

Preventing damage caused by wildlife

USING DIFFERENT KINDS OF FENCING

SEPTEMBER 2003



What does the law say?

In 1996 the law pertaining to damage caused by wildlife was changed. The focus of the new law is on damage prevention as a prerequisite for compensation. The county council can subsidise preventive measures, and compensate for damage caused by animals that are protected during general hunting seasons.

In order to obtain reimbursement for damage caused by protected wildlife, the owner of the domestic stock must have actively tried to prevent damage. This applies in high risk areas.

If preventive measures have not been taken because the presence of a predatory animal was unknown or unforeseeable, damage will be reimbursed. To minimize the risk

of recurrence, however, preventive measures should be taken as soon as a predatory attack on domestic animals has occurred.

At the Wildlife Damage Centre we study preventive measures. We run projects to investigate the suitability and cost-effectiveness of different types of fencing, for example. This brochure describes our findings to date.

Two kinds of fencing to keep predatory wildlife out

The Wildlife Damage Centre currently recommends two kinds of fencing to prevent predatory animals from attacking domestic stock. The first type consists of 4-5 horizontal electric wires, up to a height of 90 to 110 cm (Fig. 1). The lowest wire should be no more than 20 cm above the ground to prevent the predator from crawling beneath or digging under the fence. The second consists of sheep grid fencing, with one electric wire about 15 cm above the fencing and another about 20 cm above the

ground on the outside of the fencing (Fig. 2). Fencing should not have any openings through which a predator

can pass. Gates should be well fitted and electrified. Electric wires should carry at least 4,500 volts.



Fig. 1. Fence with 4-5 electric wires.

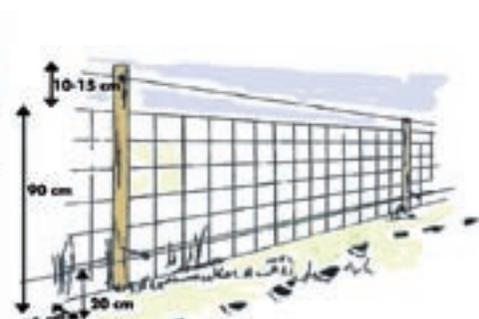


Fig. 2. Sheep grid fencing with two electric wires.



Fig. 3. An effective electric fence requires well-fitted materials of good quality. The picture shows a fence made by Insultimber with 2.5 mm wiring and eucalyptus posts, which do not require insulators.

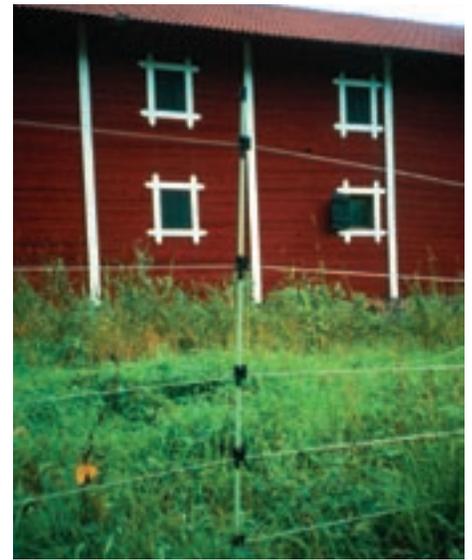


Fig. 5. An electric fence with spring glass fibre posts and flexible wire fasteners to enable easy adjustment of the height of the wiring.

Putting up your own fence

In order to secure effective protection, your electric fencing must be properly constructed and of good quality materials (Fig. 3).

Good quality for less maintenance

Good quality includes wiring that conducts electricity well, an adequate power supply and fence posts that are firmly fixed in the ground. Good quality reduces future maintenance requirements. It also makes your fencing more secure.

If your fence is to be set up near a wooded or uncultivated grazing land, then resilient fencing with spring posts should be used. Springs can prevent a fence from being broken by large non-predatory wildlife such as deer and elk, for example (fig. 4 and 5).

Plan your fence to meet present

and future requirements. It can be worthwhile to spend some time drawing up a work plan.

Posts provide stability

Always use heavy corner posts (10-15 cm in diameter). Corner posts should be set at a frost-free depth of at least one metre. Posts between corner posts or points where direction changes can be made of glass fibre, plastic or wood (4-6 cm in diameter). Wooden posts should be pressure-creosoted. The recommended distance between non-corner posts in hilly terrain is 4 metres. The distance can be increased in flat terrain. Use straight lines of fencing where possible. Note that plastic posts are weakened by cold and can split.

It is important that wires are well fixed and taut. An entire fence will slacken if the fence gives way at any

point, making it easier for an animal to part the wires and get in.

When crossing ditches and other obstacles it is important to ensure that fencing follows the contours of the terrain as closely as possible. Excellent products, such as glass fibre posts with adjustable wire holders, are commercially available to make this easier (Fig. 5). Avoid tree posts.

Choose the right wire

The wire should be highly tensile, strong and well galvanized. Stainless wire can also be used, but should be complemented with a spring to take up slack caused by stretching. The wire should have 1.4 – 2.5 mm diameter (heavier wire is more visible, but more expensive and more difficult to work with). Wires should be taut, and fitted with tighteners to simplify maintenance.

Wire splices should be sturdy to ensure a good hold and closely twined for minimum resistance and maximum conduction.

Electric rope or tape should be avoided in permanent fences since these often do not conduct electricity adequately, are more expensive, and have a shorter lifetime than galvanized wire. Do not use wire that easily corrodes or wire that can cause serious injury to animals.



Fig. 4. Stainless wires should be attached to a spring (L-G Produkter).

Insulator design

Insulators should be sturdy, durable and heavy enough not to prevent current from leaking into conductive elements. A good insulator should provide a minimum of 20 mm space, measured across the surface of the insulator, between wire and non-insulated parts. Since there is a lot of strain on the insulators at corner posts, twining the insulator cable around the wire on the outside of the post is a good, inexpensive way to minimize this strain (Fig 6). Remember that the insulator cable should be weather resistant and not weakened by sunlight. Choose good quality insulators.

Electrical grounding important

To avoid short-circuiting and consequent electric shock, the grounding of an electrical fence is very important. Iron ground wires should be at least one metre long and inserted at intervals of 1 to 2 metres. Ground well, using at least three ground wires depending upon ground conditions. The voltage reaching the ground wire should not exceed 300 Volts.

Spacers should be used when electric wires are added to sheep fencing. The electrified wire should be about 15 cm from the fence (Fig. 2, page 1).

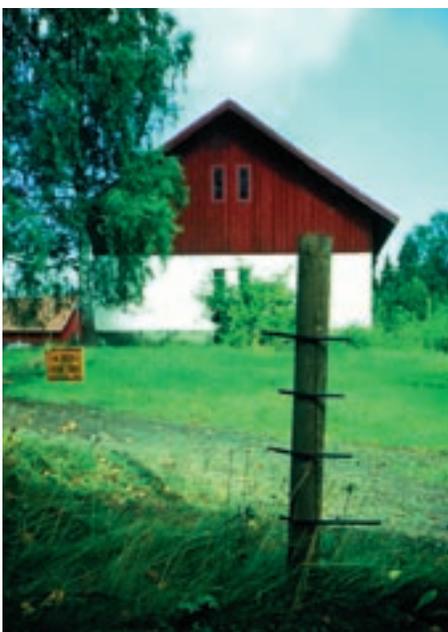


Fig. 6. There is a lot of strain on the insulators at corner posts. A good, inexpensive way to relieve this strain is by winding the insulator cable around the wire on the outside of the post.

Choose the right power supply

In general, you should choose a power supply with more capacity than you will need for your planned fence. This enables you to extend your fencing without having to invest in a new power supply.

Grass that grows up along the bottom wire is burnt off. After a rainfall, however, tall grass nearby can fall in layers over the wire and cause a voltage loss. The power supply should be sufficiently powerful to supply the fence with at least 4,500 Volts, despite such a loss of voltage.

Powerful battery units are available where it is not possible to connect the power supply to the mains supply. It is also possible to complement a battery with a solar panel to avoid having to charge the battery so often.

Check voltage

Voltage should be checked regularly with a voltage meter. While some power supplies have built-in voltage

meters, the voltage running through the wires can be measured with a separate voltage meter. The meter can be equipped with an alarm system to warn you when the voltage drops below a certain level of volts. Lightning conductors can also be connected between the unit and the battery in order to protect your equipment.

Maintenance is essential

Maintenance is essential for the function of your fence. Vegetation in contact with the fence should be removed at least once a year and wires must be kept taut.

Electric fencing connected to the mains supply should be on all year round to keep deer and elk away from the fence.

Total cost of current consumption of power suppliers at given costs for electricity

Electricity price	M15	M35	M60	M105/D
50 öre/kWh	6	7	11	30
70 öre/kWh	8	11	15	42
90 öre/kWh	11	13	19	53
100 öre/kWh	12	14	22	60

Cost is listed in öre/24 hrs and includes mains charges, floating power supply costs and taxes. The table is based on information from the summer 2001. Estimate of annual costs, example: M60 unit, price 70 öre/kWh = SEK 0.15/24 hrs. Price per annum: 365 days/yr x SEK 0.15/day = SEK 54.75/per annum.

Current consumption of power suppliers

Fence length (km)	1.5	4	6	10
Unit	M15	M35	M60	M105/D
Current consumption (W)	5	6	9	25

Information source;
Agra, Elefant Elstängsel, Örebro

Material costs for two different fences (length 4 km)

	Electrified fence using five wires	Sheep fencing with two electrified wires	Additional features of sheep fencing
Materials cost excl. unit and lightning conductor	SEK 35,000* (SEK 10/m)*	SEK 73,000* (SEK 19/m)*	SEK 20,000* (SEK 5/m)*
Unit and lightning conductor	SEK 6,600*	SEK 6,600*	SEK 6,600*

* Approximate values

All parts of the electrified fencing system: Wooden posts, glass fibre posts, insulators, four gates, wire drum, warning signs, wire, wire tighteners, earthing irons, electric fence cable.

All parts of the sheep fencing: Sheep fencing, wooden posts, insulators, electric fence cable, earthing irons, wire, four gates, cramps, wire drum.

Cost to meet special needs, e.g. in nature reserves, are not included in the estimate.

In brief

Frozen ground is a bad conductor

When the ground is frozen and cannot be used as a conductor due to excessively high resistance, one or two wires (2nd and 4th wires) can be disconnected from the other wires. These are then connected to each other and to the ground (earth) wire. When an animal impacts a live wire and a ground wire, the circuit will be closed and produce the desired effect. The bottom wire should not be connected to a ground wire.

Snow insulates

Snow insulates, which means the circuit fails to close when the animal is standing in snow. This problem can be solved in the same way as for frozen ground.

Fencing along waterways

In order for an electric fence to provide secure protection from an attack by predatory wildlife, the protected area must be fenced in on all sides, including stretches alongside water. In areas subject to environmental support agreements, or where it is impossible to set up an electrified fence for practical reasons, owners of domestic stock should consult with county councils about fencing. Bears, wolves and lynx are all good swimmers.

Do not leave climbable objects near the fence

No large rocks, stone walls or other climbable objects should be left close enough to the fencing to be used by the predatory animals to gain admittance. Trees should not be used as posts or be situated too close to the fence. Make sure that stone piles and cairns do not contain holes or hollows that enable entry beneath the wire.

Spring fencing

A spring fence is highly resilient. Intermediate posts are made of glass fibre or other material that can bend and then return to their original position. The wire is of a sort that can withstand a certain degree of strain.

There are also a variety of springs available on the market for fitting to stainless wire (Fig. 4 and 5).

Electrified fencing regulations

To avoid personal injury, interference with telecommunications and fire, there are regulations to be observed when setting up and using electrified fencing.

Please, contact an electric fencing distributor for more information.

Common mistakes

- Inadequate earthing/grounding.
- Corner posts not strong enough and not deep enough into the ground.
- Insulators are of inferior quality.
- The bottom wire is fixed too far from the ground.
- Voltage is too low due to leakage or resistance.

Voltage problems?

- If the fencing is too long for the capacity of the power supply, then the voltage running through the wires will be too low.
- Too much resistance caused by wire material or inadequate splicing of wires results in lower voltage.
- Vegetation hanging over the bottom wires, or wires in contact with sheep fencing, are both causes of voltage loss.



Here is a selection of electric fencing distributors in Sweden

Agra Elefantstängsel

Filarevägen 6, SE-703 75 Örebro
Phone: +46-19-314565
Fax: +46-19-314564
E-mail: agra@oreline.net
Home page: www.electricfencing.info

Alfa Laval

Products sold in most Lantmännens stores.
Home page: www.alfalaval.se or www.alfalaval.com

Boleprodukter

Hostaängsv. 1, SE-824 40 Hudiksvall
Phone: +46-650-54 24 70
Fax: +46-650-54 24 79
E-mail: bole@bole-produkter.se
Home page: www.lantbruksnet.se

L-G Produkter

Bjäraryd, SE-294 93 Sölvesborg
Phone: +46-456-303 31, 303 32
Fax: +46-456-303 44
E-mail: order@lgprodukter.se
Home page: www.lgprodukter.se

Lundex

Box 153, SE-234 23 Lomma
Phone: +46-40-41 88 90
Fax: +46-40-41 88 93
E-mail: lundex@lundex.se
Home page: www.lundex.se

Do you wish to apply for a grant for electric fencing to protect your stock from predatory wildlife? Please contact your county council office for further information.



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www.viltskadecenter.com

The Wildlife Damage Centre is a service organisation for official authorities, organisations, private enterprise and the general public. The centre operates on behalf of the Swedish Environmental Protection Agency. The Wildlife Damage Centre provides services such as information on ways to prevent injuries to stock caused by protected predatory wildlife.