

**GIANT HOGWEED (*Heracleum mantegazzianum* Somm. & Lev.)
BY THE RIVER ALLAN AND PART OF THE RIVER FORTH**

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INTRODUCTION

Giant Hogweed (*Heracleum mantegazzianum*) is a native of the Caucasus Mountains, but is now widely naturalised throughout north-central Europe and Scandinavia (Tutin et al 1968). It was introduced into Britain as a garden ornamental in the late nineteenth century and since the 1930's has become widespread in Scotland (Drever and Hunter 1970) where it is spreading at an increasing rate (Williamson and Forbes 1982). It is most commonly found growing next to waterways, and the banks of the River Allan have become extensively colonised. Giant Hogweed may have been introduced into the area from the gardens of Cromlix House (from which a stream drains into the River Allan) where it is known to have been planted in the first decade of this century (R. Eden personal communication).

Giant Hogweed is conspicuous by its large size, with mature individuals under favourable conditions reaching 3.5m tall and possessing leaves over 1m wide. It takes three or four years to mature, senescing each winter to grow back more vigorously the next spring from the large tap root. Immature plants can be distinguished from the smaller, native Hogweed (*Heracleum sphondylium* L.) by their bristles and red blotches which cover the hollow stems (although Stewart and Grace 1984 have described hybrids which show intermediate characteristics). Giant Hogweed is monocarpic, flowering and reproducing only once at the end of its lifespan, when locally individuals have been observed to produce from 2,000 to 20,000 seeds (Neiland 1986).

The spread of Giant Hogweed has caused concern primarily because of the injurious sap which contains furocoumarin chemicals that sensitize human skin to strong sunlight (Youngman 1958, Knudsen 1983). There have been several cases of severe blistering and dermatitis amongst children and gardeners who have come into contact on sunny days with the copious sap that exudes from cut stems (Drever and Hunter 1970). Giant Hogweed can restrict public access to river banks and may cause erosion since it often replaces existing vegetation which has helped to stabilise the soil.

In the present paper, our aims are to describe part of the local distribution of Giant Hogweed, and to explain its distribution and possible means of control. A more detailed account can be found in Neiland (1986).

METHODS

Distribution

The distribution of Giant Hogweed on the banks of the River Allan and some of its tributaries, and the section of the River Forth downstream from its confluence with the Allan to Stirling Bridge, was mapped up to 50m from the water's edge on 3, 4, 16, 20 and 24 August 1985. At all sites, the number of adults were counted, except where there were over fifty when the colonies were simply classified as 'large'. Immature individuals were also recorded and numbers estimated where possible. Neiland (1986) includes notes on the types of habitat in which Giant Hogweed grows and details of their soil chemistry.

Dispersal

The seeds of Giant Hogweed, in common with other Umbelliferae, separate into two carpels when dry, and the marginal ridges of these form a broad wing which suggests an adaptation to wind dispersal. To investigate this, dried seeds of average size were released from a height of about 2m (a frequent height of adults) on a windy day in an open area on Stirling University Campus, and the distance they travelled was measured. The wind speed and duration of wind gusts was also recorded. The process was repeated several times. Having then established a relationship between windspeed and dispersal distance, maximum expected dispersal distances for seeds in the area were calculated using local windspeed data for sample days in August 1985.

Most Giant Hogweed grows in riparian habitats, perhaps because water is an important means of dispersal. To investigate whether this was the case, the time taken for seeds to sink was recorded, and calculations were made as to how far it was theoretically possible for seeds to be dispersed using water velocity data for the River Allan.

Seeds may be removed and dispersed by birds and this was studied at a Giant Hogweed site in Bridge of Allan (NS 788 963) on 21 and 22 August, 1985.

RESULTS

Giant Hogweed grows at numerous open sites along the bank of the Rivers Allan and Forth (see Figure 1 – fold-out map). At most sites where adults were present, there were less than 50 flowering plants. The largest colony was in Bridge of Allan (NS 788 963) where there were many hundreds of adults and thousands of immature plants. This was an area of privately-owned river bank where no attempt had been made to control Giant Hogweed. At 80% of the sites where adults grew, seedlings and non-flowering plants were present. Sites without mature plants may have resulted from recent colonisation or destruction of older individuals by control measures.

Giant Hogweed grows in open woodland near the banks of the Allan and plants were occasionally seen on roadside verges and railway lines close to the rivers. It was also found on wasteland, rubbish tips, land around derelict buildings or demolition sites, and in gardens. There are large numbers on wasteland next to a scrap-metal yard at Causewayhead (NS 806 952), around the foundations of the demolished Pig Testing Station in Bridge of Allan (NS 789 963) and in the gardens of Cromlix House (NN 785 059). Although not mapped, a few plants were found to grow at considerable distances from the banks of the Allan. One individual was seen about 1km from the river on a roadside verge near the main entrance to Stirling University (NS 801 969), and another by the M9 motorway at NS 780 977.

Dispersal

The wind dispersal experiment showed that seeds could be blown considerable distances. Even in moderate windspeeds of about 3m/sec they could travel over 2m, while in high winds of 14m/sec, they were blown over 10m. This is further than had been suggested by previous workers (Clegg and Grace 1974).

The investigation of water dispersal showed that seeds remained afloat for two or three days. Although they may sink more quickly in turbulent water they can clearly be carried several kilometres downstream even at low water river velocities of 0.15m/sec (Forth River Purification Board communication) if unhindered by obstacles. During periods of high water the river is liable to burst its banks and deposit seeds further from the usual channel.

Dispersal by birds was not observed and none were seen to feed on the seeds. Tits and warblers were attracted only by the numerous insects which swarmed around the umbels.

DISCUSSION

The results of mapping suggest that the plant is increasing its numbers and distribution in the study area in spite of control measures by Stirling District Council, Bridge of Allan Community Council and a few riparian landowners. But it does remain absent from agricultural land because it cannot tolerate grazing or ploughing. Cattle, goats and sheep readily graze Giant Hogweed and seem attracted by the scent, particularly of the flowers. Neiland (1986) observed cows tearing open black plastic bags in order to reach inflorescences within. The animals appear to suffer no ill-effects from eating the plant, although there are rare reports of it causing blisters around the mouth (Andrews et al 1985). Ploughing cuts through the roots of the emerging plants and thereby prevents their establishment. Although the Rivers Allan and Forth do pass through much agricultural land, riverbanks are often fenced or left unploughed and therefore provide a suitable habitat for the plant. This is also the case with areas of wasteland or open woodland.

Giant Hogweed is not grazed naturally in Britain and neither hares nor rabbits were observed to eat it; nor does it suffer from insect herbivory. Therefore, if grazing by domestic animals or ploughing cannot be used to control it, other methods must be found. Herbicides and cut and slash methods have been used on the banks of the River Allan to control Giant Hogweed, but so far with only limited success. Amongst the herbicides, 'Glyphosphate' is the most effective (Neiland 1986) but is expensive and in common with other herbicides can be injurious to wildlife, tending to kill non target species in the vicinity. It was used during the summers of 1984 to 1986 on the extensive areas of bank owned by Stirling District Council (SDC), and has proved very effective at reducing the population of larger plants which represent the major problem as far as the access to riverbanks is concerned. However there are still large numbers of seedlings appearing each year in these sprayed areas. The seed which gives rise to these plants may have been a) blown in from opposite untreated privately-owned banks, b) washed in by the extensive flooding during the summer of 1985 and c) represent a reservoir of dormant seed in the soil. Cut-and-slash methods are more selective than herbicides but laborious and unpleasant for workers who touch the cut stems. Moreover the plants will regenerate unless they are cut just before the seeds are ripe. The problems of control are made more difficult by the ease of dispersal of the large numbers of seeds that are produced annually, and the seeds' dormancy which enables them to persist in the soil for many years (Forbes and Williamson 1983).

If Giant Hogweed is to be controlled in the study area then a co-ordinated strategy aimed at eradicating all the colonies is needed, not just those on land owned by SDC. Carefully timed cutting and herbicide spraying operations can be successful in controlling the plants, but must be maintained over several years to be effective, and this requires long-term planning by the local authorities.

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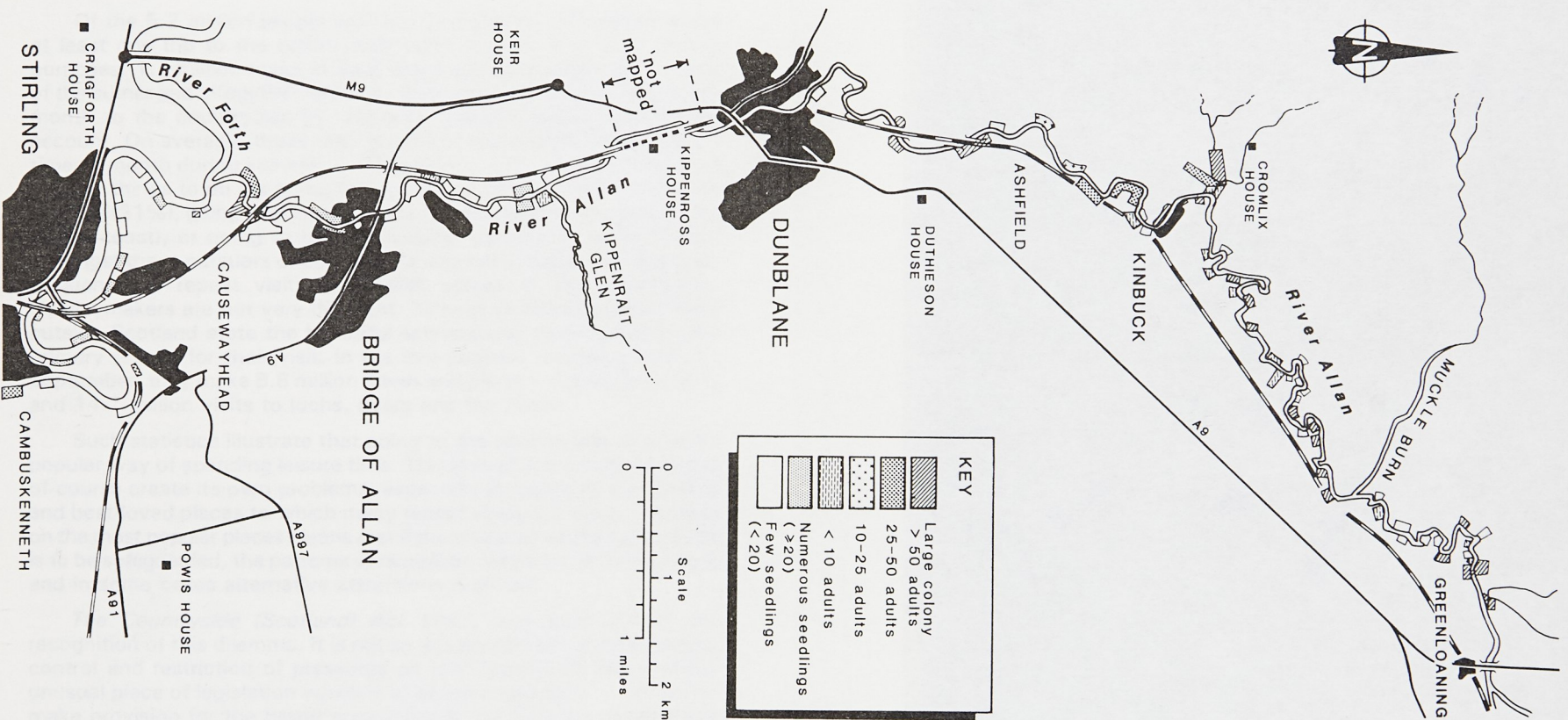


Fig. 1 Hogweed distribution along the River Allán and a part of the River Forth