



Canadian Food
Inspection Agency

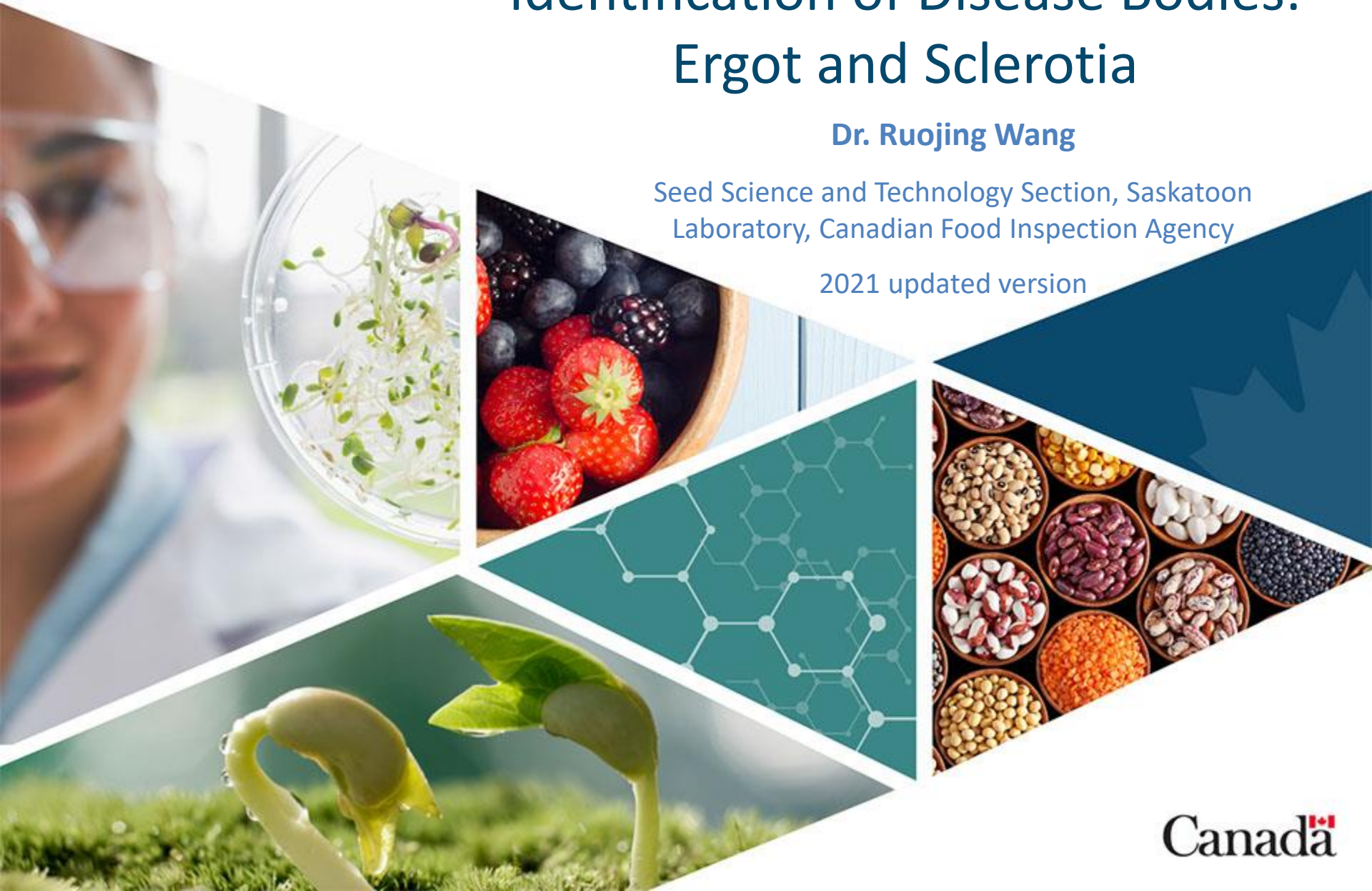
Agence canadienne
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Identification of Disease Bodies: Ergot and Sclerotia

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2021 updated version

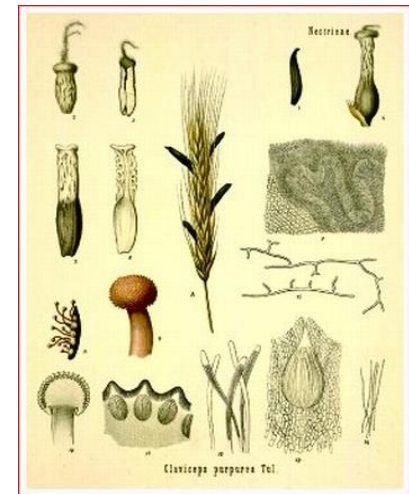


Ergot

- Ergot (*Claviceps purpurea*) is a fungal disease that infects flowers of many Grass family (Poaceae) species:
 - Cereals: rye, triticale, wheat, durum, and barley
 - 200 species in the subfamily Pooideae, i.e. *Agrostis*, *Avena*, *Dactylis*, *Festuca*, *Hordeum*, *Lolium*, *Poa*, *Secale*, *Triticum*.
 - Open pollinated grass species are more susceptible
- Contaminated seed will potentially spread disease
- Ergot bodies contain toxic alkaloids, and should never be consumed by humans or fed to animals
- Distributed worldwide in temperate climatic zones



Ergot bodies from infected *Triticum aestivum* (wheat)



*Images from the websites of the Government of Saskatchewan and Herbaria, New Zealand

Ergot development in *Secale cereale* (rye)

Identifying Ergot Disease Bodies

- During purity analysis of cereal and grass species:
 - Magnification 10x or greater to search for the disease bodies and their fragments
 - Reported by number or percentage by weight in seed testing



Ergot as a contaminant in seeds or grains



Ergot size range in a single crop



Ergot in *Festuca arundinacea* (tall fescue)

- Ergot overwinters as a black, grain-sized fungal structure
- The size varies with the species that ergot infects

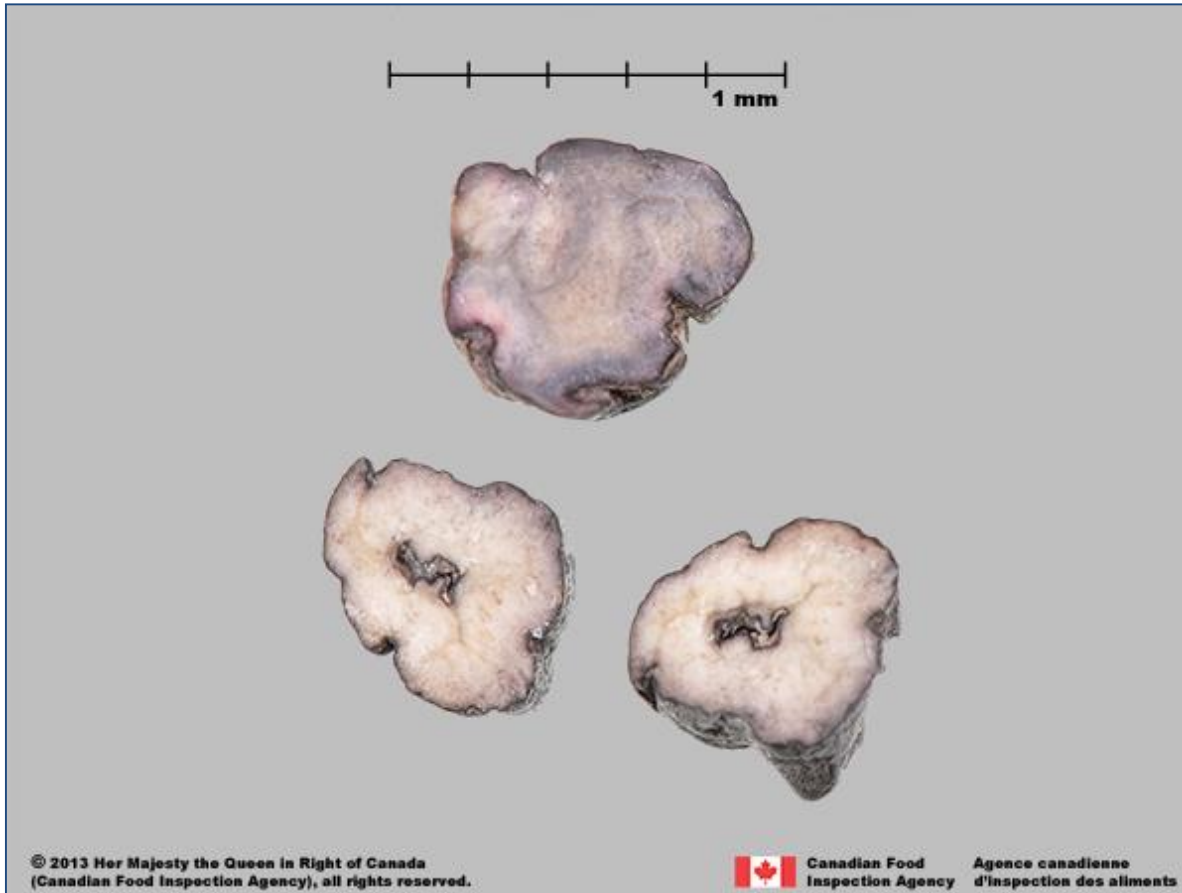
Ergot Body Features

- Elongated, generally 1-4 times longer than the host seed.
- Cylindrical with rounded ends, straight to curved and generally tapered at one end.
- Black or purplish black in colour
- Surface may appear smooth or wrinkled lengthwise



*Photo of rye ergot from:
www.botany.hawaii.edu/.../ErgotSclerotia2.gif

Ergot Body Features



- The interior of the ergot body is generally light grey or light pink on with purplish staining.
- This fungal tissue is encased in a darkly pigmented outer layer.
- The outer layer is hard but will break if pressed firmly with forceps.

Debris and Seeds Similar to Ergot

A seed sample may contain inert materials that look similar:

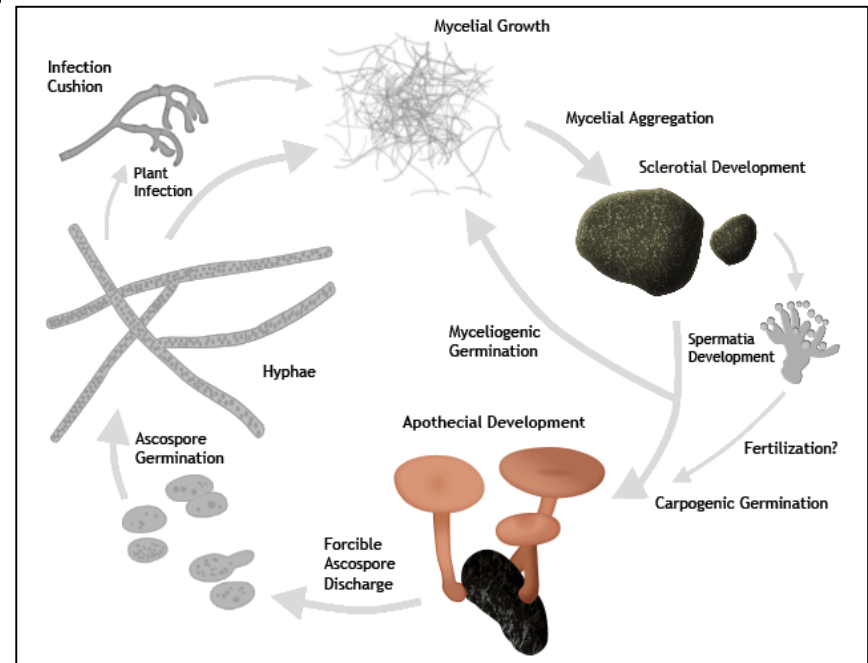
- Ergot infected stems or plant materials
- Dark coloured seeds the same colour as infected seeds
- Rodent droppings
- Insect parts or droppings



Black hulless *Hordeum vulgare* (barley) (arrow L) with ergotized grains (R)

Background: Sclerotia

- Sclerotia in this section refers to the resting bodies produced by fungi in the family Sclerotiniaceae
- *Sclerotinia sclerotiorum* commonly infects cultivated plants and causes white mould or stem rot
- This fungi infects a range of 408 species of broadleaf plants including these crops:
 - beans, sunflowers, soybeans and canola.
 - field pea, potato, mustard, safflower, lentils, flax, borage, buckwheat, chickpea, lupine, faba bean.
 - numerous vegetable crops



Sclerotinia sclerotiorum life cycle

*Image from: www.sclerotia.org/img/life-cycle2.gif

Sclerotia Features

- Sclerotia from *Sclerotinia* species are generally hard, dull black coloured and variable in size and shape
- Most sclerotia have an irregular shape and a wrinkled texture



Sclerotia Features



- Exterior colour is generally dull black or grey, with a wrinkled texture
- Interior colour of sclerotia are dull white or light pink

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Sclerotia as a Seed Contaminant



- Sclerotia are a range of sizes and shapes depending on the host crop
- They may stand out from or look similar to the crop kind under analysis
- Small sized sclerotia can easily be mistaken for seeds

Sclerotia from *Glycine max* (soybean)

Sclerotia as a Seed Contaminant



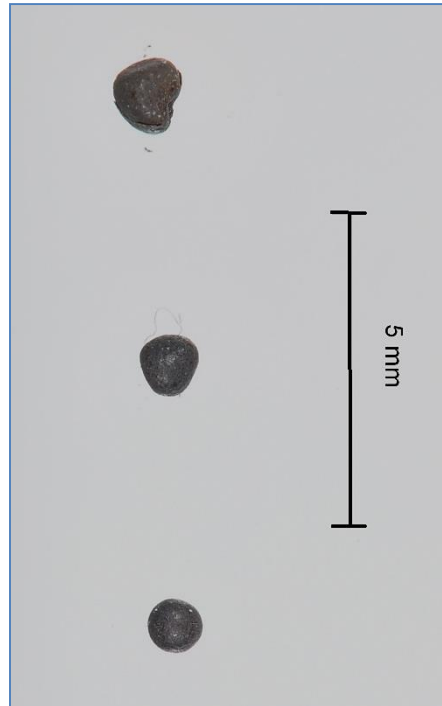
- Sclerotia can be a common contaminant in *Helianthus annuus* (sunflower seeds), indicated by arrows in the image

*Image from North Dakota State University,
www.ag.ndsu.edu/.../rowcrops/pp840-10.jpg

Sclerotia as a Seed Contaminant



Seeds (L) and sclerotia (R)
of *Brassica napus* (canola)



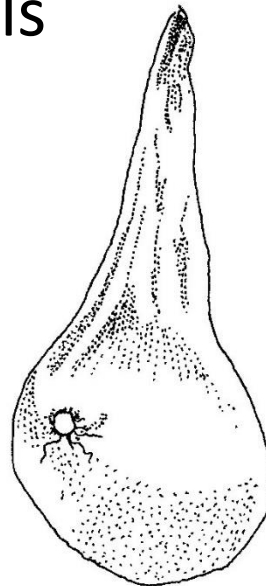
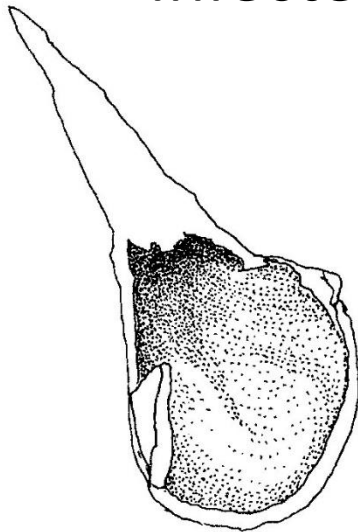
Sclerotia of *Sisyrinchium*
montanum (blue-eyed grass)



Sclerotia (L) and seeds (R) of
Trifolium hybridum (alsike
clover)

Debris Similar to Sclerotia Bodies

- Soil particles
- Rodent droppings
- Infected plant materials



Drawing of
insect galls

Grade Tables and Disease Bodies

Table 1. Ergot and/or Sclerotia as a grading factor in the Grade Tables, *Seed Regulations*, Canada
(https://laws-lois.justice.gc.ca/eng/regulations/c.r.c.,_c._1400/page-22.html)

Grade Table Number	Crop Kind	Ergot or Sclerotia
I	Wheat, Drum wheat	Ergot
II	Barley, oats, triticale, rye	Ergot
III	Cereal mixtures	Ergot
V	Sunflower (Open Pollinated)	Sclerotia
VI	Sunflower (Hybrid)	Sclerotia
VII	All crops in Table VII (<i>Brassica</i> crops)	Sclerotia
IX	All crops in Table IX (clover)	Ergot or Sclerotia
XI	All crops in Table XI	Ergot
XII	All crops in Table XII	Ergot
XIII	All crops in Table XIII	Ergot
XIV	All crops in Table XIV	Ergot

Acknowledgements

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provided by: Karen Zoller, SSTS

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Questions/comments send to:

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