

The control of Robinia in the Czech Republic

Introduction

In August 2010 I took part in a conservation trip to Ždánice in the Czech Republic as part of the European Union Conservation Action Network (EuCAN) project. The trip was based in a valley important for butterflies. The work undertaken included the removal of scrub and cutting and raking vegetation to improve the grassland, and the removal of Robinia (*Robinia pseudoacacia*). Robinia is an invasive tree that takes over (in this case) grassland on woodland edge. As removing this tree took up a large proportion of my time in the Czech Republic I thought I should learn more about it.

Description

Robinia (also known as Black Locust, False Acacia and Honey Locust amongst others) is a fast growing tree that reaches heights of between 15 and 30m at maturity with a diameter of up to 1m. The bark of robinia is smooth and green in saplings but deeply furrowed and dark brown in colour in mature trees (fig 1). The leaves alternate along stems and each leaf is divided into between 7 and 21 leaflets. The leaflets are located opposite each other within the leaf with a terminal leaflet at the end. The leaflets are rounded and dark green on top and paler underneath (fig 2). The saplings contain large thorns in pairs along the stems (fig 3). Flowers appear in May and June as a cluster of white flowers that droop from the tree (fig 4). The seed pods that develop are between 4 and 9 cm long containing 4-8 seeds.



Fig 1 – The ridged bark of a mature robinia



Fig 2 – The leaf of robinia showing the leaflets.



Fig 3 – The spikes on a robinia seedling



Fig 4 – The drooping cluster of flowers of robinia

<http://www.duke.edu/~cwcook/trees/rops.html>

Reproduction

Robinia reproduces in several ways. Seeding can occur from trees just six years old but the majority of seeding occurs in trees aged between 15 and 40. Despite the large amount of seeds produced from an early age, germination rates are low because of a thick seed casing. The most effective way that robinia reproduces is through suckering from the roots and sprouting from stumps. This can form a dense thicket of robinia which are in affect clones of the parent tree. Suckers will emerge from root systems as a matter of course but where roots or stem are damaged through fire, browsing, wind, cutting or disease vigorous suckering and sprouting occurs. This allows robinia to spread quickly into open areas.

Distribution

Robinia is native to the Appalachian Mountains of North America but is now naturalised over much of America and Canada. The robinia was introduced into Europe as an ornamental tree in France in 1601. Due to its quick growing and leguminous nature it has been used extensively for erosion control, reforestation and as a nectar producer for honey bees. Robinia is now present across much of Europe (fig 5).

MAP (European distribution)

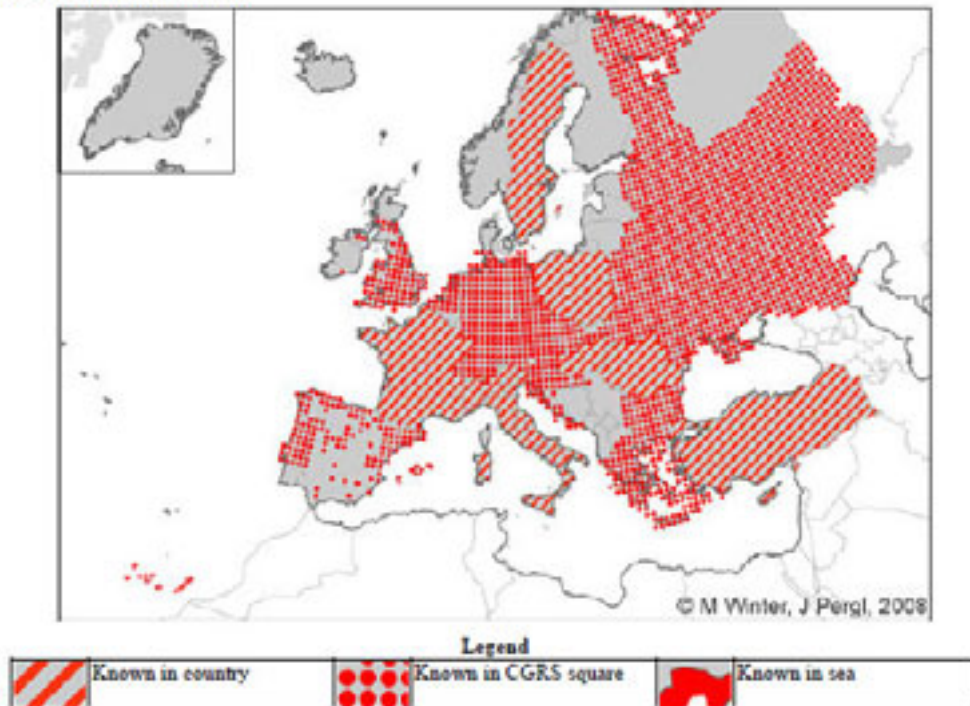


Fig 5 – European distribution of robinia from Basnou, C. 2006

Control

There are potentially four types of management techniques that can be used on robinia:

- (1) Prevention – In the past robinia was planted for reforestation and for the reduction of soil erosion on bare sites. Using alternative trees for these purposes would prevent the introduction of robinia into an area.
- (2) Biological – In America robinia has natural pests, primarily the locust borer (*Megcallene robiniae*) but also locust leafminer (*Odontota dorsalis*) and locust twig borer (*Ecdytolopha insitiana*). Locust borer larvae construct feeding tunnels that allow heart rot fungi (*Phellinus rimosus* or *Polyporus robiniophillus*) penetrate and decay the heart wood. Locust leafminer causes widespread defoliation whilst locust twig borers casues high levels of seedling mortality. American robinia also suffer from witches' broom disease and her viruses and fungal problems. In Europe Robinia has a high resistance to local fungi and insects and at the moment no biological control methods are available
- (3) Mechanical control of robinia can lead to more problems if done on its own. Cutting can, as mentioned earlier, cause an increase in root suckering and sprouting. Ring barking, which is an effective control of a lot of trees leaving standing deadwood, will kill the stem but again will stimulate suckering from the roots. Controlling of seedlings is also problematic. Burning of the dense thickets of seedlings will increase suckering while mowing increases seed germination.
- (4) Chemical control can be used in conjunction with mechanical control although the success is variable. To control seedlings (under 4m) applying a glyphosphate based herbicide (e.g. Roundup) to the foliage can be effective although as it is non-selective care has to be taken

when applying it especially in high quality areas. Larger seedlings or seedlings in sensitive areas can be treated by applying glyphosphate based herbicides to cuts at the base of the stem. Larger trees. To control larger trees the use of oil soluble herbicides (e.g. triclopyr based herbicides such as Garlon) is the most effective form of treatment. The herbicide needs diluting in an oil (special formulated oils or with some pesticides diesel or kerosene can be used at a concentration of roughly 20-30% pesticide/70-80% oil depending on pesticide used). This can be administered in several ways including painting on stumps of felled trees, applying to stems that have been ring barked or by wetting the bottom 12-18 inches of bark around the whole circumference of the tree. This type of treatment needs to occur in the growing season of the tree – mainly between spring and when the leaves change colour in autumn. These methods are successful at killing the stems but the effect on killing the roots is variable and subsequent treatment of seedlings from suckering may be needed.

The latest research shows that for the maximum chance of the killing the roots through the pesticide being translocated through the root system is to treat the trees in the autumn towards the end of the growing season. It has also showed that applying herbicide to the bark at the base is more effective at reducing suckering as the tree and roots are poisoned without the tree being physically damaged, which can stimulate suckering. A new method that is shown to be successful is called 'hack and squirt'. In this method a axe or bill hook is used to put angled downward cuts through the bark every 10cm. Small quantities (1ml per cut) of herbicide (triclopyr or glyphosphate based herbicides can be used) at a high concentration is then squirted into each cut. The herbicide sits in the cut until it is translocated into the root system. The tree mustn't be ring barked as the herbicide won't be able to be translocated through the phloem to the roots.

Conclusion

Controlling robinia is difficult due to its aggressive nature and ability to produce clones through its roots and stump especially when damaged. The most effective way of controlling robinia is through a mixture of prevention, mechanical and chemical treatments. The timing and type of treatment is important in reducing the amount of suckering from roots and stumps and follow up treatment of seedlings may still be needed.

References

- Basnou, C. 2006, *Robinia pseudoacacia*, Delivering Alien Invasive Species Inventories for Europe.
Huntley, J.C. *Robinia pseudoacacia*, <http://forestry.about.com/library/silvics/blsilrobpse.htm>
Invasive Species Specialist Group, http://www.issg.org/database/species/reference_files/
Sabo, A.E. 2000, *Robinia pseudoacacia* Invasions and Control in North America and Europe, Restoration and Reclamation Review, Vol 6, No 3
Wieseler, S., Alien Plant Invaders of Natural Areas: Black Locust, Plant Conservation Alliance's Alien Plant Working Group, <http://www.nps.gov/plants/alien>
Wisconsin Department of Natural Resources. Black Locust (*Robinia pseudoacacia*), http://dnr.wi.gov/invasives/fact/black_locust.htm