Peanuts for the Ord

Department of Agriculture, Western Australia

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Peanuts for the Ord?

By officers of the Soils Division

Peanuts were extensively tested in experiments on the Ord River in the early 1950s, but it is only recently that varieties better adapted to heavier soils have re-opened prospects of commercial production.

The new varieties remain dormant after maturity and an irrigation just before harvesting allows the crop to be lifted with the soil friable enough to reduce harvesting losses and the amount of soil sticking to the kernels. These varieties have been extensively tested in Department of Agriculture trials at Kimberley Research Station since 1958, and preliminary recommendations for crop production and pest and disease control have been formulated.

Japan appears to offer the best market prospects, particularly for small kernels for the culinary trade, although oil markets are also likely to take a large proportion of the crop. Calculations using 1974 figures suggest that peanuts could return a net profit of $85 a tonne, and yields of at least 1.5 t/ha should be obtainable.

Trials were carried out on both main types of peanut—Spanish and Virginia Bunch. Spanish varieties have an erect growth habit with a small, pink roundish kernel and Virginia Bunch types are semi-prostrate with large, elongated pink kernels. Both commence flowering 20 to 25 days after emergence and continue flowering until day 80. Spanish varieties mature in 100 to 110 days and Virginia Bunch varieties in 100 to 140 days.

Land preparation and planting

A fall of more than 6 cm/100 m appears to be necessary for peanuts, and two landplanings may be needed to level out natural and plough irregularities. Previous crop residues are best ploughed in with a two-way disc plough. A single 12 to 15 cm ploughing is usually sufficient on light soils, but two ploughings appear to be necessary on the heavier Cununurra Clay soils. The irrigation blocks can be furrowed out and fertilised in one operation, placing ridges 90 cm from centre to centre.

Before planting the land should be pre-irrigated to germinate weed and crop seeds which can then be cultivated out. This is done in late November to early December, just before planting. The herbicide trifluralin can also be applied and incorporated into the soil during this operation.

Planting can be combined with the cultivation/trifluralin operation and aims to place the seed 5 to 8 cm deep in compacted soil in the ridges.

Virginia Bunch types should be planted in late December on light soil types, using a seeding rate of 90 to 100 kg/ha to produce some 110 000 plants/ha. Spanish types should be planted from the end of January to mid-March, at a rate of 100 to 120 kg/ha, producing some 240 000 plants/ha. Seed of both types should be dusted with a 1:1 Ceresan/Captan mixture at a rate of 55 g per 45 kg bag of seed. Diammonium phosphate fertiliser at 100 kg/ha has proved adequate for peanuts on Ord River soils.

Planting to harvesting

Wet season rains are irregular and supplementary irrigation is needed during dry periods.

Cultivation to control weeds should be started immediately after emergence of the peanuts, and continued until the peanuts begin pegging down. Broad leaved weeds are the main problem, as trifluralin will not control them. They may need to be hand-pulled from crop rows.

Pests and diseases have not proved a serious problem and it is possible that December planted Virginia Bunch varieties will need no chemical treatment. Spodoptera may cause some damage to late planted crops, however, and the later planted Spanish crop may need up to four sprays using moderate rates of Parathion.

The leaf spot fungus Cecospora spp. has caused serious losses, and even complete defoliation, but can be controlled by a number of fungicides. Benlate at 140 g/ha in 280 litres of water and 2 litres of spraying oil gives successful control, providing spraying is begun as soon as the first signs of the fungus appear. Peanut rust has also appeared on the Ord but its likely economic effects are uncertain. Mancozeb (Dithane M. 45) should give control if required.

Harvesting

Peanuts are harvested at maturity after the kernels have turned pink, the shells brownish, and the kernels are free of the shell. The peanuts
are cut and pulled, windrowed, dried and shaken to remove soil. After four to five days' drying they are threshed to remove the nuts from the plants.

Removing soil has been the greatest obstacle to peanut production on the Ord, but a pre-cleaner which is 95 to 99 per cent successful has allowed almost complete separation of shells from other materials. The shells can then be dried to 10 per cent moisture in bags or bulk.

Dried nuts in shell can then be deshelled, screened, graded and cleaned/selected for sale. Cool store facilities (at 4°C and 60 per cent RH) are necessary to store seed kernels or confectionery kernels awaiting shipment.

Ryegrass control recommendations proved effective

By G. A. Pearce, Plant Research Division

Although it is a productive pasture grass in the agricultural areas, annual (“Wimmera”) ryegrass (Lolium rigidum) has two major disadvantages: the dormancy of a proportion of its seeds makes it an important weed in cereal crops and it can be involved in the “annual ryegrass toxicity” problem.

Recommendations for the control of annual ryegrass, and therefore annual ryegrass toxicity, have been shown effective in two continuing trials near Katanning.

In a herbicide trial including grazing, seed numbers were reduced by as much as 97 per cent over an 18-month period; and in burning trials by as much as 92 per cent after a single burn. Counts for nematode galls and bacteria on

seeds were also reduced to near zero by burning on properties suffering from regular outbreaks of annual (“Wimmera”) ryegrass toxicity.

**Herbicide trial**
The herbicide trial reported here was started in 1973 to investigate the effectiveness of various treatments in reducing the density of annual ryegrass in a clover pasture. The treatments were applied, with three replications, on 60 m by 20 m plots on an old ryegrass-dominant subterranean clover-based pasture.

Grazing associated with the trial was varied according to the feed available and was as intense as 100 sheep per hectare for four weeks during the 1974 spring. The treatments shown in Table 1 were applied in 1973.

Results for 1973 (Table 1) indicate that, despite the reduction in seed stalks, sufficient seed was produced to re-establish the ryegrass population. In spite of this, on plots where the ryegrass density was halved, the subterranean clover was in a better position to compete and produce a better quality pasture.

In 1974, grazing alone prevented the formation of most seed heads and sheep were removed at the end of September. However, cool conditions and occasional rain caused some ryegrass to continue growing and the spring treatments were delayed until October 21. The plots were then sampled for seed production in January, 1975.

Although the results indicate that complete eradication of the ryegrass is unlikely to be achieved by these control methods, it is obvious that heavy grazing, or a combination of grazing and herbicide treatment, can considerably reduce the ryegrass population in a pasture. The reduced population should reduce the risk of ryegrass toxicity appearing.

**Table 1—The effect of grazing and Gramoxone application on annual ryegrass in a clover pasture**

<table>
<thead>
<tr>
<th>Treatments (Grazing—Gramoxone)*</th>
<th>Mean counts per 400 sq cm</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Plants 22/8/73</td>
</tr>
<tr>
<td>1. Nil</td>
<td>...</td>
</tr>
<tr>
<td>2. 1.4 l/ha winter</td>
<td>10.6</td>
</tr>
<tr>
<td>3. 1.15 l/ha winter</td>
<td>10.6</td>
</tr>
<tr>
<td>4. 1.4 l/ha winter and spring</td>
<td>8.3</td>
</tr>
<tr>
<td>5. 1.15 l/ha winter and spring</td>
<td>9.0</td>
</tr>
<tr>
<td>6. 1.15 l/ha spring</td>
<td>91.8</td>
</tr>
<tr>
<td>7. Grazing only</td>
<td>...</td>
</tr>
</tbody>
</table>

*Winter Gramoxone applications were made in July and treatments include grazing. Spring applications were made in September or October and treatments include grazing.

**Table 2—The effect of burning on the survival of annual ryegrass seed and associated nematode galls and bacteria**

<table>
<thead>
<tr>
<th>Site 1—No./400 sq cm</th>
<th>Site 2—No./400 sq cm</th>
<th>Site 3—No./400 sq cm</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Unburnt</td>
<td>Burnt</td>
</tr>
<tr>
<td>Viable seed</td>
<td>2421</td>
<td>351</td>
</tr>
<tr>
<td>Galls</td>
<td>15.3</td>
<td>0*</td>
</tr>
<tr>
<td>Bacteria</td>
<td>12.9</td>
<td>0</td>
</tr>
</tbody>
</table>

* Twenty five galls were found but all contained dead worms. **Fifty per cent of surviving galls contained dead worms.
and also reduce the intake of rye-
grass.

**Burning trials**
The effect of burning annual rye-
grass on the survival of viable seed,
nematode galls and toxic bacteria,
was tested on three 60 m by 80 m
plots in pasture similar to that used
for the herbicide trials. Sites 1 and
2 were burnt on December 20 and
site 3 on January 20, by which time
a larger proportion of the seed had
shed and thus could escape some
effects of the fire. Ten 400 sq cm
samples were collected from each of
the plots and a control area immedi-
ately after the fires. The samples
were tested for viability, nematode
galls and bacteria. Results are
shown in Table 2.

The viability of seed surviving
the fire was about 10 per cent, in-
dicating that burning may be the
most effective means of reducing
and pasture areas, perhaps account-
ing for up to 99 per cent of the
seed.

It was also a very effective means
of killing the nematode galls and
bacteria known to be associated
with annual ryegrass toxicity.

However, it should be noted that
because of variations in the heat of
fires caused by pasture density and
climatic factors, the high levels of
control obtained in this trial may
not necessarily be repeated in a
paddock-scale fire.

### Drop inlet spillways for gully dams

*By C. R. Coffman, Adviser, Irrigation and Drainage Branch*

Spillways of gully dams are very
subject to erosion because of the
difficulty of maintaining a protec-
tive grass cover when the stream
flows continuously through winter
and perhaps well into summer. At
the same time, although concrete
drop inlets (or pipe spillways) can
be designed for continuous flows as
well as the occasional storm flows,
the cost of large concrete structures
is so high that a combination of
drop inlet and emergency by-pass is
suggested as a most economical and
practical safety measure.

Concrete drop inlets for dams are
a long established engineering tech-
nique for dealing with dam over-
flow. They have been used in flood
control and irrigation projects in the
United States and elsewhere but are
virtually unknown to Western Aus-
tralian agriculture. The general
layout is summarised in the figures.

Drop inlets are most easily in-
stalled in new constructions but they
can fairly readily be placed in walls
of existing dams with spillway prob-
lems. This article includes a chart
of pipe-size selections suited to most
streams in the South-West and indi-
cates installation procedures.

It is suggested that the risk of
spillway erosion of gully dams can
be greatly reduced by installing a
concrete drop inlet to take the
normal stream flow, using a grassed
by-pass spillway to cope only with
the occasional storm flows.

**Designing the drop inlet**
Experience with the design of
several drop inlet systems in the
South-West indicates that the top of
the drop pipe should be 30 to 50
cm below the level at which the
by-pass spillway will flow. At the
same time the settled (surveyed)
height of the dam wall should be
at least 90 cm above the floor of
the spillway, making the top of the
drop pipe 120 to 140 cm below the
settled crest height of the dam wall.

Knowing these measurements for
a particular or proposed dam allows
calculation of the height or head
(H) of the drop pipe down to a
firm, undisturbed footing.

To allow selection of pipe
diameter, the average or normal
winter stream flow must be esti-
mated in cubic metres per second.
This can be done as carefully as
possible by measuring a representa-
tive cross-section of the stream in
square metres, then timing the
movement of a stick or float along
a measured 10 or 20 metre level
section of the stream to find the

**Pipe Diameter Selection Chart**

*Note: metric diameters are nominal*

<table>
<thead>
<tr>
<th>Diameter of outlet pipe</th>
<th>Pipe diameter in metres</th>
</tr>
</thead>
<tbody>
<tr>
<td>225 mm (9 in)</td>
<td>10</td>
</tr>
<tr>
<td>300 mm (12 in)</td>
<td>9</td>
</tr>
<tr>
<td>375 mm (15 in)</td>
<td>8</td>
</tr>
<tr>
<td>450 mm (18 in)</td>
<td>7</td>
</tr>
<tr>
<td>525 mm (21 in)</td>
<td>6</td>
</tr>
<tr>
<td>600 mm (24 in)</td>
<td>5</td>
</tr>
</tbody>
</table>

**Flow F in cubic metres/second**

<table>
<thead>
<tr>
<th>mm</th>
<th>(inches)</th>
</tr>
</thead>
<tbody>
<tr>
<td>450</td>
<td>(18)</td>
</tr>
<tr>
<td>525</td>
<td>(21)</td>
</tr>
<tr>
<td>600</td>
<td>(24)</td>
</tr>
<tr>
<td>675</td>
<td>(27)</td>
</tr>
<tr>
<td>750</td>
<td>(30)</td>
</tr>
<tr>
<td>825</td>
<td>(33)</td>
</tr>
<tr>
<td>900</td>
<td>(36)</td>
</tr>
<tr>
<td>1050</td>
<td>(42)</td>
</tr>
<tr>
<td>1200</td>
<td>(48)</td>
</tr>
</tbody>
</table>

**Diameter of drop pipe**

21

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flow in metres per second. Multiplying the two results together gives stream flow in cubic metres per second (F).

**Using the selection chart**

Locate values for H (height of drop pipe) and F (estimated normal stream flow) and read off, on the separate line below the chart, the required diameter of the drop pipe. This will be directly below the F value.

Where the H and F values coincide on the body of the chart the nearest curved line indicates the required diameter for the outlet pipe. If the meeting point falls between two lines it is best to select the nearest curved line to the right as this has the bigger diameter and gives the bigger safety margin. The required diameter of the outlet pipe is marked at the top of the chart.

In the example shown on the chart, with H at 3.6 m and F at 0.6 m³/second, the required diameter of the drop pipe is 525 mm and of the outlet pipe 300 mm.

For convenience, standard well liners are often used as a drop pipe, and in the example given would be suitable but oversize.

The length of outlet pipe needed is best measured on-site once the positions of the drop pipe and the toe of the downstream batter are known. However, it can also be estimated as equal to twice the maximum height of the dam wall, plus the crest width of the wall, plus 5 m (this assumes that the downstream batter is 1 in 2, the upstream batter is 1 in 3, and that the outlet pipe will be laid along the stream's mid-line.

Further details for design and construction of drop inlet spillways are available from the Department of Agriculture.

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**TOP** — Cross section through dam wall showing heights of the wall as constructed and when settled; and of the emergency by-pass relative to the top of the drop inlet

**CENTRE** — Plan of general layout for a dam with a drop inlet spillway. Note that the emergency by-pass should have a wide, flat bed which is well grassed. The length of the by-pass depends on where it can discharge safely.

**BOTTOM** — The crest of the wall should be distinctly arched when freshly built to allow for settling.