

## Goat fencing

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Fences are being used successfully to contain all breeds of goats in many environments. They are one of the first improvements intending goat owners should consider for without good fencing goats will roam. This not only upsets neighbours, but also disrupts stock breeding programs.

This Agfact covers the following points in relation to fencing for goats:

- behaviour,
- conventional fences,
- electric fences, and
- upgrading existing fences.

Material costs vary with time and location, therefore comparisons of cost have not been made. But, to make costing easier, a list of materials used per kilometre is given for each type of new fence on flat ground. In hilly country more posts and other material will be needed.

The term '*prefabricated fencing*' describes materials such as Hinged Joint®, Ringlock®, and wire netting.

### Behaviour

Goats are intelligent, inquisitive animals who tend to test a fence more than other stock. Any fault in a fence is soon detected by goats. In particular goats test the lower third of the fence—especially the gap between the ground and bottom wire.

It is important to maintain the bottom wire close to the ground and at an even distance above it. Surface irregularities like gilgais, gullies or stump holes need to be filled or blocked. A bottom selvage wire and correct wire tension are good deterrents to goats

going under fences. Gaps under gates caused by washed out wheel tracks may need to be filled.

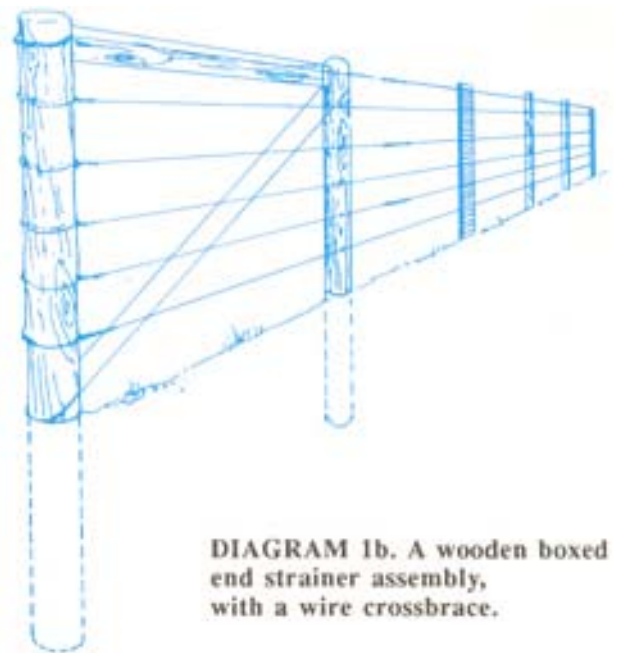
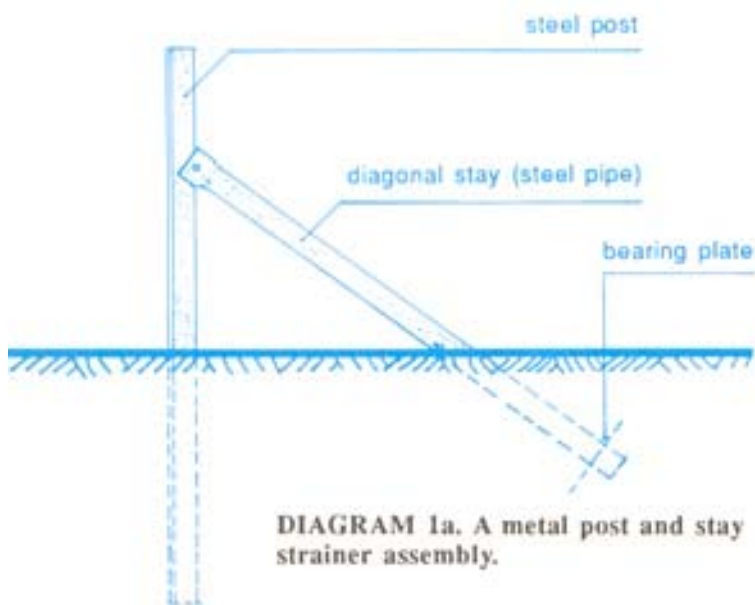
The climbing habit of goats—particularly kids—means fence lines must be clear of rocks, stumps, fallen timber, earth works or anything on which goats will climb and play. Any raised vantage point will provide a stage from which goats may clear a fence.

Domesticated goats rarely jump fences from the ground—except when they are being severely pressured, such as by dogs.

Fence strainer stays can also present an easy escape route. Large section angled stays on strainer posts need to be protected to prevent kids running up these and jumping out—round galvanised pipe angle stays are suitable. A boxed end assembly may be used when building new fences for goats.

**Goats will test a barrier—particularly the bottom third of the fence.**





**A boxed end assembly with offset electric wire on a new prefabricated fence. This is the best type of fence-end for goats—there is no large inclined stay for them to climb, only the strand of twisted wire (arrowed).**



Fences that contain crossbred ewes and lambs will, with some attention to detail, be suitable for goats. However, one type of prefabricated fencing—often called pig netting and described as 8/80/15\*—can be a problem with horned goats. In this type of fence where the vertical wire pickets are 150 mm apart, goats can easily get their head and horns through but may have difficulty in getting them out. A goat could become caught and die. Therefore, we do not recommend the use of prefabricated fences with vertical pickets less than 300 mm apart. This spacing allows goats to twist their heads more easily to free themselves.

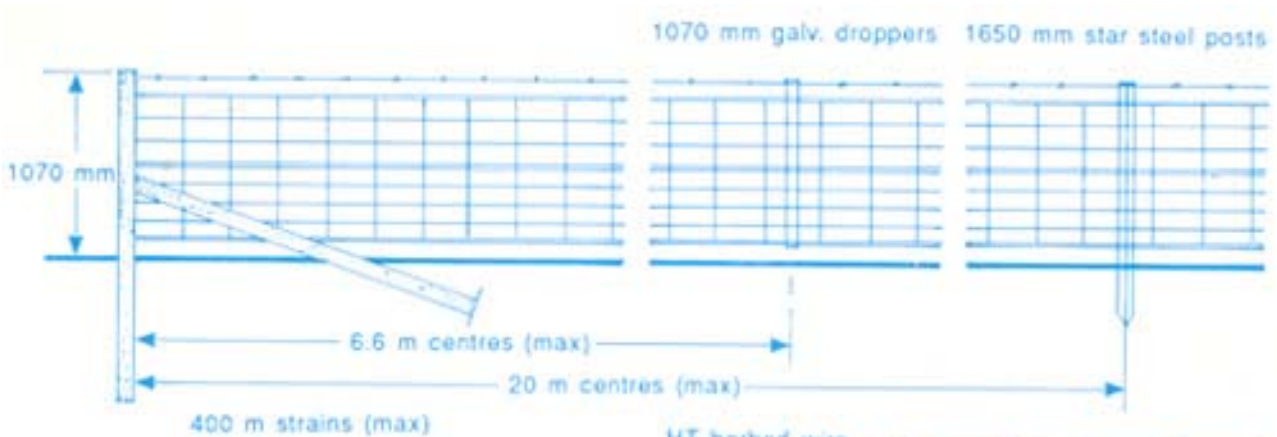
Horn tipping may completely overcome the problem of goats getting caught in 150 mm picket spacings. Even with the wider picket spacing some problems can occur where a steel post reduces the free space between wire pickets.

Special buck paddocks should be provided for males during the non-breeding season. Prefabricated material such as 7/90/30 or 8/90/30, and electric wires on outriggers are suitable.

### **Conventional fencing**

Three designs are suitable for goats. Two are suitable as boundary fences with prefabricated 7/90/30 or 8/90/30. The other fence is adequate for internal fencing. The designs suggested are also suitable for sheep and cattle.

**“8/80/15” prefabricated fence means 8 wires, 80 cm (800 mm) high, with vertical wire pickets at 15 cm (150 mm) intervals ...**  
**“7/90/30” prefabricated fence has 7 wires, 900 mm high, with pickets at 300 mm intervals, and so on.**



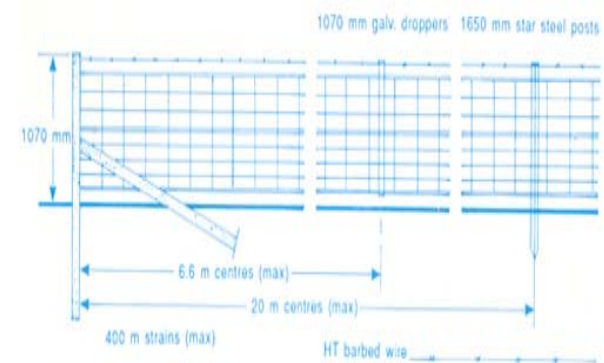
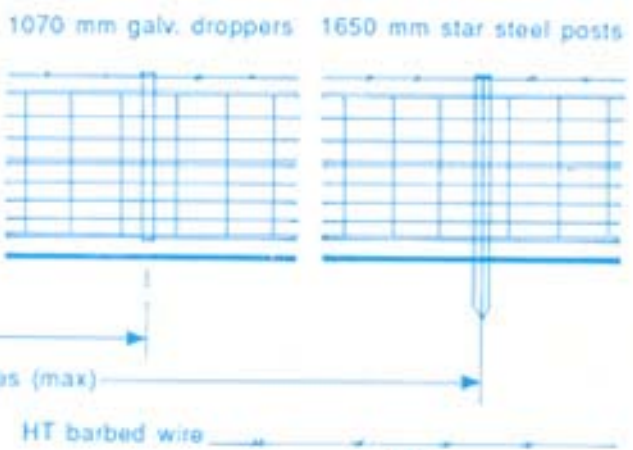
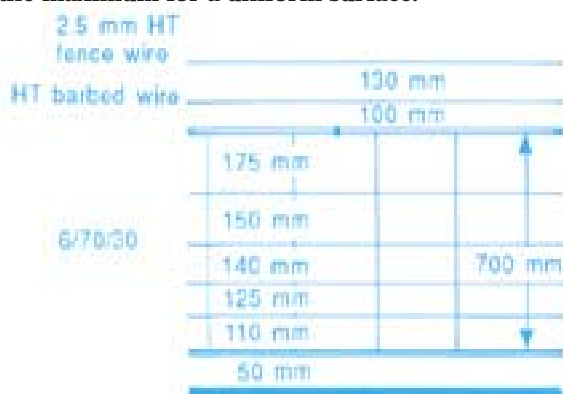
**Diagram 2.**

**Boundary fences: 7/90/30 or 8/90/30**

It is important that a boundary fence allows an absolute minimum of movement by stock pressure. The fence described in Diagram 2 will contain most kids. It features:

- Steel posts 1650 mm,
- droppers 1070 mm,
- bottom selvage wire about 25 mm above the ground with bottom of prefabricated fence attached at 1.5 m intervals,
- top selvage wire,
- one additional barbed wire above the fabricated wire for additional height. Materials required to

**BELOW: A 6/70/30 prefabricated subdivision fence. Distances between posts and between droppers is the maximum for a uniform surface.**



**ABOVE: A 8/90/30 prefabricated boundary fence. Distances between posts and between droppers is the maximum for a uniform surface.**

build 1 km of these fences are:

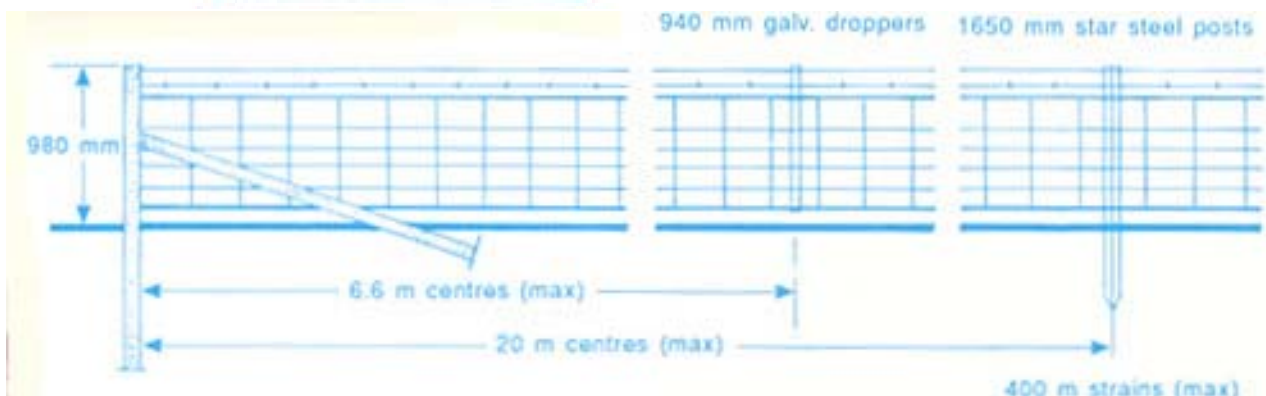
- five rolls 8/90/30 or 7/90/30,
- two coils 2.5 mm high tensile plain wire for the selvage wire,
- two reels of high-tensile barb wire,
- steel posts 1650 mm (to suit terrain),
- droppers 1070 mm (to suit terrain),
- suitable end strainer assemblies (see text).

**Subdivision fences**

**6/70/30**

The design in Diagram 3 will control the movement

**Diagram 3**





**Electric wires offset near the bottom and top of an old fence to give a very secure barrier around a buck paddock.**



**Close vertical pickets can cause problems with goats getting caught in the fence.**

of all adult stock, however some very young kids may get through. Young stock that penetrate this fence will usually return to their paddocks.

This fence is cheaper to erect than the boundary fence described above. It features:

- steel posts 1650 mm,
- droppers 940 mm
- bottom selvage wire 25 mm above ground with bottom of prefabricated fence attached at 1.5 m intervals,
- top selvage wire,
- two additional wires are used above the prefabricated wire for extra height.

Materials required to build 1 km of this fence are:

- five rolls 6/70/30, two coils of 2.5 mm high-tensile plain wire, top and bottom selvage and additional top wire,
- two reels of high-tensile barb wire,
- steel posts 1650 mm (to suit terrain),
- droppers 940 mm (to suit terrain),
- suitable strainers (end assemblies).

Alternatives to using barb wire include a suitably insulated electric wire, or a horse sighter wire.

### **Other designs**

Previous recommendations for goat proof fences included an 8/115/30 prefabricated fence which did not require plain wire above the prefabrication to get extra height. This style of fence is quick and easy to build and is therefore a favoured design where a number of small subdivision paddocks are required.

However, kids of up to 12 kg body weight can get through the gaps between the third and fourth wires from the bottom. With internal fences this may not be a great problem but in boundary fences it is undesirable. This problem can be overcome by running an additional plain wire through the middle of the gap between wires three and four, and tying securely to the fabricated material.

This style of fence is very viable and has proved to be very effective around areas where kangaroos are a problem, such as forests. It does not necessarily stop the roos but they get a clear view to jump the fence and are therefore less likely to get caught in a top wire.

In some cases where there are a number of small paddocks it may be desirable to be able to climb through a fence. Unlike some other designs, the 8/15/30 is impossible to climb through and one should not climb over a fence for this practice damages the wires.

Wire netting fences built to control rabbits and wild dogs have been used by some producers for goat control. Although several sizes of netting are available, the two most commonly used are referred to as either rabbit or dog netting.

While these have a specialised role, they are far more expensive to build than the other fences described. These fences can be modified using a number of electrified wires resulting in a fox proof fence. This design is described in the Agfact A5.7.10 *Fencing for geese*.

### **Further details**

Selva wires are additional plain wires attached to the bottom and/or top to strengthen prefabricated fencing. They are of greatest importance when fences are built over uneven ground.

Selva wires are also very useful when it is necessary to hang a skirt off the bottom of a fence when crossing deep depressions. Bottom selva wires are also recommended in conventional goat fences to stop goats from forcing their way under.



**Electric wires offset near bottom and top of an existing fence around a training paddock.**

Wire tension is an important factor in fence performance and life. Maintenance of wire tension relies heavily on the use of suitable end assemblies. Our recommendation is to use 2.5 mm high-tensile wires for selva wires, with additional plain wires run above the prefabricated section.

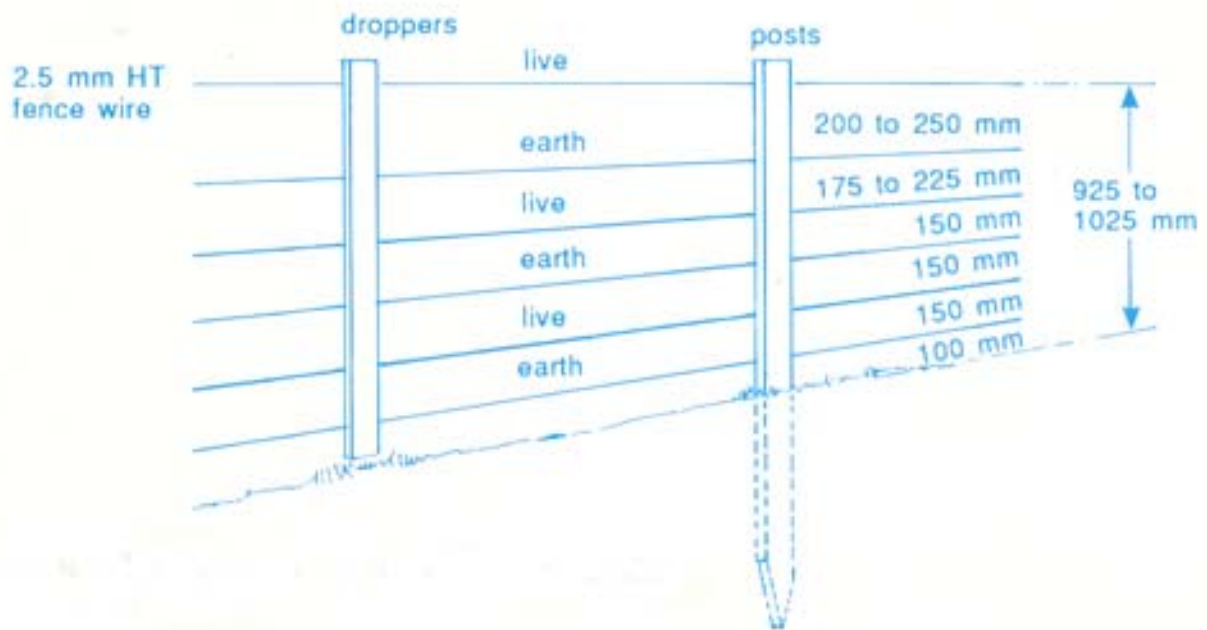
The correct tension for 2.5 mm plain wire is 2.0 kN and for prefabricated wire fencing is 1.0 kN per line wire. It is virtually impossible to achieve the correct tension without the use of some type of tension gauge.

Post spacings given in the diagrams are for fences built on even surfaces. When a fence goes over a hill or through a gully more posts will be necessary. More posts are needed over a hill to maintain the correct height of the fence while more posts and/or tie-downs are necessary when crossing a gully to keep the fence down.

### **Permanent electric fences**

Two types of electric fence are recommended—one for boundaries and one for subdivisions. The two designs are known to work in a wide range of environments for control of goats and other livestock.

Electric fences are effective when well built and maintained and when stock have been trained to them. If stock have had no previous experience of electric fences, then they may go through. Usually, one contact



**DIAGRAM 4. A six line permanent electric fence.**

with a live wire and suitable earthing is sufficient training for most stock.

Electric fencing can offer cost savings over conventional fencing and can be easy and quick to build. Depending on the design they may also offer a measure of control over some vertebrate pests.

To be effective and give good service they do have to be built correctly using a design suitable for the specific application. It is also good practice to check the fence voltage regularly and at a number of points around the property where this is applicable.

A 'cheap' electric fence will soon let you down.

Each fence design consists of plain wires that are alternatively earthed or energised. For full design details refer to Agfact E2.1 *Permanent Electric Fencing*.

### **Six line boundary electric fence**

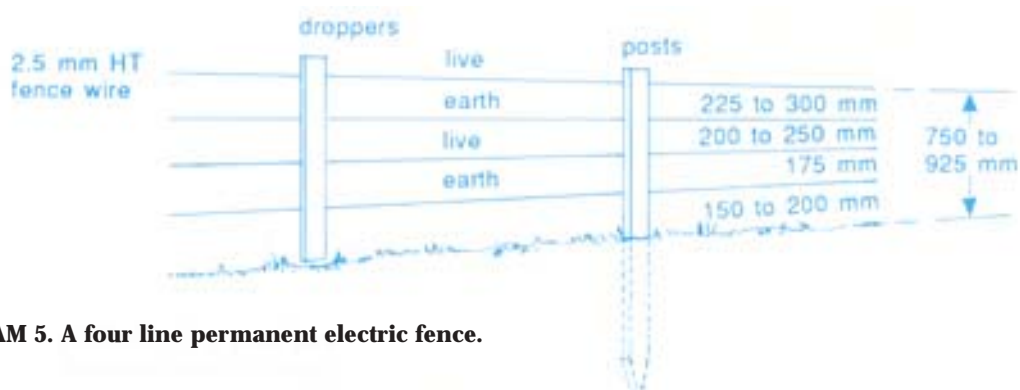
This design will stop the movement of almost all animals. It is certainly effective against all domestic

livestock and will provide a measure of control over other animals such as kangaroos, feral pigs, wild dogs, and foxes. It features:

- line posts can be spaced up to 20 m over uniform surfaces—closer over undulating ground,
- line posts are either 1650 mm steel posts with insulators, specialised timber or fibreglass,
- timber or fibreglass droppers can be spaced at 6.6 m intervals on uniform surfaces—closer over undulating ground,
- wires are alternatively earth or live with the bottom wire earthed.

Materials required to build 1 km of this fence are:

- four coils 2.5 mm high-tensile wire,
- minimum 50 line posts and 100 droppers, with insulators if required,
- three bullnose insulators at each strainer,
- Accessories like cable clamps, underground cable,



**DIAGRAM 5. A four line permanent electric fence.**

line switches and earth stakes are also required—don't forget to include the cost of an energiser.

### **Subdivision four-wire electric fence**

This fence will control the movement of adult stock, it does not have the security of the previous design. Therefore it is suggested as being suitable only for sub-division fencing. It does control all livestock trained to electric fencing. Features:

- line posts spaced every 20 m over uniform surfaces,
- line posts are either 1350 mm steel posts with insulators, specialised timber or fibreglass, 2.5 mm HT fence wire droppers
- droppers spaced at 6.6 m intervals over uniform surfaces,
- wires are alternatively earth or live with the bottom wire earthed.

Materials required to build 1 km of this fence are:

- three coils 2.5 mm high tensile wire.
- line posts, droppers, insulators if required,
- two bullnose insulators at each strainer.
- Accessories like cable clamps, underground cable.

Specialised hardwood posts and droppers—either iron bark or creosote treated hardwood products—have excellent insulating properties. In most soil conditions these hardwood posts can be driven and are suitable to use as main line posts.

Fibreglass post are also suitable in a wide range of conditions. However, in soils that are too hard, or in rocky conditions, steel posts may need to be driven. Electrified wires need to be attached to steel posts by an insulator. Hardwood droppers may be tied to steel posts as insulators. Other types of insulators are available, but are often more expensive than hardwood droppers.

Wire tension, as with conventional fencing, is of great importance. Therefore adequate end assemblies—strainer posts—must be used.

Boxed end assemblies are normally recommended because goats cannot climb up these. Wires should be strained to the correct tension which is 2.0 kN for each 2.5 mm high tensile wire. A tension gauge is necessary to achieve the correct tension.

### **Other electric fence designs**

Another design that has been used with success in the pastoral areas of NSW is a five wire electric fence. This fence has the top, middle and bottom wires electrified with the remaining wires earthed. Wire



**Special care is needed over undulating land and rocky outcrops.**

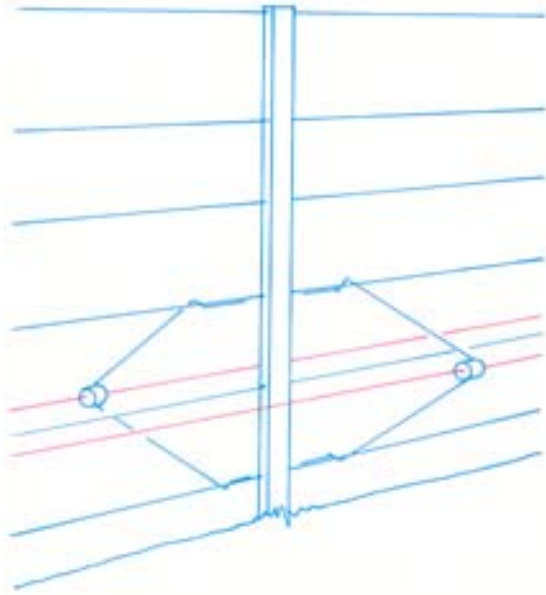
spacings used in this fence are—from the ground—125 mm, 125 mm, 150 mm, 175 mm and 200 mm, to give an overall height of 775 mm.

Electrified bottom wires are acceptable in areas where pasture growth is not prolific.

**Temporary Fencing.** Electric fencing can be used for temporary fencing, for example dividing a crop paddock for strip grazing. Special woven wire and rewind reels are available for this purpose. Multiwire electric fences are suitable for use as semipermanent subdivision fences, for example to divide a large paddock for a period of two years to aid in scrub control.

### **Earthing**

Effective earthing is essential to ensure electric fences work efficiently under all conditions. The designs discussed in this Agfact are earth return systems where all non electrified wires are connected to the earth pole of the energiser and suitable earth stakes. It may be necessary to have extra earthing stakes along the fence particularly in low rainfall areas. It is not enough to rely on the animal's contact with the soil surface to make the earth. In most environments poor earthing occurs when the soil surface dries out.



**DIAGRAM 6.** Upgrading conventional fencing for goats, using 2.5mm HT electrified wires. The wires are 250 mm above ground level and 250 mm from the fence. The insulated offsets are spaced about 20 m on level ground.

### Energisers

Choose an energiser carefully, ensuring that it is big enough to maintain a good voltage all year round. Although goats soon learn to respect electric fencing—equally they soon learn when it is off or not working effectively.

A mains operated unit is preferred because it does not rely on batteries. That is not to say that battery or solar units will not do the job—just that they need regular attention and size for size a solar unit is more expensive.

There are also a number of variations in energiser design. The most common types simply deliver a single high pulse every second. Others charge each wire with an alternate positive and negative current . . . others use random high voltage pulses. The important point is that the energiser should maintain an effective deterrent to the goats—and where necessary vertebrate pests.

### Upgrading existing fences

Many producers buying goats may modify existing fencing rather than build new fences. Those most frequently in need of upgrading are plain wire fences, prefabricated fences and old fences.

**Plain Wire Fences.** In purely grazing areas many fences have been built of plain wire, with or without one or more strands of barbed wire. In areas that have traditionally run only cattle, the fences may be multistrand barb wire.



**Porcelain insulators and a wire outrigger used on goat proof fence.**

Such fences can be easily goat proofed by tying prefabricated fencing directly onto them. However, in hilly country this is expensive and often difficult.

When the fence is sound it may be possible to add electrified wires on stand-off insulators. To control goats, additional wires near the bottom and top of the fence are necessary. The relative merit of using electrified wires on each side of a fence needs to be assessed against cost.

Location of the electric wires is important. The bottom electric wire needs to be placed about 250 mm above ground and about 250 mm out from the fence. The top electric wire is located below the existing top wire and about 25 mm from the fence.

**Plain wire fence.** If all main line posts are bored native hardwood—gidgea for example—then it may be possible to insulate selected wires and electrify these. However, most fences contain some steel posts and these need to be insulated.

Barbed wire in a fence that is to be electrified is no longer necessary as a deterrent to stock and is in fact dangerous. It is best to remove and discard the barbed wire. Replace or strengthen end assemblies that cannot carry the extra load of additional electrified or plain wires, or prefabricated material.





**A polythene outrigger is used here to hold an electric wire clear of a prefabricated fence.**

The suitability of various techniques, types of equipment and their placement varies with the existing fence.

**Existing prefabricated fences** may require relatively little improvement, depending largely on the type of prefabrication that has been used. A single off-set electrified wire about 250 mm off the ground generally will be quite sufficient.

With netting fences that are in good repair, the addition of an electrified wire on stand-off insulators—located between the top of the netting and the top wire—is usually sufficient.

If the base of the netting is weakened and not stock proof it may be necessary to use foot netting to cover holes. It is difficult to place an electrified wire near the bottom of holed wire netting, for there are often long ends of wire than can touch the electrified wire. This causes it to earth giving voltage loss.

A single barbed wire attached to the bottom of the fence is another option which may not only discourage the goats from pushing under, but also offers a wire on which to tie the netting. Netting fences in very poor condition may be a candidate for re-building.

A single, off-set electrified wire placed about 250 mm up from the ground will eliminate the problem of goats becoming caught in prefabricated fences using patterns with narrow vertical picket spacing, such as 8/80/15.

Other prefabricated fence patterns can have problems with animals passing through because either:

- the spacings between horizontal wires are too wide or
- the spacings between vertical pickets are too wide.

Overcome the problem by running an additional plain wire across the space that is too wide—this is most often the second or third space from the bottom. Again, the addition of a single offset electrified wire 250 mm up from the ground is also satisfactory.

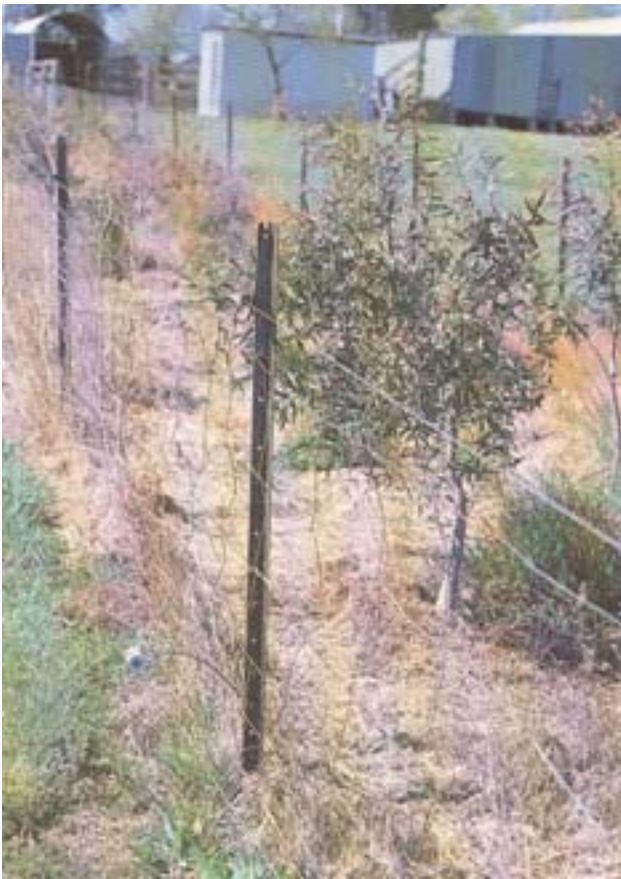
If the prefabricated section is too far off the ground—higher than about 25 mm—an additional bottom wire may be necessary. The addition of at least a bottom selva wire is an advantage in fences that do not have them. Details such as creek crossings also need to be checked to ensure that minimum clearances are maintained.

### **Aged, poor condition fences**

Due to broken or rotted posts, or perhaps washaways, many fences are barely adequate to control sheep movement, let alone goats. Some fences can be refurbished relatively cheaply by dummied broken posts, or building new strainers or the addition of new wires.

Addition of either prefabricated fencing or electrified wires can stock proof fences only if these fences can be stood-up and strained to the correct tension. The cost and time involved to repair an old fence must be weighed against the cost of erecting a new replacement fence-or even the need for the particular fence at all.

Old fences, past salvage, should be removed completely. If left lying around they are not only unattractive but are a nuisance when mustering, can be dangerous to people and stock—and they can help teach stock bad habits.



**A tree lot protected from stock by a sound electric fence.**

### **Other considerations**

**Legal obligations.** Every person owning, or who is in charge of, stock has a legal obligation to restrain their stock from straying on to roadways, crown lands, quarantined areas or other protected land. There are a number of acts covering this subject, such as the Stock Diseases Act, which can render the owner liable to a fine or, in the case of a road accident, a compensation claim.

It is also important to confine stock not only for legal reasons, but also to maintain good relations with neighbours. Therefore effective boundary fencing is a very important subject when considering any stock enterprise.

**Trees.** Goats are particularly destructive to trees and therefore consideration needs to be given to tree guards.

A single adult tree can be protected by wrapping the trunk up to 2 m high with a number of wraps of wire netting or even corrugated iron. Young single trees need careful guarding with quite substantial steel mesh or similar, as the goats will stand on the mesh or even butt it in to get to the foliage.

The most effective and cost efficient method of protecting or establishing trees is to make a tree lot, ensuring that the fence will keep the goats off the trees. The 8/90/30 prefabricated design is quite suitable however the fence must be at least 3 m from the nearest trunk. If it is too close the goats will stand on the fence and lean over to get to the trees, eventually breaking down the fence. In this case some electrification will prove to be most effective.

Goats can be grazed where there are scattered adult trees, or where there is considerable regrowth without guarding, provided a careful eye is kept on the amount of damage being done to the trees. Careful attention to bark and foliage ensures goats can be grazed without permanent damage to the trees.

### **Acknowledgments**

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### **DISCLAIMER**

The information contained in this publication is based on knowledge and understanding at the time of writing (November 2003.) However, because of advances in knowledge, users are reminded of the need to ensure that information upon which they rely is up to date and to check currency of the information with the appropriate officer of New South Wales Department of Agriculture or the user's independent adviser.