

# Ragwort poisoning in a suckler herd

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## ABSTRACT

Ragwort (*Senecio Jacobea*) is also known as ragweed, buachalán and buachalán buidhe. It is a common weed of Irish pastures and thrives on a wide range of soils, but competes best on lighter free draining soils where fertility is reasonably high and grazing not intensive, according to Teagasc.

There are four main types of ragwort to be found in Ireland according to *An Irish Flora* (1996) and it is a highly poisonous plant if eaten. Ragwort is toxic to cattle, horses, deer, goats, pigs and chickens. Sheep are less affected by it.

Diagnosing a case of ragwort poisoning in the Regional Veterinary Laboratories starts with the vet.

## HISTORY & CLINICAL SIGNS

In June 2010, Athlone Regional Veterinary Laboratory (RVL) was contacted by a veterinary practitioner regarding a herdowner who had 21 yearlings which had developed watery green diarrhoea four weeks after being turned out on to grazing beside a river. All of the animals were home-reared and three of them had died at the time that the initial contact was made. There were three other groups of cattle on the farm and all were noted to be clinically normal. There were no sheep on the farm.

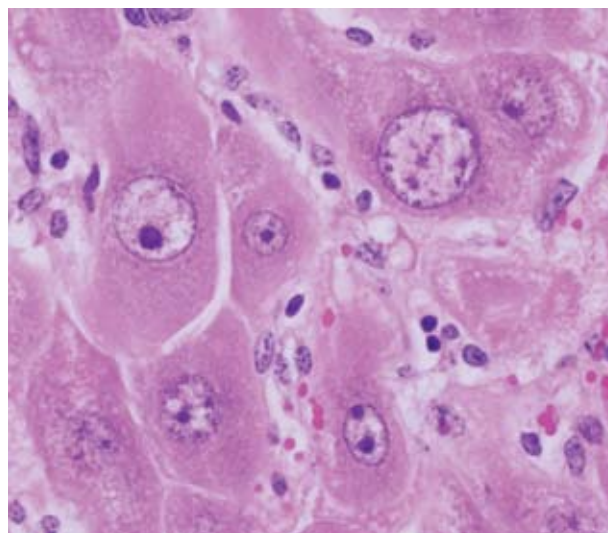
Some of the cattle exhibited trembling of the limbs, appeared stiff and were reported to be dragging their back legs. A consistently noted clinical sign among the animals that died was a crusty type lesion on the muzzle. Other common clinical signs recorded in many of the clinically affected animals included stupor and rectal prolapse due to tenesmus. The river was the only source of water in the field and the cattle had access to it.

## PATHOLOGY

Three carcasses were examined post mortem at Athlone RVL. Significant gross lesions included diffuse

enteritis, oedema of the abomasal folds, mesentery and intestinal wall, and the liver tissue consistency was firm. Histopathological examination (**Figure 1**) of the liver showed diffuse hepatic fibrosis (extensive periportal bridging and

**Figure 1**



dissecting fibrosis), megalocytosis, bile duct proliferation, cholestasis and single cell hepatocellular necrosis. There was also spongiform change (status spongiosus) present in the brain of one of the animals. A diagnosis of ragwort toxicity was made following gross and histopathological examinations and following confirmation that there had been ragwort identified in the silage eaten during the previous winter.

## CLINICAL PATHOLOGY

In the early part of the investigation batches of blood samples from the affected animals were submitted for biochemical analysis (Table 1). Samples 1 to 5 were submitted at the beginning of the investigation and samples 6, 7 and 8 were taken by the investigating laboratory officer when he visited the farm five days later. Samples 9 and 10 were submitted from affected animals about four weeks after the first submissions from the herd were received.

Hypoalbuminaemia was the most notable finding on examination of the results of these analyses. This indicated either a loss of protein (e.g. parasitism) or else an impaired protein synthesis (e.g. malnutrition or liver damage). Raised GGT and GLDH values were only present in some animals which indicated hepatocellular injury (i.e. liver damage) supporting the previously determined histopathological diagnosis of chronic ragwort poisoning.

Additional samples 11 to 23 were submitted with a view

to assessing the prognosis of other animals which had not yet exhibited clinical signs. Samples 19-23 (Animals 21, 22 and 23 were from the affected group, while 19 and 20 were from a different group) showed evidence of hypoalbuminaemia. There were some slightly raised GLDH values noted in blood samples from animals in the apparently unaffected groups. Interestingly, all animals were positive on the Woolfe test (Iodine flocculation test) with results of 4:1 recorded. Some of the non-clinical animals in which positive Woolfe tests were recorded subsequently developed clinical disease.

## DISCUSSION

A diagnosis of chronic ragwort poisoning was made in this case based on the histopathological changes in association with the history of exposure to ragwort in the silage. In the course of the investigation, the issue of whether something else could have caused the cirrhosis arose. The main alternative cause of cirrhosis in cattle (aflatoxicosis) was considered unlikely in this case as there was no history of the animals being fed mouldy feed.

Ragwort (*Senecio jacobea*) is a highly poisonous plant and cattle in particular are highly sensitive to its active compounds, pyrrolizidine alkaloids. These are cumulative toxins, which damage the liver leading to a variety of clinical signs which may include jaundice, diarrhoea, generalised oedema or photosensitisation. In animals which display clinical signs, the disease is almost always

Test (range)	GGT (18-55)	GLDH (0-25)	Total Protein (57-83 g/l)	Albumen (23-37g/l)	Globulin (31-51 g/l)	A/G (0.5-1.5)	Woolfe Test
No.							
1	32 iu/l	6 iu/l	67.0 g/l	17.0 g/l	50.0 g/l	0.34	Not Tested
2	26 iu/l	6 iu/l	69.0 g/l	20.0 g/l	49.0 g/l	0.41	Not Tested
3	11 iu/l	5 iu/l	63.0 g/l	20.0 g/l	43.0 g/l	0.47	Not Tested
4	4 iu/l	3 iu/l	63.0 g/l	18.0 g/l	45.0 g/l	0.4	Not Tested
5	102 iu/l	42 iu/l	61.0 g/l	22.0 g/l	39.0 g/l	0.56	Not Tested
6	68 iu/l	70 iu/l	59.0 g/l	21.0 g/l	38.0 g/l	0.55	Not Tested
7	30 iu/l	9 iu/l	70.0 g/l	18.0 g/l	52.0 g/l	0.35	Not Tested
8	5 iu/l	36 iu/l	68.0 g/l	15.0 g/l	53.0 g/l	0.28	Not Tested
9	9 iu/l	15 iu/l	64.0 g/l	24.0 g/l	40.0 g/l	0.6	4:1 positive
10	26 iu/l	5 iu/l	74.0 g/l	21.0 g/l	53.0 g/l	0.4	4:1 positive
11	2 iu/l	14 iu/l	72.0 g/l	30.0 g/l	42.0 g/l	0.71	4:1 positive
12	9 iu/l	27 iu/l	82.0 g/l	30.0 g/l	52.0 g/l	0.58	4:1 positive
13	25 iu/l	34 iu/l	84.0 g/l	30.0 g/l	54.0 g/l	0.56	4:1 positive
14	14 iu/l	31 iu/l	76.0 g/l	29.0 g/l	47.0 g/l	0.62	4:1 positive
15	2 iu/l	12 iu/l	78.0 g/l	31.0 g/l	47.0 g/l	0.66	4:1 positive
16	2 iu/l	24 iu/l	74.0 g/l	29.0 g/l	45.0 g/l	0.64	4:1 positive
17	20 iu/l	28 iu/l	64.0 g/l	24.0 g/l	40.0 g/l	0.6	4:1 positive
18	18 iu/l	5 iu/l	59.0 g/l	23.0 g/l	36.0 g/l	0.64	4:1 positive
19	27 iu/l	30 iu/l	70.0 g/l	22.0 g/l	48.0 g/l	0.46	4:1 positive
20	2 iu/l	5 iu/l	70.0 g/l	20.0 g/l	50.0 g/l	0.4	4:1 positive
21	13 iu/l	7 iu/l	82.0 g/l	21.0 g/l	61.0 g/l	0.34	4:1 positive
22	16 iu/l	4 iu/l	74.0 g/l	20.0 g/l	54.0 g/l	0.37	4:1 positive
23	2 iu/l	14 iu/l	67.0 g/l	19.0 g/l	48.0 g/l	0.4	4:1 positive

Table 1: The results of biochemical analyses carried out on the affected animals and their comrades.

fatal. Sheep tend to be more tolerant but losses will still occur. Affected horses lose weight, are mildly jaundiced, inappetent and may appear to be blind while frequent yawning is also commonly described.

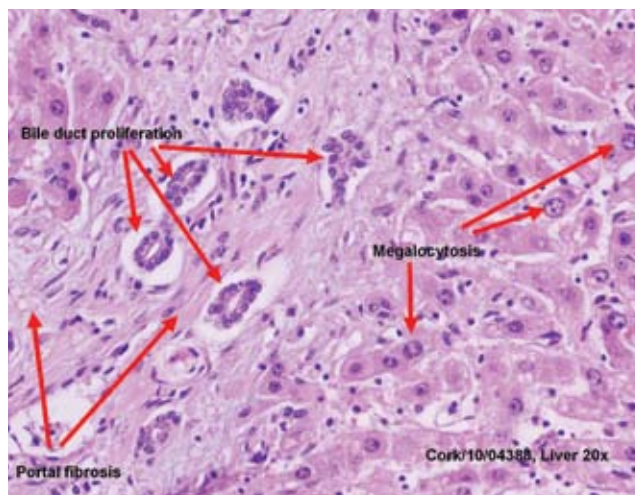
This case highlights the slow but progressive nature of chronic ragwort poisoning and the difficulty caused by the time delay between ingestion of the ragwort plant and clinical signs appearing which can complicate accurate identification of the cause. In the course of the disease, normal liver cells are progressively damaged and replaced by fibrous tissue, a process which will continue long after the poison has been removed from the animal's diet.

In this case there was marked hypoalbuminaemia on biochemical analysis and significant oedema to be seen in the tissues at post-mortem examination. Hypoalbuminaemia is due to a dysfunctional liver being unable to generate albumin and the loss of circulating albumen leads to loss of colloidal pressure and the leakage of intercellular fluid into the extracellular spaces resulting in the clinical sign of oedema. While raised liver enzymes (GGT and GLDH) were noted in some animals they were a less consistent finding than hypoalbuminaemia.

The Woolf Test (Woolf, 1951) is an old test (also called the iodine flocculation test) which is used as a crude guide to indicate the presence of liver damage. It essentially gives an indication of the amount of albumin in the sample in relation to globulin. The results are scored on a scale of negative to 4:1 with the latter suggesting advanced liver damage. It proved of benefit in this case as a prognostic indicator in animals not showing clinical signs. The albumin-globulin ratio gives similar indications with a ratio of less than 0.5:1 considered worthy of suspicion.

The clinical sign of the photosensitisation (**Figure 2**) was present in this case but is not generally a consistent finding. It was described by Radostits *et al.* as one of the possible clinical signs of ragwort poisoning and is due to the failure of the liver to detoxify chemicals that may cause photosensitisation.

**Figure 2**



Spongiform change in the brain was also seen in this case which is another indirect effect of a damaged liver. Spongiform change occurs when the liver function is reduced to the extent that toxins are not filtered from the bloodstream resulting in damage to brain tissue.

Ragwort is a biennial plant in which the typical yellow flowers (Fig 11) occur during the second year of growth. The plant is poisonous through both years of growth. While the growing plant tends to be unpalatable to cattle, they will ingest the plant when pastures are bare. Dead or dying ragwort is considerably more palatable to cattle and poses a greater risk. If the plant is conserved as hay or ensiled, the risk of poisoning remains, often leading to the whole silage pit being contaminated. Control requires the pulling rather than cutting of the plants or alternatively spraying with an effective herbicide.

Radostits O. M, Gay C. C., Hinchliff K. W., Constable P. D.,  
 Veterinary Medicine 10<sup>th</sup> Edition  
 Woolf C. R. (1951) South African Medical Journal Suid  
 Afrikaanse TYDskrif vir Geneeskunde.

## READER QUESTIONS AND ANSWERS

### 1. IN A CASE OF CHRONIC RAGWORT POISONING WOULD YOU EXPECT SERUM ALBUMIN TO BE:

- Low
- Normal
- Raised

### 2. WHICH OF THE FOLLOWING BIOCHEMICAL TESTS IS USED TO INDICATE LIVER FUNCTION?

- Creatinine
- Beta hydroxyl butyrate
- Glumate dehydrogenase (GLDH)

### 3. WHY DOES PHOTOSENSITISATION OCCUR AS A CLINICAL SIGN IN RAGWORT POISONING CASES? IS IT BECAUSE OF DAMAGE TO:

- The thyroid
- Liver
- Kidney

### 4. WHAT IS THE MAIN OTHER ALTERNATIVE CAUSE OF CIRRHOSIS IN CATTLE?

- Aflatoxicosis
- Copper toxicity
- Fatty liver

### 5. IS THE RAGWORT PLANT:

- Annual
- Biannual
- Biennial

Answers: 1.A,2.C,3.B,4.A,5.C