1-1-1980

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Pasture establishment on old land in high rainfall regions

By D.A. Nicholas*

Release of a range of new clovers has given farmers along the south coast of Western Australia the opportunity to improve old land pastures. Some methods to establish these new clovers are presented here.

Many pastures which once contained 40 to 100 per cent clover now contain less than 10 per cent clover. Reduction in the clover has in many instances been associated with reduced animal performance and carrying capacity. The deterioration of pastures is considered due to any of a number of factors — clover scorch disease (Kabatiella), clover root rot diseases, poor seasons, undergrazing or repeated cropping. Such adverse conditions are better tolerated by recently released clover cultivars (“cultivated varieties”) than most of the older cultivars.

However attempts at establishing the new clovers on old land have revealed many problems, particularly in high rainfall areas. This is in marked contrast to the simple and reliable establishment that can be obtained on new land.

Principles of establishing clover on old land in 600 mm and higher rainfall areas are discussed in this article and some methods which can be used are also outlined.

Competition from other species
Clover sown into old land has to compete with many other plants for nutrients, space and light. If competing plants are not controlled they can choke out the newly sown clovers because of their high density or by their growth habit. This competition must be reduced — even if it results in a temporary reduction in pasture production.

Time of sowing
Clover sown directly into a pasture one week or more after the existing pasture has germinated will almost certainly grow poorly or die due to the severe competition from already established plant species and attack by insects. Sowing at or before the opening rains, allows the clover to compete on more favourable terms with the regenerating pasture.

Sowing dry, before the break of the season does carry the risk of losing the readily germinable clover seed if a false break is experienced. However, providing seeding is delayed until either early opening rains are received or until late March, whichever is the earlier, the risk is greatly reduced. Usually along the south coast, if enough rain is received after early April to promote a germination there will be sufficient follow up rain for continued plant growth. Results with the dry sowing method have been excellent and it can be combined with the normal top-dressing programme. Early sowing also minimises losses in production.

Where seeding is delayed after the opening rains, the delay should be minimised. Seeding should be by the 1st June at the latest.

Delays in seeding make it harder to kill unwanted species; growth is slower, due to the colder, waterlogged and overcast conditions; clover seed production is reduced; and damaging insects are more prevalent.

Weed control before seeding
If seeding has to be delayed until after germination, the growth of the regenerating pasture must be checked or stopped. This applies both to “false break” germination (such as of...
An example of pasture growth in July after dry sowing in late March.

capeweed) and to that following the normal opening to the season. Cultivation by scarifying or discing can be effective but this may give poor control with long periods of wet weather, and it may be impossible to get back on to the land for further cultivation or seeding. Herbicides offer an alternative.

Where annual grasses and broad-leaved weeds such as capeweed are present, Sprayseed at 1.5 to 2 L/ha is effective and where only broad-leaved weeds such as capeweed are to be controlled, Reglone at 350 to 400 ml/ha (no wetting agent) will be effective.

For best results with these sprays, pastures should be grazed continuously and heavily until two or three days before spraying so that root development is restricted and plants are small. Also spraying should preferably be within two weeks of a full germination when pasture is growing actively. Seeding should follow within two to four days.

Where only young germinating clover is to be killed, a low rate of dicamba (350 to 500 ml/ha) should be used. However dicamba can have a residual action, particularly under dry conditions.

Very limited experience has shown that clover establishment can be satisfactory when seeding is delayed for a week using 350 ml/ha of dicamba and soil conditions are damp. Docks and sorrel present particular problems. Both weeds are often plentiful in rundown pastures, are prolific seed-producers and are most susceptible to sprays that unfortunately also kill clover. Where dock or sorrel is particularly dense, control should begin a year or two before reseeding, as described below.

While dicamba can be effective against seedlings of dock and sorrel, it delays seeding. Even when all seedlings are killed before pasture seeding, further germination of dock and sorrel can occur. This can be held in check by a dense, vigorous clover pasture. Other methods, such as spray-graze can be used in an established pasture.

Kikuyu and couch grass pastures usually require special treatment. In most situations the best method of reducing a thick mat of stems and roots is to heavily graze with sheep. Cultivation can result in a very rough, cloddy paddock which is hard to work. Growth of kikuyu and couch during winter is slow and offers little competition to sown clover.

Weed control the previous year

Competition from other species can be greatly reduced if the paddock is cropped for grain or hay, in the year before pasture reseeding. By killing weeds such as dock and sorrel in the crop, the number of seedlings in the next year can be greatly reduced. Grasses and capeweed can also be effectively controlled.

Where cropping is not feasible, some control of broad-leaved weeds is still possible. The spray-graze technique, using 750 ml/ha of 2,4-D amine six to eight weeks after germination followed a week later by heavy grazing with sheep, is effective against capeweed, dock, doublegeee, annual thistle and turnip. Note however that there are restrictions on areas where 2,4-D amine can be used.

Annual ryegrass is not normally a problem in high rainfall areas, but if necessary the spray-top technique can reduce the seed set. This involves grazing heavily up to flowering and then applying Sprayseed at 880 ml/ha. The technique has also shown promise in controlling brome grasses. Clover seed production is not seriously affected.

Control after seeding

Despite good control of weed species before seeding and good grazing management, in some cases, weeds
may start to dominate the pasture by June or July.

Broad-leaved weeds can be controlled by the spray-graze techniques or where both annual grasses and weeds are present, an alternative is to use a low rate of Spraysad. Provided that the clover has six or more trifoliate leaves, 650 to 750 ml/ha of Spraysad will do little lasting damage to the clover, although some immediate loss in production should be expected. Small capeweed plants can be controlled by Reglone at 350 to 400 ml/ha, without a wetting agent.

Annual grasses can be controlled by heavy grazing, but for chemical control, use Grammoxone at 450 ml/ha. A number of post-emergent herbicides are showing promise for grass control. An example is Surflan at 500 grams of active ingredient per ha. While Surflan is currently quite expensive it does give control over a longer period.

The herbicide method can also be used directly on old pastures to increase the clover content. Some clover, at least 10 to 15 per cent of the total pasture is suggested, should be present before the method is used. If the clover content is very low or a new cultivar would be useful, a reseeding programme will be required.

When chemicals are used to control weeds, moderate to severe losses in total pasture production can result and there may also be transient damage to the clover. These losses may require a change in stocking rate.

Seedling

For good establishment, seed should be covered with soil — 10 to 15 mm deep on sandy surfaced soils, and 5 mm deep on heavier soils. This may require cultivation before seeding even when herbicides have been used, unless suitable seeding equipment (a combine or drill) is available. A more even depth of seeding can be achieved if most of the stubble or pasture residues is removed by either burning or grazing.

Germination and establishment of clover will be poor if seed is simply dropped on to the surface of the ground. The risk of losses from partial germinations is high and germinating seedlings find it difficult to penetrate the soil surface.

Although a combine can be used where little residue remains, a disc drill will give better results in many situations. A triple disc drill enables accurate seed placement even in kikuyu paddocks if suitably prepared.

Where a paddock has been renovated or cultivated before seeding, the seed can be dropped on the surface and covered with harrows. On sandy surfaced soils, heavy stocking can be used to trample some seed into the ground when equipment is unavailable. In all situations seed should be applied evenly. This is difficult to achieve with low rates of seed when using a spinner type of topdresser. Where a spinner is used, the seed should be thoroughly mixed with fertiliser and the distance between runs reduced to 30 to 50 per cent of normal.

Rolling after seeding on loose, sandy-surfaced soils can help promote a faster and more even germination. However the use of a roller can be limited in areas prone to erosion by wind and water.

Insects

Insect populations in old pastures can increase to high levels and ruin a reseeding programme.

The main pest of germinating clover is red-legged earth mite. It is particularly a problem if the clover is planted a week or more after the break to the season. By that time the mites have usually hatched and will attack any germinating clover.

With up to 5,000 mites or more per square metre and usually less than 100 clover plants per square metre, the clover is under great threat. Clover seed can be treated with a systemic insecticide (dimethoate or omethoate), although to be effective the seed must germinate within a week of treatment.

Blanket sprays are also effective. With dry seeding, spraying should be delayed until after the mites emerge — usually one to two weeks after the break. Where seeding is carried out after the break, spraying should be undertaken within one week of seeding. If mite numbers increase again further sprays could be warranted for first year clover.

Lucerne flea can occasionally cause losses — but usually they are only obvious in spring. Withholding periods for the various chemicals should be observed. Further information on sprays is available from the Department of Agriculture.

Grazing

With poor management of grazing, clover can be lost from any pasture. Clover is well adapted to grazing and this character should be exploited. Pastures which are ‘nursed’, the equivalent of undergrazing, can allow grasses and broad-leaved plants to blanket out the clover.

Before starting a reseeding programme, the possibility should be considered of increasing clover content simply by either a high grazing pressure or a more consistent moderate grazing.

When using a herbicide before seeding, correct grazing management will help considerably. Heavy continuous grazing from germination up to two or three days before seeding will keep plant tops and roots small. The stock are removed before spraying to allow plants to make some leaf growth. This growth is then clean and not covered in dust, making the herbicide more effective.

Winter grazing of reseeded pastures can lead to pugging, particularly if a normal tyned cultivator has been used. If sheep are unavailable, heavy intermittent grazing with cattle may be all that is possible. Periods to graze should be chosen where possible when the soil has at least dried out a little.

Where the control of grasses and weeds has not been good, heavy grazing particularly during the first three months is necessary if the clover is not to be shaded out. If grazing is not possible or is not effective, herbicides should be used.

Time of seeding and the degree of competition affect the time when resown pastures should be first grazed. However, in most situations some grazing should begin within three to six weeks of germination. Grazing pressure should be maintained throughout the year to encourage the clover relative to other species, but then for good seed production from the clover, grazing pressure during spring should be moderate.
Under-grazed pasture. By grazing off in early summer, the clover germination will be improved.

Illustration of the effect of stocking rate on the clover content of pasture.

Other considerations

Inoculation
If good subterranean clover has been grown on the paddock in previous years, there is no need to inoculate or lime pellet the new seed. If seed is being treated with insecticide, inoculation would be wasted.

Seeding rate
A minimum of 8 kg/ha of seed should be used. Higher rates (10 to 15 kg/ha) result in a more rapid cover but the initial cost would be much higher.

Spraying
An even application of herbicide is essential and is best done by the careful operation of a well maintained boom spray.

Clover cultivar
Carefully choose the cultivar or mixture of cultivars to be sown, taking into account annual rainfall, soil type and risk of disease. There is usually no need to include in the mixture a cultivar which has been sown previously on the area as it is most likely that at least 10 kg/ha of that cultivar will germinate. However, with badly deteriorated pastures, where repeated cropping has taken place, or where all germinating clover is killed before reseeding, a previously sown cultivar could be included in the mixture.

Other species
Grasses and sometimes perennial clovers for particular situations are often included in the seeding mixture to improve the the overall quality and production of the new pasture. For example, grasses can give an “early bite” if sown at a high rate. However the main aim, that of re-establishing the clover, should not be forgotten and not more than 6 kg/ha of grass should be sown.

For high rainfall areas and on suitable soil types, perennial grasses such as Australian phalaris can be included. Cereals such as oats or barley at 15 to 20 kg/ha can be used as a cover crop — but they must be grazed off early so that the clover is not disadvantaged.

Fertiliser
Soil analyses and/or reference to paddock history will enable a suitable fertiliser application to be made.

Undersowing
Sowing clover under a crop is less likely to succeed on old land than new land—the competition from the crop and other species would be greater, and usually the crop would be sown later. Undersowing of crops which produce much dry matter, such as oats, cannot be recommended. Undersowing other crops could be considered providing sowing is before the end of May. Many crops, such as barley, are often not planted until July and such a late sowing date would not allow time for the clover to reliably produce enough seed.

Also, if undersowing, clover should not be sown too deeply. The crop is usually sown at 30 to 50 mm — far too deep for the much smaller clover seed.

Hay cutting
Although hay cutting can reduce the grass content of a pasture it can also reduce clover seed production. Therefore first year pastures should not be cut for hay.

Clover scorch disease
Providing tolerant cultivars are used, clover scorch should not be a serious problem. Under conditions ideal for the disease, some losses may occur, but these can be minimised by adequate grazing.

Long term regeneration
To encourage a good germination of clover in the following year, large quantities of dry residues should not remain on the paddock over summer. By grazing these off in early summer the softening process of the clover seed will be increased, increasing clover germination the subsequent year. Overgrazing should be avoided however, as it can cause erosion problems and also encourage the establishment of capeweed.

References
Farmnote 82/78 – Five new clovers bring changes in pasture recommendations.
Bulletin 3217 – The red-legged earth mite and lucerne flea in Western Australia.
Farmnote 64/79 – Control of dock.