ADA COUNTY

FISH & GAME LEAGUE

PO Box 190496, Boise ID 83719.

TO: Lloyd Knight, Administrator, Plant Industries Division, Idaho Department of Agriculture

REGARDING: Negotiated Rule Making, 02.06.22 – Noxious Weed Rules, Docket No. 02-0522-17xx

Dear Mr Knight:
We request that this written comment be included in the record of the referenced Negotiated Rule Making.
The Ada County Fish & Game League, Inc. supports the petition of Angela Rossman to amend Department Rule 02.06.22 to list Japanese Yews, Chinese Yews and English Yews to the list of Noxious Weeds pursuant to the laws enacted by the Idaho Legislature.
We specifically advocate adding them to the existing list set forth in Rule 02.06.22.02, which provides:
"Weeds listed in the control list are known to exist in varying populations throughout the state. The concentration of these weeds is at a level where control and/or eradication may be possible. A written plan for weeds on the Statewide Control Noxious Weed List shall be developed by the control authority that specifies active control methods to reduce known populations in not more than five (5) years, The plan shall be available to the Department upon request."
We suggest this provides a measured approach which does not require outright eradication but does leave flexibility to minimize exposure of domestic and wild animals to these deadly toxic plants.
A single mouthful can kill a horse or cow, an elk or deer, within minutes.

THE MANDATE FROM THE LEGISLATURE

Idaho Code Sec. 22-2402 sets forth a statutory definition of " noxious weed" and assigns the duty of determining whether a plant is within the definition to the Director. The statute says "noxious weed" means any plant having the potential to cause injury to .... livestock ... or other property. "Property" would include wild animals within the State which are designated by law as " ...Property of the State of Idaho ..." Idaho Code Sec. 36-103 (a).

The pending negotiation places the status of Japanese Yews, Chinese Yews and English Yews squarely in issue. The Director will now decide whether they fall within the statutory definition.

WE RESPECTFULLY SUGGEST THERE CAN BE LITTLE DOUBT ON THIS ISSUE GIVEN THE CLEAR RECORD OF LIVESTOCK AND WILD ANIMALS THAT HAVE INGESTED THESE PLANTS AND QUICKLY DIED FROM IT.

Very truly yours,

ADA COUNTY FISH & GAME LEAGUE, INC.

By: Forrest R Goodrum

Forrest R. Goodrum, Legislative Director

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Yew Toxicology in Domestic and Wild Species

History and General Information

- Yew is known as the "tree of death," dedicated to the gods of death
- Yew leaf extracts were frequently used for murder and suicide
  - Caesar writes about Catuvolcus, one of the kings of Eburones, who chose death from Taxus baccata rather than be taken prisoner
- Yew is now used as an ornamental shrub and frequently used for Christmas wreaths

Species and Distribution – Taxus sp. most common varieties and their distribution

Taxus baccata- European Yew

Taxus cuspidata- Japanese Yew – most common ornamental shrub in US and Canada

- Distribution- Widespread due to cultivation in landscape architecture and design
- Japanese and European Yew are both imported species that have become well established in US as ornamental shrubs
- Both grow as shrubs and never grow larger than 20 feet
- Thought to be the two most toxic species

Taxus brevifolia- Western Yew

- Distribution- Western US and Canada, ranging from California to Montana and to Alaska
- Grows as an evergreen tree with drooping branches ranging in height from 15 to 75 feet

Taxus cannadensis- American Yew or Ground hemlock

- Distribution- mid-western and northeast US, ranging from Kentucky to Minnesota and to Maine
- Grows as spreading shrub, ranging in height from 3 to 5 feet
- Browsing by white-tailed deer is thought to have led to selection for spreading growth over the arboreal form (escape browsing below snow pack)

Yew Anatomy

- Darkest green of all evergreen shrubs
- Leaves are dark green dorsally and pale green to yellow-green ventrally (pictured left) with a prominent mid-rib
- Alternate, stiff, flat to needle-like leaves
- .5 to 1 inches long
- Fruit is bright red, ovoid, fleshing cupped berry (aril)
  - Aril surrounds a single small brown seed
- Chemical composition – hundreds of distinct molecules have been isolated from Yew sp. (mostly flaveniods and toxins)
  - Hydrocyanic (HCN) esters
  - Ephedrine
  - Taxol
  - Oil of Yew
  - Taxines- Taxine A, B, C
  - Others – taxicatin, taxicin I and II, taxiphyllin, taxiresinol, iso-taxiresinol, taxusin, taxinine A, B, E, H, J, K, and L, anhydrotaxininol
- Oil of Yew
  - Intestinal irritant responsible for colic and diarrhea symptoms of yew poisoning
  - Found in sap of yew
- Taxines (generic pictured left)
  - Non-irritating, diternepoid alkaloid
  - Taxine A and B are most the most common alkaloids (taxine B being the most abundant)
  - Responsible for Yew deaths

- Found in all parts of the plant except aril

Yew Toxicology

- Yew are toxic to all animals to varying degrees
  - White-tail deer and certain seed eating birds are much less susceptible
- Yew are toxic all year round
  - Yew are more toxic later in the year due to a build up of toxins
  - Most cases of yew poisoning are seen later in the year because of the scarcity of food and the enhance plant toxicity
- Yew is always poisonous
  - Fresh and dried yew are both toxic
  - Yew eaten directly from plant is as toxic as yew clippings
  - Health of plant does not seem to significantly reduce toxicity (green yew is as toxic and brown yew)

Yew Poisoning & Treatment

Two Syndromes associated with Yew Poisoning (both caused primarily by taxine A and B)

1. Acute Syndrome
   - Symptoms- Death.
   - Animals are frequently found dead next to yew bushes
   - Death usually follows 1 to 3 hours after ingestion
   - Onset of acute syndrome is rapid – Animal will appear normal, then unexpectedly gasp a few times and die
   - Cause of death is cardiac arrhythmia
     - Taxine acts as a cardio-depressant
     - Taxine inhibits sodium and calcium currents, blocking myocardial conduction
     - Heart suddenly stops in diastole
2. Subacute Syndrome
   - Symptoms – Ataxia, diarrhea, hypotension, colic, hypothermia, coma, seizures, weakness, respiratory failure, bradycardia and sudden death
   - Animals (usually cattle) die within 24 to 48 hours after ingestion
   - Survival without treatment is possible but occurs infrequently

Severity of yew poisoning depends on:

- Health status of animal- Sick animals seem to be more susceptible to acute syndrome
- Age of animals- Young animals are more prone to acute syndrome
- Amount of yew consumed- The more yew that is eaten, the more severe the poisoning is
- Type of animal poisoned- Monogastrics are more susceptible to acute syndrome
  - English yew is lethal to ruminants at around 0.5% of the animal's body weight
  - English yew is lethal to monogastrics at around 0.1% of the animal's body weight

Diagnosis – Finding fragments of yew leaves and twigs in the mouth, stomach and intestines

- In cases where no yew detritus is found in GI tract diagnosis of yew poisoning may be determined by GC/MS of stomach or rumen

Necropsy

- No pathogenic lesions
- Exception – In cases of animals dying subacutely, there is a mild inflammation of the upper intestinal tract
- Inflammation is due to the action of the irritant oil of yew

- In grams per pound BW
  - Horse0.9
  - Ox 4.5
  - Sheep4.5
  - Goat 5.5
  - Pig 1.4
  - Total Fatal Doses (in grams)
  - Horse100-200
  - Ox~500
  - Pig 75
  - Dog 30
  - Fowl30

Typical case of yew poisoning

- "Three cows from a herd of 14 crossed a cattle guard into a driveway lined with yews and consumed some of the branches. Two of the cows died suddenly and the third died a few hours later after showing signs of nervousness, trembling and ataxia. No gross lesions were seen at necropsy, but large quantities of yew leaves were present in the ruminal ingesta. The bushes were later identified as T. cuspidata."

  ----Veterinary Medicine – Small Animal Clinician, Sept. 1984.

Treatment of yew poisoning

- No treatment for acute syndrome
- Aggressive decontamination of stomach using activated charcoal and a cathartic ($MgSO_4$)
- Rumenotomy and removal of rumen contents
- Administration of atropine sulfate to counteract bradycardia
  - Problem – atropine slows gastrointestinal peristalsis and prolongs the elimination of the ingested toxic plant
  - Therefore, treatment with atropine but must be done judiciously

Deer resistance to yew poisoning

- Anecdotal evidence for white-tail deer resistance to yew poisoning
  - Newspaper articles about people in Cayuga heights complaining about local deer eating their ornamental yew bushes
  - Occasional references to white-tail resistance in yew toxicology articles
  - Unrecorded experiment at Vet School about a white-tail deer being fed yew ad libidum without any detrimental effects
- Not all deer are resistant
  - Dutch article indicating that fallow deer are susceptible to yew toxicosis

Bibliography

For this project I have compiled over 30 articles concerning every aspect of yew biology and toxicology. These are the most salient articles in regard to this presentation.

Hare, W.R. (1998). Bovine Yew (Taxus spp.) Poisoning. Large Animal Practice January/February: p. 24-28

Lang, D. G., Smith, R. A., and Miller, R. E. (1997). Detecting Taxus Poisoning Using GC/MS. Veterinary and Human Toxicology 39 (5): p.314

International Yew Resources Conference: Yew (Taxus) Conservation Biology and Interactions. 12-13 March, 1993. Berkeley, California, USA.

Kingsbury, J. M.: Poison Plants of the United States and Canada. Prentice Hall, Englewood Cliffs, NJ. 1964; p. 121-123

Clarke, E.G.C and Clarke M.L.: Garner's Veterinary Toxicology. 3rd ed. Williams and Wilkins Co., Baltimore, MD. 1967; p.399-401

Kerr, L.A., Edward W.C. (1981). Japanese yew: a toxic ornamental shrub. Veterinary Medicine – Small Animal Clinician September: p.1339-1340

[History and General Information]
[Species and Distribution of Yew] [Yew Anatomy]
[Yew Toxicology] [Yew Poisoning & Treatment]
[Deer Resistance to Yew Poisoning] [Bibliography]

Case report: Japanese Yew (Taxus cuspidata) poisoning in cattle

Article in The Canadian veterinary journal. La revue veterinaire canadienne · December 1978

Source: PubMed

2 authors, including:

Ian K Barker
University of Guelph
179 PUBLICATIONS **4,007** CITATIONS

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CASE REPORT

Japanese Yew (*Taxus cuspidata*) Poisoning in Cattle

G. W. THOMSON
AND I. K. BARKER*

Introduction

European Yew (*Taxus baccata*) is considered the most dangerous of all poisonous plants in Britain and is a relatively common cause of poisoning of European livestock (3, 4). The Japanese Yew (*Taxus cuspidata*) is similarly toxic (1, 3, 4, 5) and because it is a hardier member of the *Taxus* family is the most common ornamental yew in the Northern U.S.A. and in Canada (4, 5). Bruce, in 1927 recorded an occurrence of *Taxus* poisoning (*Taxus canadensis*) in cattle in the lower Fraser Valley of British Columbia (2). Lowe *et al* (5) and Alden *et al* (1) report on cases of *Taxus cuspidata* poisoning of livestock in the U.S.A. The lethal effects of consumption of this plant by livestock, and lack of reference to it in Canadian veterinary literature prompted this case report.

History

Herd A — In the early morning this group of 13 Angus cows were found in the yard chewing on juniper plants around the foundation of the house. They were put into a small field and fed hay. In the late afternoon one cow became recumbent, gasped a few times, rolled over onto its side and died. In the early evening another cow, while eating hay, suddenly became recumbent and died within minutes.

Herd B — Four of a group of 35 Holstein heifers and cows were found dead in a field in the early morning. The group had been on the pasture for three weeks, were fed supplemental hay and were last observed the previous evening. Following the four deaths, the group was moved into a small padlock for observation and a fifth animal died later in the day. Investigation following the diagnosis revealed that the previous day the gardener had trimmed a hedge around the house and had dumped the clippings onto the pasture.

Laboratory Findings

One animal from herd A and three from herd B were necropsied. All were in excellent general condition. All carcasses were severely bloated and showed evidence of severe autolysis. Rumens had marked gas caps and contained roughage of normal to dry consistency. Coniferous plant material, including 2 cm long needles and 3 mm x 1 mm droplet-shaped "seeds", was found in the rumen content of the carcasses from herd B (Figure 1) and a slight "piney" odour of the rumen content was noted. No significant histological lesions were detected in a variety of tissues examined from the four carcasses. Samples of the plants from both premises were identified as *Taxus cuspidata*.[1]

Discussion

Livestock found dead on pasture present a diagnostic challenge to both clinician and pathologist. In addition to entities such as bloat, clostridial toxemias, lightning, hypomagnesemia, chemical toxicities (urea, organophosphates and heavy metals) and anthrax, poisoning by certain indigenous and exotic plants should be considered.

Taxine, the toxic principle of Japanese Yew (*Taxus cuspidata*) is present in all parts of the plant and resists prolonged storage and drying (4). It is a nonirritant alkaloid which apparently primarily depresses conduction in the heart, resulting in arrest in diastole (3). Taxine is rapidly metabolized, apparently by the liver, and excreted as benzoic acid (3) and therefore no toxicological test is useful in diagnosis. No specific gross or microscopic lesions are present in the carcasses.

FIGURE 1. Plant material from rumen content of carcasses from herd B. Inset of a branch of fresh foliage of Japanese Yew. Note linear, stiff 1.5-2.5 cm leaves and small ovoid young male strobili (*arrow*). Scale at bottom right corner represents 1 cm.

*Ontario Ministry of Agriculture and Food, Veterinary Services Laboratory, Box 3612, Guelph, Ontario N1H 6R8 (Thomson) and Department of Pathology, Ontario Veterinary College, Guelph, Ontario N1G 2W1 (Barker).

[1]Identification kindly done by Dr. G. Lumis, Department of Horticultural Science, University of Guelph and Dr. J.F. Alex, Department of Environmental Biology, University of Guelph.

Diagnosis of taxine poisoning therefore depends on two features: clinical history and finding foliage in the rumen content. As in the present cases, those reported in the literature occurred following either access to trimmings of the plants or access to the ornamental shrub around buildings (1, 2, 5). The history in herd A indicated the cattle chewed juniper plants surrounding the foundation of the house. Juniper is not considered toxic and this feature of the history was therefore felt to be incidental to the loss of the two animals. It was not until a few weeks following necropsy that plants were gathered and identified as Japanese Yew. Recognition of coniferous material in the rumen content of carcasses from herd B brought forth the history of access to hedge trimmings.

Animals from both herds were in excellent general condition and were on high-quality feed and yet apparently readily consumed yew foliage. Herd A was poisoned in the early spring and herd B in the late fall. Taxine is reportedly in greatest concentrations in the plant in the winter. These facts indicate toxicities can occur year round. Toxic doses are not well established but are given as 10 g of leaves per kg body weight (total about 500 g) for the bovine (3). There is no known antidote for taxine following ingestion by domestic species.

Summary

Two incidents of poisoning due to ingestion of foliage of the Japanese Yew (*Taxus cuspidata*) resulted in sudden deaths of seven cattle. Diagnosis depended upon history of access to and demonstration of plant material in rumen content of carcasses as no gross, histological or toxicological findings are significant.

Résumé

Deux cas d'empoisonnement consécutifs à l'ingestion d'aiguilles de l'if japonais, *Taxus cuspidata*, entraînèrent la mort rapide de sept bovins. Le diagnostic reposait sur l'anamnèse, qui confirmait l'ingestion de ces aiguilles par les bovins, et sur la présence de telles aiguilles dans le contenu du rumen. En effet, les lésions macroscopiques, l'histopathologie et la toxicologie ne donnent pas de résultats concluants lors d'un tel empoisonnement.

Acknowledgments

The authors thank Dr. C.J. Young, Campbellville, Ontario and Dr. John Chesney, Department of Clinical Studies, Ontario Veterinary College for providing the clinical histories. Since this writing Dr. Young has brought to our attention a further occurrence. Two of seven thin, overwintering cattle died after breaking into a yard and chewing Japanese Yew plants.

References

1. ALDEN, C.L., C.J. FOSNAUGH, J.B. SMITH and R. MOHAN. Japanese Yew poisoning of large domestic animals in the midwest. J. Am. vet. med. Ass. 170: 314-316. 1977.
2. BRUCE, E.A. *Ostragalus campestris* and other stock poisoning plants of British Columbia. Dominion of Canada, Department of Agriculture Bulletin 88. 1927.
3. CLARKE, E.G.C. and M.L. CLARKE. Garner's Veterinary Toxicology. Third Edition. pp. 399-401. London: Baillière, Tindall and Cassell. 1967.
4. KINGSBURY, J.M. Poisonous Plants of the United States and Canada. pp. 121-123. Englewood Cliffs, New Jersey: Prentice-Hall. 1964.
5. LOWE, J.E., H.F. HINTZ, H.F. SCHYRVER and J.M. KINGSBURY. *Taxus cuspidata* (Japanese Yew) poisoning in horses. Cornell Vet. 60: 36-39. 1970.

BOOK REVIEW

Abomasal Secretion and Motility in Sheep. J. Van Bruchem. Published by Centre for Agricultural Publishing and Documentation, Wagenigen. 1977. N.A. Distributors: ISBS Inc., Box 555, Forest Grove, Oregon. 140 pages. Price $9.50.

This monograph is apparently the author's Ph.D. thesis and will be of limited interest to the general reader. The research itself is not a major contribution to the field although well worth publication. The literature survey may be of some interest to workers in the area. It is, however, marred by lapses in English.

The literature on neurohumoral control of secretion and motility has expanded greatly in the past few years and the usefulness of this work is therefore reduced by the fact that there are only a few references as recent as 1976. *H. Chapman.*