Fencing FACTSHEET

Order No. 307.251-1
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DEER EXCLUSION FENCING FOR ORCHARDS AND VINEYARDS USING WOVEN WIRE

This factsheet outlines the use of woven wire with high tensile smooth wire (htsw) to protect orchards and vineyards from deer. Two designs are outlined, one for low deer pressure and one for high deer pressure situations.

INTRODUCTION

Deer damage in orchards and vineyards is a very serious problem in BC, especially in high density dwarf tree plantings and easy to reach grape plantings. Two basic fence types can be used:

- full electric: a psychological barrier which is low cost but requires periodic attention and may not be 100% effective
- nonelectric woven wire: a physical barrier which can be very effective but is much more expensive

Electric fences should only be considered where the producer is willing to use the best materials, inspect and maintain the fence regularly and remove those deer that continue to cross the fence.

WOVEN WIRE FENCE DESIGN

A nonelectric deer fence must present a physical barrier that deer cannot crawl under, crawl through or jump over. Two designs using woven wire (with htsw strands above) are outlined below as **A** (low deer pressure) and **B** (high deer pressure).

DESIGN A (low pressure)	**6 feet 6 inch woven wire plus 2 single strands above**
Total Height:	8 feet (requires12 ft. posts)
Woven Wire:	14/78/12, hinged joint *14 horizontal wires *78 inch height *12 inch spaced vertical wires
Top Wires:	2 single strands spaced 9/9 inches

TWO PIECE WOVEN WIRE DESIGN

An alternative to the fence designs discussed here is the use of two pieces of 4 foot high woven wire placed one on top of the other and clipped together for an extended height fence.

FENCE HEIGHT EXTENSIONS

While constructing a complete new fence is the preferred option, the producer may make use of extensions to existing fence posts if the following conditions can be met:

- extensions must be adequately sized
- connection to the existing post must be adequate
- existing posts must have been set deep enough; (up to 1/3 of new fence height in ground); depth may be insufficient for an extended height fence

Height extensions can also be used on new fences to reduce post costs (i.e., Design B uses 12 foot posts with extensions to reach 9 1/2 feet height instead of using 14 foot posts).

DESIGN B (high pressure)	**7 feet 6 inch woven wire plus 3 single strands above**
Total Height:	9 1/2 feet (requires 12 ft. posts with extensions)
Woven Wire:	16/90/12, knotted or hinged joint *16 horizontal wires *90 inch height *12 inch spaced vertical wires
Top Wires:	3 single strands spaced 8/8/8 inches

All wires are 12 1/2 ga. galvanized steel (some variation is possible); some woven wire uses high tensile steel for greater strength. As noted below, additions can be made to these two designs for added control:

To resist deer crawling under the wire

- use an extra bottom strand of either htsw or barbed wire clipped to the bottom woven wire
- use a piece of woven wire (1 to 2 ft.) buried and clipped to the bottom woven wire. This may be awkward to do and wire corrosion may limit the life expectancy
- use boards (preferably pressure treated) buried and stapled to the bottom woven wire

To resist deer crawling through the wire

- extra wire strands at deer height; consider the effect of snow pack in "reducing" fence height
- one or more electric wires offset to the deer side

To resist deer jumping over the wire

- extra strands above the woven wire
- **DO NOT** use material such as boards as a horizontal top rail; this will give deer a well defined reference point and increase their tendency to jump

To resist high deer pressure on the wire

- use knotted joint woven wire
- and/or, use wire with 6 inch spaced verticals

Figure 1 shows a woven wire deer fence with one electric offset wire and one extra top wire.

Figure 1 Typical Deer Exclusion Fence

WOVEN WIRE JOINTS

Tow types of joints are used where line (horizontal) and stay wires (vertical) cross: **hinged** and **knotted**.

A **hinge joint**, Figure 2 below, is made with separate short lengths of stay wire and allows the fence to "fold" under pressure. However, the wire wrap can come loose allowing the stay wire to separate from the line wire.

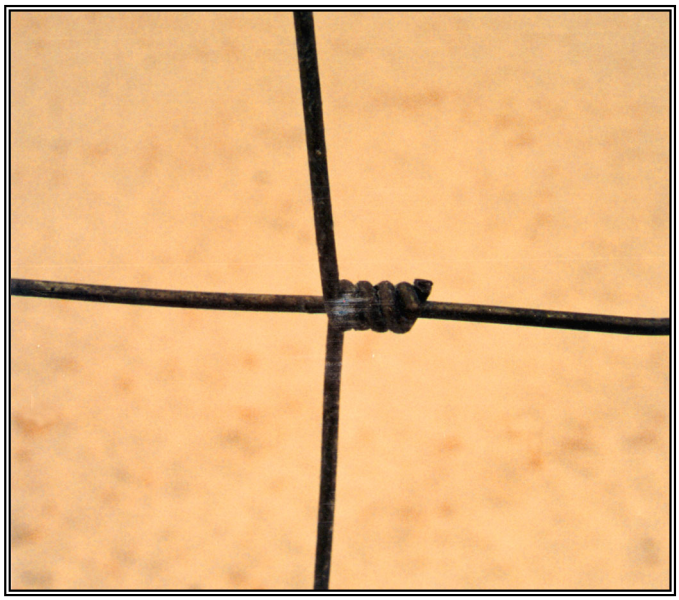

Figure 2 Hinged Joint Woven Wire

A **knotted joint**, Figure 3 below, is made with a one piece continuous stay wire and separate knotting wire. This joint will not separate easily and is the preferred choice because of the extra security of the joints. However, depending on the density of deer and on wire price differences, hinged-joint wire may be used as it is a lower-cost wire that is suitable for the typical low-pressure orchard conditions.

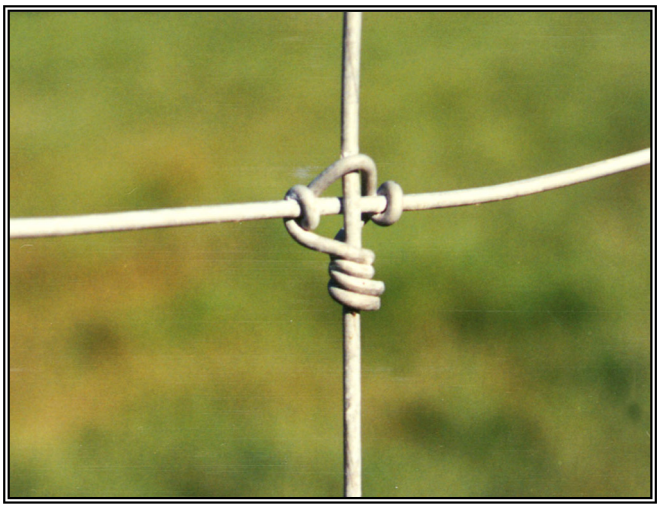

Figure 3 Knotted Joint Woven Wire

INSTALLING WOVEN WIRE

The following points are important when installing woven wire fences:

- Place the wire on the deer side of the line posts. Ensure the wire is flush with the ground and there are no gaps due to terrain irregularities. Deer will go under a fence if it is possible.

- Join woven wire by using a wrap-splice as shown in Figure 4 below. Leave 4 to 6 inches of line wire beyond the end stay. Lay together the end stay wires of each of the two sections to be spliced, then wrap the free ends tightly around the line wire with pliers or a splicing tool.

Figure 4 Splicing Woven Wire

- An alternative splice is a compression sleeve. See Publication No. 307.131-1 entitled ***Spices for High Tensile Smooth Fencing Wire***.

- Tension woven wire to remove only 1/3 to 1/2 of the tension curve from the line wires, as shown in Figure 5 below.

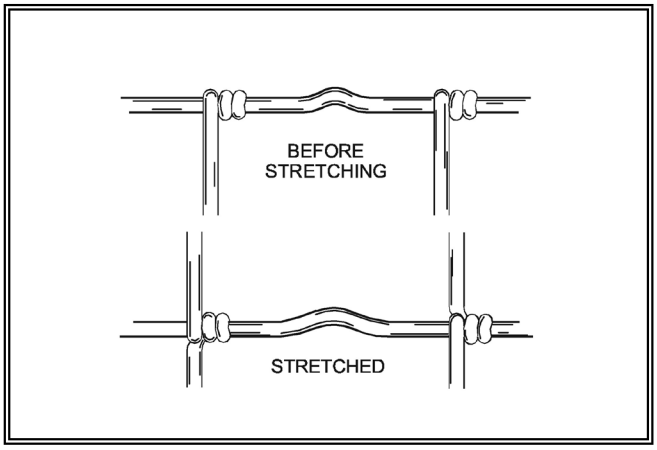

Figure 5 Tensioning Woven Wire

- Tensioning may be done from the end post (then stapling wire tight onto brace post) or from a braced dummy post set 6 to 8 feet beyond the brace. Extreme caution is necessary if using a tractor for tensioning because of the operator hazard as well as possible over-tensioning.

- When tying off woven wire at the end brace, take the free end of each line wire around the end post and wrap on itself, as shown in Figure 6 below. **DO NOT** depend only on staples to hold the fence wire tension.

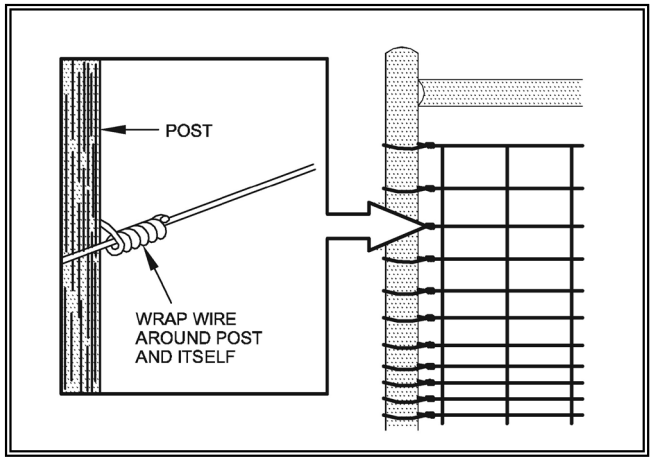

Figure 6 Tying Off Woven Wire

- **DO NOT** drive the staples "home"on line posts. The wire should be free to move.

- For maximum pull-out resistance, rotate staples so as to cross the grain of the post (reducing post splitting) and to ensure the two legs of the staple spread out and away from each other.

- Individual htsw strands are tensioned to 200 lbs. and knotted or spliced as shown in Publication No. 307.131-1 entitled ***Splices for High Tensile Smooth Fencing Wire***.

FENCE LINE POSTS

Whichever wire configuration is used, the following is recommended:

Minimum Line Post Size- 3 to 4 inch by 12 ft. long

Preferred Line Post Size- 4 to 5 inch by 12 ft. long

- "3 to 4 inch" means the post diameter range
- Use pressure treated posts
- Set posts a minimum of 3 feet into the ground
- Space according to the terrain (up to 15 feet apart average; up to 20 ft apart in level terrain).

FENCE BRACE ASSEMBLIES

Braces are the foundation and anchor of a good fence. Using good construction methods will protect the orchard or vineyard and ensure a long life fence.

Figure 7 below is a drawing showing well-designed end brace construction. Note that:

- posts are set in the ground a minimum of 3 feet (4 feet is preferred)
- the horizontal rail is not notched into the driven posts, but is connected using 3/8 inch rebar into pre-drilled holes
- the height of the rail is approximately ¾ of the fence height
- braces are set at a maximum of 660 feet apart
- use inline braces if no corners are needed

End Braces: 2 posts of 4 to 5 inch minimum diameter (preferred is 5 to 6 inch) by 12 feet long set 3 feet minimum into the ground (preferred is 4 feet); 1 hortizontal rail at 4 to 5 inch by 10 feet long.

This single span brace is sufficient for most conditions but in poor soils (sandy, wet, etc.), use a double-span brace assembly with three driven posts and two rails with the wire tie-off on the centre post.

Inline Braces: Use an end brace (for runs greater then 660 feet) with brace wires in both directions.

Corner Braces: For 90° corners, use a brace of three driven posts and two rails. (Optional if the wires are being tied off – build two separate end braces of 4 driven posts and 2 rails).

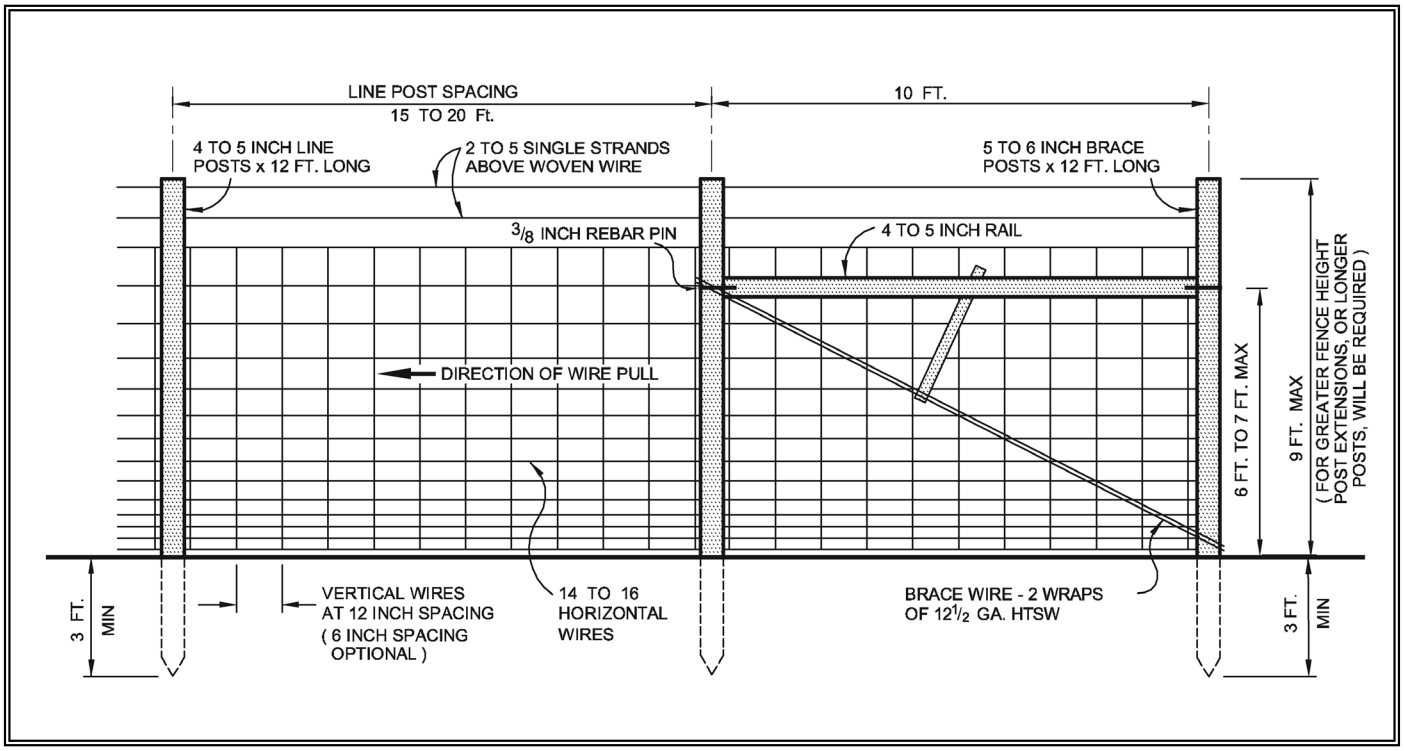

Figure 7 Typical Line Fence and End Brace Design

FENCE EFFECTIVENESS

Fencing out feral deer driven by hunger is quite different from fencing commercial livestock. The other options the deer may have for food, such as unfenced neighbouring plantings, will affect how they will pressure a fence. At some hunger threshold, deer may breach almost any fence design.

"COMMUNITY" FENCES

Fencing a number of neighbouring operations together can reduce fence costs and improve effectiveness.

FOR FURTHER INFORMATION CONTACT
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