

Wildlife damage to trees and shrubs

Wildlife is integral to the life of forests and fields, and it is therefore normal for animals to feed there and leave signs of their presence. As they seek to satisfy their natural needs (food and reproduction), animals can cause damage to their environment, ranging from a few minor deprecations associated with normal animal life to severe ecological and/or economic damage that reflects an overall imbalance.

What is damage?

Definition

Forests and woodlands, wooded strips, copses, hedgerows and isolated trees are important and often complementary sources of a wide variety of timber products and fruits:

- lumber (carpentry, sawmills) and utility wood (posts, stakes, poles), industrial wood (paper, pulp) and fuelwood (logs and woodchips);
- timber by-products: stem wood chips for mulching trees and shrubs; chipped branches used as an organic amendment for enriching the carbon content of agricultural soils;
- fleshy fruits (apples, pears, cherries, olives, etc.) or dry fruits (acorns, beechnuts, chestnuts, walnuts, hazelnuts, etc.) for human and animal consumption.

Woodlands and hedgerows also help to improve grassland quality and crop yields by acting as windbreaks. Trees add organic matter to the soil through the year-on-year decomposition of fine roots and leaf litter. They also help, directly or indirectly, to protect livestock and their health.

By mitigating adverse climatic effects and improving soil quality, trees help to maximise the overall potential of fields or meadows and contribute significantly to improved agricultural production.

Impacts of wildlife on these various crops are referred to as damage, i.e., *"any action by animals that, through their presence, feeding, and/or behaviour, reduces the quantity or quality of the current or future yield of a timber or agricultural crop"*.

Risk factors

The vulnerability of crops and the intensity of damage depend on several environmental factors:



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- the size of the animal population: when hunting no longer regulates the interactions between wild animals and their biotope, their demographic and geographical expansion can lead to overexploitation of resources and increase the frequency of damage;
- existing food resources for animals, determined by the natural richness of the forest and field environment and the type and abundance of nearby crops;
- the attractiveness to animals of a given plant species at a given growth stage (palatability);



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- weather conditions causing food scarcity in forests in winter or in lowlands during summer droughts;
- the presence of refuges and cover where deer on the run can hole up for several days during the hunting season;
- human activities (on-road and off-road traffic, hunting, logging) that cause stress to animals. These disturbances can cause gregarious species such as deer to mark their territories by rubbing trees or stripping bark.

Types of damage

Cervids (roe deer and red deer) and leporids (rabbits and hares) damage trees in various ways (Tableau 1, p.5).

Damage may be related to feeding and/or behaviour and its appearance provides clues as to the species responsible.

Damage can be due to browsing (removal and consumption of young shoots), rubbing (male deer rubbing their antlers on tree trunks), bark stripping (red deer feeding on bark), and bark gnawing (nibbling on bark by rabbits and hares).

Although browsing is the main cause of animal damage to woody plants, bark stripping and rubbing, which are exclusively the work of wild ungulates, can also cause significant damage locally.

1 - The distinct bevelled cut on this stem shows that it was browsed by a rabbit.

2 - This locust sapling was rubbed by a roe deer during the rutting season.

3 - The teeth marks on the trunk of this Douglas fir are characteristic of winter bark stripping.

4 - Bark girdling by rabbits rapidly leads to the death of the tree.

BROWSING



Browsing (**Photo 1**) refers to the removal and consumption of seeds, seedlings, buds, leaves or needles, vertical shoots or lateral branches of woody undergrowth, natural regrowth, or artificial plantations in forests and fields.

Animals use their teeth to detach the palatable parts of plants within their reach. They may eat entire shrubs (leaves, branches, bark) and sometimes pull up or snap young seedlings.

Deer, rabbits and hares all cause this type of damage, which is mainly feeding-related as they seek to supplement their diet of herbaceous and semi-woody vegetation.

RUBBING



Rubs are wounds inflicted on the bark of trunks and stems of young trees for purposes other than feeding (**Photo 2**). Bark is torn; trunks are stripped to varying degrees

and sometimes even snapped. This type of damage, caused by male deer, mainly affects young trees (less than 10 years old) and usually leads to the death of the damaged tree.

The causes of rubbing are essentially behavioural. Male roe deer and red deer use tree trunks to rub off the velvet from their newly acquired antler growth when it starts to shed. During the rutting period, they search for mates and engage in mock combat against young trees and shrubs to release their aggression and mark their territory with scent signals.

BARK STRIPPING



This refers to any wounds caused by red deer when they use their teeth to detach pieces of bark that are then entirely consumed. The damage is often concentrated and mainly affects trees with thin bark and relatively high-set branches.

As there is no sap flow in the bark during winter, it adheres firmly to the trunk. The animal has to scrape the trunk with its teeth to detach the bark, leaving clearly visible teeth marks (**Photo 3**).

In the spring and summer during sap flow, bark is easily detached and red deer tear it off in strips. This can cause rot or discolouration of the wood, thus reducing its market value.

The causes of this type of damage, which is related to both feeding and behaviour, are complex and not clearly understood, but clearly complementary: need for roughage (lignin) to improve rumen function, quenching thirst during severe winters or prolonged droughts, excessive stress in animals made nervous by hikers or hunters.

BARK GNAWING



This type of feeding-related damage is caused by rabbits and hares. It is closely correlated with food scarcity and with the animals' need to wear down their incisors.

It consists of bark nibbling and is often characterised by oblique teeth marks at the collar or base of the trunk of young trees (**Photo 4**).

Consequences for woody plants

Injuries to woody plants can have many different consequences, both quantitative and qualitative, which are exacerbated by accumulation.

The reaction of the tree depends on its height, age and vigour, on the species, the time of year, and the frequency and severity of the injuries.

The main consequences (**tableau 2**) are:

- loss of viable trees and sometimes complete destruction of natural regeneration or artificial plantations (browsing, rubbing);
- need for restoration work (fill planting in damaged plantations, replacement of destroyed tree guards or possibly installation of overall protection), closer surveillance of plots, all resulting in additional investment costs;
- growth deformations or retardation giving rise to additional costs for corrective pruning (of browsed trees);
- partial or total loss of production (volume) and lower quality and price per cubic metre of wood (products unfit for marketing, e.g. when the butt log is damaged by bark stripping or rubbing) causing a shortfall in earnings;
- when animals prefer certain species over others, this can change the species composition of a forest as they eliminate certain plant species (loss of biodiversity), which can favour other rarely browsed or more resistant species (as in the case of spruces dominating firs, or beeches dominating oaks). Species that are generally highly palatable (ash, cherry, maple, mountain ash) disappear most often.

Table 2 - Consequences of wildlife damage for tree mortality, growth, and shape

DAMAGE	PART ATTACKED	FREQUENCY OR INTENSITY	CRITERION	CONSEQUENCE
Browsing (Deer)	Leader (determines height growth and the future shape of the tree)	Once or twice	Shape	Loss of apical dominance and lower technical quality in the case of forks (irregular shape) formed by replacement shoots or upward growth of several upper lateral shoots.
			Growth	Retarded aerial growth (esp. in conifers, which store their reserves in their old needles in winter).
	Leader and lateral branches	Intense and/or repeated	Shape	Multiple forks and irreversible defects (bushy growth habit with no top). Stagnating growth or gradual desiccation of the branches, leading to the death of the tree (depending on species).
			Growth	In the growing season, loss of leaf mass (all tree species) and retarded aerial growth in young trees the following year (as with summer pruning) in proportion to the severity of the damage.
				In winter, loss of needle mass in evergreen conifers (the needles being the main nutrient storage sites). Less vigorous growth the following year due to the substantial loss of carbohydrates.
				Tree remains within the reach of animals for many years.
Mortality	No natural regeneration due to almost total absence of seedlings (shoots and seedlings eaten).			
	Mortality of young trees and natural seedlings (if all shoots are removed and in the event of severely reduced growth > 25 %, or if all needles and buds of evergreen conifers are consumed).			
Browsing (Hares)	Leader	Once	Shape	Loss of apical dominance and loss of technical quality due to forking.
			Growth	Severely retarded height growth (if plant bitten through a few cm above the ground) or needles bitten off down to the base of the plant (feather duster look).
			Mortality	Sapling bitten through at the collar.
Rubbing (Deer)	Trunks of young trees	One side of the trunk	Shape	Loss of technological quality due to frequent development of branches below the rub.
			Growth	Severely retarded height growth.
				Formation of a callus around the wound (in some species, such as Douglas fir).
		Mortality	Possible springtime mortality of young trees and hand-planted seedlings due to gradual dieback of the tree portion above the exposed sapwood.	
All round the trunk	Dieback and snapping of the main trunk (and lateral branches).			
Bark stripping (Deer)	Trunks of young trees	One side of the trunk	Growth	Retarded growth even if wound heals over (especially in the case of winter bark stripping).
				Loss of technological quality of the trunk through exposure to pathogenic rot fungi.
			Mortality	Outright mortality rare, but possible weakening of the mechanical resistance of the main trunk, greater susceptibility to wind and snow, ultimately causing the tree to snap.
Bark gnawing (Hares and rabbits)	Trunks (and low lateral branches) of young trees	One side of the trunk	Growth	Retarded height growth.
		Girdling	Mortality	Desiccation of the main trunk and death of the tree.