

Briefing

November 2016

Ragwort: Problem plant or scapegoat?

Common ragwort is an ecologically important wildflower native to the UK, Europe and Asia which seems to arouse strong views. This briefing summarises the issues and corrects inaccuracies which are in danger of misleading the public, politicians and policy makers and misdirecting precious time, money and resources.

UK wildlife is already under threat due to widespread habitat loss and poor practice, leaving many species reliant on patches of habitat in increasingly hostile, ecologically poor landscapes. More disruption of these already under-pressure areas by ill-informed policies and measures, such as 'tidiness schemes' prompted by unnecessary weed control or intensive farming, will make things worse especially for bees and pollinators.

Summary

Ragwort (*was Senecio jacobaea* now *Jacobaea vulgaris*) is an important wildflower for invertebrate wildlife:

- 35 insect species totally rely on Common ragwort for food including 7 moth and 7 beetle species;
- Another 83 species are recorded as using Common ragwort often as a significant food source, with a further estimated 50 species of parasite in turn feeding on those;
- In addition to these 133 species, Common ragwort is a significant source of nectar for others including bee species that specialise in feeding on yellow Asteraceae (daisies) and many species of butterfly.¹
- Government research shows that of over 7,000 plant species in Britain Common ragwort is the 7th most important nectar-producing plant.²

Like many other wildflowers, ragwort happens to be toxic and has the potential to cause livestock poisoning. Efforts to control and reduce ragwort directly affect the wildlife that is dependent on it and often result in significant collateral damage. In a 2014 survey of members by the British Horse Society 98% of respondents were confident that they could recognise Common ragwort **yet** 17% of responses to photos of plants with yellow flowers were misidentifications, with regular reports of a variety of yellow flowered plants being uprooted or sprayed with herbicides and species such as Fleabane, Hoary ragwort and St. John's wort being routinely destroyed due to mistaken identity. Even rare and endangered species like the Fen ragwort (*Senecio paludosus*) are at risk. In 2014 Fen ragwort was sprayed with herbicide on its SSSI; the nature reserve was designated purely to protect Britain's last remaining naturally occurring Fen ragwort population.

Confirmed incidences of poisoning are very rare indeed and are almost always associated with horse welfare cases where the animals are not being properly looked after. Other livestock are less susceptible and do not generally live long enough to develop symptoms. In the small number of recent cases relating to cattle developing liver disease the alternative cause, moulds in hay, has not been excluded.

Ragwort is an important part of our natural heritage and care is needed in how it is managed. Current indiscriminate forms of control are ineffective with considerable costs to taxpayers and our environment. Horses do not freely choose to eat live ragwort: most risks arise through dried ragwort in hay and overstocking along with insufficient supplementary feeding. Mistreating livestock and supplying toxic hay are both illegal.

¹ Ragwort - Insect Fauna in Detail, Buglife
www.buglife.org.uk/sites/default/files/Ragwort%20-%20Insect%20Fauna%20in%20detail_1.pdf

² Agriland Project data (Fera / University of Bristol)

Rather than ill-informed targeting of ragwort a more effective approach would be to provide a clear focus on grassland management and hay quality and would allow limited resources to be directed in a more cost-effective and coherent way, whilst also limiting the impacts on nature and biodiversity.

Ragwort and the law

Under the Weeds Act 1959 a landowner or occupier may be ordered to control the spread of ragwort. The Ragwort Control Act 2003 allows for the creation of a code of practice. Neither of these Acts makes ragwort control compulsory in the absence of an order. However, there has been a tendency to misquote the legislation and imply that there is an automatic legal responsibility to control the plant, which there is not.

There is also frequent confusion about the terminology used in the Acts which names a group of “injurious weeds”. This does not mean that the weeds concerned are dangerous or cause injury. The Weeds Act was a consolidation of earlier legislation and was not debated in Parliament but it is clear from the original discussions in the 1920s that it was referring to harm in agriculture in the context of largely pre-industrialised farming practices.³ Some of the other species listed in the Act are non-poisonous or even edible.

Vitality, under Section 13 of 1981 Wildlife and Countryside Act it is illegal to uproot any wildflower including ragwort unless carried out by the landowner, occupier, someone authorised by them, or by a specified official.

Common misconceptions

Common ragwort has been subjected to a campaign of “awareness raising” often involving distribution of a whole set of misunderstandings and falsehoods in which:

- Ragwort has been blamed for animal deaths which were unproven or obviously not ragwort-related;
- Bad or irrelevant statistics and poor and biased surveys have been used to spread scare stories; and,
- Ragwort has been falsely branded a threat to human health or to the countryside.

Companies repeating these claims in marketing statements could be breaking consumer legislation and despite action by the Advertising Standards Authority to stop anti-ragwort adverts such ill-informed and false claims have been repeated and adopted by councils, politicians and governments resulting in:

- Unnecessary, draconian measures to control or eradicate ragwort, often causing ecological damage to nature reserves and wild areas like the New Forest;
- Miles of roadside verges being subject to unnecessary ‘tidiness’ measures;
- Other valuable species of plant being targeted as a result of outdated, archaic and anachronistic legislative measures originally aimed at raising agriculture production during and after World War I;
- An entirely unnecessary air of panic leading to proposals for more poor legislation based on misunderstandings of nature, such as proposed measures that started as ragwort control in Scotland being modified into proposed control measures for all potentially toxic plants. These would have affected everything from bluebells to oak trees.

Several misconceptions are propagated about ragwort including:

1. *Ragwort is “extremely toxic”* – this claim was made in a survey by an equine organisation, but that term is used in science for substances that are thousands of times more poisonous than ragwort.^{4 5}

³ *Debate on the Agriculture Act*, Hansard, 3 November 1920

⁴ Gossel S. S. and Crowl D.A eds 1994 *Handbook of Highly Toxic Materials Handling and Management (Environmental Science & Pollution)* CRC Press

⁵ Craig A. M., Pearson E.G., Meyer C. and Schmitz J.A. 1991 Clinicopathologic studies of tansy ragwort toxicosis in ponies: sequential serum and histopathological changes *Journal of Equine Veterinary Science* Volume 11, Issue 5, September/October 1991, pp. 261-271

2. *Ragwort is an “invasive plant”* - a term used by ecologists for plants which are not native to the UK, not in their natural surroundings and capable of growing, spreading and outcompeting native species and affecting natural features such as rivers and waterways. Common ragwort is a native UK plant but there is a smaller plant called Oxford ragwort which originally comes from Sicily. This grows on waste ground and not in pastures and is not considered a problem.
3. *Ragwort is a danger to humans or even poisonous to the touch* - Poisoning by this highly distasteful plant would require consumption of a great deal of it. Some people can get a rash because of an allergy to compounds present in many of the plants of the daisy family called *Sesquiterpene lactones*⁶ but these are not the toxic alkaloids. It makes sense to wear gloves if pulling up poisonous plants but research shows that the alkaloids are very poorly absorbed by the skin. The risk of eating meat from animals that have consumed ragwort has been looked at and judged to be minuscule as the toxic alkaloids are destroyed in the process of exerting their toxicity in the animal and are not passed on.⁷
4. *Enough ragwort exists on land that is not being controlled to support the wildlife that depends on it* – the general panic about ragwort leads it to be controlled in areas where even the poor official guidance does not recommend control. Also the wildlife species will often exist in meta-populations which are linked colonies which individually occasionally die out to be recolonised from their neighbours. Loss of any habitat in this system can lead to the entire complex dying out even when there is habitat left. Furthermore, many species may have complex requirements, not just the presence of ragwort, which would only be satisfied in sufficient quantity on land that is being grazed.
5. *Tiny amounts of ragwort such as pollen grains and seeds can be dangerous because the damage is cumulative* - Damage caused by the toxins can be cumulative but alkaloids have to first be absorbed and then converted to toxic compounds called pyrrolic metabolites. These are highly reactive and will react even with water in the cell.⁸ Only if they interact with DNA will they cause damage and even then there are repair mechanisms which will undo this. This means that small doses like this are insignificant.

Government advice and statistics

Defra, the UK government’s environment department, is responsible for producing the advice for England. Advice for Wales and Northern Ireland generally follows Defra’s lead on the matter and there is separate legislation in Northern Ireland which has the same effect as the Weeds Act. Defra’s Code of Practice appears to base its view of risk on some particularly poor science and use of data and extrapolation of statistics. Defra says that it bases its view of the risk of ragwort on:

*A figure of 500 horse deaths from ragwort poisoning in 2000. This figure is based on the number of confirmed horse deaths from ragwort poisoning seen by the Philip Leverhulme Large Animal Hospital Teaching Hospital at Liverpool University as a percentage of all the horse cases treated during the year, and grossed up to be representative of the total horse population.*⁹

The source of these figures, Professor Derek Knottenbelt, is a prominent anti-ragwort campaigner. There is no test that can confirm ragwort poisoning. The set of problem chemicals occur in many other British plants and 3% of plants globally.¹⁰

⁶ Warshaw, E. M. & K. A Zug. 1996. *Sesquiterpene lactone allergy*. Am. J. Contact. Dermat. 7: 1-23

⁷ Mattocks A.R. 1986 *Chemistry and Toxicology of Pyrrolizidine Alkaloids* Academic Press

⁸ Fu P. P., Xia Q., Lin G. and Chou M. W 2004 *Pyrrolizidine Alkaloids Genotoxicity, Metabolism Enzymes, Metabolic Activation, and Mechanisms* Drug Metabolism Reviews Vol. 36, No. 1, pp. 1–55

⁹ *Code of Practice on How to Prevent the Spread of Ragwort*, Defra 2007

¹⁰ *Opinion of the Scientific Panel on Contaminants in the Food Chain on a Request from the European Commission Related to Pyrrolizidine Alkaloids as Undesirable Substances in Animal Feed*. The EFSA Journal 447, 1-51, EFSA 2007

More importantly the characteristic microscopic changes in the liver that are diagnostic have other causes including toxins from moulds that commonly grow on damp feedstuffs.^{11 12} So there cannot be 100% confirmed horse deaths from ragwort poisoning. Professor Knottenbelt has stated that he sees more than 10 cases of ragwort poisoning a year and he extrapolates from those.¹³ But official University figures show that in an 8 year period from 2006-13 only one possible case was recorded. Even if there were 10 cases a year they cannot be extrapolated since animals admitted to a hospital are not a representative sample of what occurs normally. This would be especially true since the Professor would be well known for working on cases like these which would be more likely to be referred to him. This alone invalidates Defra's statistical method.

Professor Knottenbelt has suggested that ragwort was "burgeoning", it was spreading in Britain and that it was also "causing massive concern" in South Africa.¹⁴ Yet the data from the government's Countryside Survey published that year shows a significant decline in ragwort in the UK and the body that holds the plant records in South Africa says that there was no record of the plant ever being recorded there.¹⁵

Defra also claims that ragwort growing within 50 metres of grazing animals poses a high risk to livestock and that 100m is medium risk. Even by discounting the overestimation of the likelihood of poisoning this does not stand up to examination. The published research on the efficiency of ragwort seed dispersal by the wind shows that most seeds either never leave the parent plant or land close by. Only 0.5% of all the seeds that a plant can produce will usually travel more than 25 metres.^{16 17} It is of course possible for the occasional seed to travel further, but research also shows that it is the management of the site that determines whether a plant will grow and Defra takes no account of this in its estimation of risk.

Cinnabar Moths

The Cinnabar moth is a distinctive red and black day-flying moth species with brightly coloured yellow and black striped caterpillars that look almost as if they are wearing football jerseys. Cinnabar moths have declined by 67% over the past 40 years or so and as a result are listed as a Biodiversity Action Plan species.¹⁸

Ragwort is essential for Cinnabar moth's survival as it is the main food-plant for the moth caterpillars. The moths do sometimes use other related plants, but Common Ragwort is the only plant common enough and large enough to support the population at a landscape scale.

Several false stories circulate about Cinnabar moths and ragwort including that an explosion in ragwort was due to a lack of moths to feed on it and, therefore, control it to some extent. The claim was that in one year Cinnabar moths ate all of the ragwort and nearly died out as a result. The records of abundance of the moth show this did not happen. This is almost an impossibility with such a widespread plant. Another claim in a prominent horse care book says that the moths are being poisoned by ragwort, its natural food¹⁹ when research shows that they require the problem chemicals to be stimulated to lay its eggs²⁰, the caterpillars require them to be stimulated to feed and it stores the chemicals in its body to deter predators.²¹

¹¹ Robert B. Moeller, 2004. *Toxic response of the hepatobiliary system* Robert B. Moeller, Jr In ed. Konnie H Plumlee, *Clinical Veterinary Toxicology* Mosby

¹² K.V.F Jubb, Peter C Kennedy and Nigel Palmer, *Pathology of Domestic Animals 3rd edition* 1985 Saunders Ltd

¹³ *Ragwort argument rumbles onwards*. Knottenbelt D., Letter to The Yorkshire Post, 4 September 2011

¹⁴ 2007 *Countryside Survey*, Centre for Ecology and Hydrology

¹⁵ South African National Biodiversity Institute, email 2013

¹⁶ Harper, J. L. & W. A. Wood. 1957. *Biological Flora of the British Isles Senecio jacobaea L.* The Journal of Ecology 45: pp 617-637

¹⁷ Poole, A. L. & D. Cairns. 1940. *Botanical aspects of Ragwort (Senecio jacobaea L.) control*. *Department of Scientific and Industrial Research Bulletin* 82: 2-61.

¹⁸ *The State of Britain's Larger Moths*, Butterfly Conservation, 2013

¹⁹ Henderson C. and Coumb K. 2007 *The Horse and Pony Care Bible: In association with Horse and Hound*, Ebury Press

²⁰ Macel M, Vrieling K. J Chem Ecol. 2003 *Pyrrrolizidine alkaloids as oviposition stimulants for the cinnabar moth, Tyria jacobaeae* Chem Ecol. Jun; 29(6):1435-46.

²¹ Bernays E. A., Hartmann T. and Chapman R. F. March 2004 *Gustatory responsiveness to pyrrolizidine alkaloids in the Senecio specialist, Tyria jacobaeae (Lepidoptera, Arctiidae)* *Physiological Entomology* Volume 29, Issue 1, pp 67-72.

Pasture management

Cows and horses co-evolved with the many plants that contain pyrrolizidine alkaloids including ragwort. They evolved mechanisms to cope with them, including their sense of taste, and naturally avoid them. There is no evidence that ragwort is a serious problem to livestock in a field when they are supplied with the necessary amount of good food.

Ragwort does need to be controlled in hay fields because in this man-made product it loses its taste and can cause poisoning. If control is desired it should be remembered that ragwort requires bare ground to germinate and techniques such as pulling the plant can be counterproductive.

In many areas improving pasture management through stocking density and grazing timing can be more effective in restraining ragwort abundance than pulling or spraying. Research shows that when ragwort goes to seed it dies, and in the absence of soil disturbance the seeds will not produce new plants.²²

What are the solutions?

In practice horses and cattle do not eat live Common ragwort by choice, only doing so when left with inadequate alternative feed.

A shift towards the following approach would result in a more effective, and cheaper, management of ragwort related welfare concerns:

1. **Feed** - The top priority is to ensure that dried forage for cattle and horses is effectively free of Common ragwort; this is best achieved by keeping relevant hay meadows clear of Common ragwort.
2. **Pasture** - Responsibility for keeping hay meadows and hay Common ragwort-free rests primarily with feed producers, suppliers and local authorities.
3. **Testing** - Local authorities have a vital role through trading standards in regulating the acceptability of feed quality and should test for Common ragwort presence in hay.
4. **Welfare** - Where horses or cattle do graze significant amounts of Common ragwort, this is almost always a welfare issue associated with inadequate alternative feed; the law to deal with this should be applied.
5. **Habitats** - There are grazed wildlife habitats in which Common ragwort fulfils an essential ecological function and should be tolerated, as long as grazing animal health is not significantly affected.
6. **Verges** - Common ragwort on bridleways and road side verges should only be considered to present a significant risk to livestock when directly adjacent to hay fields.
7. **Law** - The law is clear no-one should uproot wild plants without the landowner's permission; everyone should act within the law.

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