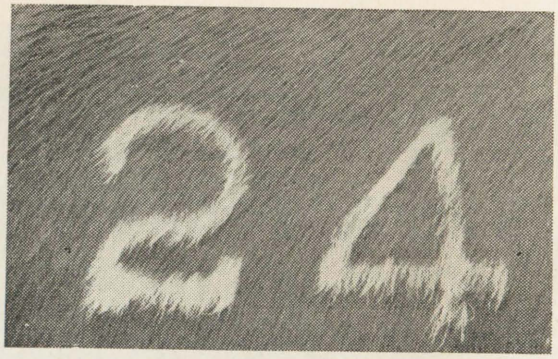
Other control methods are: **1.** Cut stump. Cut off large plants and massed clumps close to the ground and spray or swab the freshly-cut stump liberally with a solution of 1% 2,4-D amine in water (1 part D-50 in 49 parts of water). Power kerosene used neat on the stumps is also effective.

**2.** Basal bark spray. Thoroughly spray the bases of the plants up to 18 in. from the ground with an oil-based spray made by mixing 1 part of 2,4,5-T ester (T 80) or 1 part of 2,4-D ester (D 80) in 79 parts of sump oil broken down with kerosene or in 79 parts of diesel oil.

**3.** Stem injection. Inject the stems at ground level by making a series of closely spaced cuts with a hatchet, and pouring in a mixture of 1 part of Tordon 50-D to 2 parts of water.

*—G. DIATLOFF, Weeds Agronomist.*

# Freeze Branding Of Cattle



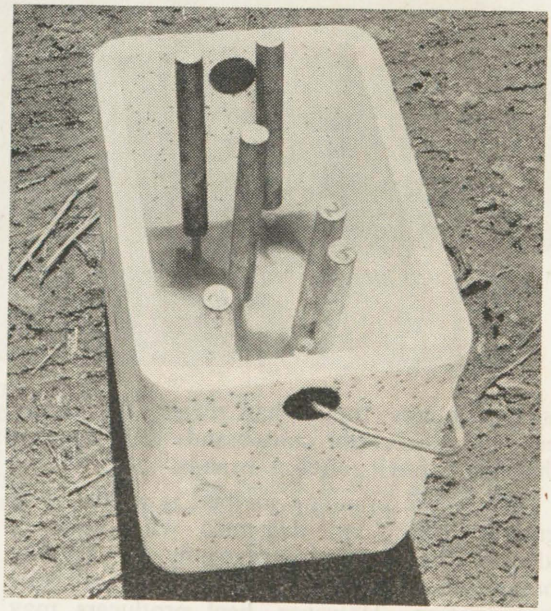
*A 4-month-old freeze brand showing excellent white hair growth.*

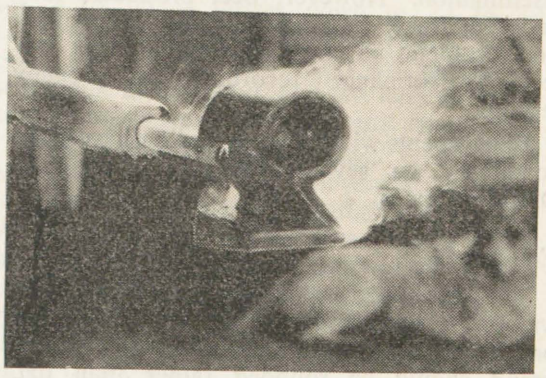
by W. J. A. HALL, Dairy Cattle Husbandry Branch.

FREEZE branding is a new method of identifying cattle. It involves destroying the pigment-forming cells of the hair follicle (the melanocytes in the skin) with the result that white hair grows on the branded area.

This destruction is brought about by applying an extremely cold brand to the animal's hide. The white hair brand that results is legible from a long distance, does not need clipping and is permanent. No hide damage results from the operation and it is less painful to the animal than the fire brand.

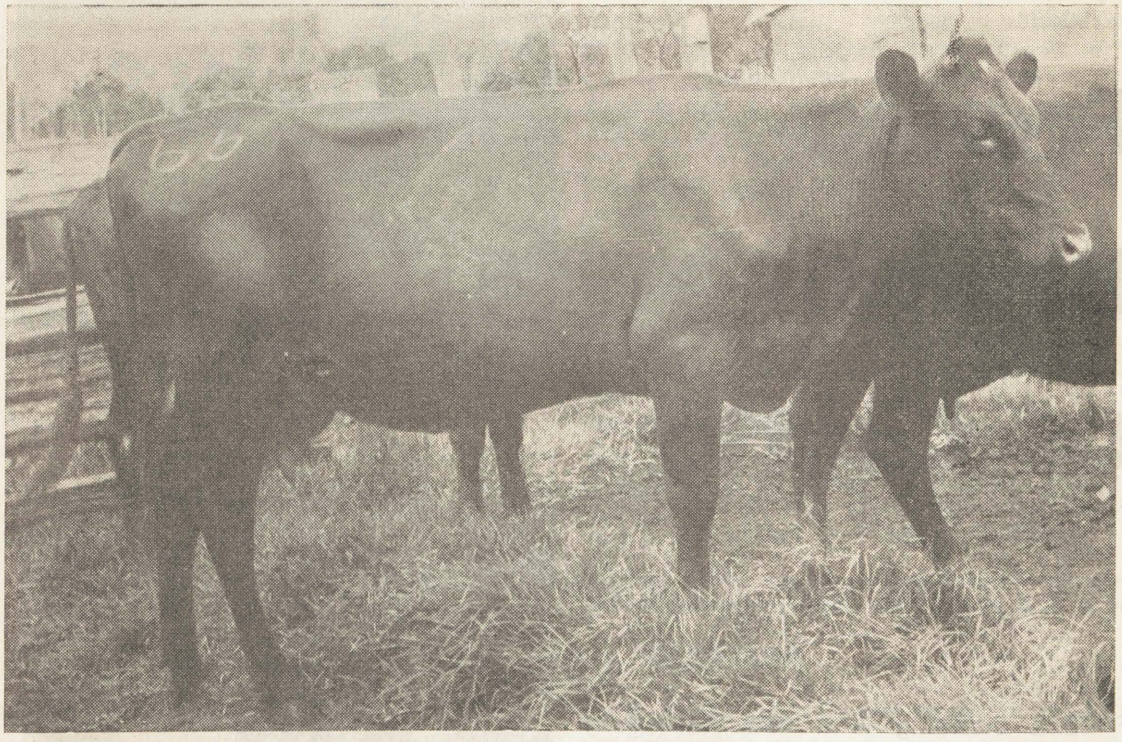
Freeze branding should not be confused with cold branding. Cold brands are designed for applying chemicals. They cannot be used for freeze branding and their use does not produce the same result. The term cold brand





*TOP. The copper brands, inverted in their mixture of dry ice and methylated spirit in a common portable domestic ice chest.*

*BOTTOM. The copper brand just after being removed from the freezing solution.*



*A clear freeze brand on an A.I.S. cow.*

is unfortunate for it has meant that some people have bought cold brands thinking that they were buying freeze brands.

The freeze branding method is probably of greatest benefit to dairymen who wish to identify their cows permanently for feeding programmes, herd recording and artificial insemination. However, beef producers may find that freeze branding can solve identification problems in artificial insemination projects, performance recording or progeny testing.

Experiments with freeze branding have been conducted on several dairy herds on the Darling Downs.

## Equipment

The size of the brands must comply strictly with *"The Brands Acts,* 1915 *to* 1965". For best results, the application face edge of the brand should be rounded rather than flat.

## Cooling Material

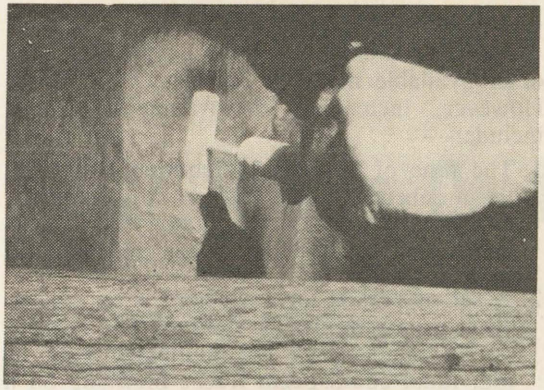
The cost of a set of brands (0-9) varies between $60 and $80. Innoculo Laboratories, 629 Canterbury Road, Surrey Hills, Victoria, 3127, have patent rights.

A reasonably sized, domestic portable ice chest and a set of hair clippers are also needed.

A mixture of dry ice (–72 deg. C) and alcohol gives the best results. Liquid nitrogen (–196 deg. C) has been tried here and overseas but results have been inconsistent. Moreover, liquid nitrogen is more expensive (13c per lb. compared with 10c a lb. for dry ice).

The use of liquid nitrogen may shorten the hide application time but, until techniques are improved, its use cannot be recommended.

Approximately 15 lb. of dry ice and a gallon of methylated spirit are required for a herd of 45 cows. Dry ice can be kept for



*Applying the brand to a closely clipped area.*

*This brand was applied unevenly. The burnt or bald section at the top of figure 1 is a result of too hard a pressure on the top section of the brand in applying it. The brand was not applied firmly enough on the bottom section of the figure, and the freezing effect did not work successfully.*

short periods if wrapped in newspaper, and methylated spirit can be used again.

**Procedure**

The dry ice is broken into chips, no more than 2 in. square and added to methylated spirit in the ice chest to form a slurry. Enough of the mixture should be available to cover the head of the brands. When the violent bubbling has stopped, the brands are cold enough to use. Usually this happens about 20 minutes after immersing them into the mixture.

The hair on the brand site is clipped as short as possible and the site brushed clean and wetted with methylated spirit. Some reports indicate that anti-freeze solution may be an effective wetting agent.

Our experiments underlined close clipping as a very important part of the operation. The area chosen should be a dark hair area on a flat, well-muscled surface and in a position which can be restrained.

A large percentage of failures occur when the animals move during branding. The rump and shoulder have been found the best branding sites. Adult cows can be branded in a crush or in the milking bails and are not usually a problem. However, younger animals must be restrained properly. A calf cradle, when available, is excellent.

The application time will vary according to the age of the animal. For adult Friesian cows, 45 sec. is acceptable and 35 to 40 sec. for A.I.S. This ranges down to 25 to 30 sec. for calves. Calves under 4 weeks can be done for 15 sec. Too short an application will result in no brand, and too long an application will leave a bald or burnt brand.

During the operation, most cows stand reasonably quietly and movement is often because of restlessness rather than pain. Where attempts are made to freeze brand with liquid nitrogen, the above application times should be halved. Some evidence suggests that liquid nitrogen may be more effective on unclipped areas, that is, the opposite effect to dry ice.

More research is needed before freeze branding can be recommended for Jerseys. Best results have been obtained using a 50 sec. application.

Roan or white cattle are obviously a problem. We found that by applying a 90 sec. brand we got a bald or burnt brand which was distinguishable.

The operator should be careful to return the iron to the dry ice solution after each brand and not to use it again until it has cooled down to the correct temperature, that is, the violent bubbling has stopped.

## Results

A swollen imprint is left on the animal for about 2 days after branding. This slowly subsides and the area becomes rather dry with the hair dropping out.

The new white hair begins to grow about 6 weeks after branding, but it can take as long as 4 months before the full white hair brand can be seen.

## Legal Aspects

Freeze brands are permanent brands and as such are to be imprinted strictly in accordance with the provisions of *"The Brands Acts"*. The Acts do not differentiate between hot, cold or freeze brands.

## Advantages And Disadvantages

Freeze branding has some advantages over other available methods of cow identification. However, there are disadvantages. These include:—

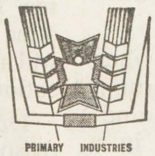
1. The time of application required limits the the number of cows that can be branded in a day: 20 an hour is good work. This makes the labour cost rather high.

2. A set of brands for each herd is expensive. Perhaps a group or co-operative of farmers could jointly buy the equipment, or an individual could begin freeze branding on a business basis within a district. One A.I. group has taken up freeze branding as a seasonal sideline.

3. Freeze branding cannot be regarded as satisfactory with light coloured cattle, particularly the Channel Island breeds.

Some excellent ear tags are now on the market and these can be cheaper than freeze branding. However, the brands have outstanding legibility from a much greater distance than most ear tags and from more acute angles.

Freeze brands are permanent. Ear tags can be difficult to read in some types of milking sheds. The choice that is made should depend on where the animals are to be observed and from what distance and, of course, the availability of freeze branding equipment.



# Water Sources On Poultry Farms

by G. D. STEWART, Poultry Section.

OVER the past few years, many changes in management, husbandry, and production techniques have occurred in the poultry industry. The general trend has been for poultry farms to get bigger while, at the same time, the number of farms has greatly decreased.

Generally, egg farmers are now associated with large towns so that a ready and easily-reached market is assured. In recent years, with town expansion pushing into what was formerly farming areas, many poultry farmers have been able to take advantage of a regular water supply rather than depending on dams, tanks, bores, and creeks.

In January, 1972, a survey of Queensland egg producers was conducted to determine just what numbers of birds have access to various water sources. To provide a complete picture on the water situation in Queensland, it was decided to find out a few other facts about water usage and problems associated with it.

Through regional poultry advisers, a questionnaire was circulated to commercial poultry farms of 1,000 birds and above seeking the required information.

### Aims of the Survey

1. To establish what numbers of commercial layers have access to each of the main sources of water supply: town supply, bore water, dam water, well water, and stream water.
2. To determine what percentage of farmers have had a water analysis completed on their water supply.
3. To determine how many, if any, farmers use a water purification technique.
4. To determine the extent to which algae is a problem.
5. To obtain an indication of the reliance farmers place on their particular water supply.

### Discussion and Results

In all, 257 egg-producing farms with a flock size exceeding 1,000 birds were sampled throughout Queensland. The total number of birds sampled was 2,093,080. The results showed:—

1. 35% of Queensland layers have access to town water supplies; 41% to bore water; 28% to dam water; 13% to well water; and 9% to stream water. (Note that these figures quote the percentage of birds having access to a particular water source and not necessarily their sole water supply.)

   It is interesting to note that a total of 54% of commercial layers in Queensland have access to underground water. This compares with figures quoted as late as 1969 by various researchers that up to 80% of Queensland commercial layers had access to underground water supplies.

2. 30% of Queensland egg producers have had a water analysis done on their supply.

3. 3% of Queensland egg producers use a water purification technique. This mainly involves chlorination.

4. 18% of Queensland egg producers reported the growth of algae as a management problem. It is interesting to note that only 7% of Queensland poultry farmers actually treat the water for algae. This figure accounts for fewer than half the farmers who reported that algal growth was a problem, the remainder physically clean the algae out periodically.

5. Most farmers have made provision for an adequate short term emergency water supply. However, it was interesting to note that 14% of commercial farmers have an inadequate emergency reserve.

An adequate emergency reserve is considered as being enough water for at least 24 hours during a period of severe heat stress. Most of the farmers in this situation rely solely on town water supplies. Some farmers are now taking steps to ensure a reasonable emergency reserve since this water usage survey brought this point to their attention.

# New Book On Honey Plants

A botanist and a beekeeping adviser have combined to write Queensland's first-ever book on the honey plants of the whole State.

Their work, *The Honey Flora of Queensland,* has just been published by the Department of Primary Industries.

Dr. S. T. Blake, Senior Botanist, contributed the botanical content and Mr. C. Roff, Chief Adviser in Apiculture, information on the plants' value to the beekeeper.

*The Honey Flora of Queensland* gives a description of the plants important to Queensland beekeepers. It also sets out the colour of the honey of each and their value as sources of both honey and pollen.

The new book is divided into sections covering the honey-bearing plants of south-eastern Queensland, coastal central Queensland, north Queensland and the Paroo district. It contains 190 black and white pictures of honey plants and a flowering calendar for each of the four regions.

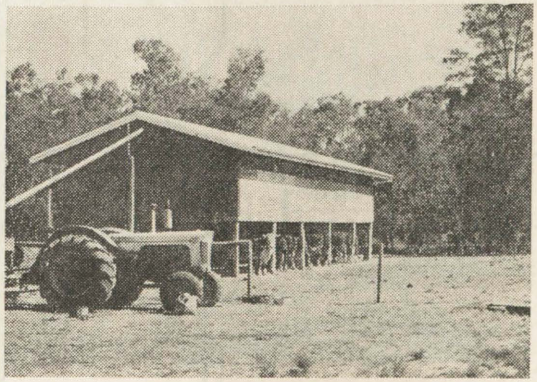
An introductory chapter gives information on the Australian official honey standards and some notes on the plants of greatest importance to beekeepers. The book also contains a comprehensive index.

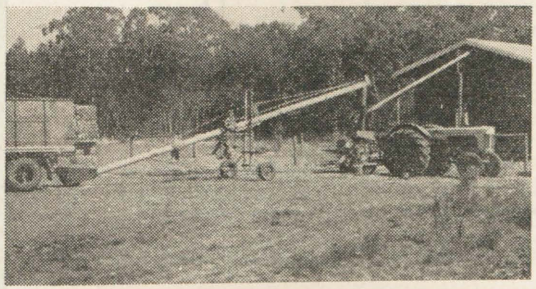
Although written as a handbook for beekeepers, *The Honey Flora of Queensland* will attract a wider readership. Its accurate descriptions of the plants make it useful to farmers, students, naturalists and, in fact, anyone with an interest in botany.

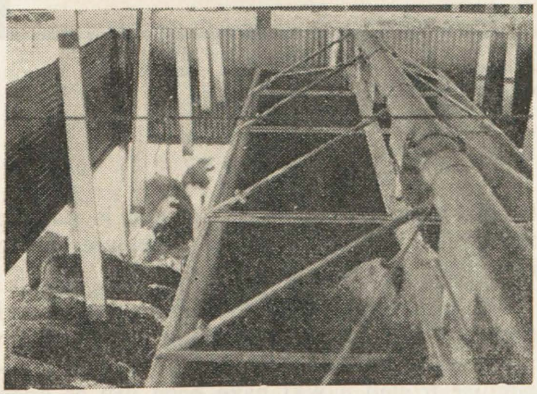
*The Honey Flora of Queensland* may be bought from the Department of Primary Industries, William Street, Brisbane, Q., 4000, or booksellers. The price from the Department is $2.60 or, if posted, $3.

# Self-feeder For Feedlotting

by R. H. GANNON, Beef Cattle Husbandry Branch.







UPPER. The self-feeder enclosed by a shed to protect the feed from the weather.

CENTRE. The set-up outside the shed for the movement and treatment of grain before it goes into the bin.

LOWER. The braced 7½ in. diameter auger with five outlets for distributing feed into the bin below.

INTEREST in lot feeding in the Dalby area has been high during the past few years. Limited crop fattening prospects because of poor winter rains and a favourable price relationship between store cattle and fat cattle have been the main reasons for the interest.

In many instances, because of the poor crops and high fat cattle prices, graziers have used lot feeding in such times on an insurance or opportunist basis. This has enabled them to turn off fat cattle which normally would have been sold at cheaper rates or retained on the property until the following summer.

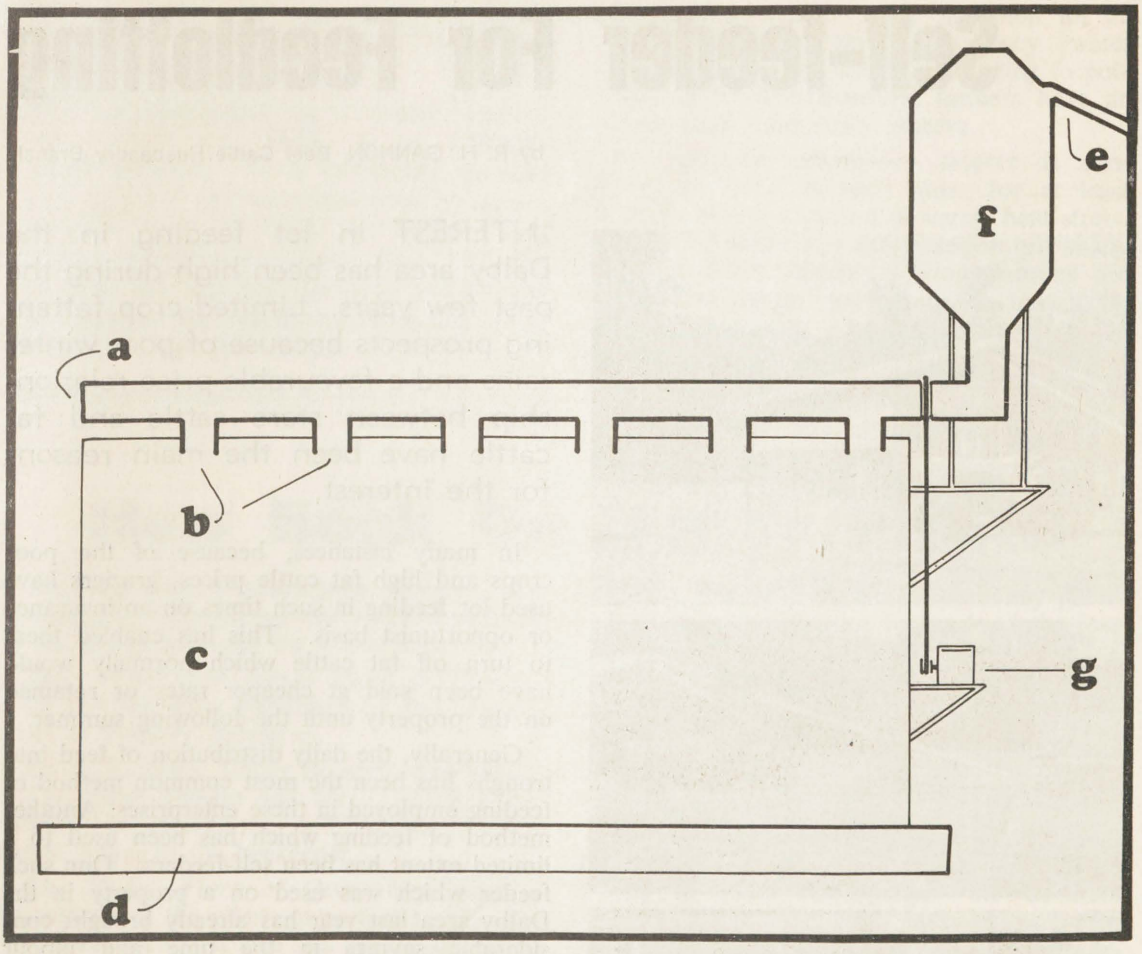
Generally, the daily distribution of feed into troughs has been the most common method of feeding employed in these enterprises. Another method of feeding which has been used to a limited extent has been self-feeders. One such feeder which was used on a property in the Dalby area last year has already brought considerable savings in the time and labour involved in lot feeding.

The self-feeder, of local design, was installed in July 1971 by Mr. T. Condon, whose property is situated south of Dalby, near Kupunn. Mr. Condon has already fattened one group of steers with the feeder and intends doing more in the future when the price relationship is favourable for lot feeding.

**Design of Self-feeder**

The feeder is simple in design consisting basically of a bin with the capacity to hold 20 to 30 tons of a hay-grain mixture. The capacity however will vary depending on the type of mix.

The dimensions of the bin are:—Length 40 ft., height 11 ft., width (top) 8 ft., width (bottom) 9 ft.



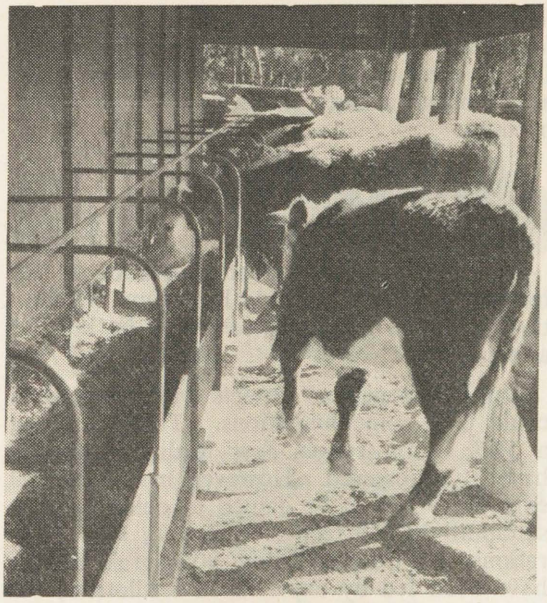

A diagram of the self-feeder layout. **a** the 7½ in. distributing auger. **b** outlets. **c** feed bin. **d** trough. **e** delivery pipe from hammer-mill. **f** cyclone. **g** motor to drive the distributing auger.

The slope in the walls allows the feed mix to drop away from the walls into the bottom of the feed bin. A 4 ft. high inverted V in the centre of the bin then allows the feed to gravitate into the troughs. An opening of 1 ft. from the bottom of the wall to the floor of the trough allows space for the gravitation of the feed.

The bin has on its perimeter a square trough 2 ft. by 1 ft. deep. The total length of the trough is 98 ft. The feed does not gravitate into the trough space on the ends. Feed is manually pushed into this part of the trough usually daily when anyone is passing the feeder or when the cattle are being inspected.

Tie bars to help strengthen the trough and prevent the cattle from walking in the trough are welded to the bin and trough. A semi-circular trough would have been just as good and cleaning of such a trough would have been easier.

A braced 7½ in. diameter auger (belt driven by a 9 h.p. motor at a workable height) runs along the top of the bin to distribute feed below. There are five outlets



Cattle at the feeder. Most cattle on the feeder were eating readily. There were, however, a few shy feeders which were removed.

from the auger placed strategically to allow feed to drop into the bin. These overhead outlets can be closed separately. An overhead distributing cyclone feeds the auger above the bin.

The cyclone receiving the hammer-milled feed is a necessity, as the flow of feed from the hammer-mill is much faster than the 7½ in. auger can handle. In the absence of the cyclone, continuous clogging would be a problem. The cyclone, by its swirling action, also helps to mix the grain and hay.

### Setting Up the Feeder

Setting up the feeder was not a complicated operation. The bin was prefabricated in Dalby in 20-ft. lengths. The 20-ft. lengths were moved to the location and placed on sleepers for support. The halves were then welded together and the feeder was levelled. The augers and cyclone, also prefabricated in Dalby, were fixed in position.

The shed was then built to enclose the feeder. There were no direct specifications for the shed except that the side walls should be out far enough and low enough to stop rain and, at the same time allow the cattle easy access to the trough. A yard fenced with three strands of barbed wire was constructed around the feeder. The original size of the yard was one quarter of an acre but this was enlarged slightly.

All feed being used in the self-feeder was carted from nearby storage sheds. However in the future, a storage shed will be built near the feeder to avoid double handling of feed. All hay and grain going into the bin were treated by a split screen hammer-mill.

### Using the Feeder

To date, the highest grain percentage used in the feeder has been approximately 70%. Initially, during the first few weeks, the grain was increased slowly and roughage reduced slowly as is done in any feedlotting programme. This meant that, during this period, only small quantities of feed were put into the bin. This allowed the change to be made in the mix each day.

After the introductory period, the bin was filled with a mix of 60% grain and 40% hay. At each fill of the bin thereafter, the grain was increased slightly and roughage reduced slightly.

Approximately 6 hours are required to cart the feed from nearby storage, hammer-mill the grain and hay and fill the bin. Additives such as urea and limestone are put through the hammer-mill. It was estimated that at a 60:40 to 70:30 grain-roughage mix, the bin held between 20 and 25 tons of feed. A full bin of feed lasted from 8 to 10 days. During this period, there were 200 head of steers 18 to 24 months old on the feeder.

Most of the 200 head on the feeder appeared to be eating quite readily and there was little evidence of bullying. A few, however, did tend to hang back but these few were regarded as being shy feeders.

### Some Problems

One of the major problems with the feeder is the even distribution of grain and hay into the trough. The problem is that, as the grain and hay drop from the outlets, there is some separation of the two feeds. The grain, being

heavier, drops into the centre of the bin while the hay, being much lighter, floats to the outside.

This means that, for a few days after each fill, the cattle are eating a much higher proportion of hay and at the end of a fill a much higher proportion of grain. There are possibly two ways this could be overcome. The first is to put spinners at the bottom of the outlets and the second is to spread the hay and grain manually as it drops into the bin.

Another problem is the introduction of cattle on to the feeder. There is no problem with the first group of cattle on to the feeder as the grain can be gradually increased. If subsequent cattle are added before the previous mob is moved out, digestive upsets could be expected. This problem could be overcome by having a separate trough set up where cattle can be introduced to grain slowly. Then, after this period, when the second group has been conditioned to grain, they can be moved on to the feeder.

## Cost of the Feeder

Some idea of the outlay for such a feeder can be gained from the following figures. These prices are based on the cost of the feeder in September 1971 at Dalby.

| | $ |
|---|---|
| Bin, Auger and Cyclone | 2,600 |
| Shed (labour and new materials) | 610 |
| Fencing | 150 |
| Cost of Feedlot | 3,360 |
| Hammer-mill | 905 |
| **Total** | $4,265 |

## Advantages of a Self-feeder

A self-feeder certainly saves time and labour when compared with the daily routine of trough feeding. This enables other work on the property to be completed without interruptions.

A self-feeder could be especially useful to producers who are considering lot feeding on an opportunity or insurance basis. This would enable them to feed the cattle and do other jobs on the property without employing additional labour. The outlay for such a feeder would be much the same as the outlay for trough feeding a similar number of cattle. In any case, where smaller numbers of cattle are involved, a much smaller self-feeder would be used.

## Future of Self-feeders

Self-feeders are a recent innovation in lot feeding and certainly could have some application when the labour output must be kept at a minimum.

Some management aspects with self-feeders could pose some limitations. To date, using a 70% grain ration, few feeding problems have been observed. However, more practical experience has to be gained to determine the suitability of self-feeders with very high grain rations. In trough feeding, 90% grain rations have been fed by experienced feedlotters, but there is more control over intake in daily feeding compared with self-feeders.

Weight gains in the two feeding methods should be comparable provided cattle on the feeders are eating readily and there is no evidence of bullying. The social aspects of cattle behaviour may be important when large numbers are allowed limited trough space. This would, however, be a matter of determining the most favourable number on such a feeder. There may be some application for two or three smaller self-feeders which would enable more control rather than one large self-feeder.

A number of feeders could avoid the upsetting effect which often accompanies the introduction of fresh cattle into a settled group.

Self-feeders, at present in limited use, have proved successful. Few problems have been encountered in the management of the feeder and the management of cattle on the feeders.

Future use and development of self-feeders will depend on the existing conditions for lot feeding. When conditions for lot feeding are favourable and time and labour must be kept to a minimum, there will be a place for self-feeders. Spasmodic lot feeding can create too heavy a demand on the available work force yet there may be no justification in employing extra labour. Such a situation is a good case for a self-feeder.

# How Weedkillers Aid Farmers

by J. M. T. MARLEY, Agronomist.

UNTIL about 20 years ago, the elimination of weeds in broadcast cereal crops in countries of high labour costs was economically impossible.

However, the appearance of 2,4-D, followed by a wide range of other herbicides, selective chemical removal of many weed species in these crops has become feasible. It has been stated that "one factory worker producing 2,4-D is equivalent to 100 hoe hands".

Today, very few people seriously challenge the value of using herbicides as part of the overall weed control programme in crops. It is recognized that chemicals are a valuable supplement to, and in some situations can be desirable replacement for, traditional methods of weed control.

The progress in the field of chemical weed control is leading to a reappraisal of aspects of crop management practices which were originally largely based on a need for mechanical control of weeds.

Studies are in progress investigating the desirability or otherwise of mechanical cultivation of fallows and crops. Comparisons of the effects of cultivation opposed to chemical weed control on soil erosion, soil micro-organisms, soil structure, soil aeration, moisture infiltration and retention, availability of nutrients, crop establishment, crop growth and crop yield are being made.

Many crops have traditionally been grown in rows to permit the passage of cultivating equipment to eliminate weeds. Agronomic trials have shown that, in many of these crops, significant increases in yield may be obtained by changing to a plant arrangement and population which does not lend itself to row cultivation. Moreover, in some row crops, disease may be spread through the crop as a result of the passage of cultivating equipment. In such situations, the use of herbicides could prove a valuable replacement for older, traditional methods of weed control.

### Time of Planting Studies

Time of planting studies are gaining further relevance. As the range and efficiency of selective herbicides increase, time of planting is dictated less and less by the need to reduce potential weed populations by eliminating a number of germinations before planting. Crop plantings can thus be more generally made at a time most likely to result in maximum yields.

One of the most obvious advantages of crop rotation has been that of its value in the control of weeds. Rotation suits farming based on manpower but does not necessarily suit farming based on the use of highly specialized expensive equipment such as is required in the production of most crops today. With the aid of herbicides, crop rotations are becoming simplified and less dependent on their requirements of weed control.

A novel approach in the use of herbicides is being developed in Western Australian sheep grazing lands. It is known as the "spray-graze technique". The success of the technique results from the increased palatability to stock of many weed species following

treatment with low rates of 2,4-D and the use of much greater than normal stocking rates for a short period.

Weedy pastures are sprayed with low non-lethal dosages of 2,4-D. This results in an increase in the palatability of the normally unpalatable weeds and, at a high stocking rate, the control of weeds is much greater than that obtained by either spraying or grazing alone. The stock are removed before desirable pasture species are damaged by overgrazing.

**Side-effects**

These and other new and potential fields of use for herbicides point to an increasing and expanding role for chemical weedkillers in future advances in crop husbandry. However, with the increase in herbicide usage, the possible negative side-effects resulting from their use are of major potential significance. These side-effects must be appreciated and appropriate precautions observed so that their occurrence can be minimized.

Some of the possible side-effects include:—

- Toxicity of the chemical to the person applying it as a result of careless handling or application.
- Damage to the crop being treated through errors in time, rate or technique of application.
- Damage to neighbouring or distant susceptible crops through application of unsuitable formulations (for example, the use of volatile ester formulations of some herbicides can be hazardous in certain areas at certain times), application under atmospheric conditions conducive to spray drift to non-target crops, application at operating pressures and through equipment conducive to the formation of small droplet size.
- Damage to following crops in the rotation through residues in the soil of persistent herbicides.
- The continuous use of herbicides identical or similar in action over long periods may lead to serious increase in the population of weed species which tolerate the treatment.

Fortunately, most of the undesirable side-effects may be avoided merely by carefully reading the label on the container of the particular herbicide to be used, and then observing those instructions and warnings in its application.

The information on the label has been carefully screened by government authorities to ensure that the claims made for efficacy and crop tolerance have been substantiated and that the necessary precautions to be observed in the use of the chemical are plainly indicated.

# Summer Cabbage Varieties

TWO promising new summer cabbage varieties, Olympic and Superette, are available to growers this year.

Both varieties have shown good resistance to cabbage yellows, and have produced excellent yields of high quality heads. They are rapid-maturing, ball-head, hybrid varieties.

Trials at the Department's Redlands Horticultural Research Station and in commercial plantings have shown that Olympic and, to a lesser extent, Superette can be grown with reasonable confidence in summer plantings in coastal south-eastern Queensland.

In commercial plantings, Olympic has been superior to Superette during the past few summers. During the prolonged, hot and wet summer of 1971-72 it showed a considerably lower incidence of tip burn, a disease caused by calcium deficiency.

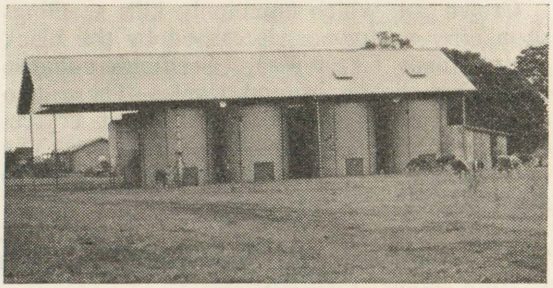
Occasionally, the heads of Olympic cabbages have not been as tight as desired but this occurs when the cabbages are harvested too early.

Until recently, growing high quality cabbages in summer in south-eastern Queensland has been difficult because of the lack of a tropical variety and disease.

*—D. G. SHEPHERD, Plant Breeder.*

# Peanut Growing-3

by J. H. SAINT-SMITH, Agronomist; G. J. P. McCARTHY, Plant Pathologist; J. E. RAWSON and S. LANGFORD, Agronomists; and R. C. COLBRAN, Plant Pathologist.



Bulk storage silos on a Queensland peanut farm.

## Nematodes

Root-knot and root-lesion nematodes are common pests of peanuts. Despite their prevalence, severe damage has, in the past, been found in fewer than 10% of the peanut plantings in Queensland.

The root-knot nematode *Meloidogyne hapla* Chitwood develops in roots, pegs and pods. The formation of small galls, each with one or more side roots, gives heavily infested plants densely matted root systems. This condition is readily recognized by examining plants in the field.

The root-lesion nematode *Pratylenchus brachyurus* (Godfrey) produces lesions on the roots, the underground portion of the stem, the pegs and the pods. Lesions, beginning as small, discoloured flecks where one or more nematodes have entered the plant, increase in size until eventually large portions of the stem and roots are destroyed. Injury to the pegs leads to many pods remaining in the ground at harvest. Root-lesion nematode injury can be diagnosed with certainty only by laboratory examination of diseased plants.

Nematodes reduce plant size, yield and rhizobial nodulation. The production of unsightly spots on the shells by both root-knot and root-lesion nematodes makes them unsuitable for the nut-in-shell trade.

Severe nematode injury in peanut plantings usually occurs on land where peanuts have been grown too frequently in the rotation. The first step in control is to increase the interval between peanut plantings. Root-knot and root-lesion nematodes have different host ranges and crops that reduce one pest may favour the other. For example, maize will reduce an infestation of root-knot nematodes but soybean will increase an infestation of both species.

In field trials, application of a granular formulation of 1, 2-dibromo-3-chloropropane (Fumazone, Nemagon) at seeding reduced nematode injury and increased yields. Because of the relatively high cost, use of nematocides should be considered only when peanuts are being planted on an area where previous peanut crops were severely damaged by nematodes.

Farmers interested in having the nematode status of their peanut crops assessed should dig 20 plants of below-average size in each block just before harvest. Discard the tops, wash the roots in water, and pack the damp roots in a plastic bag to which a label with the grower's name, locality and variety is attached. The container should be labelled 'Nematode Samples' and forwarded to the Director, Plant Pathology Branch, Department of Primary Industries, Meiers Road, Indooroopilly, Q. 4068.

## Peanut Diseases

*Pre-emergence rot and crown rot.* Pre-emergence rot causes decay of germinating seed before emergence. It is most commonly caused by a grey, furry fungus (*Rhizopus arrhizus*) or a black sooty fungus (*Aspergillus niger*).

Crown rot, which commonly kills seedlings soon after emergence, is caused by the black sooty fungus (*A. niger*). Seedlings collapse at or just below ground level. These two diseases can be extremely serious if correct control measures are not undertaken. The two causal fungi live in soil and are also seed-borne.

Two most important measures for controlling these diseases and producing good healthy stands of peanuts are:—

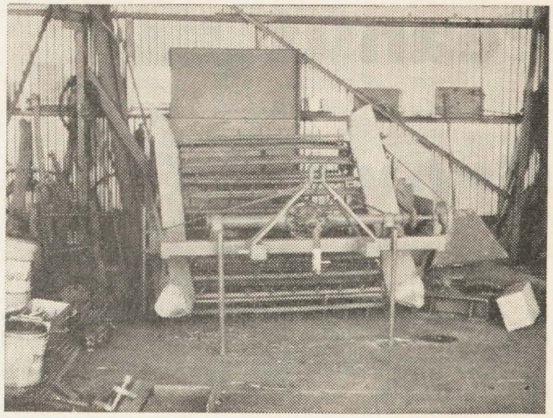
- Selection of high quality, undamaged, seed which has a high percentage of prompt germinations.
- Obligatory treatment of all seed with the recommended fungicidal seed dressing. A mixture of captan and quintozene is very effective, is recommended, and has been adopted by the peanut industry. The rate of application is 1 oz. to 20 lb. for the Virginia Bunch variety and 1 oz. to 40 lb. for the less susceptible Red Spanish variety.

Other measures advocated to reduce the incidence of pre-emergence and crown rot include avoiding:—

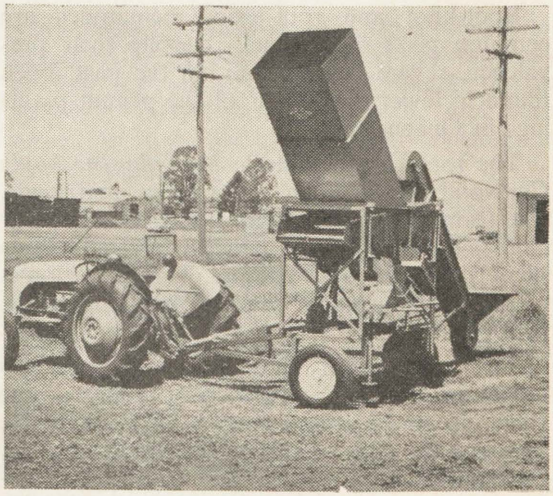
- Frequent crops of peanuts on soils with a history of the disease.
- Seed damage caused, for example, by exposure of seed to sunlight or by bad planter box design.
- Planting any deeper than necessary.
- Mechanical damage to peanut plants.

These control measures also apply for other fungi which occasionally attack planted seed and seedlings. The colours associated with the various rots are green or blue (*Penicillium* spp.), yellow (*Aspergillus* spp.), red (*Fusarium* sp.), brown (*Rhizoctonia solani*), and white (*Sclerotium rolfsii*). Most of these fungi are seed-borne and all live in the soil.

*Sclerotium rot and Rhizoctonia rot.* Although both of the fungi (*Sclerotium rolfsii* and *Rhizoctonia solani*), which cause these diseases, may attack seedlings as well as mature plants, the loss to mature plants is usually more important. Control measures for both diseases are similar. Verticillium wilt, leaf spot, and crown rot increase both diseases.



A fluffer used to remove soil from and loosen the rows of freshly cut and pulled peanuts.



A portable farm cleaner.

Sclerotium rot produces strands of white fungal threads on the nuts and pegs, and around the crowns of the plants. The threads often produce small, roundish, white to brown sclerotes which resemble radish seed. Often the fungus grows in radiating fans on the soil surface and on leaves and trash around the crowns of the plants.

Single stems or entire plants are killed. Diseased pods decay and turn black. Virginia Bunch variety is less susceptible than Red Spanish.

Rhizoctonia rot causes an area of brown, dry decay where the branches have touched the soil. Peanut pegs are attacked and decayed; pods are dusty brown on the outside while a light brown weft of the fungus develops within the shell.

Some growers profitably practise peanut monoculture. However, this system of agriculture causes general deterioration of the soil. Associated with this, the two fungi discussed above usually increase rapidly in the soil if they are present. The diseases they cause can become serious. A crop rotation which ensures that peanuts are not grown in the field for at least two consecutive seasons is a control measure.

Deep ploughing of crop residues is not recommended as a general practice at the present time. It would seem desirable that, in peanut areas where the disease has been severe, growers should adopt measures which ensure a quicker breakdown of organic residues in the surface layers of the soil. Early and thorough seedbed preparation is helpful while many growers have found green-manuring with a winter cereal before peanuts also beneficial.

No matter how the land is prepared for planting, these diseases are seriously increased if soil is thrown over the crowns of the peanut plants as a weed control measure. Burial of large weeds, fallen leaves, and parts of bushes further favours the fungi. Growers should not plant peanuts in fields where serious weed problems cannot be effectively controlled with weedicides.

When cultivation is necessary, implements should be carefully selected and prepared and can generally be used successfully without damaging the plants or throwing soil into their crowns.

Chemical control of these diseases overseas has been economically successful only in some specialized and restricted areas. It achieves a measure of control in Queensland, but is too costly.

Relationships between fertilizer practice and the incidence of these diseases have not been authenticated locally. However, some diseases, such as Diplodia blight, are known to be more severe where the nutritional level is low. A well-balanced fertilizer programme should help in keeping such diseases at a minimum level.

The diseases increase rapidly if the crops become over-mature or are otherwise left in the ground until the plants are nearly dead. Regular inspections of the crop will be necessary to select the harvest time which gives a maximum yield of good quality.

*Verticillium wilt.* This disease first appears as irregular patches of light green or almost white colour in the leaves, particularly on the edges. These patches often scorch and affected plants may wilt. Streaks of deep, reddish-brown discoloration occur in the water-conducting tissues of the tap root and stems.

The symptoms of the disease are more striking on Red Spanish than on the Virginia Bunch variety. Diseased plants may have a reduced yield, mature prematurely, and are prone to other diseases such as Sclerotium rot.

A long period (greater than 4 years) to crops such as maize, sorghum, winter cereals, navy beans, soybeans and grasses is considered more desirable than growing susceptible crops such as peanut, sunflower, and cotton. Weed hosts include stinking Roger, cobbler's pegs, Noogoora burr, anoda weed (*Anoda cristata*), and red shank. There is local evidence that the incidence of the disease increases under continuous peanut culture or when trash from infected crops or weeds is returned to the soil.

The disease is caused by a fungus (*Verticillium dahliae*) and is a problem on the more fertile soils. Good farm management will minimize the stress on infected plants. Because of uneven maturity, growers need to select carefully the correct time to harvest.

*Diplodia blight.* This disease is characterized by black stems on which small, raised, black dots appear. These are the fruiting bodies of the causal fungus. Diseased tissue may shred and turn grey. Infected plants are usually killed. Though the disease occurs in restricted areas, it can cause serious reduction in plant stands.

It attacks on soils which have been overworked (particularly with crops of peanuts), are eroded, low in organic matter, in poor physical condition, and have experienced a drop in fertility. Plants damaged during cultivation or by other diseases are often colonized and killed by the fungus.

The presence of this disease indicates that changed agronomic practices are necessary. No further cropping to peanuts should be attempted for a long time and every effort made to build up the general fertility of the soil. This would be best achieved by establishing a suitable pasture for a long period.

*Sclerotinia rot.* Two organisms (*Sclerotinia sclerotiorum* and *Botrytis* sp.) cause similar symptoms. Both attack the plants near the ground and cause a light grey, fungal rot which shreds the stem. Black, hard, irregular sclerotes are produced on the surface of the plant and inside the stems and pods. The *Botrytis* species also produces a tip blight of the plants which develop minute cushions of grey mould in wet weather.

Although these diseases are not widespread, losses of up to half of the stand have been recorded. Growers should avoid planting peanuts in paddocks where the diseases have been serious. Wet situations, patches of unusually heavy soil, and cold weather favour the diseases.

*Leaf spots.* Two fungi are responsible for serious leaf spots—*Cercospora arachidicola* (early leaf spot) and *C. personata* (late leaf spot). Both cause dead areas on the leaves and leaf fall which can reduce the yield and can encourage other diseases such as Sclerotium rot to attack the plants. The diseases are encouraged by wet conditions and therefore are more important in north Queensland.

Good cultural practices reduce the seriousness of the diseases. Crop rotation and control of peanut volunteers reduce the number of early infections and delay the build-up of the diseases. The Red Spanish variety is more susceptible than Virginia Bunch.

Where losses are consistently severe, growers should apply fungicides as a routine measure. This practice is accepted by growers in north Queensland and is being adopted by some Burnett growers.

Benomyl applied each fortnight at 4 oz. of product in 20 to 30 gal. of spray per acre gives excellent results. Various other fungicides, application rates, and spraying intervals can be used. Spraying can be delayed in the Burnett district in dry weather. Regular spray applications should be made in north Queensland regardless of the current weather conditions.

In the Burnett district, early leaf spot begins about November. It normally increases erratically and more slowly than late leaf spot. In some recent years, exceptionally wet weather after planting has caused a serious seasonal incidence of this disease. Control with fungicides has been warranted in January and even in December on most farms.

Late leaf spot usually appears in February in the Burnett district and can increase rapidly. It is usually the predominant leaf spot at harvest time.

Spraying to control leaf spot in the Burnett

- must commence before leaf spot is severe;
- will normally be directed against late leaf spot and start about February;
- need not be performed within 4 or 5 weeks of the time of harvest;
- will give excellent control which will not always be economically sound;
- has best chance of being economical if the crop has a good yield potential;
- will usually ensure safer delayed harvests;
- is needed most on farms in some elevated areas;
- is more often necessary for the more susceptible Red Spanish variety;
- will increase peanut hay yields.

On the Atherton Tableland, early leaf spot has been observed in crops 3 weeks after planting. Late leaf spot generally enters 5 to 8 weeks after planting. Late leaf spot causes most of the damage.

Spraying to control leaf spot on the Atherton Tableland

- should commence 6 weeks after planting;
- should continue at fortnightly intervals for a total of four applications.

*Spotted wilt.* Formerly known as chlorosis, this disease is caused by the tomato spotted wilt virus and is spread by thrips. Leaf symptoms range from light mottling to severe mottling and ring patterns. Severe distortion of leaves and stunting of plants is common. On an average, the yield from affected plants is reduced by about 90% and the kernels are invariably mis-shapen and discoloured and have little economic value.

Commonly from 1 to 2% of a crop is diseased but occasionally restricted areas with from 10 to 40% infection have been observed. Field incidence is related to the presence of hosts such as stinking Roger and cobbler's pegs which act as sources of infection for this virus.

The incidence of this disease is reduced by controlling alternative weed hosts within the crop and on contour banks, waterways and headlands.

*Bunchy plant.* The tomato big bud organism causes bunchy plant disease. The organism is spread by a leaf hopper and affects a wide range of hosts. Affected peanut plants have sterile pegs which curve upwards. Abnormal development of the flowers often occurs and the flowers are replaced by green shoots and miniature leaflets. There is an abnormal development of small, light green, spindly leaflets from the base of other leaves. The plants take on a light green, bunchy leaf appearance. The disease is widespread but occurs in only a low percentage of plants.

*Peanut mottle.* The peanut mottle virus causes a range of symptoms which are usually difficult to detect. The most characteristic symptom appears on the leaves which are about second and third from the terminal leaf of a branch. Well-defined, dark green areas occur in a light green leaflet.

The virus is widespread, seed-borne, readily spread by aphids, and can affect a fairly wide range of legumes. Control measures are not practical.

*Rugose leaf curl.* This virus occurs widely in clovers but is rare in peanuts. It is characterized by a puckering of the leaves on the terminal shoots which become somewhat distorted in shape, harsh to the touch, and erect in habit. Affected leaves show a marked yellowing particularly around the edges.

This problem is of no economic importance at the present time.

## Insect Pests

Information on insect pests is given in an article which may be obtained from the Department of Primary Industries offices in peanut-growing areas.

## Marketing

The Queensland peanut crop is sold to processors mainly as edible kernel or as oil grade. A small quantity of selected Virginia is sold as nut in shell.

The Peanut Marketing Board has facilities for handling the peanut crop through its plants and depots at Kingaroy, Atherton, Gayndah and Murgon. A number of small privately-owned dehulling plants clean shell and grade peanuts for the interstate trade.

## Peanut Machinery

The successful commercial growing of peanuts depends on the use of specialized equipment. Much of that used in Queensland has been designed locally.

LAND PREPARATION EQUIPMENT. Land preparation equipment is the same as that used for other crops but trials are in progress to determine which implements will be most useful when proper attention is paid to the interactions of soil, diseases and crop yields.

FERTILIZING AND PLANTING EQUIPMENT. Because peanuts are grown as a row crop in rotation with other row crops, equipment useful for planting peanuts is usually suitable for planting other row crops such as maize, sorghum, soybeans and navy beans.

Planting machinery has received much attention because peanut seeds are large and are very easily damaged. Special thick plates are used in standard planter boxes but frequently damage to seed still occurs during planting.

Boxes which are designed to plant evenly without damage to seed have plates inclined at an angle from the vertical position. These plates rely on gravity to collect, hold and then drop the seed.

Fertilizer boxes of the standard commercial types are satisfactory for commercial use but must be standardized for each fertilizer mixture used. In addition, it is necessary to check them from time to time to remove any accumulation of fertilizer on the stars or the worms.

The standard disc openers or heavy spring tine openers are satisfactory provided they are regularly checked for blockages. This can be done with a minimum of time by operating the equipment out of the ground at the ends of rows to see whether seed and fertilizer are dropping.

It is usual to have cultivator tines mounted on planters to cultivate and plant in one operation but pre-planting cultivation is often necessary to obtain satisfactory weed control.

CULTIVATING EQUIPMENT. Apart from herbicide application equipment, many types of equipment for cultivating are available. Tine cultivators, scufflers, light harrows, rotary weeders and ticklers are used during the early crop growth. Their use is discussed in the section dealing with weed control.

HARVESTING EQUIPMENT. Cutters and pullers are usually used as a unit. Cutters are mid-mounted with extended angled blades and are either stump jump or have shear bolts to prevent damage when rocks or roots are encountered. In using cutters, the best results are obtained when soil moisture is such that soil will not stick to the pods or to the blades of the cutters and not so dry that it is hard and cloddy.

Locally made p.t.o.-driven pullers are of two distinct types. One type has two endless chains which grasp peanut tops and lift plants out of the soil. The second type has car-type wheels fitted with pneumatic tyres. By having a number of wheels in contact, plants are removed from the soil and laid in rows.

Both chain and pneumatic-tyred pullers work well when soils are not excessively wet. Occasionally a crop will be ready to cut and pull when soils are extremely wet. An on the spot decision is then required to gauge whether more of the crop will be lost through inefficient pulling when the soil is wet or whether more will be lost by waiting until the soil is partly dry when some pods will be lost through rotting of pegs or germination of peanuts in the soil. In the presence of severe leaf spot, crops mature quickly. It is easy to leave kernels in the ground if not harvested as soon as they mature.

THRESHERS. Pick-up threshers, which are either self-powered or p.t.o.-driven, are manufactured by engineering shops in the Kingaroy district. These machines work well and deliver pods and some impurities either to bags or to bulk bins. Peanut threshers are specialized implements and not all growers have sufficient area to warrant owning one. One difficulty is that growers without their own threshers cannot always obtain a contractor to thresh their crop at the proper time.

FARM CLEANERS. Peanuts with a minimum of soil, stones, sticks and wire command a higher price than those delivered to the Peanut Board with foreign matter present in quantity.

Various methods for removing extraneous material from peanuts have been used. These include screens fitted round the pick up, drum and trays of peanut threshers. The use of roller screens as separate cleaning devices, just before the bulk bin, appears desirable.

Separate farm cleaners using air currents and screens are built by various South Burnett firms.

Before buying or building a farm cleaner, growers should discuss the design with Peanut Marketing Board staff or local engineering firms.

**Bulk Handling**

Bulk handling equipment for peanuts is similar to that used for grain with the important differences that elevators and gravity must be used for handling peanuts. Augers are quite unsuitable for the job.

An essential part of any bulk handling set-up is provision for artificially drying the crop. This is because nuts coming from the thresher may not have less than 12% moisture.

Some growers put threshed moist nuts into bags from bulk trucks. These bags are then held in a shed until the moisture level is low enough.

The Peanut Marketing Board has equipment for tipping bulk trucks of peanuts at its Kingaroy plant.

# Navy Beans-2

by E. C. GALLAGHER, Agriculture Branch.

## Planting

TIME AND RATE OF SOWING. Suitable planting dates for this crop extend from the first frost-free months of the district concerned until mid February on the coast and in the South Burnett.

Mid December to the end of January is recommended for the South Burnett, and this will vary in other districts. Crops mature in April and May when harvesting weather is usually favourable. Moreover, January sowing should conveniently fit in with other farm operations. Planting of peanuts, maize and sorghum is usually completed before navy beans are sown.

Spring and early summer plantings are definitely not recommended as they rarely succeed and they also build up insect pests and disease for any subsequent plantings. The Navy Bean Board discourages the issue of seed for planting before mid December each year. The early build-up of rust in recent years has been blamed on these early plantings. A planting period from mid December until mid January is recommended.

The recommended sowing rate is 27 to 30 lb. an acre for the Kerman and Gallaroy varieties and 15 to 18 lb. an acre for Californian Small White. This gives a seed spacing of 2 in. and 4 in. respectively in 36-in. rows. The row spacing of 36 in. has been adopted as this is the row spacing most commonly used in other district crops such as maize and peanuts.

Where the land is weed free and suitable for direct heading, closer row spacings of 14 to 21 in. can be used. The planting rate remains the same.

In the southern Darling Downs area under weed-free conditions, navy beans are grown in double rows 7 in. apart with the pairs 35 in. apart. There are variations of this method of planting which is done with a combine drill. The inter-row spaces are cultivated, but there is little control of weeds between the paired rows. It is claimed that the double row planting helps to support the plants under windy conditions.

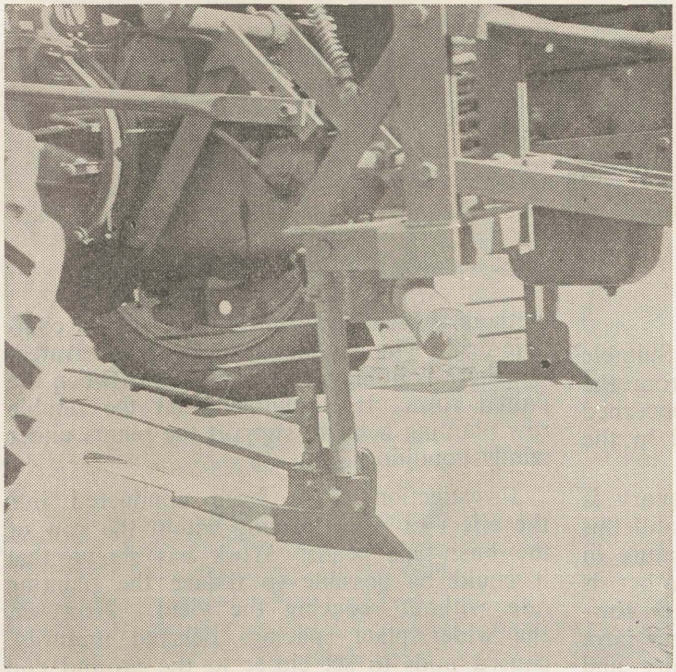
Investigations have been conducted into the effect of plant spacing within the row of the bush-type beans. Work has shown that it could be possible to reduce the planting rate without reducing the yield. However, the wider plant spacings delayed maturity, caused pods to set closer to the ground and increased susceptibility to wind damage.

The main objective of the heavier planting rate therefore is to obtain an even stand with the plants close enough to provide support for each other, to provide an adequate plant population in soils where seedlings losses occur, and to increase the height above the ground of the pod set.

DEPTH OF PLANTING. Seed should not be planted any deeper than necessary to ensure germination: 1½ to 2 in. is the most favourable planting depth.

After planting and before the crop has emerged, it is essential that no equipment be used on the ground. Harrowing at planting is usually all that is necessary to ensure germination and levelling of the ground. If, for any reason, implements must be used after planting, running over the rows must be avoided as the plants will not emerge if the soil has been heavily compacted.

SEED TREATMENT. Seed treatment is an effective method for early bean fly control and for the control of some pre-emergence seed rots. Where small areas are grown and where other legume hosts for the bean fly such as cowpeas, dolichos and *Phaseolus* species



*A two-row, mid-mounted bean cutter with a two-way hydraulic ram fitted to a three-wheel tractor.*

(including French beans and sirato) are being grown, some treatment for bean fly control is essential.

Two methods are commonly used. One is to use a spray programme with DDT 0·1% (1 gal. 25% miscible oil to 2½ acres) or dimethoate 0·03% (Roger 40, 1 gal. to 10 acres) at 3, 7 and 14 days after germination. The other is the endrin seed treatment.

The addition of a fungicidal seed dressing to the endrin-treated or untreated seed is recommended to control some pre-emergence seed rots.

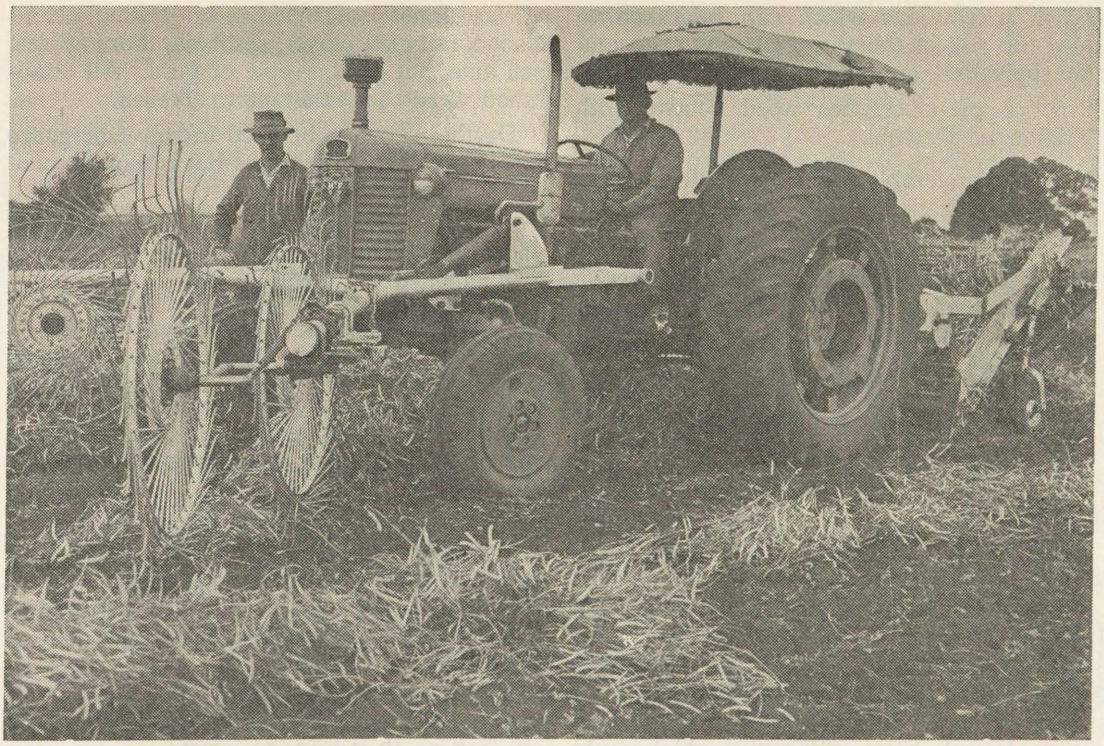
The use of endrin has declined in recent years because of the dangers in handling this concentrated insecticide. However, the possibility of complete crop losses with bean fly damage is very real. If initial protection of the crop is not given with endrin seed treatment, regular scouting of the crop is necessary and DDT or dimethoate control measures applied immediately if the bean fly appears in sufficient numbers.

Some hints on the use of endrin seed treatment are warranted. The rate to use is ½ pint (10 fl. oz.) of a 20% concentrate or ⅓ pint of a 30% concentrate with ½ pint of water to 60 lb. of seed. The seed is placed in a cement mixer and the liquid added. As soon as the seed is wet, remove it before any damage occurs and dry it quickly in shallow layers away from direct sunlight.

Although germination is not reduced for at least 1 month after treatment, the seed should be planted as soon as possible, and certainly within 48 hours, to obtain the full benefit of the endrin in bean fly control. Re-treatment of the seed with endrin could harm the germination and is not recommended.

Extreme caution must be taken when using endrin and the manufacturer's safety precautions should be followed carefully.

When the seed has dried, return it to the mixer and add 2 to 3 oz. of captan 80 per



*A Queensland-made machine used for raking, shaking out the soil, and windrowing navy beans previously cut.*

60 lb. of seed. This fungicide is used to control some seedling rots. The seed is then ready for planting. Do not handle the seed at any stage after treatment with endrin.

There is a definite disadvantage in using the endrin treatment in that many bacterial diseases are inadvertently spread throughout the whole of the seed and subsequent crop in the mixing process.

Chloranil must not be used in place of captan when using endrin, as germination is reduced. If inoculum is used endrin should not be used and chloranil is used in preference to captan. In practice, however, inoculation has not been used to any extent because of the very short term nature of the crop and the seed treatment techniques used.

Seed supplied by the Navy Bean Marketing Board is treated with a quintozene captan mixture as a slurry at 5 oz. per 100 lb. of seed.

**Irrigation**

The potential for navy beans under irrigation has not been realized. Yields of 60 bus. per acre appear possible, but little information is at present available for this crop grown under irrigation.

The possibility of growing this crop in the spring is being considered in the Lockyer Valley. Spring crops are, however, risky and are not entertained in the main growing area of the South Burnett. The usual problems are weeds, slow initial growth in the cold soils, hot dry weather in November and harvesting problems in heavy soils because of heavy weed growth and/or wet soil conditions.

The possibility of seed germinating in the pod during the hot humid summer months is also a distinct possibility. The failure of the crop to mature properly is another problem which may occur in the spring-planted crop and which does not usually occur with the summer-planted crop.

Extra precautions which can be taken to reduce the risk in the spring-planted crop and under irrigation are:—

- Practice pre-emergence weed control with Treflan or Dacthal.
- Irrigate, preferably lightly and frequently. Furrow irrigation will reduce the risk of disease.
- Harvest immediately the seed reaches a moisture content of 14%, or harvest earlier and dry artificially.
- Avoid poorly drained land.
- Be prepared to use a desiccant if the crop fails to mature.

**Crop Cultivation**

As most of the crop is sown late in the summer growing season, weeds are not usually a major problem. After complete destruction of weeds during seedbed preparation and at planting, one or two inter-row cultivations are usually sufficient for weed control.

Absence of weeds is necessary to secure the best yields and obviate difficulties which could otherwise be encountered when harvesting the crop.

Rotary harrows or weeders may be of assistance in soils where surface crusting forms after rain and prevents the emergence of seedlings. Unless the rows can be located, crossing the direction of the rows is advisable. Rotary harrows can also be used on the seedling crops after emergence where weed growth is heavy, but some crop damage can be expected.

**Chemical Weed Control**

Treflan can be used as a pre-emergence weed control on specific weeds. Some of the weeds controlled by this chemical at 1 to 2 pints an acre (the rate depends on the soil type) are: barnyard grass (*Echinochloa crus-galli*), summer grass (*Digitaria* spp.), pigeon grass (*Setaria* spp.), crowsfoot grass (*Eleusine indica*), Mossman burr (*Cenchrus echinatus*), chickweed (*Stellaria media*), fat hen (*Chenopodium* spp.), wire weed (*Polygonum* spp.), stinging nettle (*Urtica* spp.), red shank (*Amaranthus* spp.), pigweed (*Portulaca oleracea*).

Weeds not controlled are: Bathurst and Noogoora burrs, clover, sesbania, thorn apples, bell vine, nut grass, Apple of Peru. All established weeds are resistant to Treflan.

Dacthal can also be used for pre-emergence weed control in navy beans but is more expensive than Treflan.

Hormone weed killers must not be used under any circumstances. Be wary of using contaminated spray equipment.

**Harvesting**

Two methods of harvesting are commonly employed: direct heading, and cutting, windrowing and threshing with a machine fitted with a pick-up front or other modification.

In the main growing area, the method originally employed with the Californian Small White variety is still used. This method is to cut the bushes, windrow with a side-delivery rake and thresh with a conventional thresher fitted with a pick-up attachment, or with a modified peanut thresher.

The only difference in current practice is that the Californian Small White variety is cut about 7 to 10 days before full maturity when most of the pods are yellow and at least 30% are becoming brittle. The Kerman variety and other new varieties are cut when fully mature and ready to thresh.

Cutting and windrowing should be carried out in the early morning while the plants are still wet with dew. They are threshed later in the day.

Practices vary a good deal in handling the crop before threshing. A common method is to cut (two rows), windrow (four rows or more depending on the volume of material) and shake (removing soil). The windrows can be taken into a threshing machine by means of a pick-up attachment or by a receding finger reel with the knife blade removed and knife fingers covered with galvanized iron.

Two methods are commonly employed for cutting. One method is with fixed blades and the other with rotating discs. The cutters used are interchangeable with the peanut cutter blades, but whereas the peanut cutter blades are set at 45 deg. to the direction of the row, the bean-cutter blades are longer and set at 30 deg.

The cutters are usually mid-mounted on the tractor and are 3 ft. 6 in. long tapered at the leading edge. The cutting edges of the blades are blunt and smooth, thus "gliding" the bushes rather than cutting them. Two rows are cut in the one operation by the blades, which are in pairs, with the cutting edges facing each other. Guide bars parallel with the blades are also attached to this equipment. Thus, in the cutting operation, two rows are left together in one row.

Finger-wheel rakes or side-delivery rakes are used to rake two sets or more of two rows into one windrow. A machine called a shaker, and similar to the potato digger-elevator, is now commonly used to aerate and remove excess soil from the windrowed beans.

A machine developed locally has taken one complete operation out of this method. This operation follows the cutting. It consists of a pair of finger-wheel rake sections fitted on a hydraulic arm on the front of the tractor. The two pairs of two rows of beans previously cut are placed between the tractor wheels by the finger-wheel rake. A shaker mounted on the rear of the tractor lifts the bushes, shakes the soil out, levels the ground and leaves the windrowed beans in an ideal position for pick-up threshing.

One modification to the finger-wheels is the relocation of the tines of the finger-wheel by bending them around a full 180 deg. The hydraulic rams lift the rake high enough to avoid fences when turning at the end of the fields.

**Rotary Cutters**

The latest addition to the bean harvesting machinery is the rotary cutters. These are proving very popular and should take over as the main cutting method.

Basically the discs are mid-mounted on the existing cultivating or peanut cutter frame on the tractor. The discs are 21-in. coulters mounted flat and dead centre of the row, and arranged to cut approximately 1 in. below the surface. The depth of the discs is controlled by a depth wheel best located immediately behind the coulter. The depth wheel should be as wide as possible.

The disc rotates at 1·5 times the ground speed and is tilted slightly downward at the leading edge. The drive can be obtained from the power take off or brake drum of the tractor and transferred via chains through a differential to the vertical drive of the disc.

Many growers have manufactured their own units from second-hand materials found on the farm at a very reasonable cost. Two and four-row units are available. Strong materials should be used especially for frames, chains and directional drives. The bean bushes flow inward in the direction the discs are made to rotate.

The unit is more efficient in wet soils and weedy situations than bars. In combinations with a side-delivery rake mounted on the rear of the tractor, the whole operation can be carried out in one sweep with both two and four-row units. The removal of excess soil can be achieved by using the shaker or "fluffer".

Peanut threshers have been successfully modified for threshing navy beans. These machines are made for handling extraneous matter such as sticks and stones which damage conventional headers. The amount of modification varies with the make and model of the machine but it is relatively inexpensive, costing from $60 to $180.

The complete changes necessary are:—1. Cover the bottom of the threshing drum with galvanized iron. 2. Extra bar of fingers in the threshing machanism. 3. Smaller screen in bottom shaker. 4. Replace tailing apparatus with screens. 5. Fitting guides on conveyor belt. 6. Smaller mesh in bulk bins where applicable. 7. Smaller mesh on elevator where a screen is supplied for removing soil.

It is emphasized that the conversion is different for each make and model of machine and the manufacturers should be consulted.

The new varieties released have been successfully direct-headed on many occasions but they are not ideal for handling in this way. The bushes are rather slender stemmed and the larger the bush, the more the tendency for the branches to bend over and droop to the ground.

Losses with direct heading can be considerable, especially when working in steep or contoured ground. Narrow fronts taking up to three rows at a time appear more successful than the very wide fronts.

Considerable interest was expressed in the direct heading of beans and peas in Canada and U.S.A. by a floating cutter bar fitted to a conventional header. Although the machine could probably be adapted to flat cultivation areas such as the Darling Downs it did not prove at all suitable for the red soil and contoured areas of the Burnett.

### Wet Weather Deterioration

Deterioration of the crop in wet weather is still a problem. However, with the bush-type beans, the pods are held clear of the ground and less deterioration can be expected. The risk of total crop loss is much lower than in the old California Small White variety. Harvesting should be carried out as soon as possible after the moisture content of the beans reaches 14% or sooner if they can be artificially dried.

Most crop losses occur when harvesting is delayed. For this reason, it is wise to plan the overall farm programme to allow for a staggered harvest of the crops grown.

The navy bean seed is very easily cracked. Some modification to combine harvesters is therefore necessary. The speed of the drum should be reduced and variations of the concave may be necessary, such as fitting rubber bars instead of the normal rasp bars or, alternatively, placing plain galvanized iron over portion of the concave. Mesh panels in the header fronts and elevators will assist in removing excess soil.

Staining of the beans by soil or green matter must be avoided. Excessive weed growth at harvest is a nuisance with the cutting machinery and also stains the beans. If excessive green material is present at harvest time, a desiccant may have to be used. Diquat has proved successful in some situations and harvesting should be possible within a week of its application. Excessive weed growth at harvest time is usually a problem with spring-planted crops.

### Yields

Average yields for Queensland are 12 to 15 bus. per acre uncleaned. These are necessarily low as some experience is generally necessary before production becomes efficient. Yields of 36 to 42 bus. have been obtained by experienced growers with the Kerman variety in a favourable season.

### Marketing

The Navy Bean Marketing Board, constituted in 1946, is the handling authority for navy beans in Queensland. The Board and its agents, The Bean Growers' Co-operative Association, are located in Kingaroy. The agents operate drying storage and cleaning facilities.

### Return to Grower

The net return to growers for the 1971–72 crop will be 11c per lb. clean beans. Impurities vary from 5 to 50%, averaging 10·45% in the 1966–67 season and 18·8% in the 1967–68 season.

### Bean Quality

The quality of the improved navy bean varieties has reached world standard and no difficulty is being experienced in selling the product. The general requirements of the processors is a clean, white, sound bean, uniform in size, and free from impurities and off flavours.

### Pests

The main pests of navy beans are the bean fly, pod sucking bugs, pod borers and pod feeding caterpillars.

An article on the control of navy bean pests appeared in the October 1969 issue of the *Queensland Agricultural Journal.*

### Control Measures

CORN EAR WORM (HELIOTHUS) AND POD BORER. DDT 1 lb. to ½ lb. a.i. per acre (1 gal. of 25% miscible oil to 2½ to 5 acres) or trichlorophon sprays (Dipterex, 10 oz. wettable powder per acre, or Klorfon 60 13½ fl. oz. per acre).

JASSIDS, THRIPS AND BEAN FLY. DDT 1 lb. a.i. per acre (1 gal. 25% miscible oil to 2½ acres) or dimethoate (Rogor 40 1 gal. to 10 acres).

GREEN VEGETABLE BUG. DDT 1 lb. a.i. per acre. Methomil (Lannate), 4 oz. a.i. per acre (4½ oz. of 90% formulation). Endosulphan (Thiodan), 10 oz. a.i. per acre (1½ pints of 35% concentrate).

Brigalow, wilga and bauhinia on dark sedentary clay soils.

# Soils Of The Brigalow Research Station

by A. A. WEBB, Soil Technologist.

THE Brigalow Research Station is situated 32 miles north-west of Theodore in central Queensland (latitude 24 deg. 45 min. S, longitude 149 deg. 50 min. E). The average annual rainfall is 25 in.

The station, situated in Area I of the Fitzroy Brigalow Land Development Scheme, was chosen because it provided variations in soil types and vegetation representative of "brigalow" properties being developed in Area II and Area III, as well as other parts of the Fitzroy River Basin.

The objectives of the Brigalow Research Station are:—

1. To study the problems of development and utilization of brigalow lands in the Fitzroy River Basin.
2. To classify land on the property in terms of vegetation, soil types and topography and to relate this to potential productivity.
3. To study and devise systems of land development and land use appropriate to the different land classes.

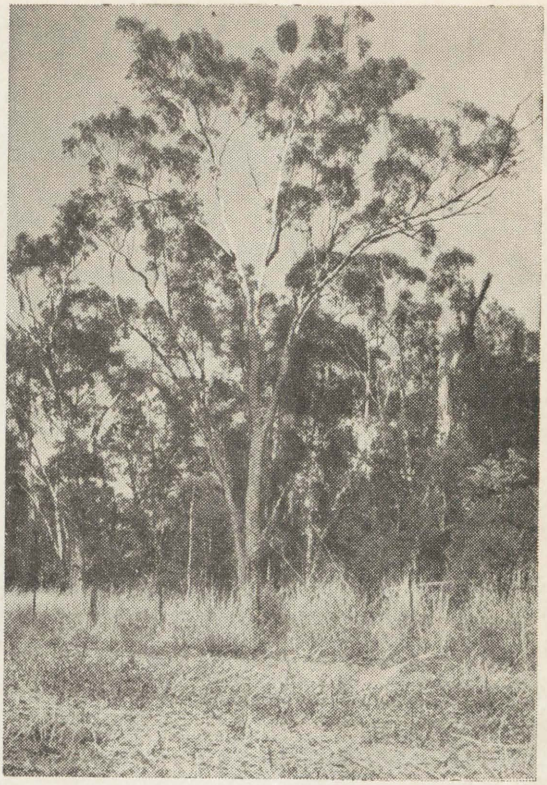
4. To study long term changes in factors affecting productivity under different systems of land use.

It is readily apparent that a soil map of the Station was required to fulfil one of the objectives, and to provide a basis to help in achieving the others.

In 1968-69 a soil association map was produced using low altitude colour aerial photographs, much ground checking and selected traverses.

The Department has printed reports which include descriptions and maps of both the vegetation and soils found on the Brigalow Research Station. A summary of the soils report is presented in this article.

In general, there are eight main groups of soils occurring on the Brigalow Research Station. They are discussed below.



Dawson gum, brigalow and wilga on heavy surfaced, texture contrast soils with a thin surface horizon.

**Type 1**

1. SEDENTARY CLAYS. Soils in this group are commonly called brigalow-wilga and brigalow-belah soils.

The soils are dark, uniform-textured clays which generally become lighter coloured with depth. They are finely structured in the top 1 to 2 in. grading quickly to coarse-blocky with depth. Lime (calcium carbonate) may occur in the upper part of the profile: overall depth is usually greater than 5 ft., although some shallower soils do occur.

Associated with these soils are small areas of dark, loamy-surfaced texture-contrast soils. These have a surface horizon 2 to 6 in. thick over a very hard, dark clay.

Dominant vegetation is brigalow (*Acacia harpophylla*) with varying amounts of belah (*Casuarina cristata*). Wilga (*Geijera parviflora*) and sandalwood (*Eremophila mitchellii*) form the main part of the understorey. Dawson gum (*Eucalyptus cambageana*) is scattered throughout. Dawson gum is commonly called blackbutt in the central Queensland region. However, the name Dawson gum is used here to avoid confusion with other species also called blackbutt in other parts of Queensland.

**Type 2**

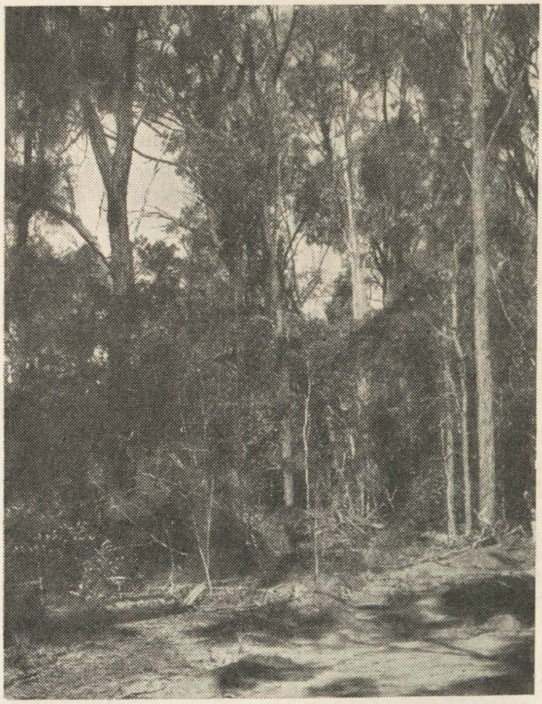
2. GILGAIED CLAYS. These soils are dark, uniform, cracking clays more than 5 ft. deep. They are finely structured in the top 1 to 2 in. grading quickly to coarse-blocky with depth. Gilgai micro-relief occurs; the gilgais are 1 to 4 ft. deep and may be roughly circular or elongate. Soils on the mounds may have profuse lime concretions, a self-mulching surface and a lighter colour than soils in the depressions.

In some areas, a complex situation exists with dark, cracking clays in the depressions and some texture-contrast soils on mounds. These have a sandy surface 3 to 9 in. thick over a grey, yellow or brown medium to heavy clay.

Dominant vegetation is brigalow with belah; wilga is the main understorey. Dawson gum may be present.

**Type 3**

3. LOAMY TEXTURE CONTRAST SOILS WITH A SHALLOW SURFACE HORIZON. These are commonly called Dawson gum-brigalow soils.



A softwood community with emergent brigalow and belah on deep, loamy surfaced texture contrast soils.

In this broad group of soils, there are variations in colour and texture and amounts of red quartzitic gravel in the upper part of the profile. The surface horizon of these soils is sandy loam which is hard setting and structureless. Thickness varies from 2 to 9 in.

A thin, bleached horizon (less than 1 in.) usually occurs at the base of the surface horizon. This overlies a very hard, dark grey or brown medium or heavy clay which has lime at depth. Structure is usually coarse and often columnar. Generally these soils are more than 3 ft. deep.

Dominant vegetation on these soils is Dawson gum, brigalow and wilga.

**Type 4**

4. LOAMY TEXTURE CONTRAST SOILS WITH A DEEP SURFACE HORIZON. Soils in this group are commonly termed brigalow-softwood scrub soils. They have similar variations to those in Type 3. Gravel is uncommon.

These soils have a sandy loam surface which is usually hard setting and structureless. However, organic litter may be present and the soil may be soft. Thickness varies from 9 to 12 in. and occasionally up to 22 in. A thin, bleached horizon may be present at the base of the surface horizon. This overlies a very hard, dark grey or brown clay which has lime at depth. The soils are more than 3 ft. deep.

Dominant vegetation is softwood species, for example, bonewood (*Macropteranthes leichhardtii*), bottle tree (*Brachychiton rupestre*), scrub boonaree (*Heterodendrum diversifolium*), with emergent brigalow-belah and Dawson Gum.

**Type 5**

5. SANDY TEXTURE CONTRAST SOILS. These soils are usually called "iron bark and box forest country".

These soils have a brown loamy sand to sandy loam surface 11 to 15 in. thick and occasionally up to 24 in. thick. It is hard-setting, and structureless. A thin, bleached horizon (1 to 2 in.) occurs at the base of the surface horizon. In this part ironstone concretions up to 1½ in. diameter are common.

This overlies a yellow, brown or grey brown, sandy clay or clay with yellow brown or reddish brown mottles. It has a coarse blocky or columnar structure. At depth, texture is usually sandy clay and reaction is alkaline. Soils in higher positions show little or no mottling.

Vegetation is poplar box, narrow-leaf ironbark (*E. creba*) silver-leaved ironbark (*E. melanophloia*), and bloodwood (*E. polycarpa*).

**Type 6**

6. ALLUVIAL SILTY TEXTURE CONTRAST SOILS. These occur on alluvial plains adjacent to streams. They have a dark, silty clay loam or fine sandy clay loam surface horizon 5 to 11 in. thick; it is structureless and hard-setting. A thin, bleached horizon occurs at the base of the surface horizon. This overlies a very dark medium or heavy clay which is very hard. Lime occurs at depth and soil may have a lighter colour.

Vegetation is poplar box (*Eucalyptus populnea*) and sandalwood.

### Type 7

7. RED AND BROWN EARTHS. These soils are red or brown and generally have a gradational texture profile grading from loamy sand at the surface to sandy clay loam or sandy clay at depth. They are not usually hard setting at the surface, are slightly hard to hard down the profile and have no structure. In some areas, they have an organic litter on the surface. Some soils have profuse lime concretions below 22 in.

Occasionally red or brown sands occur with similar characteristics to the earths except that texture does not increase appreciably with depth.

There are two distinct communities on this group of soils:—

1. Forest of ironbark, bloodwood, and Moreton Bay ash (*Eucalyptus tessellaris*).
2. Softwood scrub of bonewood, bottle tree, currant bush (*Carissa ovata*) and scrub boonaree and others.

### Type 8

8. SHALLOW TEXTURE CONTRAST SOILS AND SHALLOW LOAMS. This group of soils occurs on low ridges where sandstone may outcrop.

The main soil type is a texture-contrast soil with a grey brown, sandy loam surface. This is hard setting, structureless and 4 to 5 in. thick. A thin bleached horizon may occur at the base of the surface horizon. It overlies a brown, red or grey medium clay which is hard or very hard. Lime may occur. Overall depth to weathering rock varies from 10 to 42 in., but is usually 18 to 24 in.

Associated soils are very shallow grey brown sandy loams 8 to 10 in. deep. These are hard and structureless. Vegetation is silver-leaved ironbark and sandalwood.

### Mapping

C.S.I.R.O. Division of Land Research have described and mapped the lands in the Dawson-Fitzroy region of central Queensland.

The Brigalow Research Station is covered by two land systems, Highworth and Thomby. These two land systems occupy more than 2,500 square miles in the region. Soils of these two land systems also occupy a large part of the Eurombah and Banana land systems which together cover approximately 2,000 square miles.

Almost all of the true "brigalow" properties in the central region occur on these four land systems or their counterparts which are Humboldt, Somerby and Racecourse land systems. These are described by the Division of Land Research in two other reports and together cover approximately 5,600 square miles.

In Table 1, the names used to describe the soil groups given in this text are listed with the equivalent names used by Speck (1964) and Stace (1968).

A more detailed report containing a soils map has been prepared and a limited number of copies is available for distribution on request to the Manager, Brigalow Research Station, M.S. 586, Theodore, Q., 4719.

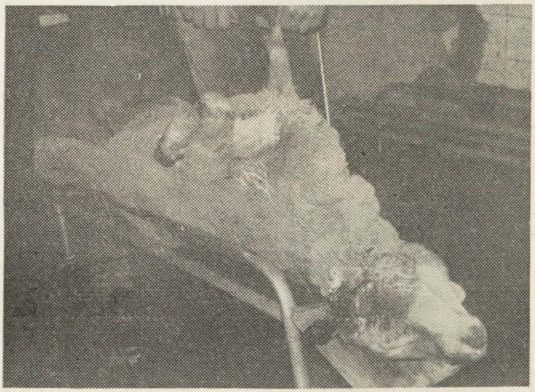
TABLE 1

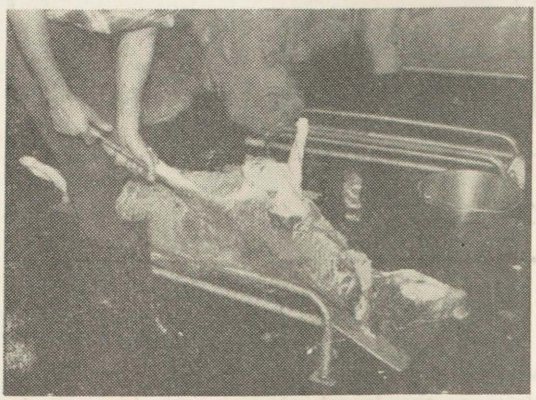
COMPARISON OF SOIL GROUPS IN TEXT WITH NAMES USED BY SPECK *et al.* (1968) AND STACE *et al.* (1968)

| Soil Groups used in the text | Soil Families after Speck *et al.* (1968) | Soil Groups after Stace *et al.* (1968) |
|---|---|---|
| Sedentary clays | Rolleston | Grey, brown, and red clays |
| Gilgaied clays | Pegunny (Wyseby) | Grey clays (solodic) |
| Loamy texture contrast soils— | | |
| (a) Shallow surface horizon | Retro | Solodised solonetz and solodics |
| (b) Deep surface horizon | Luxor | Solodised solonetz and solodics |
| Sandy texture contrast soils | Luxor | Solodics |
| Alluvial silty texture contrast soils | Retro | Solodised solenetz and solodics |
| Red and brown earths | Struan, Dunrobin | Red earths |
| Shallow texture contrast soils and shallow loams | Medway, Southernwood | Red-Brown earths, solodics, lithosols |

# Cradles For Small-stock Dressing

by J. D. FARRELL, Slaughtering and Meat Inspection Branch.





CRADLES in use at the Ipswich Public Abattoir are invaluable in the hygienic production of clean sheep and veal carcasses.

The design is the result of discussions between the abattoir management and the supervising officer of the Department of Primary Industries. The cradles were built by maintenance staff at the abattoir.

**Country Slaughter-houses**

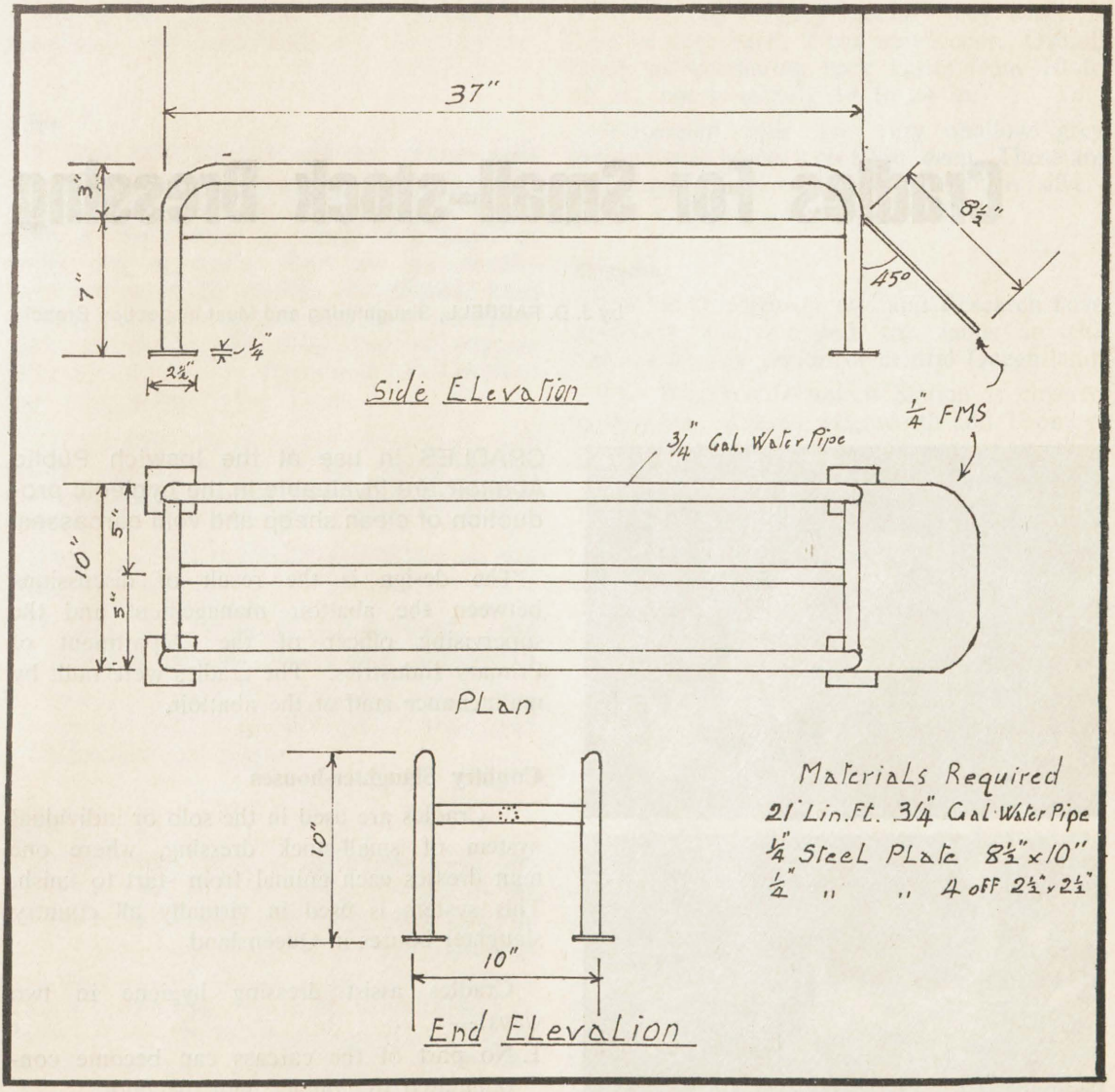
Cradles are used in the solo or individual system of small-stock dressing, where one man dresses each animal from start to finish. This system is used in virtually all country slaughter-houses in Queensland.

Cradles assist dressing hygiene in two ways:—

1. No part of the carcass can become contaminated by contact with the floor.

TOP. *A dressing cradle in use at the Ipswich Public Abattoir. Note that the "side stick" has been used, severing the jugular vein and carotid artery on one side only. The slaughterman does not cut the aesophagus (weasand) and so prevents contamination of the head, tongue and cheeks by the flow of ingesta from the stomach. Very little ingesta spills on to the floor. The transverse cut, more widely used, does not give comparable control over the stomach contents.*

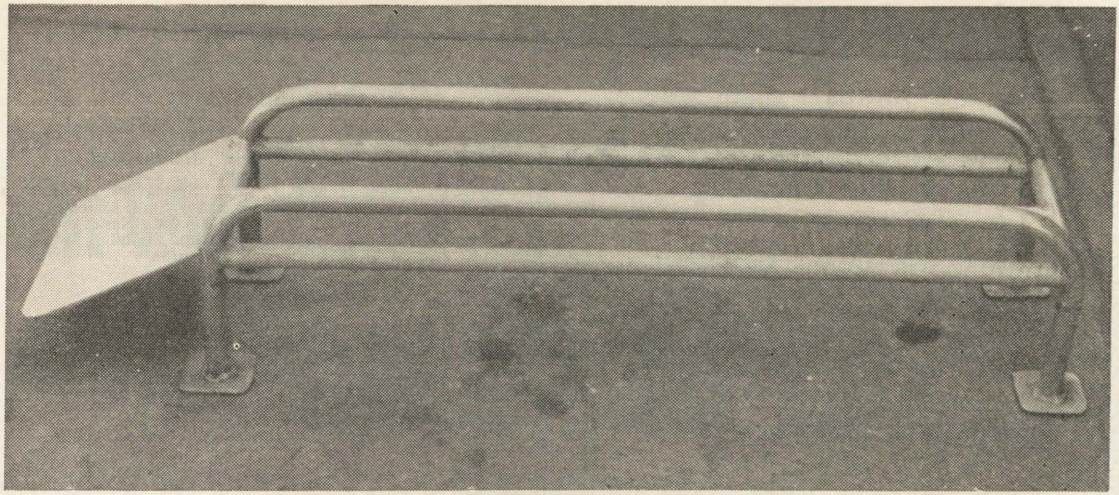
BOTTOM. *Legging is nearing completion. Note that the weasand has been tied off to prevent spillage of stomach contents. The weasand, together with approximately 1 in. of the trachea (windpipe) attached, is separated from its attachments and then tied off with a simple knot.*



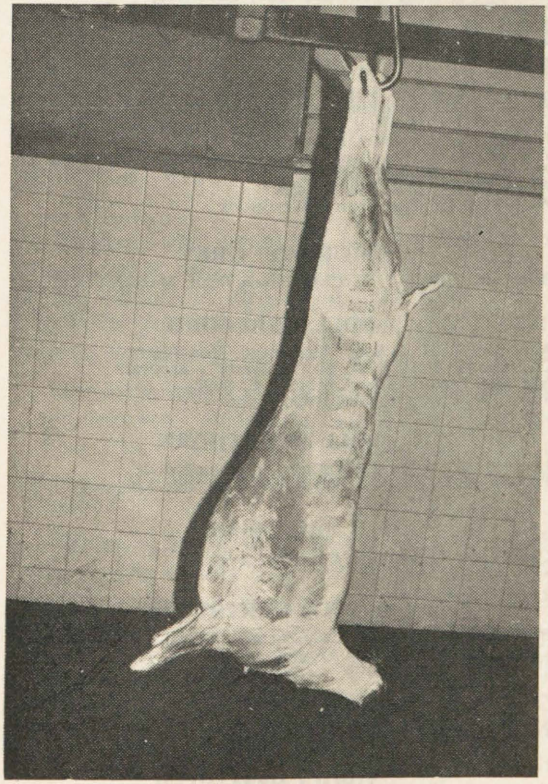

2. The fleece does not become wet during dressing.

The cradle shown has been found suitable for dressing sheep and lambs in the weight range normally used by a retail butchery. It has also been found suitable for dressing calves up to about 100 lb. dressed weight. If very large sheep, lambs or calves are to be dressed, the length shown may have to be increased.

The design shown has been found simple and inexpensive to construct and well worth consideration where the solo system of small stock dressing is used.



*After they have been built, the cradles are hot-dip galvanized to prevent rusting.*



*The end result: a clean carcass dressed hygienically.*

# Culling Beef Cows

THE basic principle in culling beef breeders is to remove those that are likely to have the lowest earning capacity in the next year.

All cows retained should be physically sound. Those with defects such as bottle teats, eye cancer or showing signs of age should be culled first. However, cows should not be culled on age unless they are in a worse physical condition than their counterparts in the herd and are likely to be a survival risk.

If the grazier uses pregnancy diagnosis, the next group to examine is the non-pregnant cows. If the pregnancy rates are sufficiently high, all non-pregnant cows can be culled. Fat and non-pregnant cows have no earning capacity in the following year, and can be sold in the near future. On the other hand, poor or lightly conditioned, empty cows can be fattened for sale early in the wet season.

When pregnancy diagnosis is not used, dry cows can be removed at the end of the calving season. This has much the same effect as culling the non-pregnant cows after pregnancy diagnosis but had two disadvantages. These were: poor, empty cows can be fattened more quickly on better country; and breeder paddocks often carry more cattle than is entirely necessary. This can prevent breeders from putting on the necessary condition.

*—T. H. RUDDER, Beef Cattle Husbandry Branch.*

# Tuberculosis-Free Cattle Herds (As at November 21, 1972)

## ANGUS

Crothers, H. J., "Mooreenbah", Dirranbandi
Mayne, W. H. C. & Sons, "Gibraltar", Texas
McKelvie, Mrs. M. R., Boonara, Condamine

## A.I.S.

Cox, T. L. & L. M. J., Seafield Farm, Wallumbilla
Crookey, J., Arolla A.I.S. Stud, Fairview, Allora
Davis, W. D., "Wamba", Chinchilla
Embrey, R. J. & D. M., Lanefield Rd., Rosewood
Evans, E. G., Lauraven A.I.S. Stud, Maleny
Fowler, K. J. & B. D., Kenstan A.I.S. Stud, M.S. 195 Pittsworth
Franz, E. L. and E. L., "Amabar" A.I.S. Stud, Amamoor, via Gympie
Heading, C. A., "Wilga Plains", Maleny
Henry, Mrs. K. & Sons, "Tara", P.O. Box 4, Cambooya
H. M. State Prison Farm, Numinbah
Klein Bros., Kapleton A.I.S. Stud, Ma Ma Creek, via Grantham
Lawley, E. D. & Sons, Arley A.I.S. Stud, Maleny
Littleton, H. V. D. S. & N. A., "Wongalea", Bowenville
Marquardt, C. R. & J. L., "Cedar Valley", Wondai
Martin, J. P. & R. J., Kentville, via Forest Hill
McShane, Est. A. H., Handford Rd., Zillmere
Middleton, C. W., Airton Vale, Cambooya
Mitchell and Mulcahy, Rosenthal
Neale, D. G., "Groveley", Greenmount
O'Sullivan, P. W., "Navleigh", M.S. 371, Greenmount
Phillips, J. & Sons, "Sunny View" A.I.S. Stud, Kingaroy
Pagel, E. E., and Hayes, E. M., Trafalgar Stud, Tarampa, via Lowood
Queensland Agricultural College, Lawes
Ross, W. & Co., M.S. 23, Rosewood
Sanderson, W. H., "Sunlit Farm", Mulgildie
Schelbach, N. N. & Co., Allanview Stud, Warwick
Schloss, C. J., "Shady Glen", Rocky Creek, Yarraman
Scott, W. & A. G., "Walena" A.I.S. Stud, Blackbutt
Siebenhausen, J. & S. C., "Meniton", M.S. 195, Pittsworth
Sullivan, A. M., Crystal Springs, Pittsworth
Sullivan, F. B., "Fermanagh", Pittsworth
Sullivan, M. C., "Valera", Pittsworth
Thompson, W. H., "Alfa Vale", Nanango
Vohland, A. R., Bevallan, Stoneleigh, M.S. 150, Pittsworth
Voight, E. M., Fernvale
Weier, L. G., Prairie Plain A.I.S. Stud, M.S. 765, Allora
Wieland, A. W. & T. G., "Milhaven", M.S. 786, Boonah

## AYRSHIRE

Goddard, B., Inverell, Mt. Tyson, via Oakey
Mathie, J. E. & M. D., "Ainslie", Maleny
Ross, E. D. & Co., "Ardrossan", Crediton, Mackay
Scott, J. N. & Son, "Auchen Eden", Camp Mountain
Smith, E. J., "Hillcrest", Borallon
Zerner, G. F. H., "Pineville", Pie Creek, Gympie

## BRAFORD

Bowden, W. H., "Brendale", South Pine Road, Strathpine
Thompson, M. A. K., "Glen Kyle", Buderim

## FRIESIAN

Behrendorff, E. C. & N. G., Inavale Friesian Stud, M.S. 786, Boonah
Chamberlain, C. H., Sherwood, Rocks Road, Gympie
Evans, P. J., M.S. 28, Dragon St., Warwick
Goodwin, A. T. & P. M., Winabee Stud, Killarney
Guppy, N. J. & H. M., Bli Bli Road, Nambour
Hickey, K. A. & M. R., Bunya
Lobley, N. E., "Neloby", Mumford Rd., Narangba
McWilliam, A. A., "Oatlands", Wight's Mtn Rd., Samford
Martin, R. J. and E. L., Kentville, via Forest Hill
Morrison, E. J. & Son, Cedar Creek, via Closeburn
Norgaard, M. J. & B. F., Yarrabine Friesian Stud, Yarraman
Panzram, J. & K., Blenheim, via Laidley
Pomerenke, P., Kentville, via Forest Hill
Queensland Agricultural College, Lawes
Robert-Thompson & Co., R. D. and A. M., M.S. 411, Beaudesert
Staines, R. V., Bowhill Rd., Oxley South
Stumer, A. O., Brigalow, Boonah
Vonhoff, A. R. & D. G., M.S. 918, Toowoomba

## GUERNSEY

Dionysius, R. L. & L., Warana Stud, M.S. 1796, Proston
Dippel, J., Thornton, via Laidley
Erbacher, J. P. & M. M., "Leafmore", Hodgsonvale
Gibson, A. & D., Mooloo, via Gympie
Holmes, C. D. (owner Holmes, L. L.), "Springview", Yarraman
Hopper, G. T. & H. W., Elendean Guernsey Stud, Maleny
Scott, Cecil & C. A., "Coralgrae", Din Din Rd., Nanango
Smith, Mrs. E. P., Remleigh Guernsey Stud, Imbil
Wilson, R. A. and M. R., "Okeden", Proston

## HEREFORD

Hill, W. W. & P. C., "Mathalla", Dirranbandi

## JERSEY

Conochie, I. S., Brookland Jersey Stud, M.S. 461, Kalbar
Forsyth, D. E., Kobarnie Stud, Mulgildie, Q., 4629
Gotke, B. B., "Reynold Valley Stud", Charlwood, Kalbar
Harley, G. W. & P., "Hopewell", East Nanango
Herbener, K. E., P.O. Box 172, Monto
H. M. Prison Farm, Capricornia Stud, P.M.B. 11, Rockhampton
H. M. State Farm, Palen Creek
Hodgens, G. & J. F., "Bunyeris", Peachester
Lau, J. F., "Rossallen", Goombungee, Toowoomba
Mahaffey, H. W. & V. N., "Coombooran", via Gympie
McCarthy, J. S., "Glen Erin", Greenmount, Toowoomba
McDonald, R. G., "Buffelvale", M.S. 807, Mundubbera
Newton, J. C. & A., Merryvale, Upper Caboolture
Paulger, S. & S. M., "Adavale", Kenilworth
Perkins, M. J. & E. M., Byee Jersey Stud, M.S. 692, Sth. Nanango
Porter, F. & Sons, Westwood Stud, Conondale
Postle, R. S. & G. C., "Yarallaside", Pittsworth
Queensland Agricultural College, Lawes
Redgen, H. M. & N. F., Bonbrae, Maleny
Scott, P. E., "Kiaora", Manumbar Rd., Nanango
Semgreen, A. L., "Tecoma", Coolabunia
Snare, A. E. & Son, Laidley Park Stud, Laidley, 4341
Spressor, O. W., Carnation Jersey Stud, Mt. Walker Rd., Rosewood
Thompson, J. R. H. & R. V. A., "Dewrang", Natural Bridge, Nerang
Todd, J. R., Aberfoyle, Laravale, via Beaudesert
Vohland, A. R., Bevallan, Stoneleigh, M.S. 150, Pittsworth
Wadley, D., "Nindethana", Moggill
Waite, H. M., M.S. 182, Laidley
Westbrook Training Centre, Westbrook

## MURRAY GREY

Beresford, J. P. & P. J., Copenhagen Bend, Maryborough

## POLL HEREFORD

Anderson, J. H. & Sons, "Inverary", Yandilla
Christensen, B. L. & M. O., "Elavesor", Rosevale
Nee Nee Pastoral Co., Dirranbandi, 4392
Stiller, N. L., "Vine Veil", Guluguba

## POLL SHORTHORN

Leonard, W. & Sons, "Welltown", Goondiwindi
Pointon, R. B. & S. C., "Wywurri", M.S. 780, Kingaroy

## BRAHMAN

Queensland Agricultural College, Lawes

## SANTA GERTRUDIS

Barbara Plains Grazing Co., Barbara Plains, Wyandra
Central Estates, "Comet Downs", Comet

## SHORTHORN

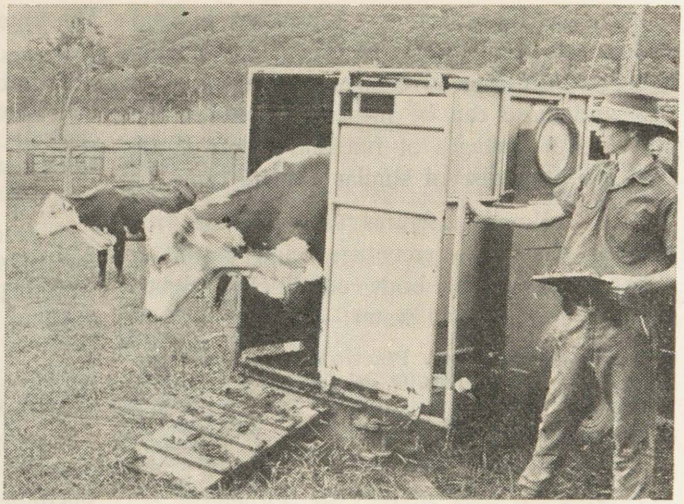
Pointon, R. B. & S. C., "Wywurri", M. S. 780, Kingaroy

## DROUGHTMASTER

Ferguson, G. A. E. & H. R., "Charraboon", Toogoolawah
University of Queensland Veterinary School, St. Lucia

# A Guide On Weighing Cattle

by R. TYLER, Beef Cattle Husbandry Branch.



This mobile weighbridge is being used to measure the response to mineral supplements in an eastern Darling Downs field trial.

WEIGHING cattle is a practice that is increasing. This is a natural development since the weight of beef cattle is the main single factor which affects their value.

Knowing the weight of a beast can be of considerable help to the cattleman in assessing its sale value, in measuring weight gains on a particular feed or, in breeding cattle, determining weight for age.

However, unless correct weighing techniques are employed, weighing cattle can confuse rather than assist the cattleman. When measuring weight gains certain rules should be observed.

While 2 lb. a day is a very good gain, extravagant claims such as 6 lb. a day are sometimes made. It is doubtful whether such high gains can be substantiated. Usually exceptionally high weight gains or dressing percentages can be explained by faulty weighing techniques. This article deals with the three main factors which affect the reliability of cattle weights. They are: the animal, the operator and the scales.

## The Animal

Gut fill is one of the most important points to consider when weighing cattle. A 900 lb. steer can quite easily lose 60 lb. when locked off feed and water overnight.

Such a steer would drink between 40 and 80 lb. of water a day as well as eating 25 lb. of dry matter. This intake capacity emphasizes the need for standardizing weighing procedures in relation to eating and drinking.

Cattle brought from a saleyard may have been off feed and water for 24 hours. This, plus the upsetting effect of travelling, could cause a loss of fill to the extent of 100 lb.

If such cattle were weighed immediately on arrival on the property and again 10 days later, a gain of 10 lb. per day would be suggested which, of course, would have nothing to do with carcass gain.

Gut fill can cause errors in weighing of animals on lush feed. If cattle are weighed just before they go on to young green oats and again a week later they will usually show a weight loss because the crop has caused them to scour and therefore lose more digestive tract contents than normal.

DRESSING PERCENTAGE. Variations in feed and water intake can have an appreciable effect on dressing percentage. Variations of 5% and more can be measured between the dressing percentages of full and empty cattle that are otherwise of similar carcass type.

The following figures approximate the normal dressing percentages for cattle at different levels of body condition weighed straight off feed and water:—

APPROXIMATE DRESSING PERCENTAGES ON A FULL WEIGHT BASIS

| Condition | Dressing % (approx.) |
|---|---|
| Store steers .. .. .. .. .. | 48 |
| Forward store steers .. .. .. .. | 50 |
| Fat steers .. .. .. .. .. | 52 |
| Very fat steers .. .. .. .. | 54 |

By holding these steers off feed and water for 16 hours the dressing percentage would probably rise by 4 to 5%.

If they are off feed and water for 24 hours and have been road transported for, say, 100 miles, the dressing percentage could be 6 or 7% higher than the above figures.

PREGNANCY EFFECT. The pregnancy status of a cow can cause variations in liveweight. If a cow is weighed several times during pregnancy and again immediately after she calves, the weights can be very misleading. Without any change in body condition she will show a weight gain up to the point when she calves and then she will show a dramatic weight loss. What has actually been measured is the growth of the unborn calf plus foetal tissues and fluids.

The unborn calf with associated fluids and tissues in an average Hereford cow, for example, would weigh approximately 30 lb. when she is 6 months pregnant. At the ninth month of gestation, the total additional weight caused by pregnancy would be approximately 125 lb. Seventy-five pounds of this weight would be the calf itself.

**The Operator**

Errors are frequently made by incorrect reading or recording of weights. The operator will be more efficient if he is allowed to concentrate on weighing and recording while the stock handling is done by others.

When cattle have been weighed previously, their record sheet together with their identification numbers should be used at the subsequent weighings. As each beast is being weighed, a quick comparison can be made with its previous weights before the beast leaves the scales. In this way any exceptional weights can be checked.

During the process of weighing, cattle will deposit dirt and dung on the scales. The operator should always see that the dial pointer or steelyard returns to zero before the next beast is weighed.

Muddy yards are unsatisfactory for weighing. Apart from leaving mud in the scales, a beast may carry 10 lb. of mud on its feet and legs.

**The Scales**

It is difficult to recommend a particular make of scales as there are many different brands on the market and all have their particular advantages and disadvantages.

When purchasing scales, the manufacturer should be prepared to give a guarantee on the accuracy of the machine. The scales should at least be accurate to within 5 lb. in every 1,000 lb.

The type of scales that is required is another decision to be made. Stationary scales are the most popular and would be all that most cattlemen would need.

Mobile scales, while having the advantage of being able to be used at different places, are more costly. Special care is needed when using mobile scales so that accurate weights can be taken. As these scales are towed from place to place and have to be set up before each group of cattle is weighed, particular care should be taken to ensure that they are level. The level should be constantly checked during weighing as they may shift off level if a beast bumps them.

INSTALLING SCALES. The importance of taking great care when selecting a site to erect a set of scales cannot be over emphasized. The position selected should be high and away from where water is likely to flow during wet weather. If water can flow under the scales, mud will build up and in time will stop the knife edges from moving freely.

The scales should be mounted on a concrete platform with sufficient clearance between the concrete and the scales to permit easy cleaning under the scales.

To weigh efficiently, scales must be level. They should be set on a solid base so that once they are set level they cannot move.

CHECKING ACCURACY OF SCALES. Before each mob of cattle is weighed, check that the dial pointer or steelyard is returning to zero and, if not, adjust until it is. A rough guide to the accuracy of the scales can be made by weighing something of a known weight such as a bag of fertilizer. A further check can be made by weighing the same article in each corner of the scales. The weight should be the same no matter what position it is in on the scales. An alternative is to weigh a person of known weight at the centre and each end of the scales.

If an error is noticed in the weight, a heavier article should be weighed in case the error is cumulative, that is, the heavier the article weighs the greater the error. A minor fault can sometimes be corrected with a sharp shake of the scale platform.

If the error is cumulative, the scales should be repaired by a scalemaker. Weights and Measures Inspectors from the Machinery and Scaffolding Department will check scales on request.

The charge for checking scales (January 1972) was: 5 cwt. capacity $2.40; 15 cwt., $3.40; 15–30 cwt., $5. It is advisable to have scales officially checked every few years.

WEIGHING TECHNIQUES. The most common technique used when weighing is to weigh the cattle straight out of the paddock.

When weighing cattle, the conditions at each weighing should be as consistent as possible. This is so that the beast's fill will be standardized. Fill is mainly affected by the period of time that has elapsed since the animal's last drink, how long it has been off feed and whether it has been stirred up or not in the process of mustering and yarding.

Though all of these points are difficult to control when cattle are weighed straight from the paddock, the time of weighing should at least be standardized.

As the watering habits of cattle may vary, locking off feed and water overnight will give greater accuracy than weighing direct from the paddock.

If measuring the weight gain of cattle on a given feed, it is best to work with groups of at least 20 head rather than individual animals. If the average is taken for a group of cattle, their performance can be measured reasonably accurately.

When comparing the weight gain of two groups of cattle on different feeds, it should be remembered that factors such as sex, age, breeding and pregnancy can all cause differences in weight gain in addition to the feeding conditions.

Key points to keep in mind when weighing cattle are:—

- Are the scales weighing accurately? If not, what adjustment, if any, can be made?
- Concentrate on accurate reading of scales and recording weights.
- Are the conditions at this weighing as close as possible to the conditions that applied or will apply to weighings which will be used for the comparison purposes?
- Keep a careful watch on the build up of dirt in the scales and make necessary adjustments.
- If measuring weight gains, aim at working with groups of at least 20 head.
- If breeders are weighed, make the necessary allowance for pregnancy.

# Brucellosis-Tested Swine Herds (As at November 21, 1972)

## BERKSHIRE

Bishop, N. H., Three Moon, via Monto
Clarke, E. J. & Son, "Kaloon Stud", Boonah
Cochrane, S., "Stanroy", Felton
Cook, F. R. J., Astonvilla, Middle Creek, via Pomona
Crawley, R. H., Rockthorpe, Linthorpe
Dalby Hospital Board, Jubilee Farm, Dalby
H. M. State Farm, Numinbah
H. M. State Farm, Palen Creek
Handley, Est. J. L., "Meadow Vale", Lockyer
Handley, G. R., "Locklyn" Stud, Lockyer
Hutton, G. J. & Sons, "Grajea" Stud, M.S. 182, Laidley
Kimber, E. R., Tarella, M.S. 805, Mundubbera
Ludwig, A. L., "Beau View" Stud, Cryna, via Beaudesert
Neuendorf, W., M.S. 794, Kalbar
Queensland Agricultural College, Lawes
Research Station, Hermitage
Rosenblatt, G., "Rosevilla", Biloela
Traves, G., "Wynwood" Stud, Oakey
Westbrook Training Centre, Westbrook
Whitley, L. D., Yarrol, via Monto

## LARGE WHITE

Ashwell, J. & B., "Green Hill", M.S. 465, via Cambooya
Ballon, E. E. & E., Maclaglan
Barrier Reef Islands Pty. Ltd., Hayman Island
Barron Bros., "Chiltern Hill", Cooyar
Batterham, P. & N., Raby Park, Inglewood
Beutel, G. R. and Son, Brookdale Stud, M.S. 786, Boonah
Bishop, N. H., "Three Moon", via Monto
Briskey, R. G. and M. J., Wallingford, Pittsworth
Brosnan, D. J., "Bettafield", Mt. Murchison, via Biloela
Cauley, J. R., M.S. 918, Toowoomba
Cauley, T. P., M.S. Jondaryan 444, Rosalie
Clegg, J. A. & M. A., "Karoma" Stud, Mundubbera
Coleman, C. J., Merriland Stud, Britannia Station, Charters Towers
Cook, F. R. J., Astonvilla, Middle Creek, via Pomona
Corney, Messrs. F. D. and E. C. W., Pagel, Tara
Cotter, N. J., "Olaroy", Goomeri
Craig, K. F., "Echoes", Bancroft, via Monto
Dean, G. F. & A. M., Home Creek, Wooroolin
Department of Aboriginal and Island Affairs, Cherbourg
Diete, E., Ingoldsby, 4343
Duncan, C. P., "Colley", Flagstone Creek, Helidon
Duncan, J. A. & B. L., Ma Ma Creek
Dunlop Meats Pty. Ltd., Coondulla, Robertson Pk., Murray Upper
Eagle, D. R. & J. A., "Walugra", 134 Hogg St., Toowoomba
Evans, P. J., M.S. 28, Dragon St., South, Warwick, and Rosehill
Fisher, J. & L., Lyndhurst, Jimbour
Fletcher, L., "Par-en-eri" Stud, M.S. 806, Mundubbera
Forster, I. S. & D. E., 112 Drayton Rd., Toowoomba
Fowler, K. J. & B. D., "Kenstan", M.S. 195, Pittsworth
Fowler, K. P., Northelea Stud Farm, 156 Hogg st., P.S. 1436, T'wba
Franke, K. H. and B., "Delvue" Stud, Cawdor
Freeman, W. A., "Trevlac", Rosewood
French, A., "Wilston Park", Pittsworth
Gibson, H. R., "Thistleton", Wootha Rd., Maleny
Gosdon, T. C. & E. A., "Naumai", Dalby
Graham, T., Dunleigh, Highfields
Grayson, D. G., Wodalla, Killarney
H. M. State Farm, Numinbah
Head, G. A., M.S. 825, Ipswich
Hinchcliffe, D. F. & R. K., "Oakview", Milman, 4702
Hockings, J. & M., "Quambi", Kumbarilla
Hodgens, J. F., "Bunyeris", Peachester
Hudson, R. F. & V. D., "Rondel", Hogg St., Wilsonton, Toowoomba
Hutton, G. J. & Sons, "Grajea" Stud, Laidley
Jones, K. B. & I. R., "Cefn" Stud, Clifton
Kahler, J. & S., "Karajoy", East Nanango
Kajewski, C. & D. I., "Glenroy", Glencoe, via Toowoomba
Kanowski, A., "Exton", Pechey
Kimber, E. R., "Tarella", M.S. 805, Mundubbera
Kruger, V. F. & B. L., "Greyhurst", Goombungee
Kuhl, V. and C. A., "The Mounts", M.S. 222, Oakey
Lee, G. J., M.S. 444, Jondaryan
Le Gros, W., "Elourea Stud", Marburg
Little, R. S., P. M. & G. W., "Glengarry", Jimbour
Maranoa Stud Piggery, Mitchell
Marsden, M., "Fernflat" Canaga
Marsh Pastoral Co., Brymaroo
Mathieson, K. N., "Iderway", Gayndah
Mengel, N. D., Douglas Park, M.S. 223, Nobby
Player, G. W., Square Top, via Kaimkillenbun
Postle, R. S., G. C. & Son, "Yarallaside" Stud, Pittsworth

## LARGE WHITE—continued

Powell, R. S., "Kybong", Gympie
Purcel, J., "Scoria", Thangool
Queensland Agricultural College, Lawes
Quilter, P. R., Paga Paga Piggeries, Postman's Ridge
Radel, V. V., "Braedella" Stud, Coalstoun Lakes
Reiser, G., Brisbane St., Beaudesert
Research Station, Biloela
Ridge, I. D. & B. M., Jay Dee, Pine Creek, Canungra
Rosenblatt, G., "Rosevilla", Biloela
Ruge, A. F. & V. M., "Alvir" Stud, Biggenden
Ruge, G. H. & I. E., "Al-Lester" Stud, Woowoonga, Biggenden
Salvation Army Training Farm, Riverview
Sharp, D. W. & L. J., "Arolla", Lavelle, Q., 4357
Shears, B. A., Old Bay Rd., Burpengary
Smith, R. & I. E., Lupton Rd., Beaudesert, 4285
Smyth, R., Barambah Rd., Goomeri
Thomas, F. & Sons, "Rosevale", Laravale
Vandenberg, J. J., Tamborine
Ward, R. J., "The Plateau", Mulgildie
Willdo Farming Co., Southbrook
Willet, L. J., "Wongalea", Irvingdale
Williams, W. L. & M. E., "Jindabyne", Miles
Withcott Stud Piggery, Rowbotham St., Toowoomba
Wolfenden, C. B. & J., Rossmoya
Young, W., Jnr., Kybong, via Gympie

## TAMWORTH

Kanowski, S. E., Pinelands, via Crows Nest

## WESSEX SADDLEBACK

Douglas, Mrs. W. S. & Son, "Greylight" Stud, Goombungee
Jurgensen, R. H. and R. R., Kildare. M.S. 1065, Boonah
Smith, C. R. & Son, "Belton Park", Goombungee

## LANDRACE

Ashwell, J. & B., "Green Hill", M.S. 465, Cambooya
Ballon, E. E. & E. Maclaglan
Barrier Reef Islands Pty. Ltd., Hayman Island
Batterham, P. & N., Raby Park, Inglewood
Bertolotti, F. E. J. & N. I., "Mascotte", Wallumbilla
Bishop, N. H., Three Moons, via Monto
Brosnan, D. J., "Bettafield", Mt. Murchison, via Biloela
Cauley, J. R., M S. 918, Toowoomba
Cauley, T. P., M.S. Jondaryan 444, Rosalie
Clegg, J. A. & M. A., "Karoma" Stud, Mundubbera
Coleman, C. J., Merriland Stud, Britannia Station, Charters Towers
Cook, F. R. J., Astonvilla, Middle Creek, via Pomona
Crowle, N. & D., Cooranga North, 4408
Dean, G. F. & A. M., Home Creek, Wooroolin
Diete, E., Ingolsby, 4343
Dowling, A. M. & C. M., "The Anchor", Wutul, via Toowoomba
Dunlop Meats Pty. Ltd., Coondulla, Robertson Pk., Murray Upper
Fisher, J. & L., Lyndhurst, Jimbour
Fletcher, L., "Par-en-eri" Stud, M.S. 806, Mundubbera
Forster, I. S. & D. E., 112 Drayton Rd., Toowoomba
Fowler, K. J. & B. D., "Kenstan", M.S. 195, Pittsworth
Fowler, K. P., "Northlea", Hogg Street, Wilsonton, Toowoomba
Fowler, N. E. P. & M. P., Kingaroy
Gosdon, T. C. & E. A., "Naumai", Dalby
Graham, T., Dunleigh, Highfields, 4352
Grayson, D. G., "Wodalla", Killarney
Hinchcliffe, D. F. & R. K., "Oakview", Milman, via Rockhampton
Hockings, J. & M., "Quambi", Kumbarilla
Hudson, R. F. & V. D., "Rondel", Hogg St., Wilsonton, Toowoomba
Jones, K. B. & I. R., "Cefn" Stud, Clifton
Kajewski, C. & D. I., "Glenroy", Glencoe, via Toowoomba
Little, R. S., P. M. & G. W., "Glengarry", Jimbour
Maranoa Stud Piggery, Mitchell
Marsden, M., "Fernflat", Canaga
Marsh Pastoral Co., Brymaroo
Nielsen, L. R., "Sunny Hill", Ascot, via Greenmount
Peters, L. A., "Moonlight", Bongeen
Powell, R. S., "Kybong", Gympie
Purcell, J., "Scoria", Thangool
Ridge, I. D. & B. M., Jay Dee, Pine Creek, Canungra
Rosenblatt, G., "Rosevilla", Biloela
Ruge, A. F. & V. M., "Alvir", Biggenden
Sharp, D. W. & L. J., "Arolla", Lavelle, Q., 4357
Smith, E. J., "Avrvale" Stud, Borallon, via Ipswich
Smith, R. & I. E., Lupton Rd., Beaudesert, 4285
Trout, L. B. and L. J., "Caminda", Crawford, Kingaroy
Vandenberg, J. J., Tamborine
Willdo Farming Co., Southbrook
Willet, L. J., "Wongalea", Irvingdale

D.P.I. Research

# Supplements For Beef Breeders

DRY-SEASON losses of beef breeders in Queensland often severely handicap property development.

Through its research, both on commercial properties and on research stations, the Department of Primary Industries is coming to grips with this difficult husbandry problem.

The following is a progress report on two types of investigation now in progress.

## FIELD TRIALS

Supplementary feeding is of great topical interest in the Queensland beef industry. The Beef Cattle Husbandry Branch of the Queensland Department of Primary Industries has, for several years, been conducting large-scale field trials on several grazing properties to evaluate the use of commercial supplements and other methods of supplementation.

This report refers to responses obtained in reproductive performance, particularly in young cows, fed Ultravite*, during the dry season.

Work began in 1965 with a trial at "Broadmeadow" in the Nebo district, owned and managed by Mr. Les Camm. In this, more than 450 pregnant breeders were divided into three groups. One group received no supplement, one a supplement of approximately 1 lb. Ultravite a day during the dry season, and the remaining group 2 lb. of lucerne hay a day through the dry season.

Trials were also mounted at "Glenhowden" in the Brisbane Valley, "Lancefield" and "Greycliffe" in central Queensland, "Balanda Park" at Home Hill, north Queensland, and "Captains Creek" near the coast east of Miriam Vale. Considerable difficulty was experienced during these trials because of severe drought situations and, in some years, the necessity to ensure survival in breeders took precedence over the trial procedures.

At Broadmeadow and Glenhowden, however, trials have been completed and results are now available. The trials are continuing at Lancefield and Balanda Park, at Lancefield in a seasonal mating system, and at Balanda Park in a continuous mating system. The Glenhowden experiment consisted of continuous supplementation of a group of 80 heifers from weaning right through to completion of the second mating season, compared with a similar group of heifers receiving no supplement.

The completed trials have provided some useful information, both for present application and for use in the design of future trials.

### Responses

Responses in fertility were obtained in both trials to supplementation with Ultravite. Lucerne supplementation, however, was disappointing at Broadmeadow largely because of the grazing behaviour of cows when fed lucerne hay.

Average pregnancy rates over 4 years for young cows with the first calf at foot and for mature cows are shown in the following table.

* Ultravite, is the registered trade name of a product manufactured by I.C.I. Australia Limited.

| — | Control % | Lucerne % | Ultravite % |
|---|---|---|---|
| Young cows | 66 (33–84) | 68 (60–78) | 75·5 (71–86) |
| Mature cows | 77·5 (65–94) | 73·5 (65–93) | 84·3 (79–96) |

The range of pregnancy rates is shown in brackets. It will be seen that cows supplemented with Ultravite gave a consistently and significantly better performance than either of the other two groups and that the response in young cows was higher than in the older cows.

The calving and weaning figures were complicated by losses between pregnancy diagnosis and calving, a constantly recurring problem in the Queensland environment.

Statistical analyses of the results gave an advantage to Ultravite over controls in first calf cows for number of calves weaned. In older cows, Ultravite was superior to lucerne hay for number of calves dropped and weaned.

Consideration of the pregnancy results reveals two very important features. In the first place, the young cows with first calf at foot are the most unreliable breeders and are most in need of supplementary feeding. In the second place, there is considerable variation between years. In one year, results would have been quite good without supplementation while in the other three years the good responses indicate that supplementation was warranted.

### Selective Supplementation

This raises the possibility of selective supplementation, that is, selecting the cattle and the periods in which the best result might be expected. It is apparent that supplementation exerts its greatest effect when nutritional conditions are marginal and it is possible, but by no means proven, that greater benefits could be obtained in continuous rather than seasonal mating systems, which are built-up around the reliability of rainfall. If this is correct, greater benefits are likely to be obtained in the north and north-west, and survival would be a factor as well as fertility.

At Glenhowden, advantages were obtained by Ultravite over the controls in the two mating periods examined. Conditions were very bad over the period of this trial and performance was well below what might be expected in normal seasons.

In 1968-69, 66·2% of supplemented heifers conceived compared with 59% in controls while, of these lactating heifers, 46% in the supplemented group conceived at the following mating compared with only 28% in the lactating controls. There was a very definite advantage to supplementation, but levels of fertility reveal the severe stress conditions existing.

However, this trial does show that at the vulnerable points in the breeding cycle of the young animal, that is, growth from weaning to mating and its subsequent effect on fertility and at mating following first lactation, supplementation can exert a definite effect.

This joint programme is now concluding and further results will be forthcoming. Further work has been commenced to examine the effect of supplementation for shorter periods at specific phases of reproduction.

## RESEARCH STATION STUDIES

Research into supplementary feeding of breeders commenced at "Swan's Lagoon" Cattle Field Research Station in June 1970 to evaluate the effects of breed, pasture and supplements on reproductive performance.

Mr. P. J. Allan, Husbandry Officer, is supervising this large scale trial involving nearly 300 breeding stock. Experiments of this kind are long-term investigations but information from two calf drops is now available. The cows are now in calf for the third time.

Two breeds, Shorthorns and commercial Brahman (approximately 50%) crossbreds, grazing Townsville stylo pastures at one cow unit to 6 acres and native spear grass pasture at one to 12 acres are involved. Supplements fed are various combinations of urea, molasses and phosphoric acid. The cows are mated from September to January and calve from mid June to mid November. Weaning is completed at an average age of 6 months by the end of March.

A summary of the results to date is as follows:—

- Shorthorn and Brahman crossbred cows have produced equal pregnancy rates (approximately 85%) over the 3 years studied to date.
- A Townsville stylo based pasture produced equivalent pregnancy rates to native pasture but at twice the stocking rate.
- Supplements of molasses-phosphoric acid and molasses-urea both improved pregnancy rates (88% and 93% respectively) above the unsupplemented controls (79%).
- The molasses-urea supplement shortened the interval from calving to conception by one month.
- The greatest response in terms of weaner productivity occurred in the molasses-urea supplemented group.
- Over the three mating seasons, a pregnancy rate of 85% overall has been maintained. A restricted mating season, control of infertility diseases and supplementation have probably all been contributory factors.

This work is continuing but the time of calving will be modified to a period which is more representative of the usual time of calving in north Queensland.

*—Beef Cattle Husbandry Branch.*

# Boar Performance Test Report

BOARS "approved" under the Boar Performance Testing Scheme at Rocklea during September 1972 are listed below. Average boars score 50 points for economy and 50 for carcass. Points scores can be compared only with those of boars of the same breed.

| Breeder | Ear Number | Q.A.R. Number | Points Score | | |
|---|---|---|---|---|---|
| | | | Economy of Production | Carcass Quality | Total |
| **LARGE WHITE** | | | | | |
| WITHCOTT STUD PIGGERY, Rowbottom Street, Middle Ridge, Toowoomba, Q., 4350 | SIRE: Delvue Long Lad 818<br>DAM: Withcott Jewel 580 | | | | |
| | 2552 | 514 | 48 | 54 | 102 |
| | 2554 | 515 | 61 | 63 | 124 |
| **LANDRACE** | | | | | |
| NORTHLEA STUD FARM, care of K. P. Fowler, 156 Hogg Street, Toowoomba, Q., 4350 | SIRE: Northlea Superman 2892<br>DAM: Lynangana Storm Queen 579 | | | | |
| | 4228 | 516 | 71 | 60 | 131 |
| | 4229 | 517 | 63 | 49 | 112 |


### Potatoes Are Food News

*NEVER neglect the humble potato: it's one of our cheapest, most versatile and nourishing foods.*

Potatoes are a major item in our diet, and we can make even better use of this valuable vegetable when we know more about its characteristics.

For example, it's important to choose potatoes that are not cracked or distorted. These have poor cooking quality. Another tip is to buy potatoes of uniform size so that they all need the same cooking time. This way, you avoid the nuisance of having some over-cooked and some under-cooked in the same pot.

To prevent after-cooking darkening, select potatoes that are not cracked or bruised. Adding a teaspoon of lemon juice when cooking will ensure that there's no discoloration.

If the potatoes are sold under their varietal names, you can be even more selective in your purchases. The popular, pink-skinned Pontiac is ideal for mashing and baking. Kennebec and Sebago are varieties with good chipping, salad and general purpose qualities. Sequoia and Exton tend to slough away and become mushy when cooked.

The best way to cook crisp, chipped potatoes is to cut them to the required size, put them in a bowl of very cold water for 45 to 60 minutes, and then drain and dry them well. Heat the fat or oil to 380 deg. F. and keep it at that temperature while the potatoes are cooking. After cooking for 5 minutes, drain the chips thoroughly and eat them immediately.

*—Adapted from Victorian Department of Agriculture Press Items.*

★ ★

### Handy Home Hints

ALWAYS leave an old pair of comfortable, low-heeled shoes in the car and change into these when driving. Good shoes can be ruined by scuffing at the back when driving.

Umbrella trees are very popular in south-eastern Queensland. When planting, just remember they are strong surface rooted plants, and, in time, grow into big trees. If your house is on stumps, there is little to fear, but concrete floors or walls could be damaged in time, so set the tree out in the garden away from the house.

Save the cardboard cylinders from grease-proof and foil rolls. They make ideal bon-bons for the children's Christmas stockings, and can be filled with sweets or nuts, and rolled in decorative paper, twisted and tied at the ends.

When garments with zips come back from the dry cleaners their zips are sometimes stiff and difficult to use. Remedy this by carefully rubbing both sets of teeth with the end of a candle. The zip will then run smoothly and easily.

If you have difficulty parking your car in the garage, dangle a tennis ball attached to the roof of the garage by a string at a point that, when the car is neatly parked and the door shut, the tennis ball will touch the front of the bonnet. As soon as the ball moves, indicating the car is touching, you are parked so that the door will shut.

Remnants of vynex make very attractive table mats when cut round with pinking shears. The beauty of this is you can make sets

of various colours and the size suitable for your own requirements. It works out quite inexpensive.

Be prepared for unexpected visitors: make a large number of small tart shells, seal in an airtight tin or jar and, when needed, fill with lemon spread or stewed apple topped with fresh whipped cream. There are many other fillings you can use. If tart shells are well sealed they keep fresh for weeks, but if they do get soft pop them back into a hot oven for a few minutes and they will be crisp again.

If going on a caravan, or camping, holiday this summer, take your folding plastic covered clothes airer, with some plastic clothes pegs attached. Very handy to leave erected outside the door for drying towels, bathers or small garments.

★ ★

**Every Child Should Be Wanted**

CHILDREN are something special. They are the tangible proof of two people's love for each other: at least that is what they should represent.

Unfortunately today too many children are born as the result of two people's sexual urge: they are an accident. These children may go through life without feeling the security of being loved by their parents just because they were not wanted.

For many of Queensland's illegitimate babies (about 12%) this feeling of not being wanted by one or both of their parents is more than made up for by the fact that they are desperately wanted by young couples anxious to adopt them to form their own family. These children are indeed fortunate: not so fortunate are the children of married couples who are not really wanted by their parents.

Sometimes these children, an accident of conception, are well accepted after their birth makes them a reality: they become accepted as themselves. Others have been conceived as a means of holding a broken marriage together, still others are regarded as a loathsome responsibility—what a terrible start for any life.

If these children are not actively rejected by their parents they may be made to feel that they are a nuisance, to be seen and not heard, to be tolerated. In other instances one or other parent, feeling guilty about their antoganism to their child, will over-compensate and become over-loving and over-protective. The chances of any of these children growing into happy, well-adjusted, contented adults are slim.

A parent's responsibility doesn't cease with the conception of a child: it only begins. It is tragic that in Queensland nearly 4,000 babies were born without both parents accepting the responsibility for their child. There are many reasons for this but perhaps the most frequent cause is that physical attraction and its gratification have been regarded as more important than an adult approach to sex and love.

The attitude of those involved can be likened to people hearing of a road accident in which a number of people were killed, "Oh well; that's life! It would never happen to me. I'm safe."; and then being killed in a similar accident the following day. It is as easy to become an unmarried parent as it is to have intercourse—no one is completely "safe".

Each person in the community is responsible for his or her own actions: no one else is responsible. It is interesting that, in our democratic society where people are anxious to retain their independence of thought, people accept responsibility for what they regard as their pleasurable activities but look to the community to shoulder the responsibility for any activities that involve personal hardship.

In conceiving a child, the parents of the child accept the responsibility for another life and for all that this entails, its birth, its shelter, its food and its protection, no one else is responsible.

Any further information on this or other matters concerning children, may be obtained by personal communication with the Maternal and Child Welfare Service, 184 St. Paul's Terrace, Brisbane, or by addressing letters to Post Office Box 285, Broadway, Brisbane, 4000.

# Cakes For Occasions

AMAZE your family and friends when celebrating an occasion by presenting them with one of these party-time cakes.

Strawberry Shortcake is always a favourite. The butter-rich cake is highlighted with swirls of whipped cream topped with mouth-watering strawberries.

A praiseworthy flavour combination is a unique twist in the Passion Fruit Cake.

The tangy refreshing flavour of apricots lends interest to Apricot Dessert Cake which is high and light, topped and filled with creamy marshmallow.

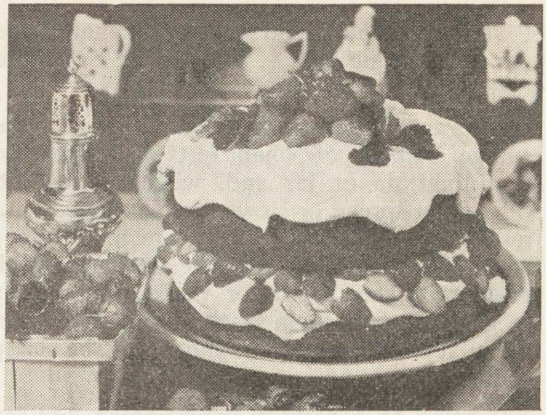
Chocolate, always a favourite, is featured in Chocolate Delight Cake.

In the recipes, a standard 8-oz. measuring cup is used. All spoon measurements are level.

**Strawberry Shortcake**

3 oz. butter, very soft
8 oz. (2 cups) self-raising flour
¼ teaspoon salt
8 oz. (1 cup) castor sugar
8 tablespoons milk
3 egg yolks
Little vanilla essence

Sift flour, salt and sugar together. Chop butter finely into flour mixture with either a cake beater on slow speed or knife. Add three-quarters of the milk and beat until smooth, then add yolks, remaining milk and vanilla and beat for 2 minutes. Turn into two 7½-in. sandwich tins buttered and lined on the bottom with paper. Bake in moderate oven (350 deg. F.) for 25 to 30 minutes. Turn out on to cake coolers. Cool.



*Strawberry Shortcake*

FILLING AND TOPPING

½ pint cream
1 tablespoon castor sugar
½ teaspoon vanilla essence
1½ cups strawberries

Whip cream with sugar and vanilla lightly. Spread half the cream on bottom layer of cake. Slice half the strawberries and place on cream. Place on top half and spread with remaining cream. Pile whole strawberries in the centre and decorate with strawberry leaves. Serves six to eight.

**Passion Fruit Cake**

3 oz. butter
4 oz. (½ cup) castor sugar
3 eggs
8 oz. (2 cups) self-raising flour
4 tablespoons milk
Pinch salt
Pulp of 2 to 3 passion fruit (fresh or canned)
¼ teaspoon pink colouring

Butter an 8-in. round cake tin, line base with paper. Cream butter and sugar. Beat in eggs gradually. Lightly mix in sifted flour and salt alternately with milk and pink colouring. Fold passion fruit pulp through the mixer and place in prepared tin. Bake in a very moderate oven (325 deg.) for 40 to 45 minutes. When cold, ice with passion fruit icing.

PASSION FRUIT ICING

1 oz. (1 tablespoon) butter

5 oz. (1 cup) icing sugar

Pulp of 1 to 2 passion fruit (fresh or canned)

Soften butter, gradually work in sifted icing sugar and passion fruit pulp. If too stiff add a few drops of water. Yields 20 slices.

**Apricot Dessert Cake**

5 oz. (5 tablespoons) butter

7 oz. (1 scant cup) castor sugar

1 teaspoon vanilla

½ teaspoon almond essence (or extra vanilla)

3 eggs

1 teaspoon lemon juice

½ cup milk

10 oz. (2½ cups) self-raising flour

Cream butter, sugar and essences. Add eggs one at a time, beating thoroughly after each. Combine lemon juice and milk, and add alternately with sifted flour, beating smooth after each addition. Turn mixture into two buttered round or square 8-in. sandwich tins. Bake in moderate oven (350 deg.) for 25 minutes. When cold, split each layer into two and sandwich together with Marshmallow Apricot Butter Cream.

MARSHMALLOW APRICOT BUTTER CREAM

*Part* 1. *Marshmallow*

1 teaspoon gelatine

6 tablespoons water

6 tablespoons sugar

Place all ingredients in a saucepan over heat, dissolve slowly, stirring constantly. Boil 2 to 3 minutes. Allow to cool and when starting to thicken, beat until white and creamy. Prepare Part 2 while this is cooling.

*Part* 2. *Apricot Butter Cream*

3 oz. (3 tablespoons) butter

10 oz. (2 cups) icing sugar

6 oz. (¾ cup) apricot jam

½ cup finely chopped glace apricots

¼ cup finely chopped angelica

Soften butter and gradually work in sifted icing sugar. Add jam and mix well together. Fold in marshmallow. To one-third add glace fruits, mix thoroughly and spread between cake layers. Cover top and sides with remaining frosting. Sprinkle sides with toasted coconut. Decorate top with pieces of glace apricots and angelica. Serves 12 to 14.

**Chocolate Delight Cake**

2 oz. cream cheese

3 oz. butter

1 teaspoon vanilla

1½ cups (7½ oz.) sifted icing sugar

1 tablespoon hot water

1 oz. dark chocolate, melted

3 eggs

9 oz. (2¼ cups) self-raising flour

¾ cup milk

Pinch of salt

Beat butter, cream cheese and vanilla till smooth. Blend in half the icing sugar. Add water alternately with remainder of icing. Blend in melted chocolate, then eggs and beat 1 minute. Fold in sifted flour and salt alternately with milk. Pour into two buttered and paper lined 8-in. sandwich tins. Bake in moderate oven (350 deg.) for 35 to 40 minutes. Cool. Fill and frost with Chocolate Frosting.

CHOCOLATE FROSTING

2 oz. (2 tablespoons) butter

2 oz. cream cheese

1½ cups sifted icing sugar

1 oz. melted chocolate

Few drops rum

Beat butter, cream cheese and icing till light and fluffy, add chocolate and rum and fill and frost cake. Decorate with walnut halves. Yields 24 slices.

# Subject Index to Volume 98 (1972)

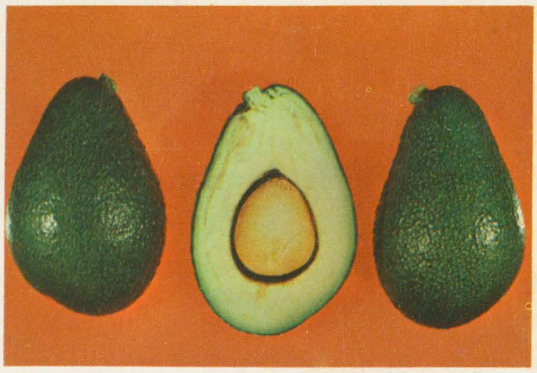
## Index to Pages and Parts

| Pages | Month |
|---|---|
| 1–56 | January |
| 57–112 | February |
| 113–168 | March |
| 169–224 | April |
| 225–280 | May |
| 281–336 | June |
| 337–392 | July |
| 393–448 | August |
| 449–504 | September |
| 505–560 | October |
| 561–616 | November |
| 617–674 | December |

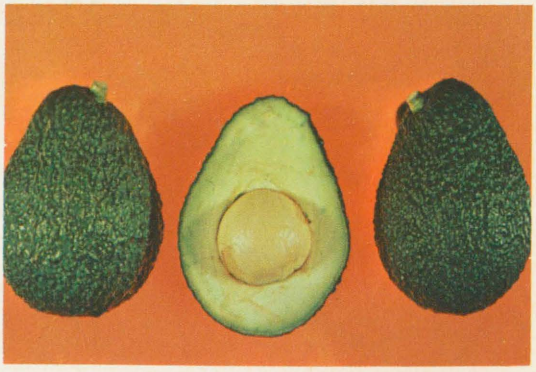
S. G. REID, Government Printer, Brisbane

# LIFT YOUR PER-ACRE OUTPUT THROUGH THE DEPARTMENT OF PRIMARY INDUSTRIES

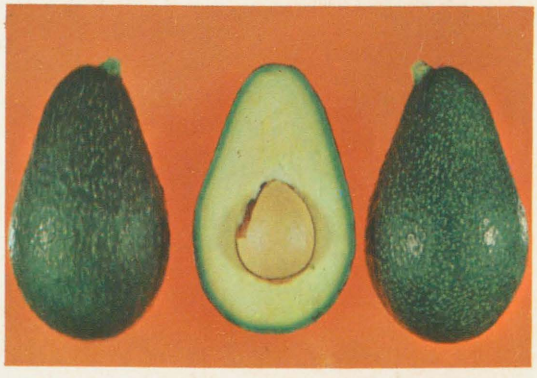
# Popular Avocado Varieties



FUERTE. The creamy to yellow flesh is of high quality. Fruit is harvested from April to August in coastal districts and weighs from 8 to 15 oz. The established tree is of large proportion and spreading habit: density per acre approximately 60 trees. Fuerte is the most popular variety in Queensland and makes up more than 40% of the total avocado tree population. This variety is prone to fruit rots.



HASS. This variety has excellent flesh quality. It is late maturing and is harvested from August to October in coastal districts and as late as January on the tablelands. The fruit is small, 6 to 10 oz., and the skin changes from shiny green to purplish black as the fruit matures. The tree is large and upright: density per acre approximately 75 trees. Hass accounts for about 25% of Queensland's total avocado tree population.



SHARWIL. Fruit of Sharwil has excellent flesh quality and weighs from 10 to 14 oz. It yields better in coastal districts than on the tablelands. On the coast, harvesting begins in June and continues until late spring. The tree is strong-growing and of medium height: density per acre approximately 75 trees. The Sharwil variety accounts for more than 20% of Queensland avocado trees under 5 years old.

RINCON. Flesh quality is slightly inferior to that of Hass, Fuerte and Sharwil, and the seed is larger. The increasing popularity of Rincon is its regular cropping habit and ease of harvesting. It grows only 10 to 12 ft. high and tree density can reach 130 per acre. The fruit, which weighs from 8 to 13 oz., has a shiny, green skin and is harvested from June to September.