



Identification Features of *Brassica* Species

April 10th , 2019

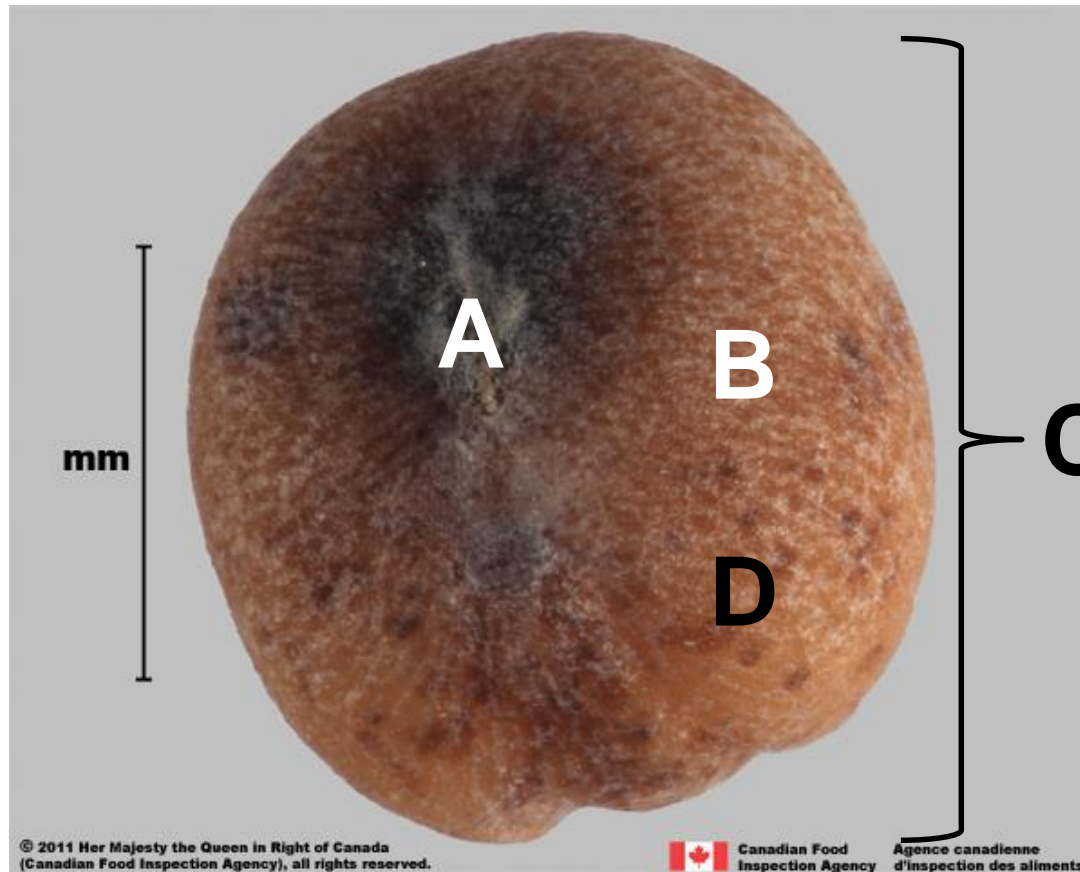
Jennifer Neudorf, SSTS, CFIA



Three Functional Groups of Brassica spp.

| Oilseeds (Canola) | Mustards |
|---|--|
| <ul style="list-style-type: none">• Argentine type (<i>B. napus</i> var. <i>napus</i>)• Polish type (<i>B. rapa</i> subsp. <i>campestris</i>) | <ul style="list-style-type: none">• Oriental/Brown (<i>B. juncea</i>)• Black (<i>B. nigra</i>)• White (<i>Sinapis alba</i>) |
| <h2>Vegetable species</h2> <ul style="list-style-type: none">• <i>Brassica rapa</i> types (eg. spinach mustard, turnip)• <i>Brassica oleracea</i> types (eg. broccoli, cabbage, kale) | |

Seed Features on *Brassica* spp. seeds



A. Hilum

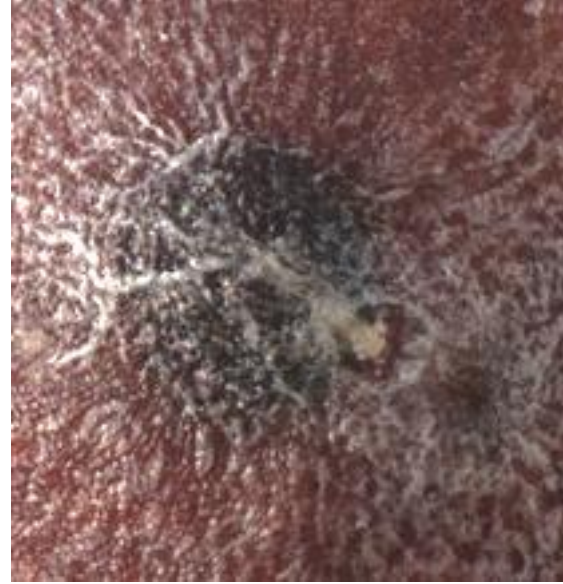
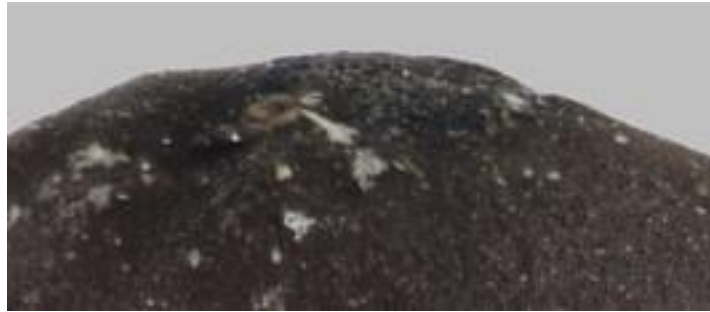
B. Reticulation

C. Size &
Shape

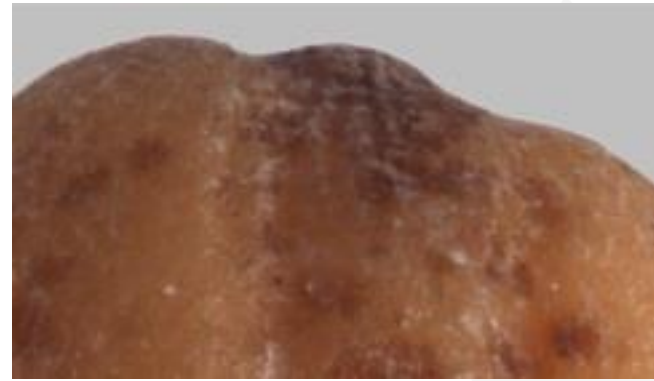
D. Colour

Seed Feature A: Hilum

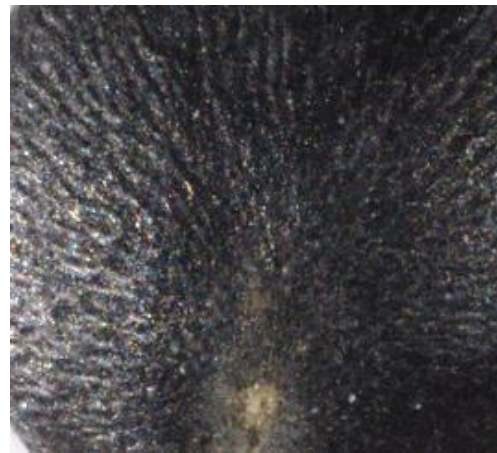
Argentine type canola
(*B. napus* var. *napus*)



Polish type canola
(*B. rapa* subsp. *campestris*)



Seed Feature B: Reticulation



Seed Feature C: Size & Shape

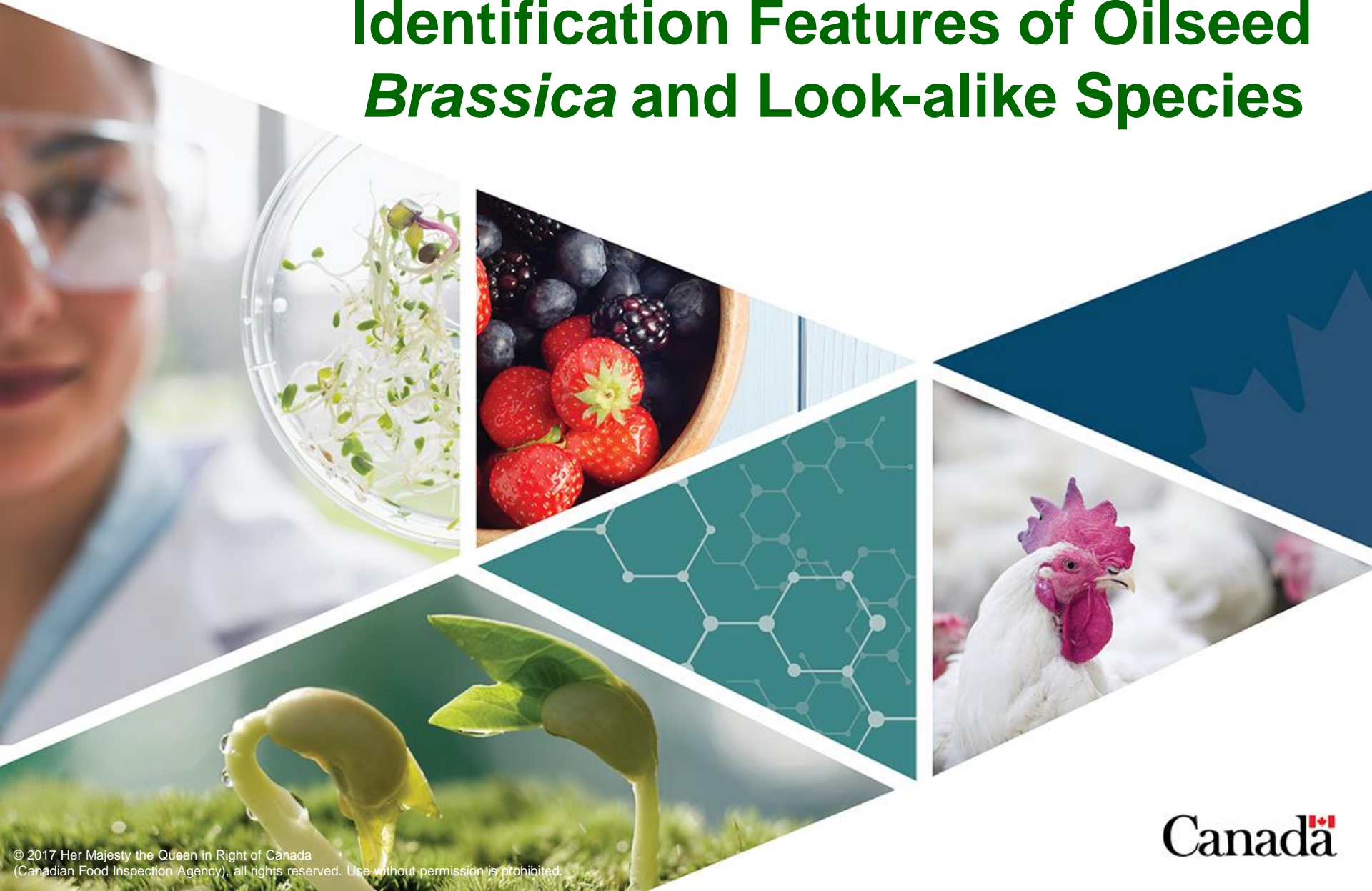


Seed Feature D: Colour





Identification Features of Oilseed *Brassica* and Look-alike Species



**Argentine type (*B. napus* var. *napus*) and
Polish type (*B. rapa* subsp. *campestris*)**



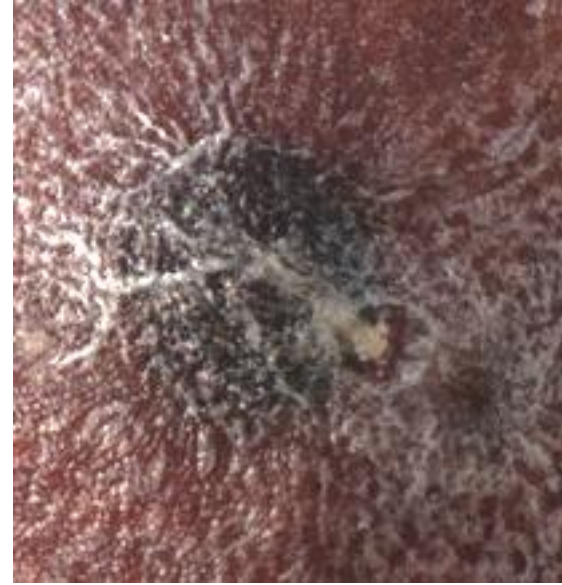
9

Argentine type canola

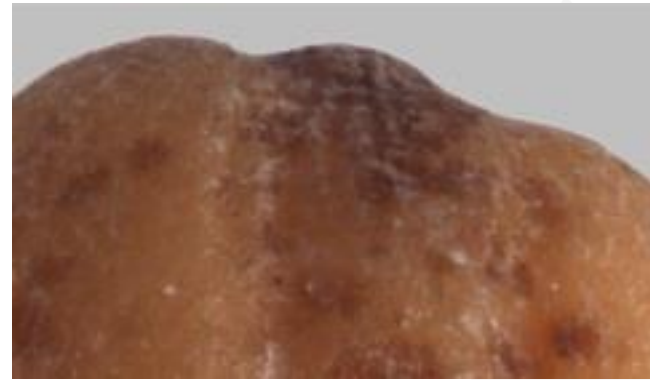
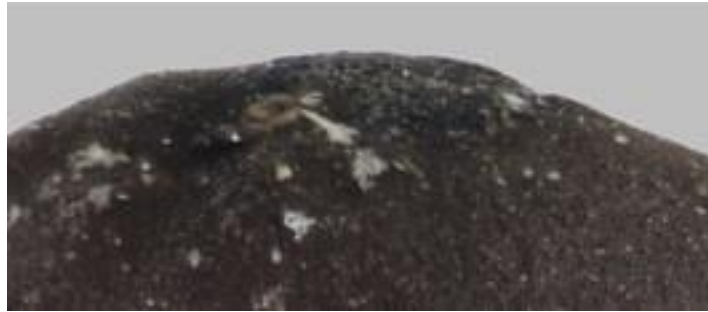
Polish type canola

Seed Feature A: Hilum

Argentine type canola
(*B. napus* var. *napus*)



Polish type canola
(*B. rapa* subsp. *campestris*)



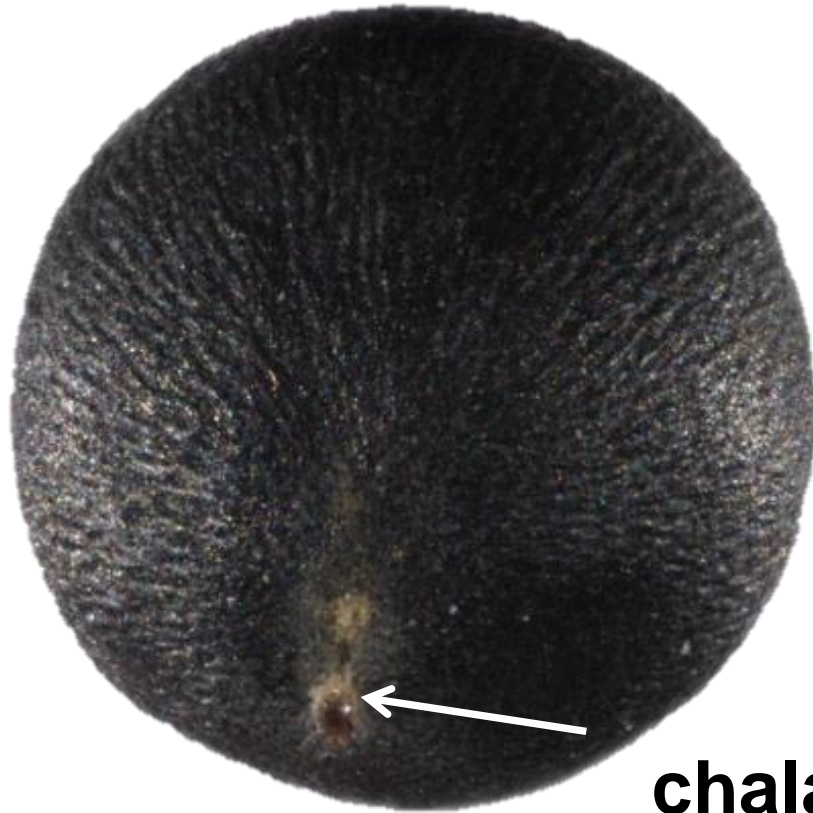
Argentine type (*B. napus* var. *napus*) and Polish type (*B. rapa* subsp. *campestris*)

1 mm



Sinapis arvensis (Wild mustard)

1 mm



chalaza



Oilseed *Brassica* spp. and *S. arvensis*

Feature Comparison

| | Argentine type (<i>Brassica napus</i> var. <i>napus</i>) | Polish type (<i>Brassica rapa</i> subsp. <i>campestris</i>) | Wild mustard (<i>Sinapis arvensis</i>) |
|---------------------|--|---|--|
| Hilum | Oval to D-shaped, flush with surface, depression around hilum | Round hilum, small and raised above surface | Round hilum, small and flush with surface, chalaza prominent |
| Reticulation | Thin with stipples, not diminished at hilum, small interspaces | Thicker with stipples, diminishes at hilum, medium interspaces | Thin with dimples, radiating lines, long interspaces |
| Shape | Angular shape, flattened at hilum, radicle prominent | Round to oval shaped, flattened sides, radicle often prominent | Round, can be flattened at top & bottom |
| Colour | Reddish-black or grey-black with a silver sheen from stipples | Yellow mottled or reddish-brown, silver sheen from reticulation | Dull black, can be brown or greenish |

Quiz #1

Which oilseed *Brassica* sp. looks similar to wild mustard? Give 3 reasons why.

Quiz #1

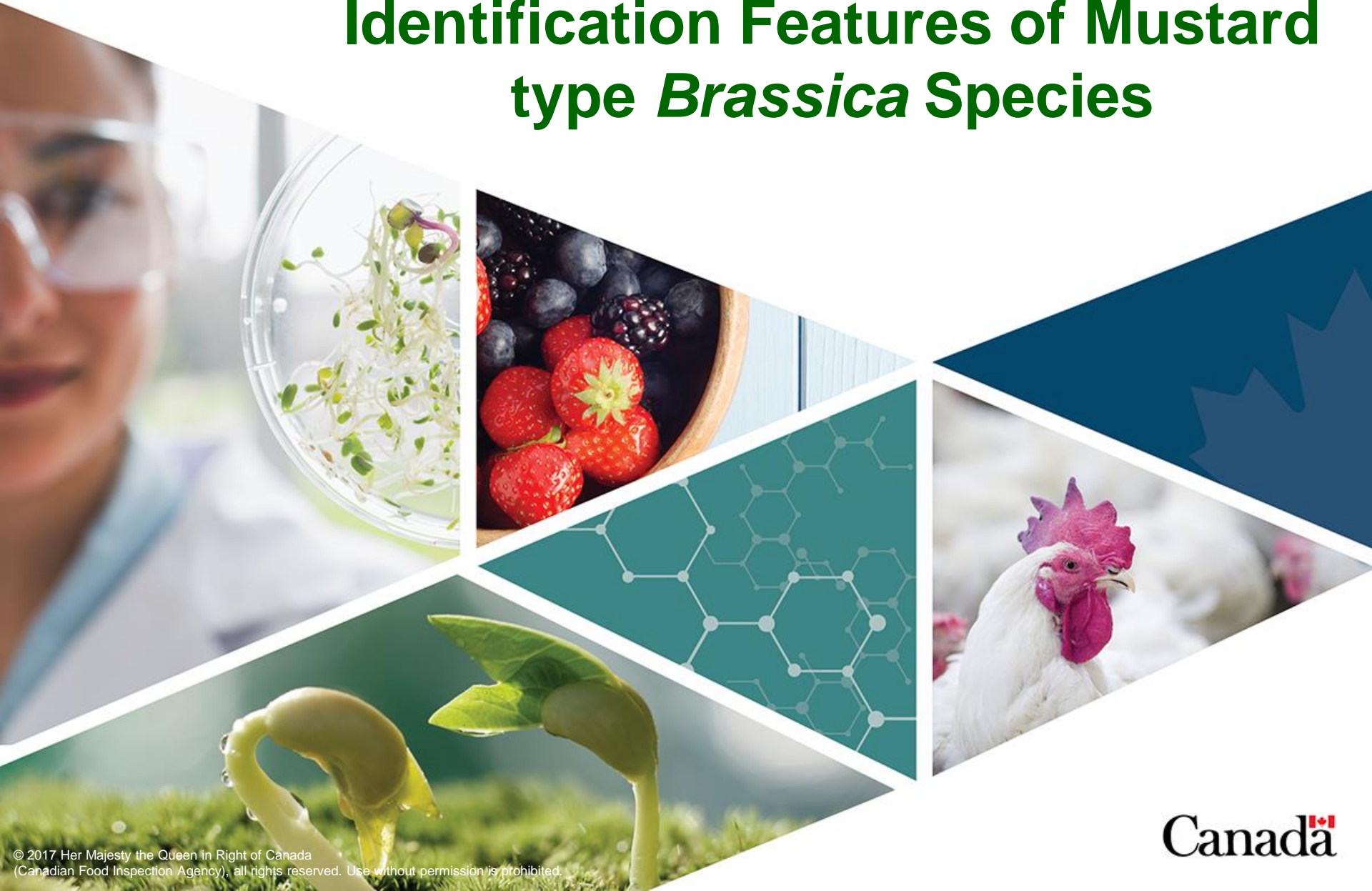
Which oilseed *Brassica* sp. looks similar to wild mustard? Give 3 reasons why.

Argentine type (*B. napus* var. *napus*)

1. Black colour
2. Fine reticulation with stippling
3. Radicle of Argentine type may not be prominent in all seeds



Identification Features of Mustard type *Brassica* Species



Oriental/Brown mustard (*Brassica juncea*); Black mustard (*B. nigra*)



17 Brown mustard (*B. juncea*)



Black mustard (*B. nigra*)

Oriental/Brown mustard (*Brassica juncea*); Black mustard (*B. nigra*)



White mustard (*Sinapis alba*)



Mustard type *Brassica/ Sinapis* spp.

Feature Comparison

| | Oriental/ Brown mustard (<i>Brassica juncea</i>) | Black mustard (<i>Brassica nigra</i>) | White mustard (<i>Sinapis alba</i>) |
|--------------|---|---|---------------------------------------|
| Hilum | Round, small, flush with surface or slightly raised | Round, small, flush with surface | Round and light-coloured |
| Reticulation | Thick lines, relatively large interspaces | Thick lines, sharp, relatively large interspaces, may have tissue | Thick lines, small interspaces, pits |
| Shape | Oval, radicle not prominent | Oval, can be angular, radicle can be prominent, small seed | Oval, radicle prominent, large seed |
| Colour | Brown, reddish-brown or yellow | Reddish-brown, dark brown or yellow | Light coloured, rarely dark |

Quiz #2

Which two mustard *Brassica* sp. look alike? List 3 ways to distinguish them.

Quiz #2

Which two mustard *Brassica* spp. look alike? List 3 ways to distinguish them.

Oriental/brown and black mustard (*B. juncea* and *B. nigra*)

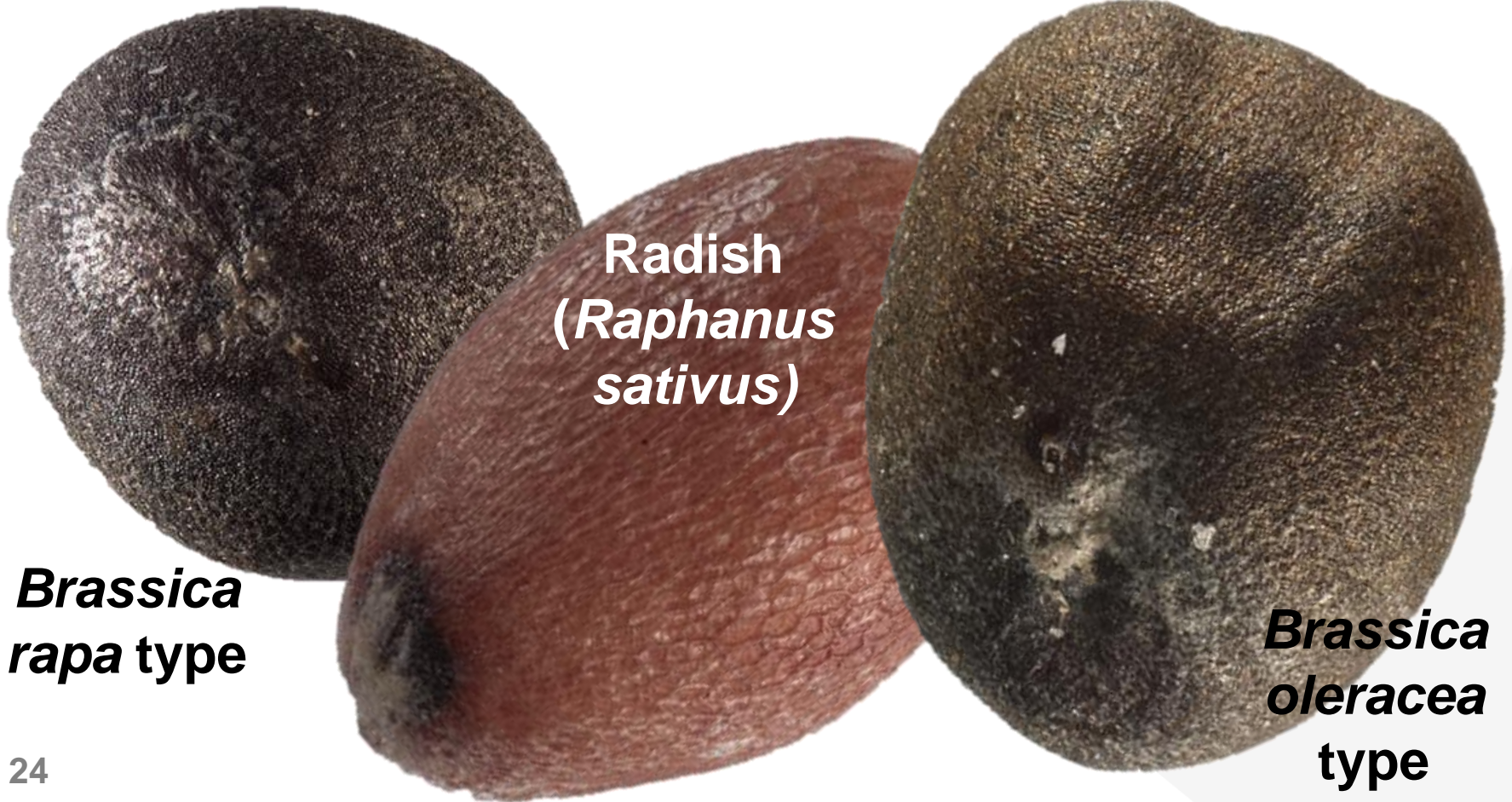
1. Black mustard is usually a small seed
2. Black mustard has deeper interspaces with tissue.
3. Black mustard usually not a regular shape.



Identification Features of Vegetable type *Brassica* and Look-alike Species



***Brassica* spp. Vegetable types**



***Brassica rapa* type**

**Radish
(*Raphanus sativus*)**

***Brassica oleracea* type**

Brassica rapa types (eg. spinach mustard, turnip)



Brassica oleracea types (eg. spinach mustard, turnip)



Radish (*Raphanus sativus*)



Vegetable type *Brassica/ Raphanus* spp.

Feature Comparison

| | <i>Brassica rapa</i> types | <i>Brassica oleracea</i> types | Radish (<i>Raphanus sativus</i>) |
|---------------------|--|--|---|
| Hilum | Round, small, raised | Round, flush with surface or slightly raised, often with yellow tissue | Round, flush with surface or slightly raised |
| Reticulation | Thin or thick lines, small interspaces with stippling, diminishes at hilum | Thin lines, may have tissue or be stippled in the small interspaces | Thick lines, relatively small, elongate interspaces |
| Shape | Oval, often angular, radicle prominent, smaller seed | Angular, radicle prominent, variable sizes | Oval, radicle not prominent, large seed |
| Colour | Dark reddish-brown, may have silvery sheen | Dark reddish-brown, brown or greyish with yellowish cast | Light reddish coloured, hilum dark |

Three Functional Groups of *Brassica* spp.

Oilseeds (Canola)

- **Argentine type** (*B. napus* var. *napus*)
- **Polish type** (*B. rapa* subsp. *campestris*)

Mustards

- **Oriental/Brown** (*B. juncea*)
- **Black** (*B. nigra*)
- **White** (*Sinapis alba*)

Vegetable species

- ***Brassica rapa* types** (eg. spinach mustard, turnip)
- ***Brassica oleracea* types** (eg. broccoli, cabbage, kale)

Quiz # 3

List some common features shared by the *Brassica* spp. in each functional group that can help place an unknown *Brassica* sp. seed?

Think about the 4 classes of seed features, and if there are trends within each functional group.

Three Functional Groups of Brassica spp.

Oilseed type

- thin reticulation
- small-medium interspaces
- stipples
- prominent radicle
- dark colour, may vary
- medium – uniform sized

Mustard type

- heavy reticulation
- large interspaces
- no sheen
- radicle not prominent
- reddish-brown colour
- small sized

Vegetable type

- variable reticulation, often in same sample
- metallic sheen – yellowish tissue covering
- prominent radicle – angular shape
- variable size, tend to be large

Quiz # 4

Brassica spp. has been a difficult genus throughout seed analyst history!

What are some of the unusual methods you have used or heard about to distinguish species?

Thank you!

Acknowledgements:

Seed ID Tool for fact sheets and key to seed families: www.idseed.org

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Seeds for imaging: National Seed Herbarium, Saskatoon

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