

Status and distribution of *Rubus spectabilis* Pursh in Ireland

Pierre Binggeli & James P.H. Paterson

INTRODUCTION

Worldwide, the Rosaceae contains the largest number of invasive woody plants and many highly invasive species belong to the genus *Rubus* (see Cronk & Fuller, 1995 and Binggeli *et al.* in prep.). In the British Isles, Clement & Foster (1994) list 18 *Rubus* species and hybrids which have escaped from cultivation. Four species, including Salmonberry - *Rubus spectabilis* Pursh, are described as widely naturalized, yet their status and distribution is poorly known.

In the British Isles there are a number of invasive plants which have major impact on native vegetation. Some, like *Rhododendron ponticum* L. and *Prunus laurocerasus* L., have a detrimental effect on forest structure, species richness and tree regeneration. These two evergreen species constitute the dense undergrowth of many native woodlands and are considered a threat to the conservation of native woodlands.

The purpose of this study was to document the status and distribution of *R. spectabilis* and ascertain the potential impact of the species on native vegetation with particular reference to woodlands and forestry plantations.

The information regarding *R. spectabilis* is presented using the approach adopted in a review of invasive woody plants carried out at the University of Wales (Binggeli *et al.* in prep.). The information included in this account is based on five different lines of investigations, i.e. a field survey of Northern Ireland carried out in September 1995; a questionnaire sent to botanists, ecologists and foresters; a literature survey; a requests for information in a number of magazines and journals; and from herbarium sheets.

SPECIES CHARACTERISTICS

Description

R. spectabilis is a rhizomatous multi-stemmed shrub reaching a height of 2 to 4 m. The plant is deciduous and non spinous, but the stems are covered with slender prickles. The woody stems may live up to seven years but generally appear to be biennial and bear pinnate leaves

composed of three leaflets. The root stock can live at least ten years and clones more than hundred years.

Taxonomy and variation

Variation in fruit colour (yellow or red), in leaf pubescence and prickliness have been observed. As a result a few varieties, subspecies and forms have been described. In Ireland, field observations suggest that putative hybrids with native *Rubus* spp. may exist.

Reproductive biology

The bright rose-purple flowers are borne solitary as early as February. They are large (ca 2.5 cm in diameter) and reported to be hermaphrodite. They produce nectar and are visited by bees and other insects as well as hummingbirds. Flowering starts prior to leafing. The fruits, when mature, are usually orange, but are sometimes dull purple. In Oregon fruits ripen in June and are readily eaten by birds and the passage of the seeds through the bird's gut enhances their germination potential. The small seeds (50-100 per fruit and 315 000 seeds/kg) have deep dormancy and may remain in the soil for many years. In its native range Salmonberry is a prolific seed producer whereas in the British Isles the fruit production appears to be low and most of the spread is done by asexual means. In Germany many clones never set fruits indicating self-incompatibility.

Resilience and resistance

When cut back the shrub sprouts vigorously and once established tolerates moderate to heavy shade.

Environmental requirements and successional status

Salmonberry is a mesic plant but does not tolerate swampy conditions. It favours high N and in North America is often found associated with *Alnus rubra* Bong. Salmonberry is most common in early succession although the seedlings are shade tolerant. Once established it spreads vegetatively under the canopy of various deciduous or mixed forests to form much of the understorey. The species can be described as stress-tolerant.

Products and uses

In the British Isles this plant has no commercial value and is presently of limited ornamental interest as it is not included in The Royal Horticultural Society's *Gardeners' encyclopedia of plants and flowers*. In Chinook Indians formerly ate the berries and new shoots, and used the bark as a remedy for indigestion caused by eating too much salmon which is apparently the reason for the shrub's common name.

STATUS IN NATIVE RANGE

Range and abundance

The range of *R. spectabilis* extends along the rim of the Pacific Ocean from central California northwards to the Aleutian Islands. The shrub is found from sea level up to a maximum of 1400 m a.s.l. Being very palatable to large herbivores, but particularly to elk, it has been eliminated in some parts of the Olympic Peninsula. It is common in mixed forests but is usually absent from pure coniferous forests.

Climate

The range lies in regions with an annual water surplus and little to moderate deficiency of water in the summer. In much of the range the winters are mild and wet while the summers are dry.

Site requirements

The species is found in a wide range of soil types. Although it prefers mesic habitats (e.g. stream bottoms and floodplains) it is also found on hillsides and clearcuts where it grows no more than a meter tall. Seedling establishment is greater on mineral soil than on undisturbed soils.

Weediness

Salmonberry is considered as very weedy. Following forest thinnings the cover of Salmonberry increases rapidly. Competition with tree regeneration is more likely to be caused by clonal expansion rather than seedling establishment.

STATUS IN INVADED REGIONS

History of introductions and intensity of invasions

First introduced to the British Isles in 1827 as a 'desirable' only 13 years after its discovery. It is said that the shrub was introduced to Scotland as pheasant food. The date of first introduction to Ireland is not known, but it was offered for sale by the Daisy Hill Nursery (Newry) as advertised in its *Wholesale Catalogue for 1921-1913*. Commonly planted, for its flowers, in the gardens of large

estates and was recommended by William Robinson in the *English Flower Garden* as 'best for the wild garden'. In parts of Northern Ireland Salmonberry was planted as a hedge species were *Crataegus monogyna* Jacq. failed to grow adequately. In the Orkney it is probably the hardiest shrub of any kind, where it "suckers madly and is extremely invasive so should be used with care." It occurs widely in parts of the north of Ireland, parts of Scotland and on the Orkneys (Fig. 2.)

Elsewhere it is naturalized in the Orange County of North Carolina and in a number of European countries including Belgium, Denmark, Faroe, France, Germany, Greece and the Netherlands.

Patterns of invasion and time-lag

In the north of Ireland most populations of Salmonberry can be traced back to the original planting, either an amenity plant around a large country house or from hedgerows. The speed of spread is slow and most of the expansion usually is the result of vegetative propagation. The spread of Salmonberry in the British Isles has only been noticed in the past two decades despite the species having been introduced for more than 150 years. This time-lag between the species introduction and its perceived spread into native vegetation, often observed in invasive plants, probably results from the limited fruit production and slow population increase.

Site and climate

In Europe, Salmonberry is only present in oceanic regions and much of the spread is observed in regions with mild and wet winters. It is found on a wide variety of soils including sand, and although it is often found on acid soils, it regenerates on sand dunes with high pH (about 8). In Ireland natural regeneration has been recorded between sea level and 360 m.

Vegetation types

Most of the spread of Salmonberry is observed in deciduous woodlands, including alder, beech, oak and sycamore woods, where the soils appear to be fertile and moist. The canopies of these woods can be partly open (alder, oak) to closed (beech) but in all instances Salmonberry produces a very dense monotypic understorey. In forestry plantations it is common under pine and larch whereas under other conifers it is generally absent unless a small canopy gap is present or along the edges. It is also found spreading into open communities of grass/bracken vegetation, into pasture and on sand dunes in sea buckthorn (*Hippophae rhamnoides* L.) clumps.

Impact on ecosystem

As Salmonberry forms dense monotypic stands it allows little or no undergrowth besides a few mosses and suppresses all tree regeneration. In the Orkney the shrub is a favourite nesting site for blackbirds.

Impact on humans and related activities

Although its berries are edible, they are rather insipid and therefore not sought after. Stands of Salmonberry are very dense and impenetrable on moist ground and prevent both view of and access to woodlands. It is now spreading into plantation forests of Co. Armagh. It could become a serious forestry weed in the western parts of the British Isles. It is already considered a problem in the Pomeroy Forest following clear cut felling. However, generally foresters do not appear to be aware of the potential problem.

Control

Control is carried out at the National Trust Argorie Estate. The use of glyphosphate is highly successful as it kills most stems and rhizomes. However, follow treatment is necessary as a large number of seedlings spring up the following years. Nevertheless its control is much easier than that of other understorey invasives such as *R. ponticum* L. and *P. laurocerasus*. In the State of Washington, Salmonberry is easier to remove than the introduced 'European blackberry' as the former can be easily pulled out of soft soils. Cutting of Salmonberry only encourages new growth.

ECOLOGICAL DIFFERENCES

Existence of ecological equivalent species and competitive interactions

In the British Isles there is no ecologically equivalent species. The native blackberry does occupy similar habitats, however its scrambling growth form, as opposed to erect one, does not result in monotypic and impenetrable stands under the canopy of broadleaved woodlands. If allowed to spread the Salmonberry could eventually displace the blackberry in much of the western parts of the British Isles.

Differences in status and ecology between invaded and native ranges

The species is weedy in both the native and invaded ranges. However, in Europe it does not exhibit the same prolific seed production and on the continent even fails to produce any fruits at all.

CONCLUSION

At present it appears that fruit dispersal and the

establishment of new clones of Salmonberry is limited and is not a shrub currently used in amenity planting. Thus its spread is localized and mainly the result from vegetative propagation of established clones. If this is really the case, the species can easily be contained by using herbicide and vegetation management. However, it is essential to assess the fruit production of Salmonberry particularly in relation to potential climatic change which may affect the British Isles. Would drier and warmer summers enhance fruiting? If they do then Salmonberry, with its long-lasting seedbank, could become a serious weed.

In its native range Salmonberry can suppress the growth of light demanding species such as Douglas Fir. In Ireland the dense stands of Salmonberry clearly prevent any tree regeneration and thus the shrub should be considered as a threat to the conservation of broadleaved woodlands. Its control should be part of a regional strategy to conserve native woodlands which aims at preventing the spread of invasive woody plants into uninvaded woodlands and controlling these invaders in key conservation areas.

REFERENCES

- Healey, J.R., Goodland, T., Binggeli, P. & Hall, J.B. (1995) The impact on forest biodiversity of an invasive tree species and the development of methods for its control. ODA forestry Research Project R4742, Final Report 1991-95. UCNW, Bangor.
- Clement, E.J. & Foster, M.C. (1994) Alien plants of the British Isles. Botanical Society of the British Isles, London.
- Cronk, Q.C.B. & Fuller, J.L. (1995) Plant invaders: the threat to natural ecosystems worldwide. Chapman & Hall, London.
- We would welcome any further information on the species, such as new locations, evidence of spread, herbarium records, ...
Please contact:
J.P.H. Paterson, ABCS, UUC, Coleraine BT52 1SA, Northern Ireland.

Article's history

This note was presented at a BES winter meeting in 1995. Further information has been gathered since and this note will be updated in due course.