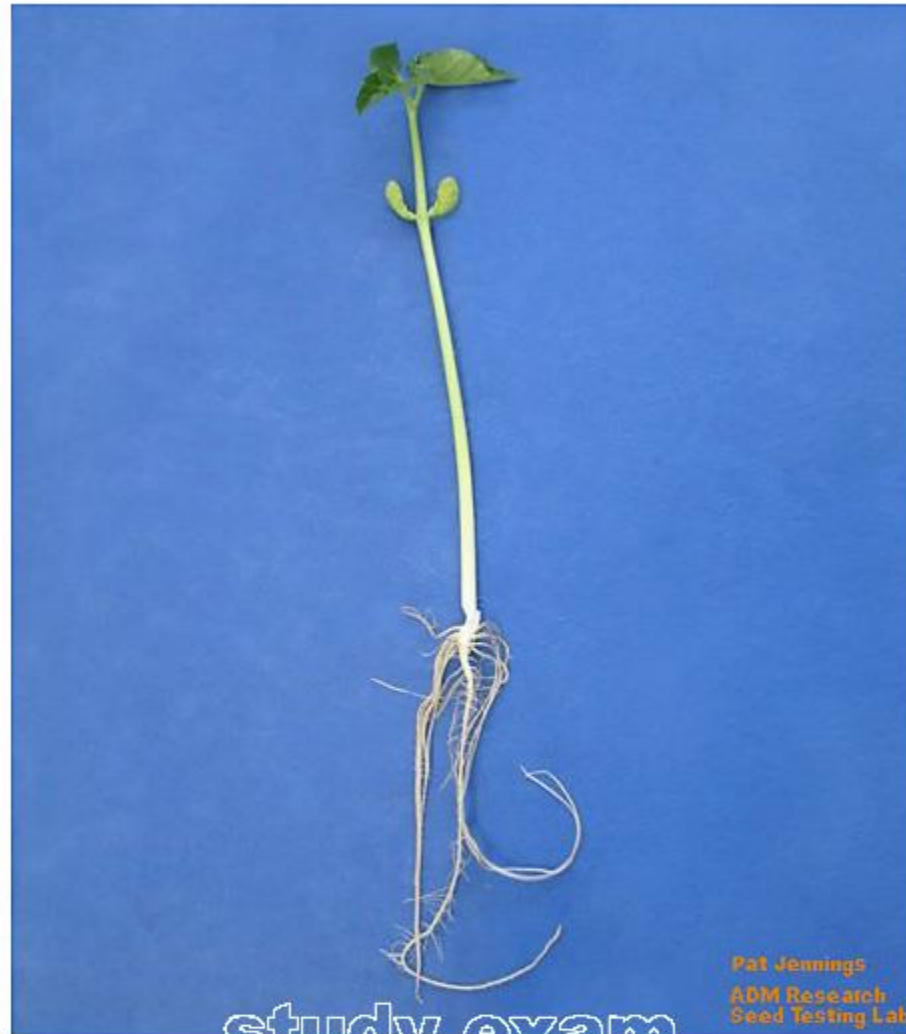


VIRTUAL GERMINATION PRACTICAL STUDY EXAM

1

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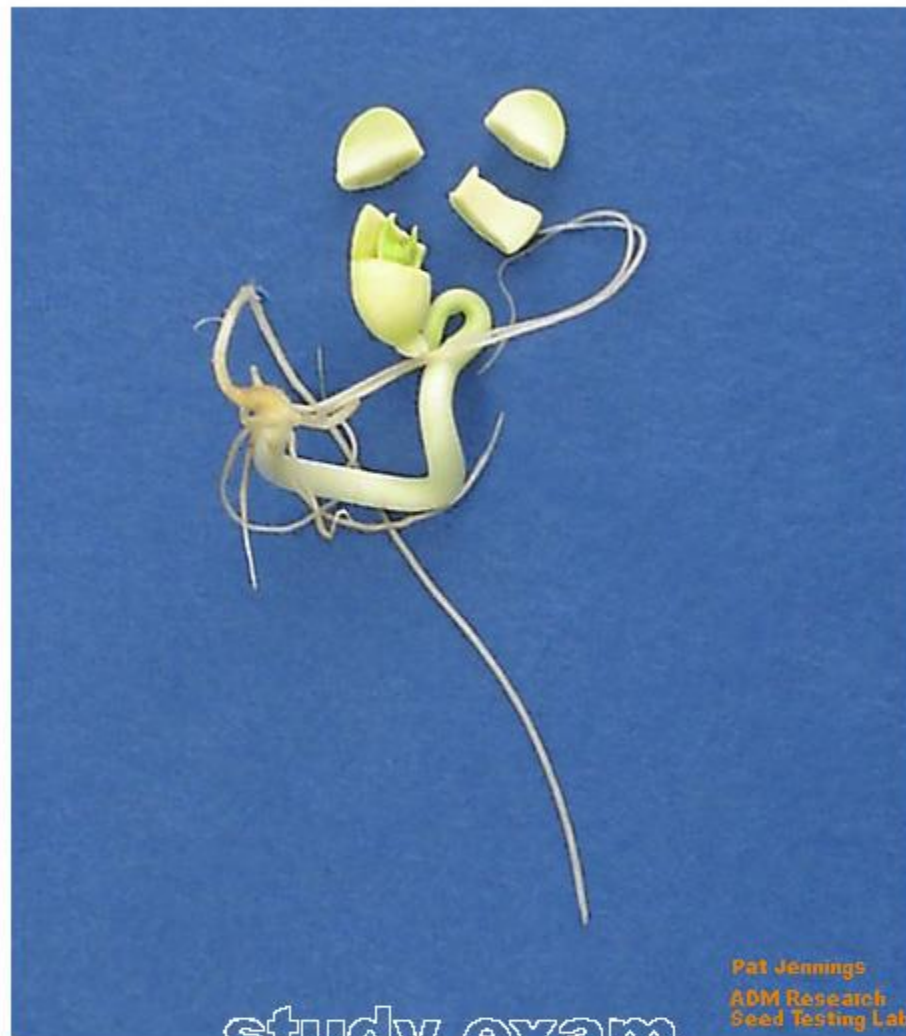


___ Normal ___ Abnormal ___ Hard Seed ___ Dead

Garden Bean

2

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___ Normal ___ Abnormal ___ Hard Seed ___ Dead

Garden Bean

3



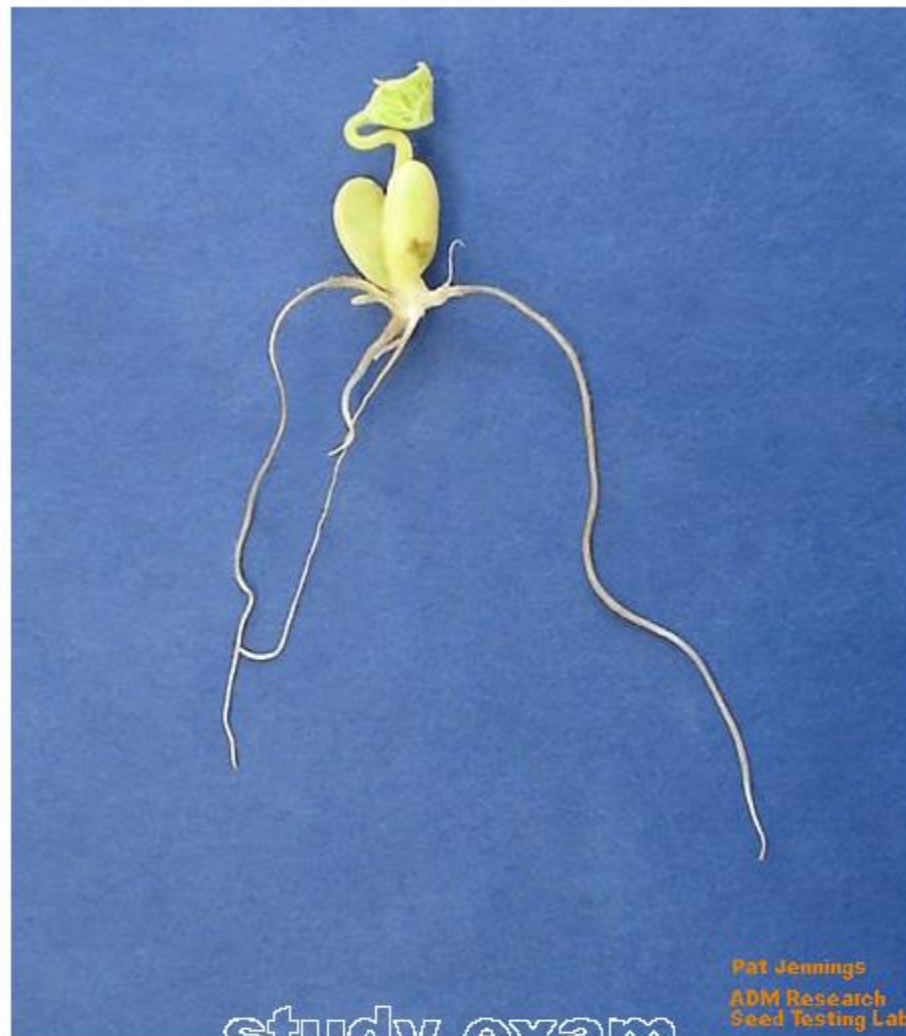
study exam

___ Normal ___ Abnormal ___ Hard Seed ___ Dead

Garden Bean

4

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___ Normal ___ Abnormal ___ Hard Seed ___ Dead

Garden Bean

5

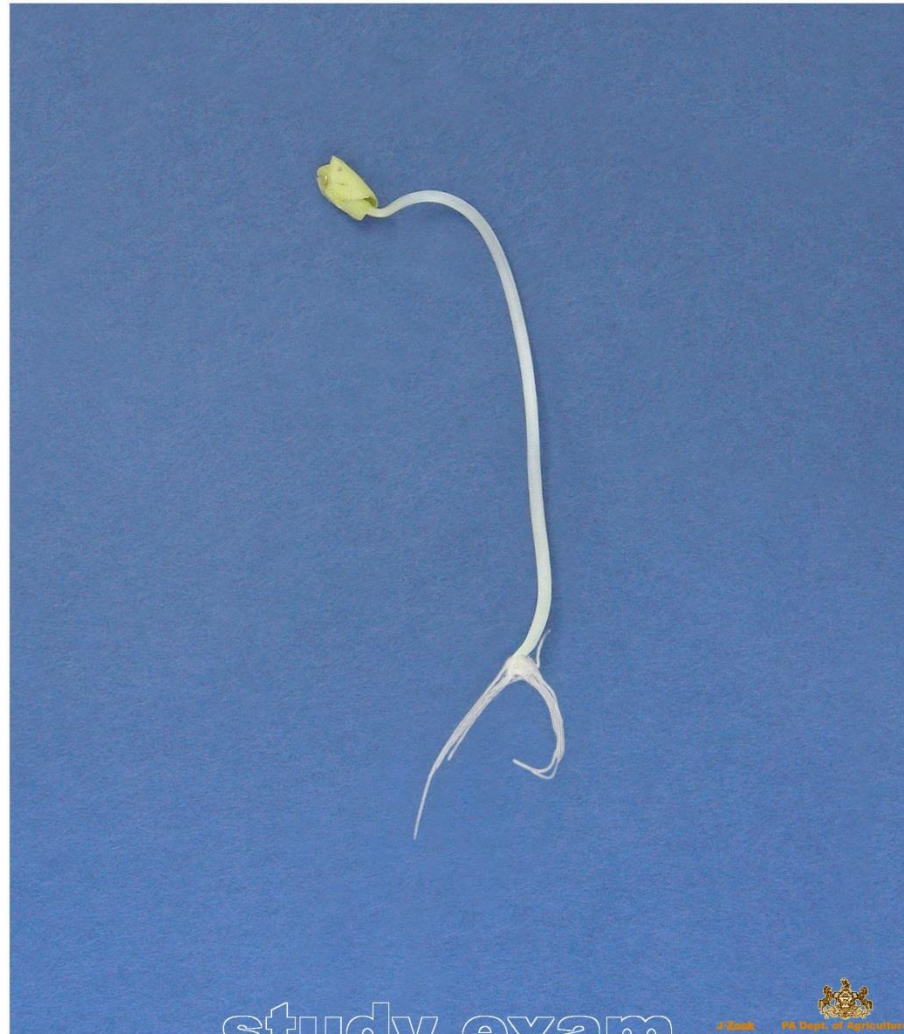
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___ Normal ___ Abnormal ___ Hard Seed ___ Dead

Garden Bean

1

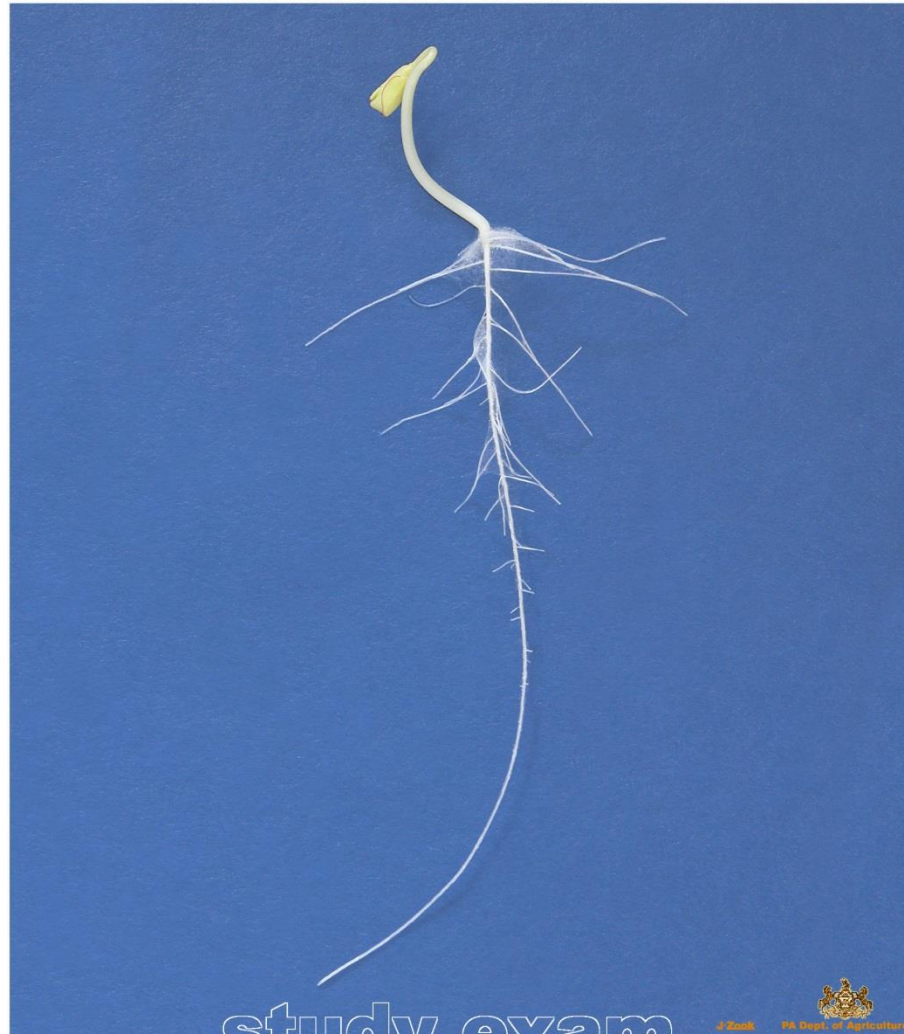


study exam

___ Normal ___ Abnormal ___ Hard Seed ___ Dead

Buckwheat

2

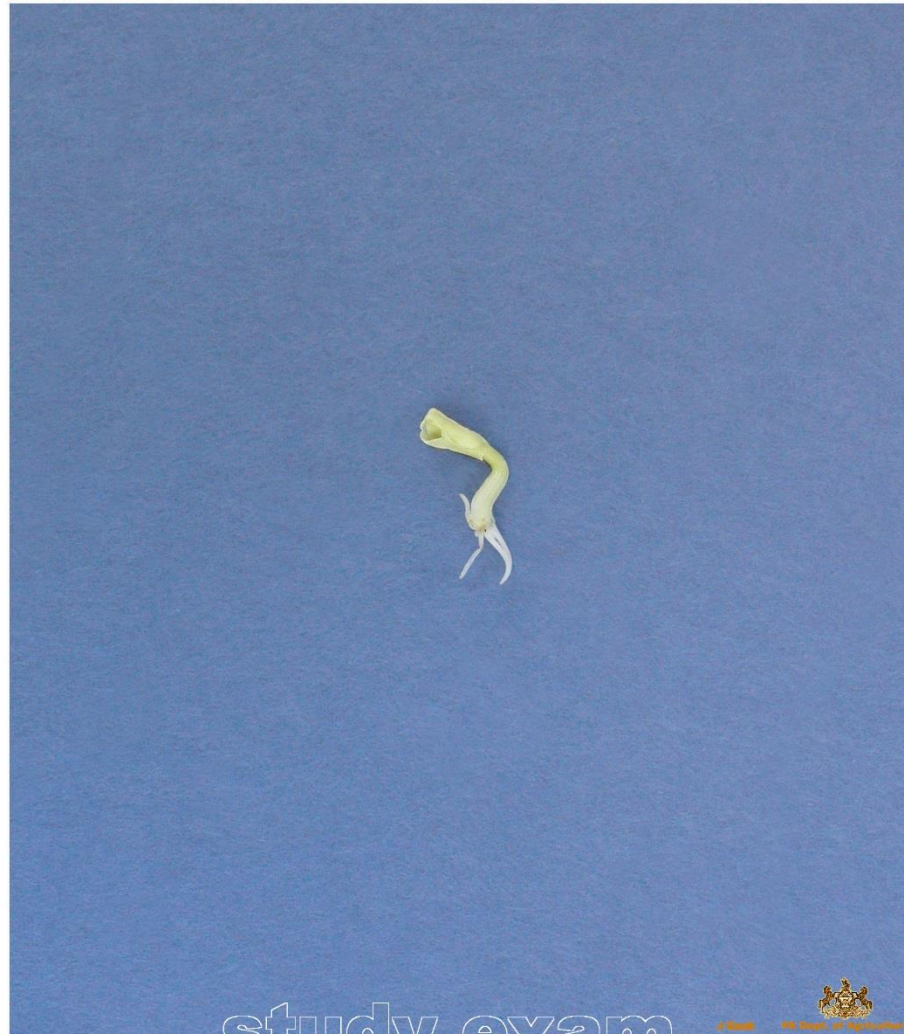


study exam

___ Normal ___ Abnormal ___ Hard Seed ___ Dead

Buckwheat

3



study exam

___ Normal ___ Abnormal ___ Hard Seed ___ Dead

Buckwheat

4

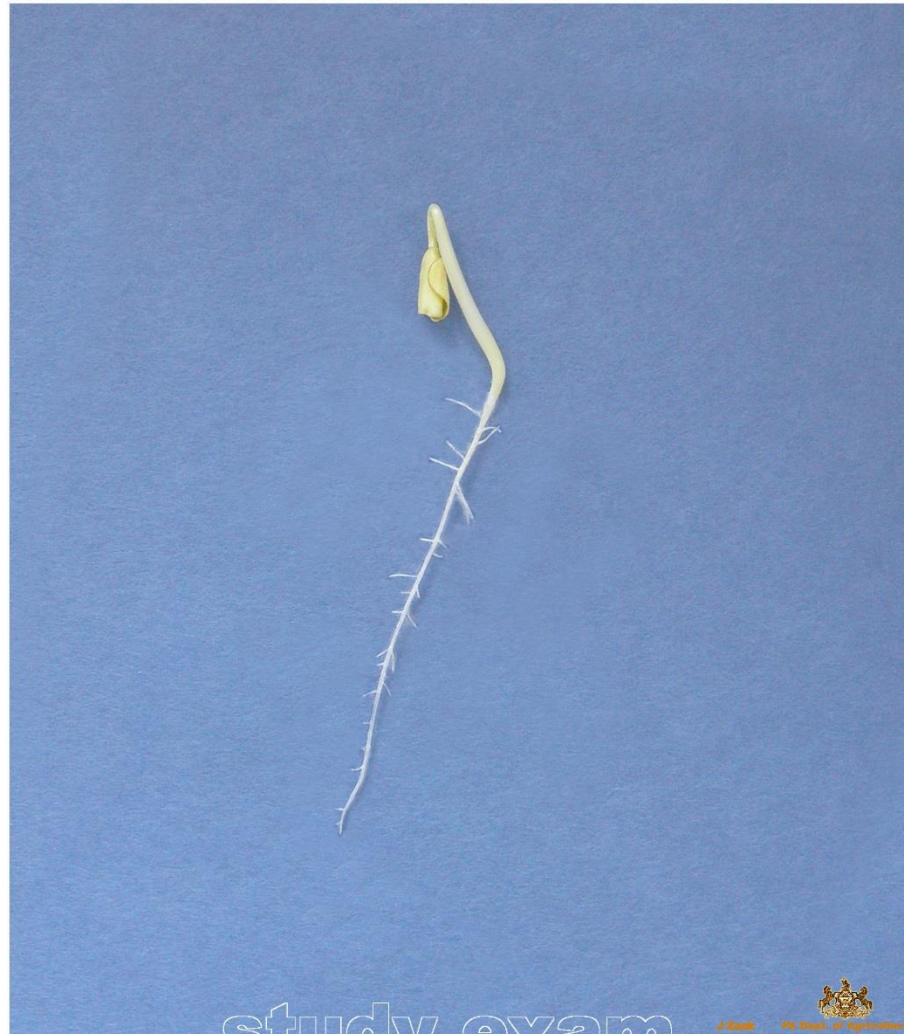


study exam

___ Normal ___ Abnormal ___ Hard Seed ___ Dead

Buckwheat

5



study exam

___ Normal ___ Abnormal ___ Hard Seed ___ Dead

Buckwheat



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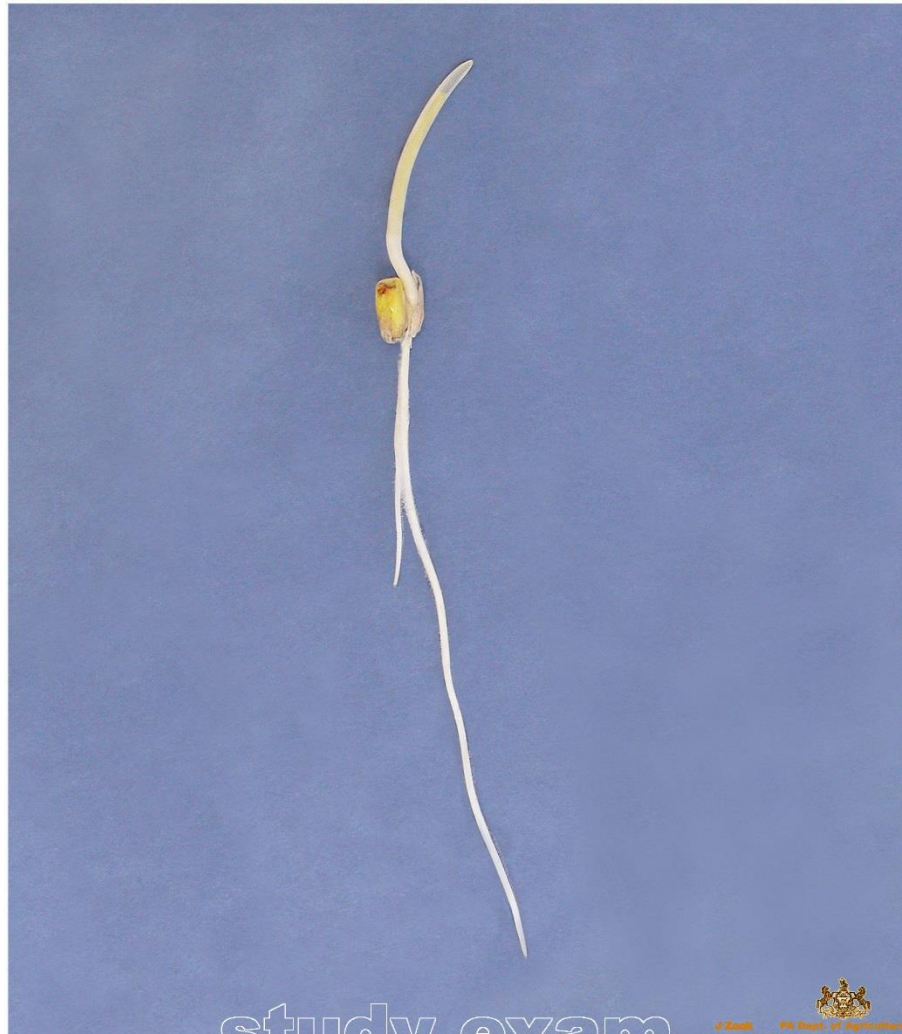
1



___ Normal ___ Abnormal ___ Hard Seed ___ Dead

Corn

2

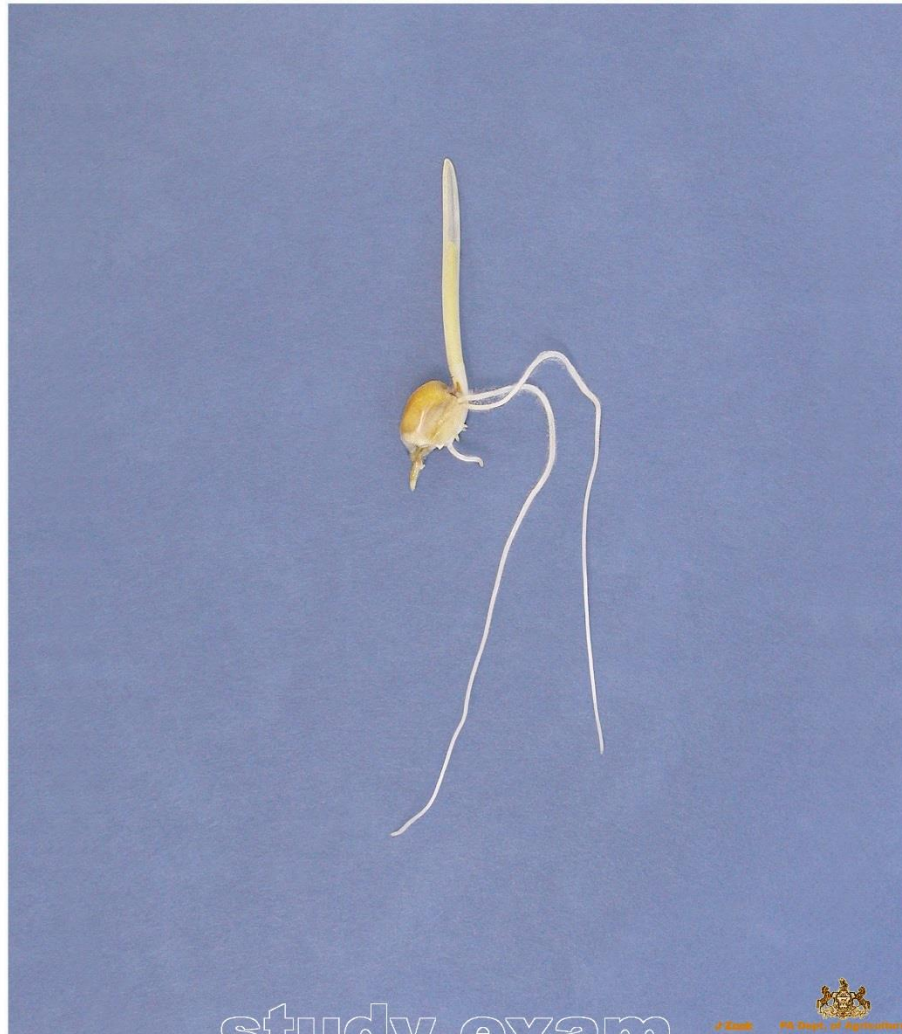


study exam

___ Normal ___ Abnormal ___ Hard Seed ___ Dead

Corn

3



study exam

___ Normal ___ Abnormal ___ Hard Seed ___ Dead

Corn

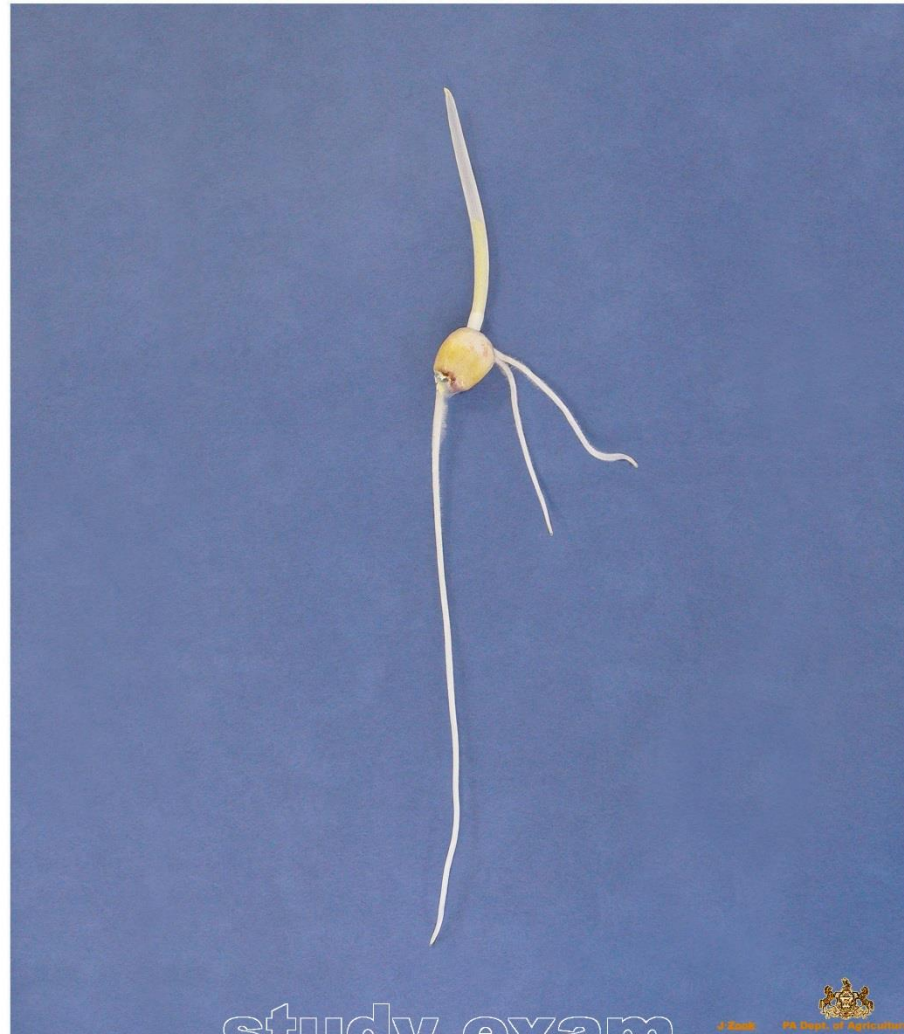
4



___ Normal ___ Abnormal ___ Hard Seed ___ Dead

Corn

5



study exam

___ Normal ___ Abnormal ___ Hard Seed ___ Dead

Corn

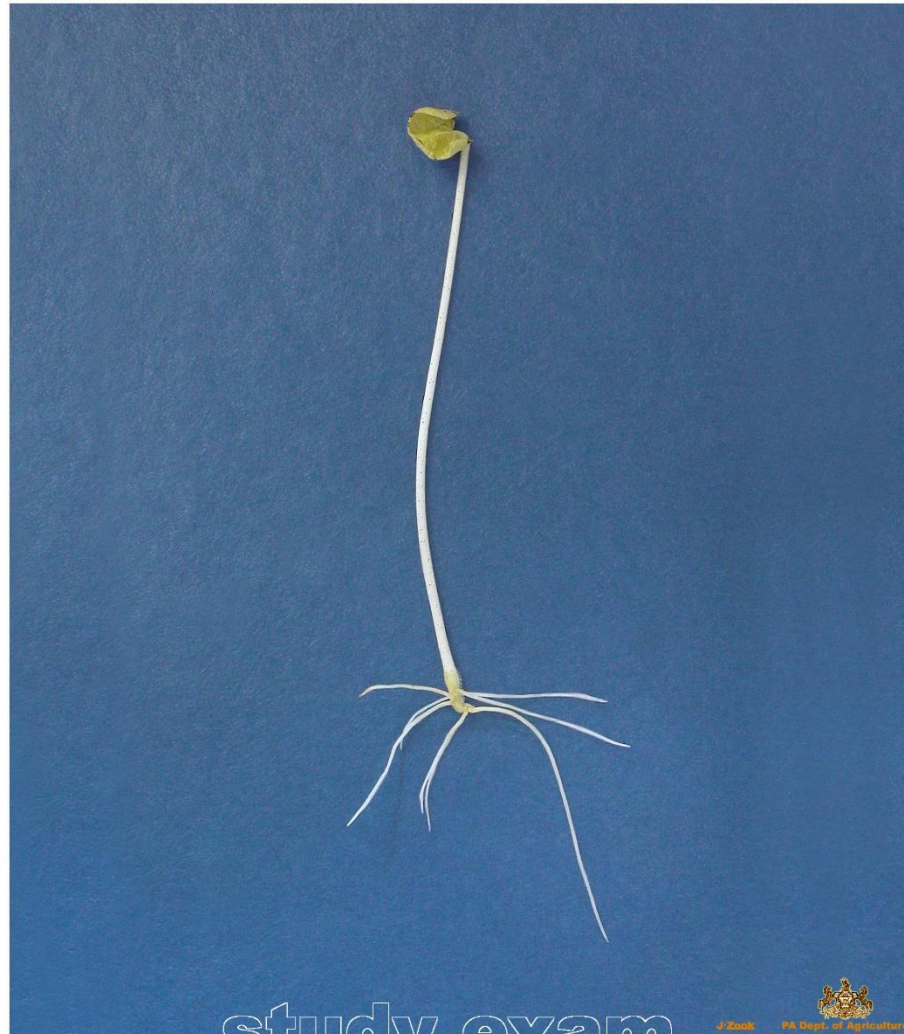
1



___ Normal ___ Abnormal ___ Hard Seed ___ Dead

Cotton

2



___ Normal ___ Abnormal ___ Hard Seed ___ Dead

Cotton

3



study exam

___ Normal ___ Abnormal ___ Hard Seed ___ Dead

Cotton

4

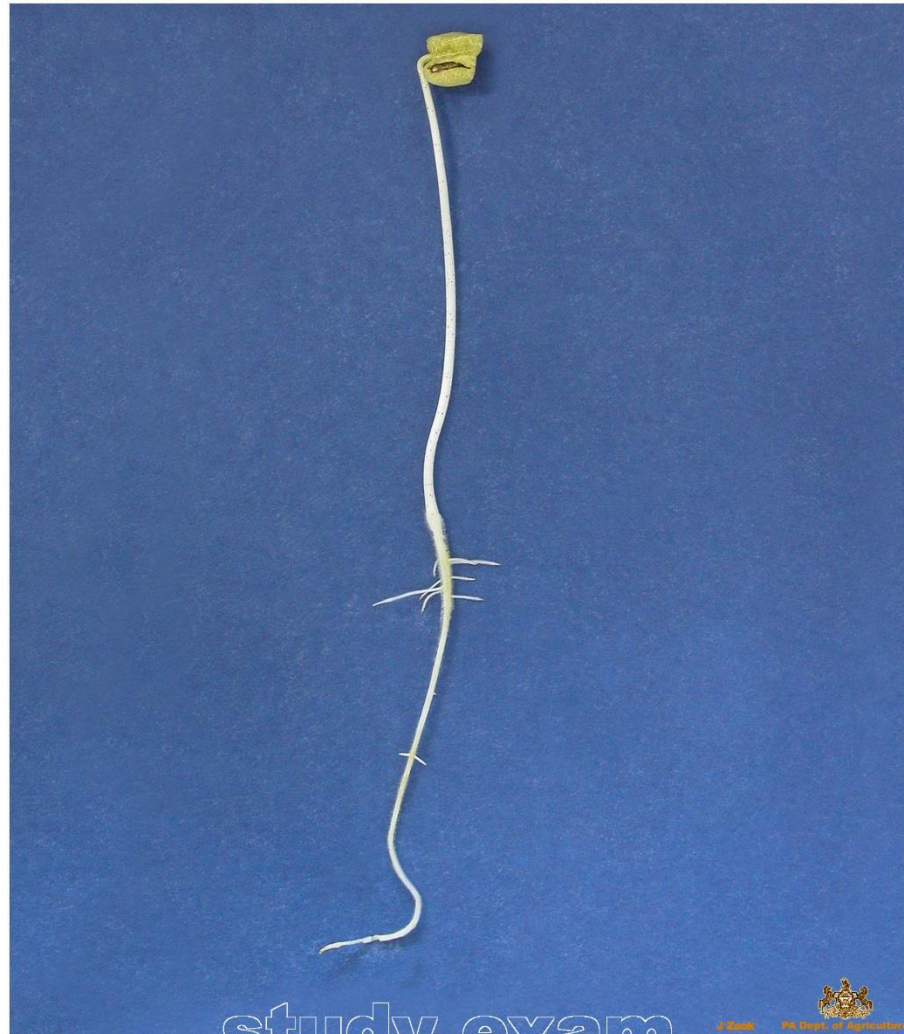


study exam

___ Normal ___ Abnormal ___ Hard Seed ___ Dead

Cotton

5



___ Normal ___ Abnormal ___ Hard Seed ___ Dead

Cotton

1



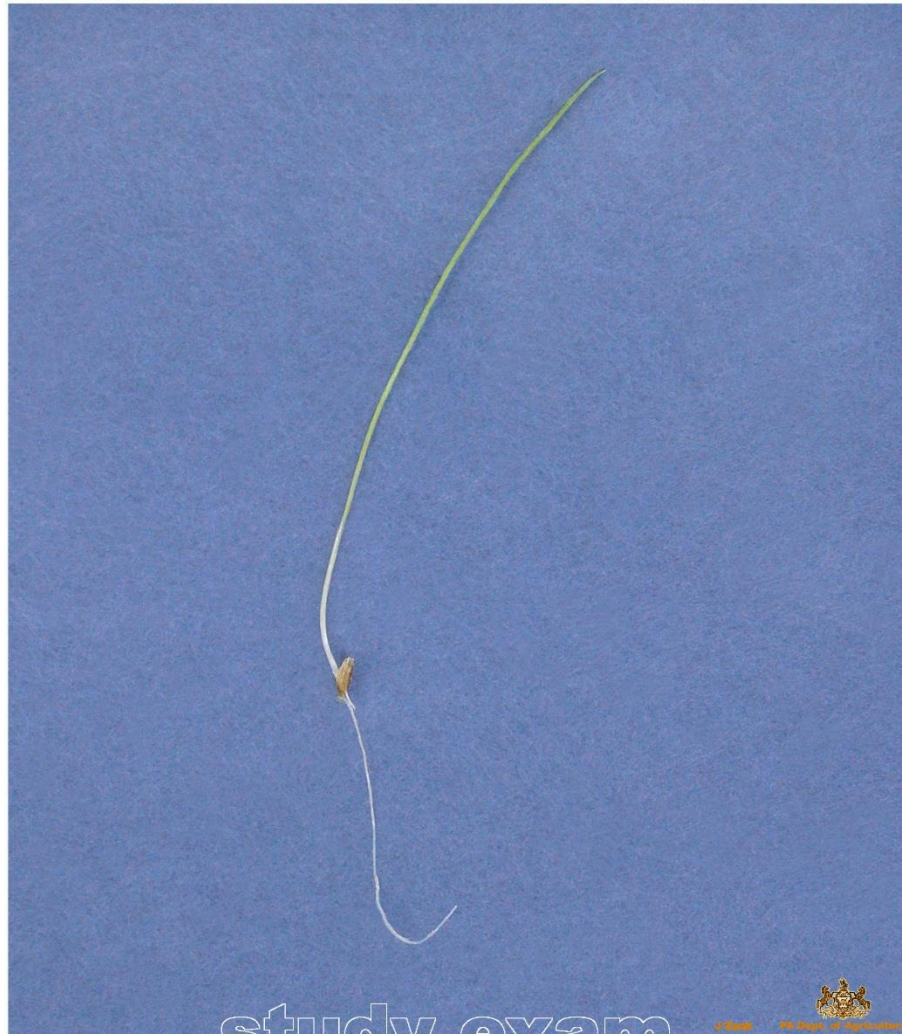
study exam

___ Normal ___ Abnormal ___ Hard Seed ___ Dead

Kentucky Bluegrass

2

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___ Normal ___ Abnormal ___ Hard Seed ___ Dead

Kentucky Bluegrass

3



___ Normal ___ Abnormal ___ Hard Seed ___ Dead

Kentucky Bluegrass

4



study exam

___ Normal ___ Abnormal ___ Hard Seed ___ Dead

Kentucky Bluegrass



5



___ Normal ___ Abnormal ___ Hard Seed ___ Dead

Kentucky Bluegrass

1



study exam

___ Normal ___ Abnormal ___ Hard Seed ___ Dead

Radish

2



___ Normal ___ Abnormal ___ Hard Seed ___ Dead

Radish

3



___ Normal ___ Abnormal ___ Hard Seed ___ Dead

Radish

4

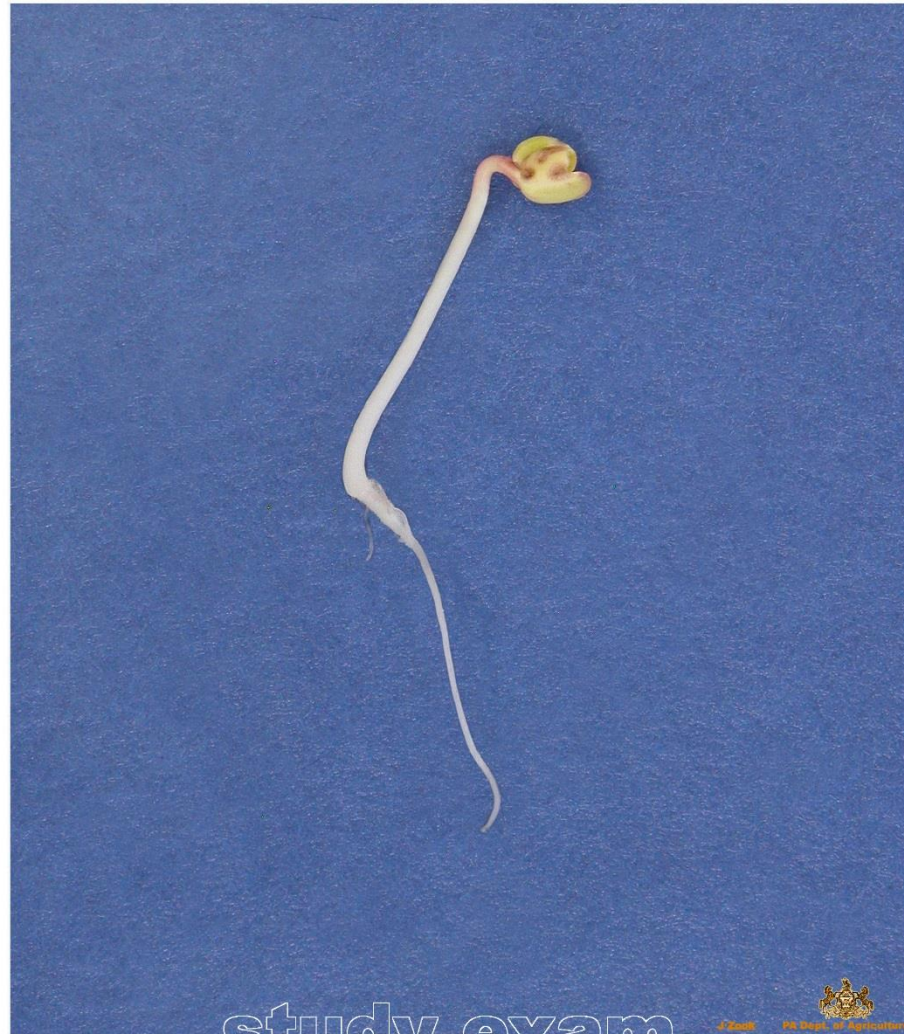


study exam

___ Normal ___ Abnormal ___ Hard Seed ___ Dead

Radish

5



study exam

___ Normal ___ Abnormal ___ Hard Seed ___ Dead

Radish

1



study exam

___ Normal ___ Abnormal ___ Hard Seed ___ Dead

Red Clover

2



study exam

___ Normal ___ Abnormal ___ Hard Seed ___ Dead

Red Clover

3



study exam

___ Normal ___ Abnormal ___ Hard Seed ___ Dead

Red Clover

4



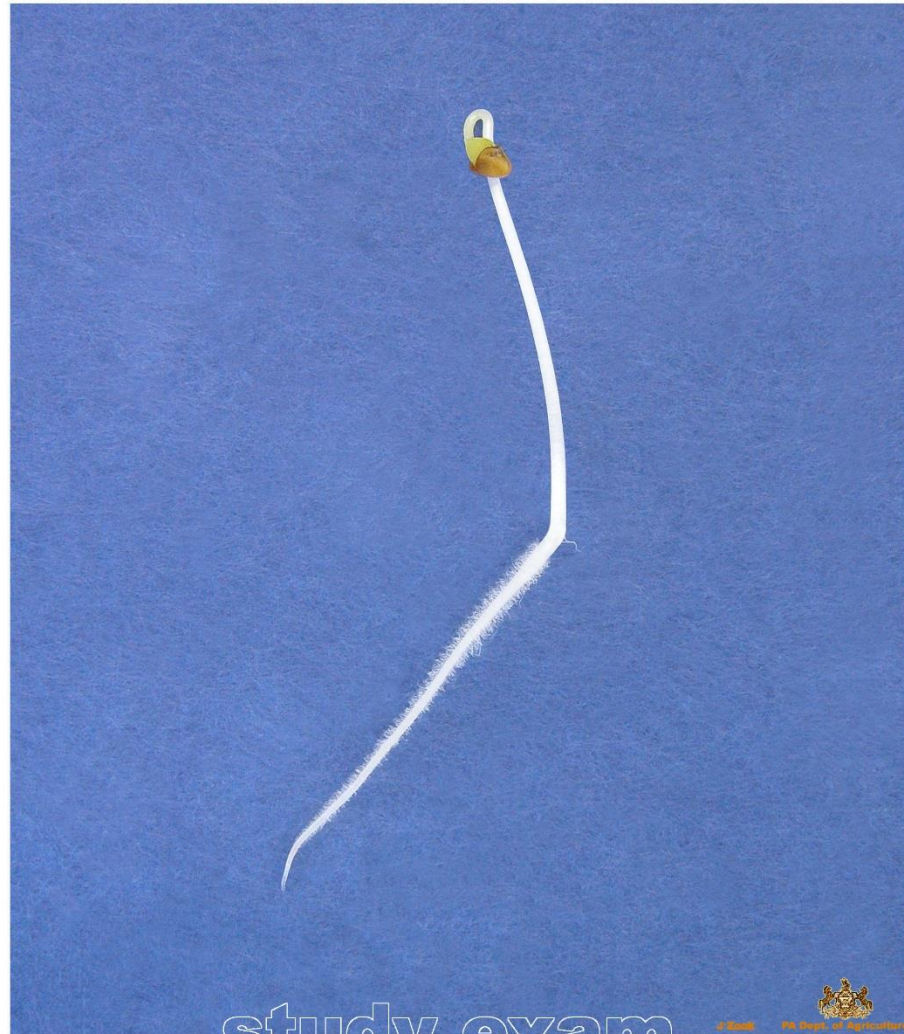
study exam

___ Normal ___ Abnormal ___ Hard Seed ___ Dead

Red Clover

5

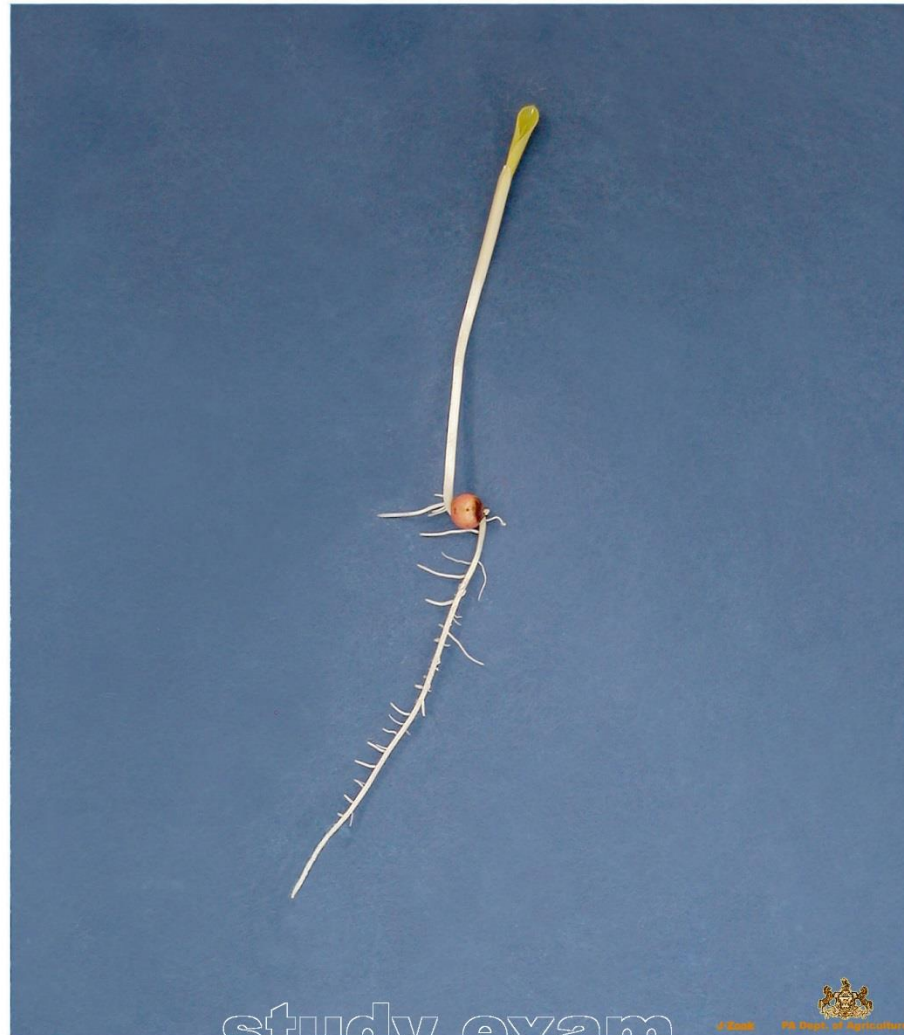
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___ Normal ___ Abnormal ___ Hard Seed ___ Dead

Red Clover

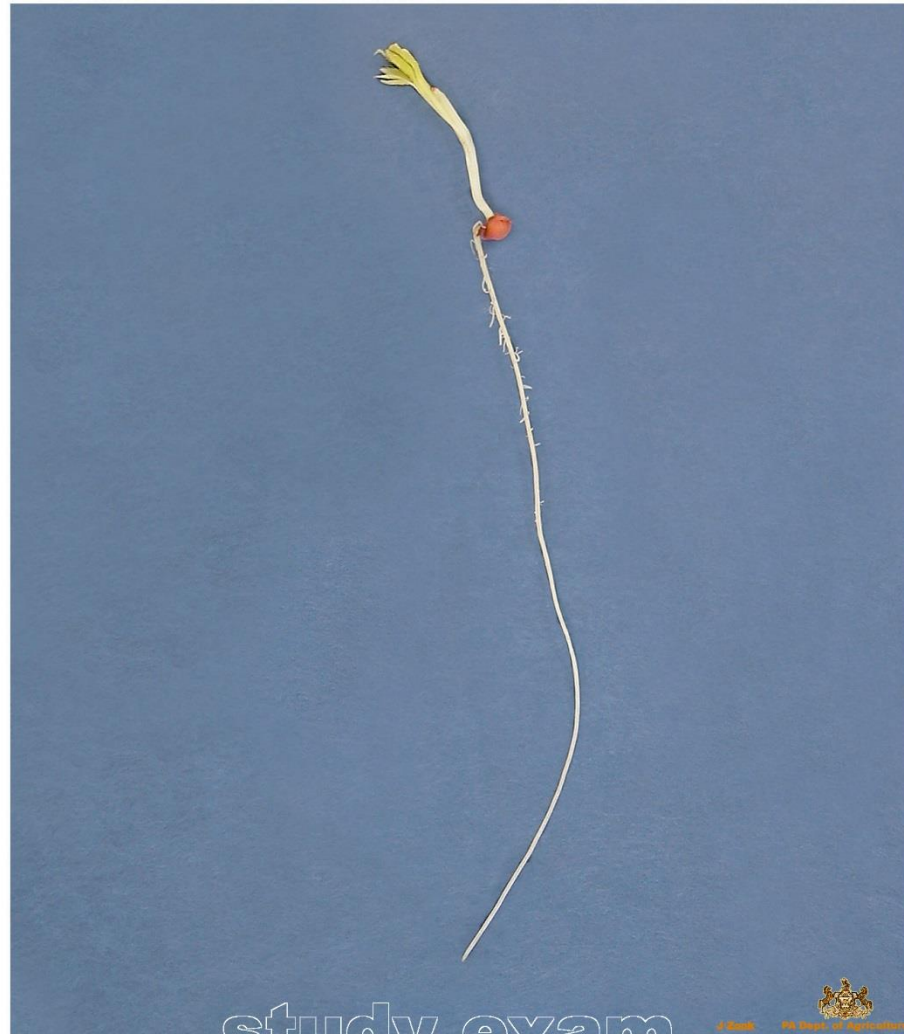
1



___ Normal ___ Abnormal ___ Hard Seed ___ Dead

Sorghum

2



___ Normal ___ Abnormal ___ Hard Seed ___ Dead

Sorghum

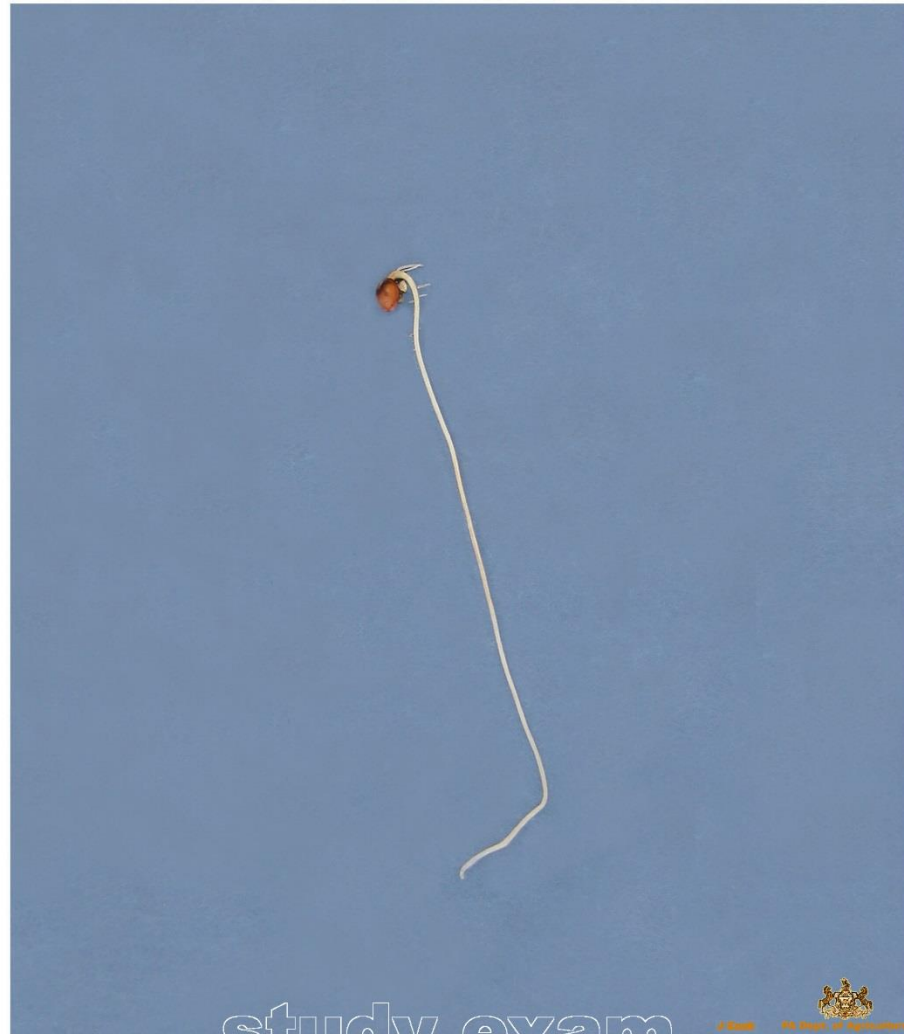
3



___ Normal ___ Abnormal ___ Hard Seed ___ Dead

Sorghum

4



___ Normal ___ Abnormal ___ Hard Seed ___ Dead

Sorghum

5



___ Normal ___ Abnormal ___ Hard Seed ___ Dead

Sorghum

1



study exam

___ Normal ___ Abnormal ___ Hard Seed ___ Dead

Tomato

2

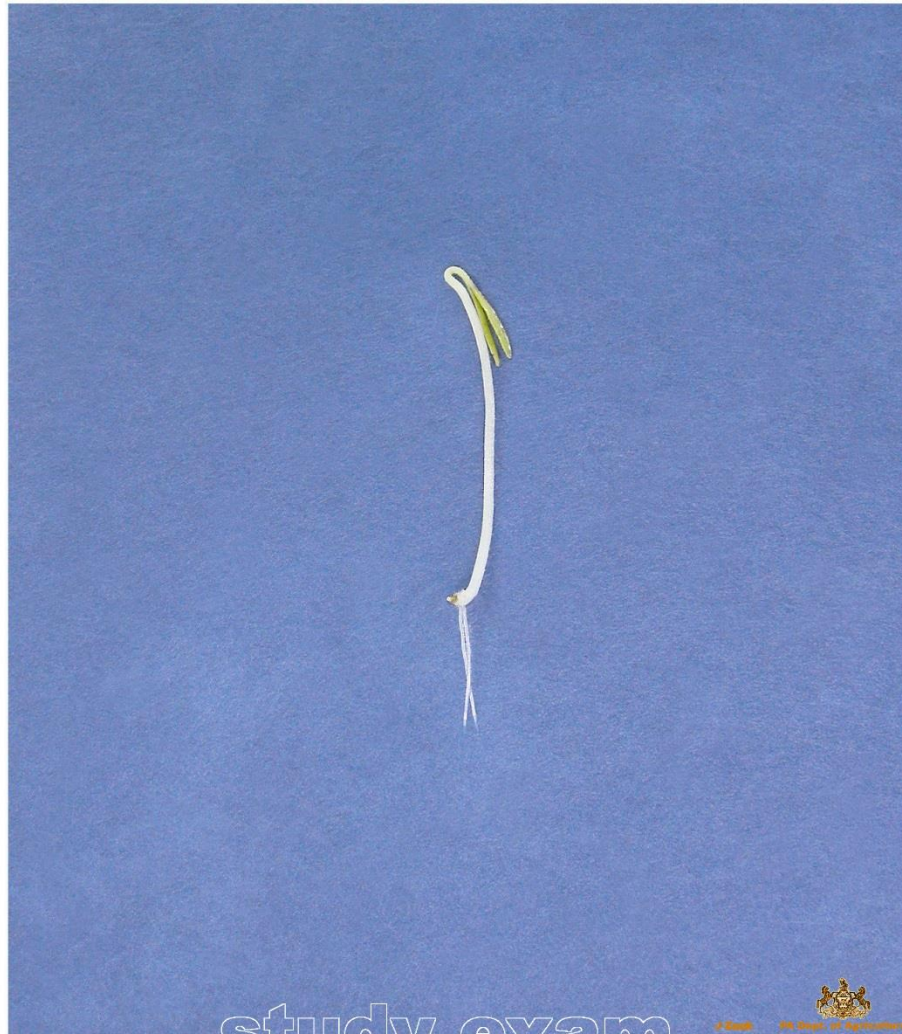


study exam

___ Normal ___ Abnormal ___ Hard Seed ___ Dead

Tomato

3



study exam

___ Normal ___ Abnormal ___ Hard Seed ___ Dead

Tomato

4



study exam

___ Normal ___ Abnormal ___ Hard Seed ___ Dead

Tomato

5



study exam

___ Normal ___ Abnormal ___ Hard Seed ___ Dead

Tomato

1



study exam

___ Normal ___ Abnormal ___ Hard Seed ___ Dead

Watermelon

2



___ Normal ___ Abnormal ___ Hard Seed ___ Dead

Watermelon

3



___ Normal ___ Abnormal ___ Hard Seed ___ Dead

Watermelon

4



study exam

___ Normal ___ Abnormal ___ Hard Seed ___ Dead

Watermelon

5



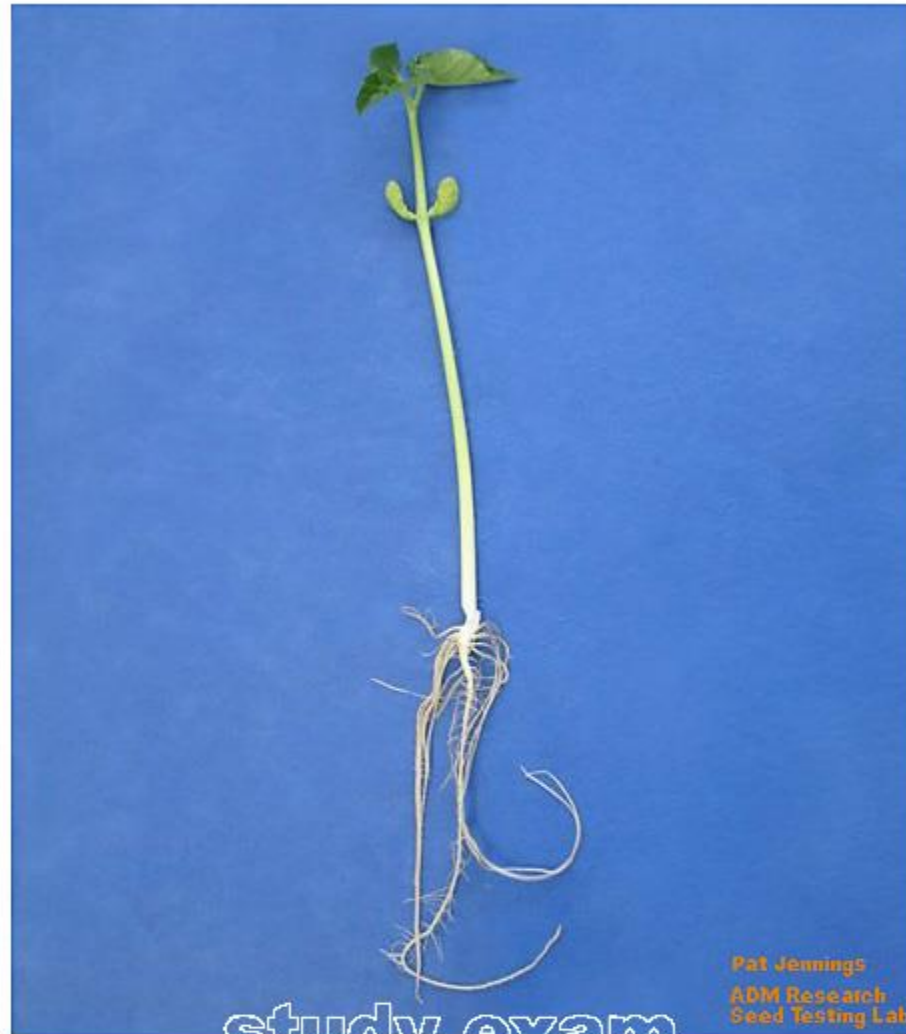
___ Normal ___ Abnormal ___ Hard Seed ___ Dead

Watermelon

VGP STUDY EXAM

ANSWERS

1



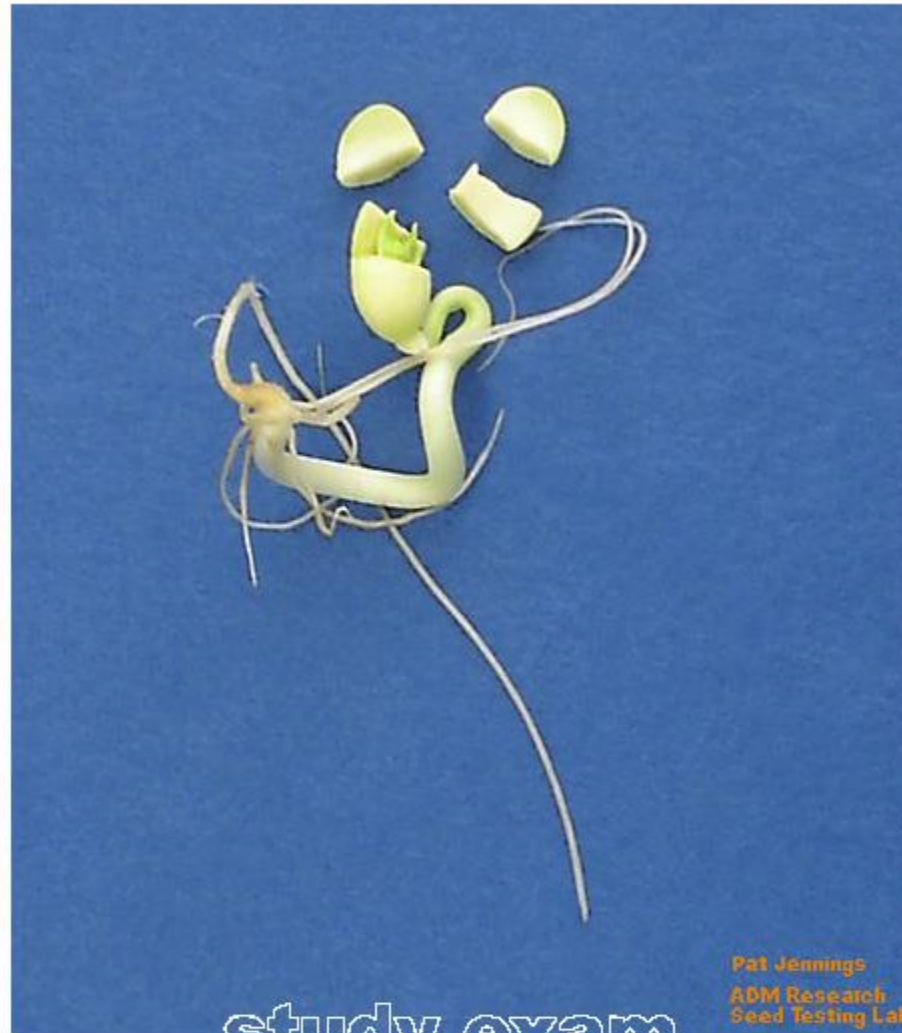
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☒ Normal ☐ Abnormal ☐ Hard Seed ☐ Dead

(Intact Seedling)

Garden Bean

2



☒ Normal ☐ Abnormal ☐ Hard Seed ☐ Dead

**(More than 50% cotyledons
remaining)**

Garden Bean

3

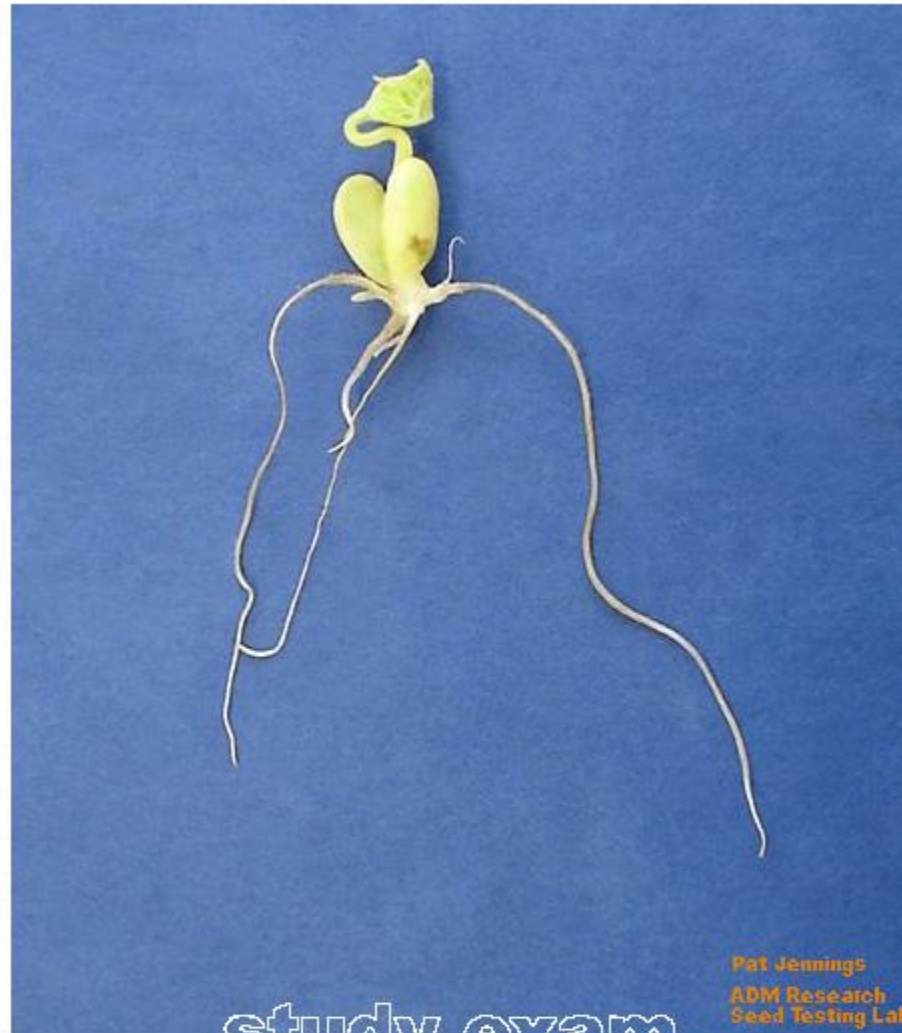


___ Normal **X** Abnormal ___ Hard Seed ___ Dead

Missing primary leaves

Garden Bean

4



___ Normal **X** Abnormal ___ Hard Seed ___ Dead

**Hypocotyl markedly shortened
or missing**

Garden Bean

5



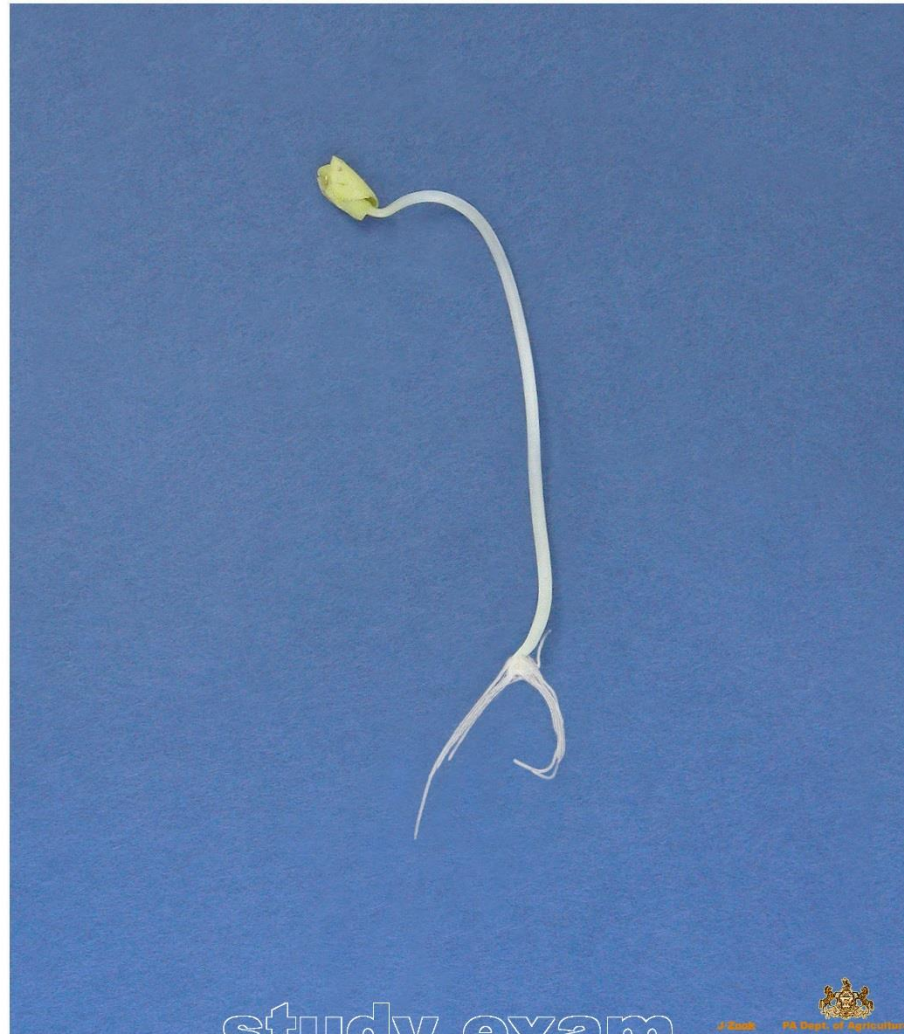
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☒ Normal ☐ Abnormal ☐ Hard Seed ☐ Dead

(Intact Seedling)

Garden Bean

1



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☒ Normal ☐ Abnormal ☐ Hard Seed ☐ Dead

(Primary root damaged or missing,
sufficient secondary or adventitious
roots)

Buckwheat

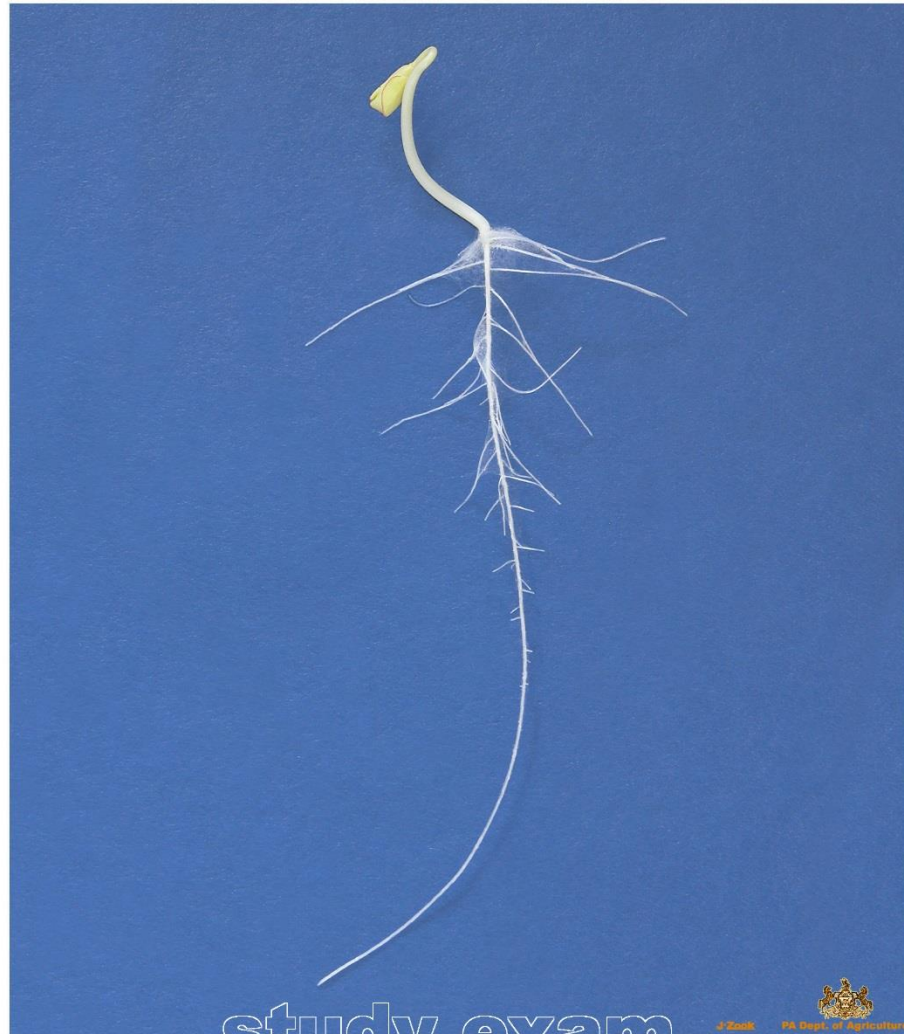


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2

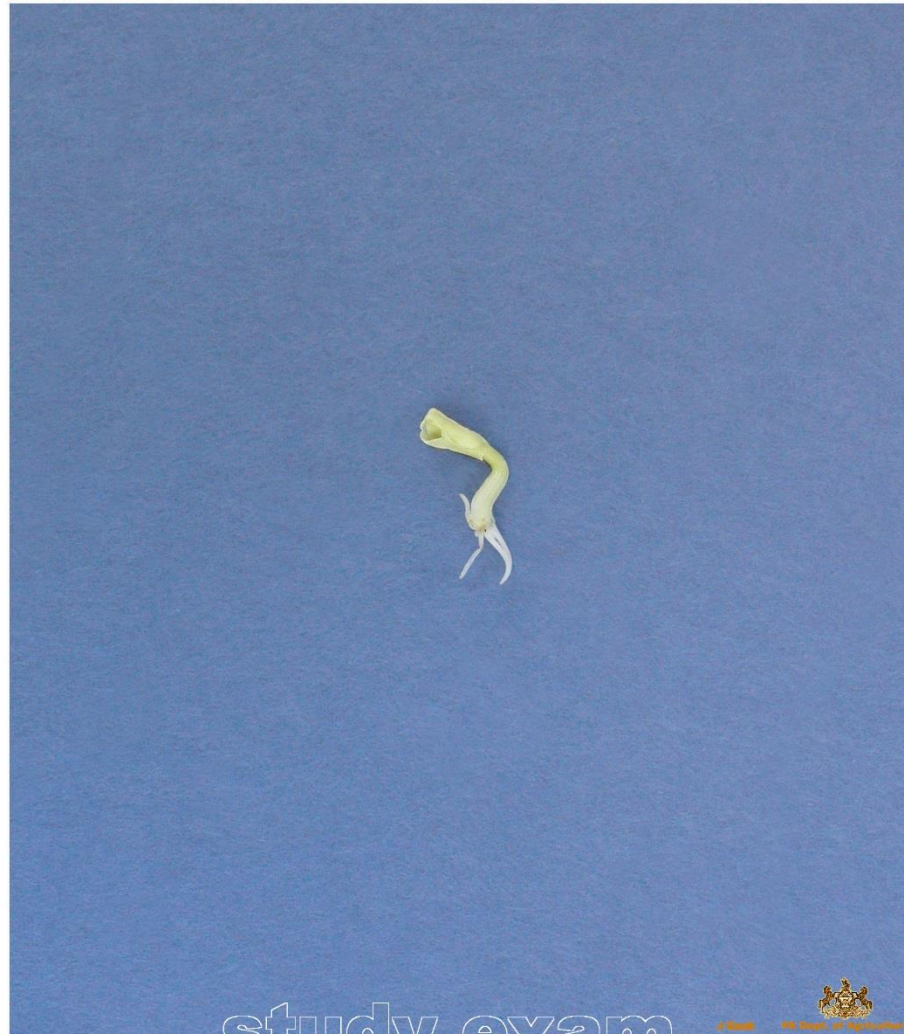


☒ Normal ☐ Abnormal ☐ Hard Seed ☐ Dead

(Intact Seedling)

Buckwheat

3



study exam

___ Normal **X** Abnormal ___ Hard Seed ___ Dead

Insufficient roots

Buckwheat

4

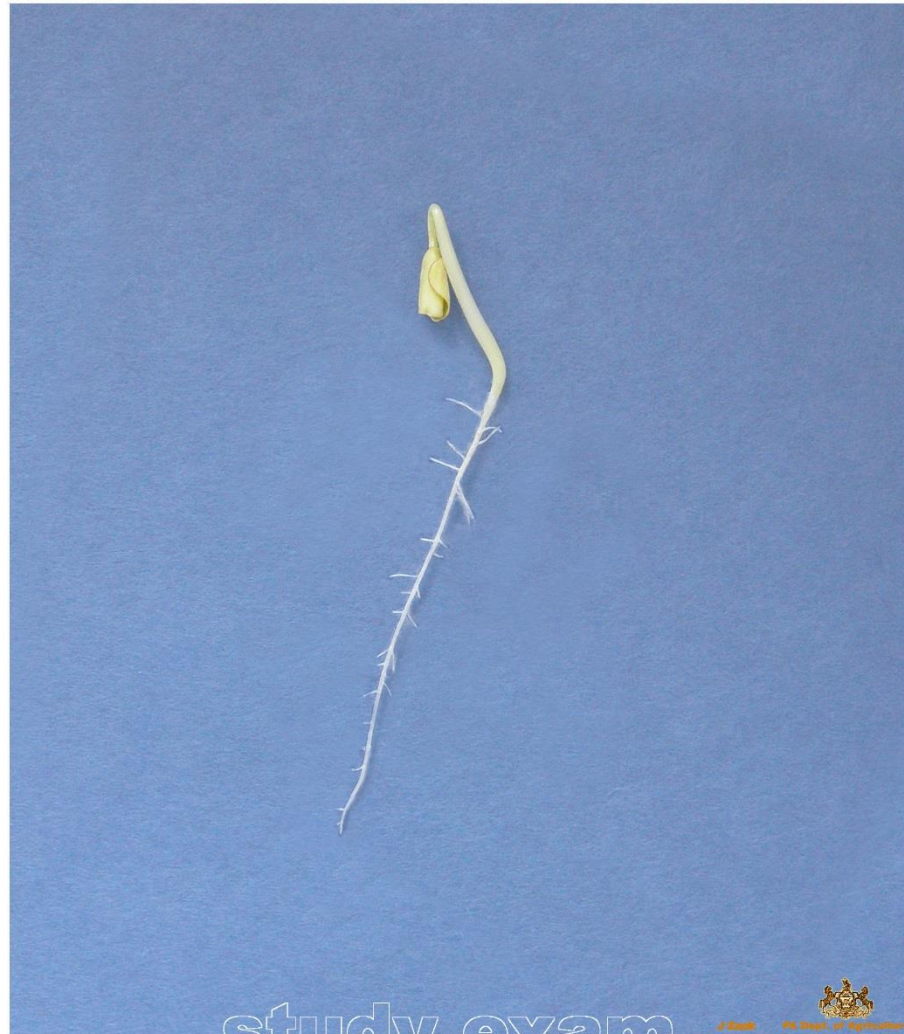


___ Normal **X** Abnormal ___ Hard Seed ___ Dead

Hypocotyl short with stubby root

Buckwheat

5



study exam

☒ Normal ☐ Abnormal ☐ Hard Seed ☐ Dead

(Seedling developing normally)

Buckwheat

1



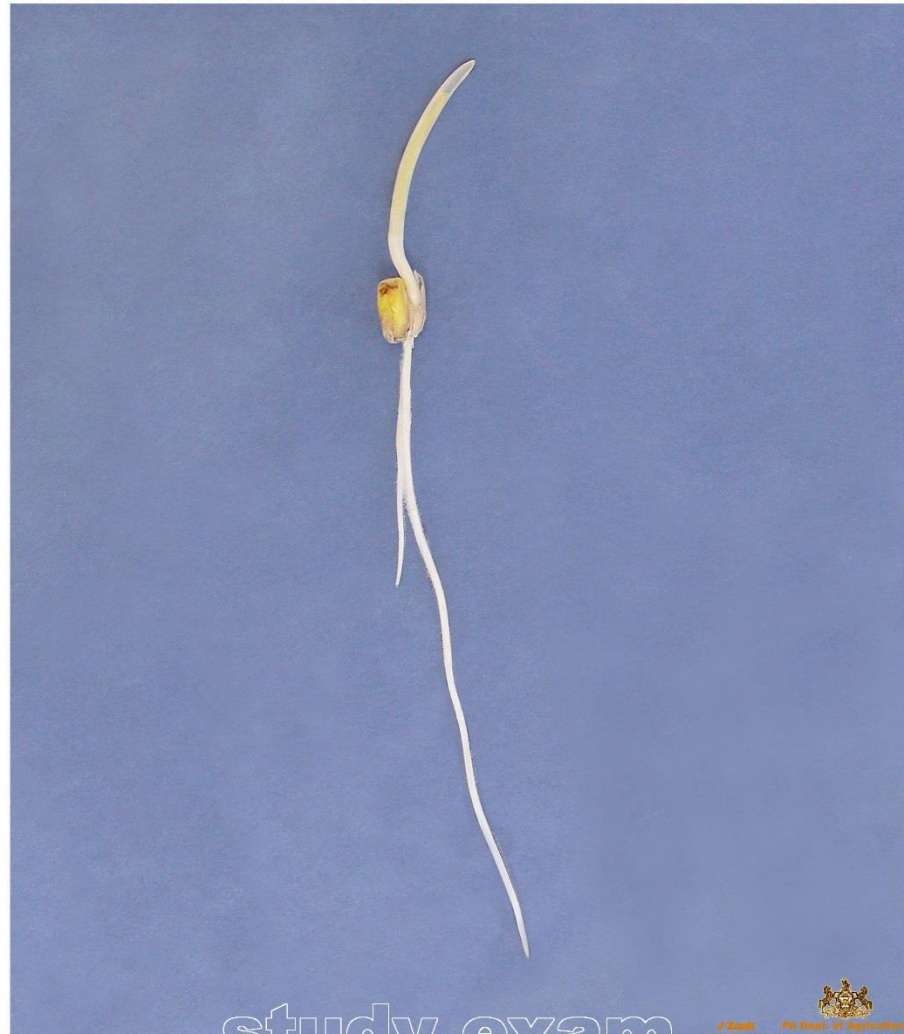
study exam

☒ Normal ☐ Abnormal ☐ Hard Seed ☐ Dead

(shoot trapped in seed coat, but
otherwise healthy)

Corn

2



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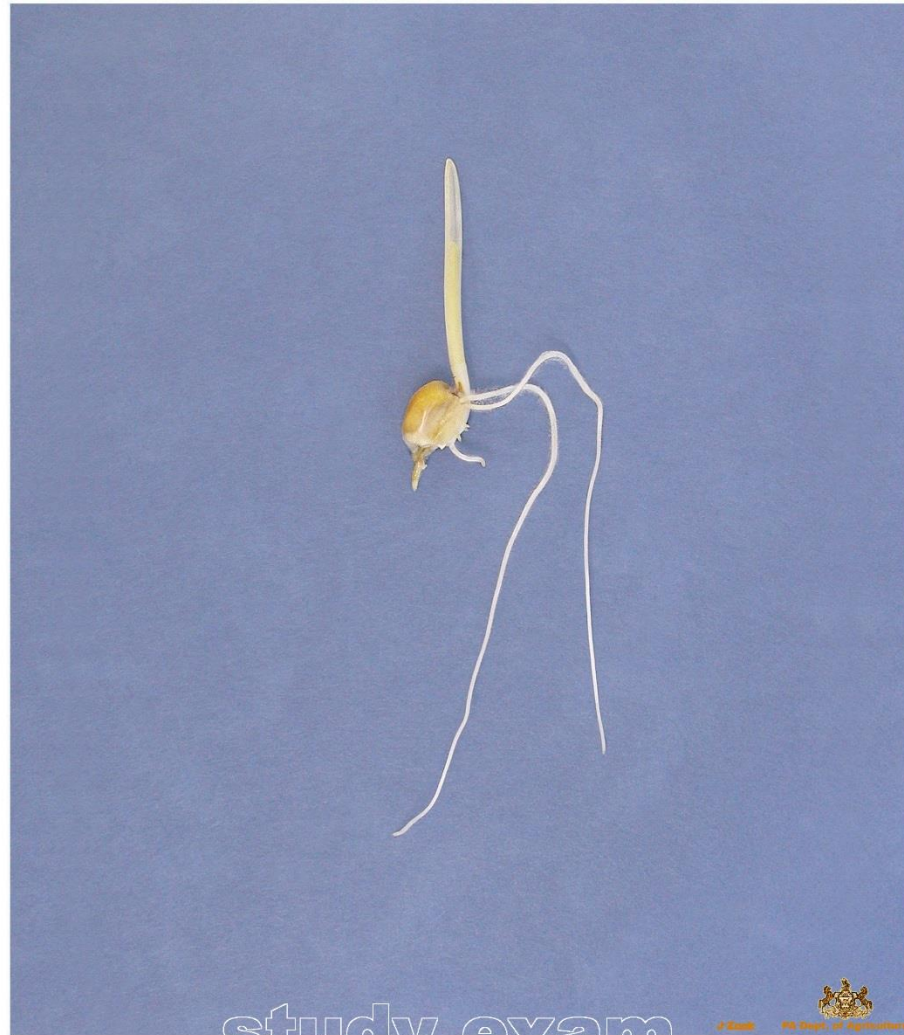
study exam

☒ Normal ☐ Abnormal ☐ Hard Seed ☐ Dead

(Intact Seedling)

Corn

3



study exam

☒ Normal ☐ Abnormal ☐ Hard Seed ☐ Dead

(Primary root missing, sufficient
seminal roots)

Corn

4

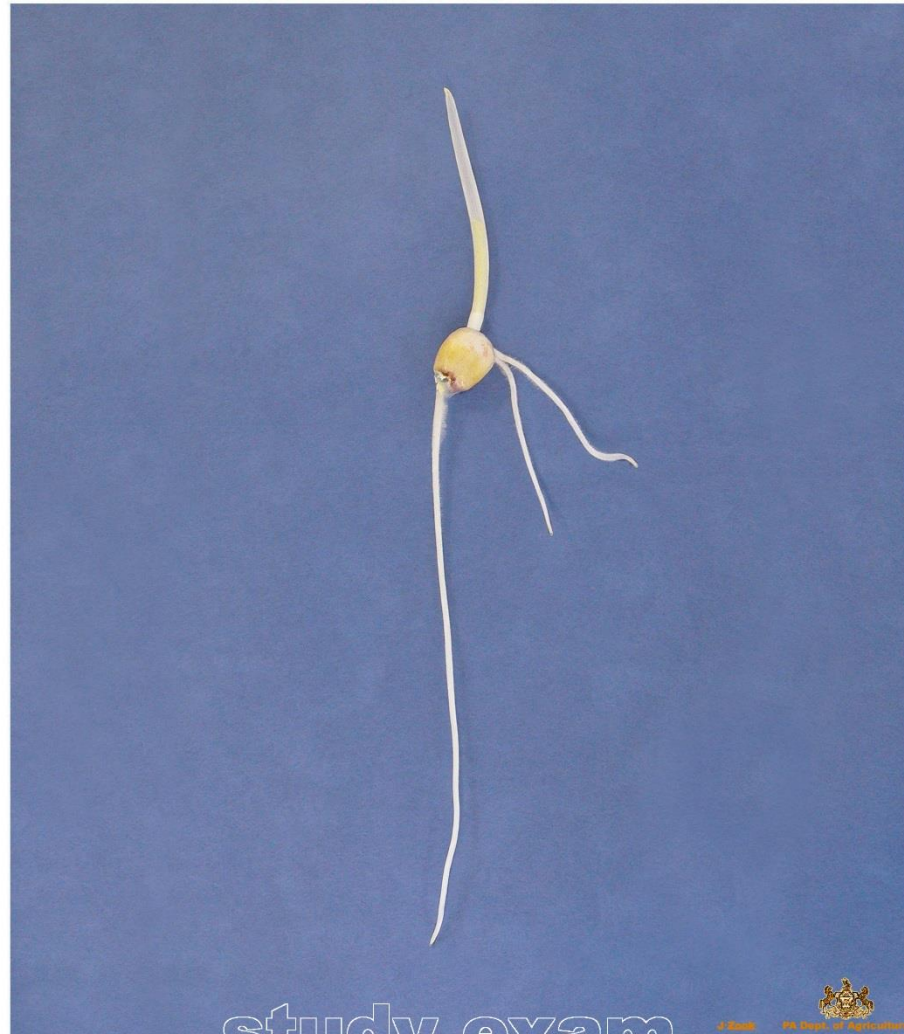


___ Normal **X** Abnormal ___ Hard Seed ___ Dead

Shoot missing

Corn

5



☒ Normal ☐ Abnormal ☐ Hard Seed ☐ Dead

(Abnormal in sweet corn, popcorn and
ornamental corn - Leaf extending less
than halfway up into the coleoptile)

Corn

1



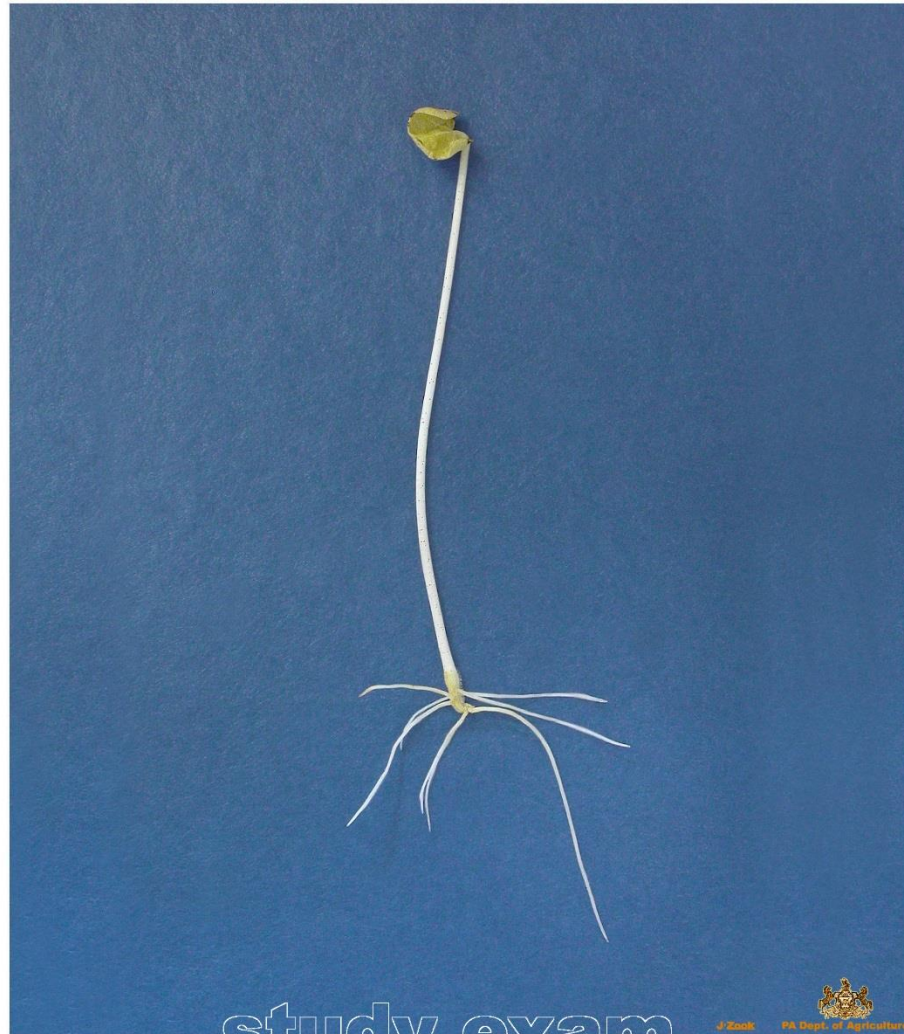
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☒ Normal ☐ Abnormal ☐ Hard Seed ☐ Dead

(Intact Seedling)

Cotton

2



☒ Normal ☐ Abnormal ☐ Hard Seed ☐ Dead

(Intact Seedling)

Cotton

3

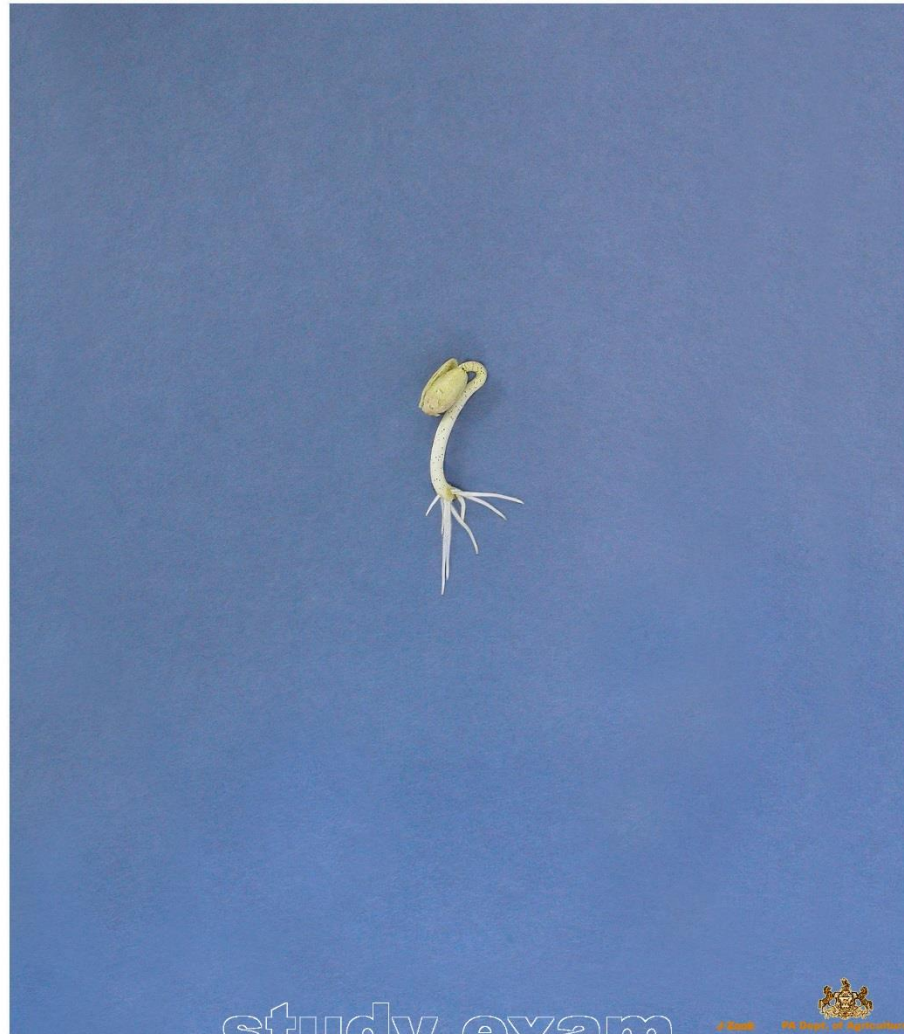


___ Normal **X** Abnormal ___ Hard Seed ___ Dead

Primary root missing, insufficient
secondary roots

Cotton

4

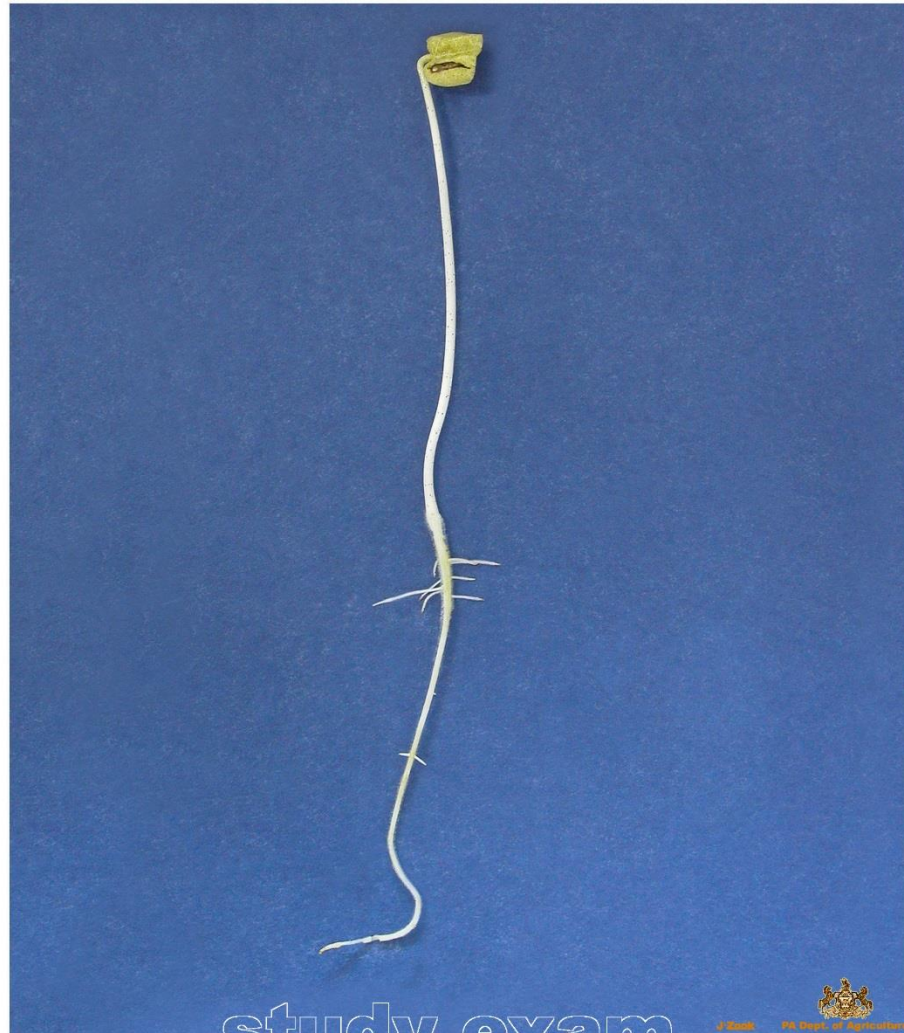


☒ Normal ☐ Abnormal ☐ Hard Seed ☐ Dead

(Primary root missing, sufficient
secondary roots)

Cotton

5



☒ Normal ☐ Abnormal ☐ Hard Seed ☐ Dead

(Intact Seedling)

Cotton

1



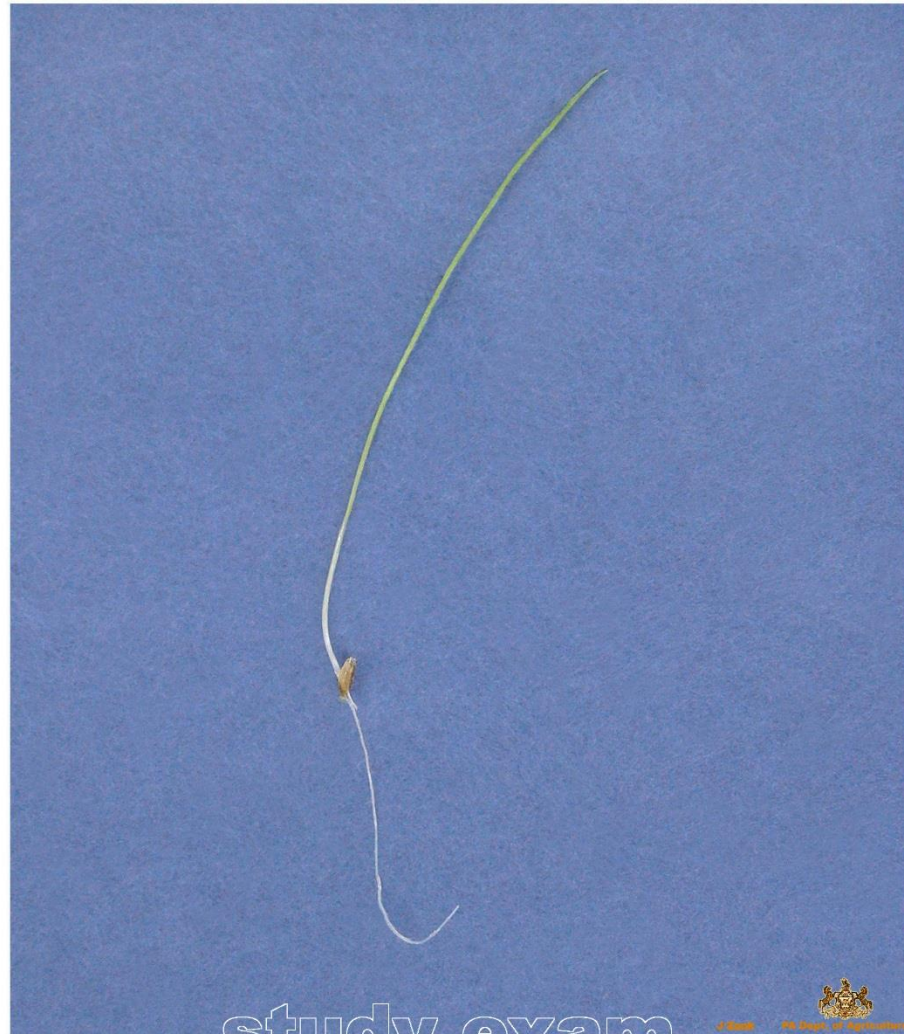
study exam

___ Normal **X** Abnormal ___ Hard Seed ___ Dead

Missing primary root

Kentucky Bluegrass

2



☒ Normal ☐ Abnormal ☐ Hard Seed ☐ Dead

(Intact Seedling)

Kentucky Bluegrass

3

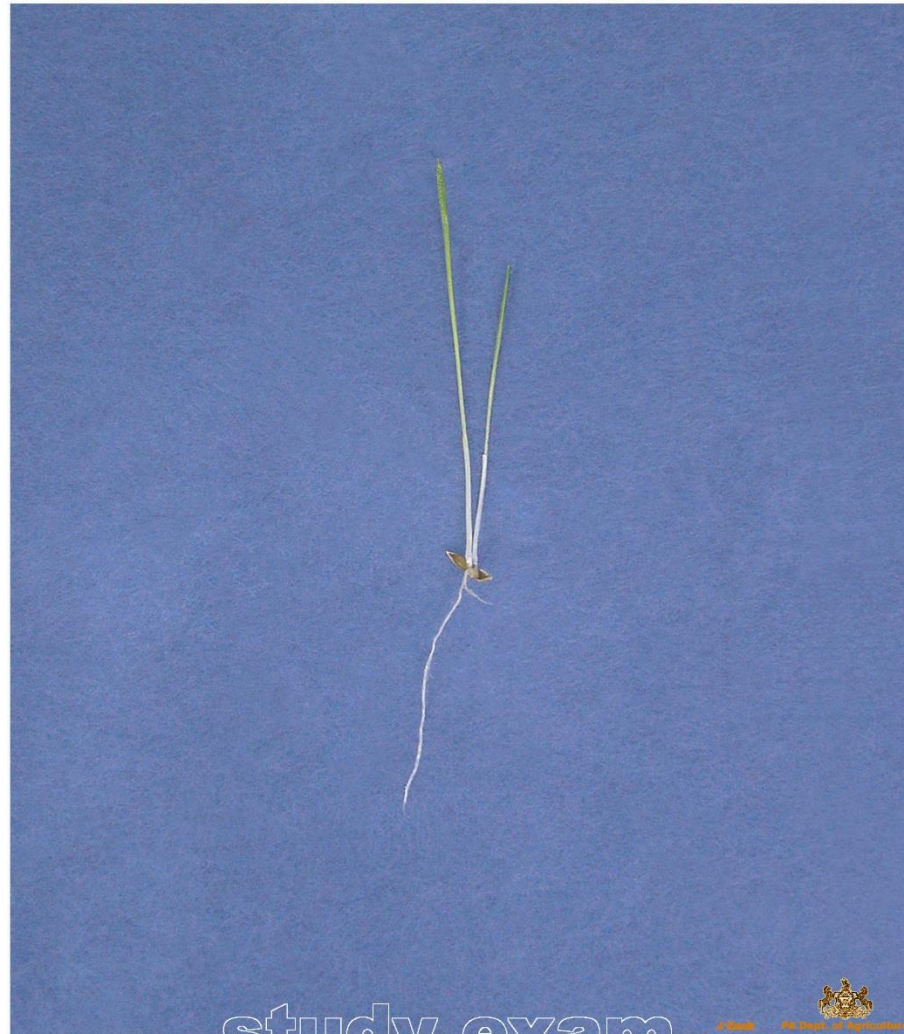


___ Normal **X** Abnormal ___ Hard Seed ___ Dead

Endosperm detached from the root-
shoot axis

Kentucky Bluegrass

4



☒ Normal ☐ Abnormal ☐ Hard Seed ☐ Dead

(Double shoot)

Kentucky Bluegrass



5



☒ Normal ☐ Abnormal ☐ Hard Seed ☐ Dead

(Primary root at least 1/16 inch in
length -for KBG only)

Kentucky Bluegrass

1



___ Normal **X** Abnormal ___ Hard Seed ___ Dead

Stubby primary root

Radish

2



___ Normal **X** Abnormal ___ Hard Seed ___ Dead

Stubby primary root

Radish

3



___ Normal **X** Abnormal ___ Hard Seed ___ Dead

Stubby primary root

Radish

4

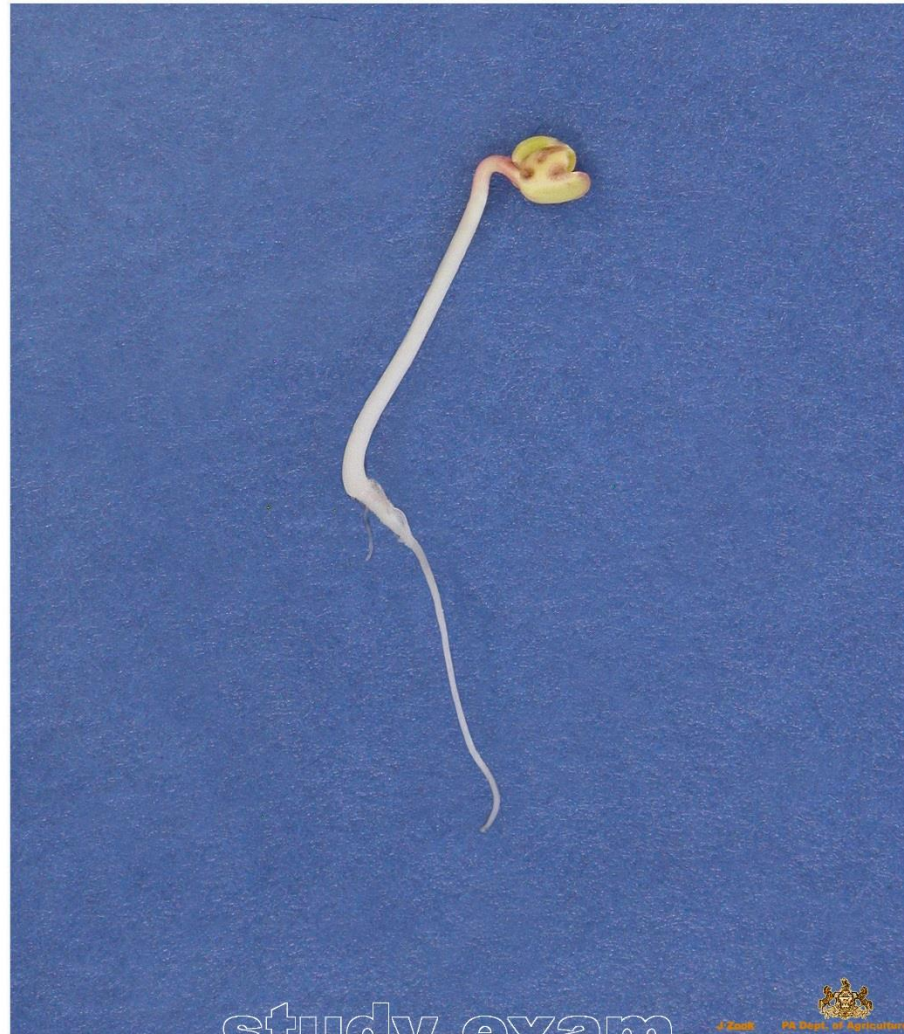


☒ Normal ☐ Abnormal ☐ Hard Seed ☐ Dead

(Hypocotyl short but developing
normally)

Radish

5



☒ Normal ☐ Abnormal ☐ Hard Seed ☐ Dead

(Necrotic spot covering less than
50% of cotyledon area)

Radish

1



study exam

___ Normal ___ Abnormal X Hard Seed ___ Dead

Red Clover

2



study exam

___ Normal **X** Abnormal ___ Hard Seed ___ Dead

Insufficient root

Red Clover

3



study exam

___ Normal ___ Abnormal ___ Hard Seed **X** Dead

Red Clover

4

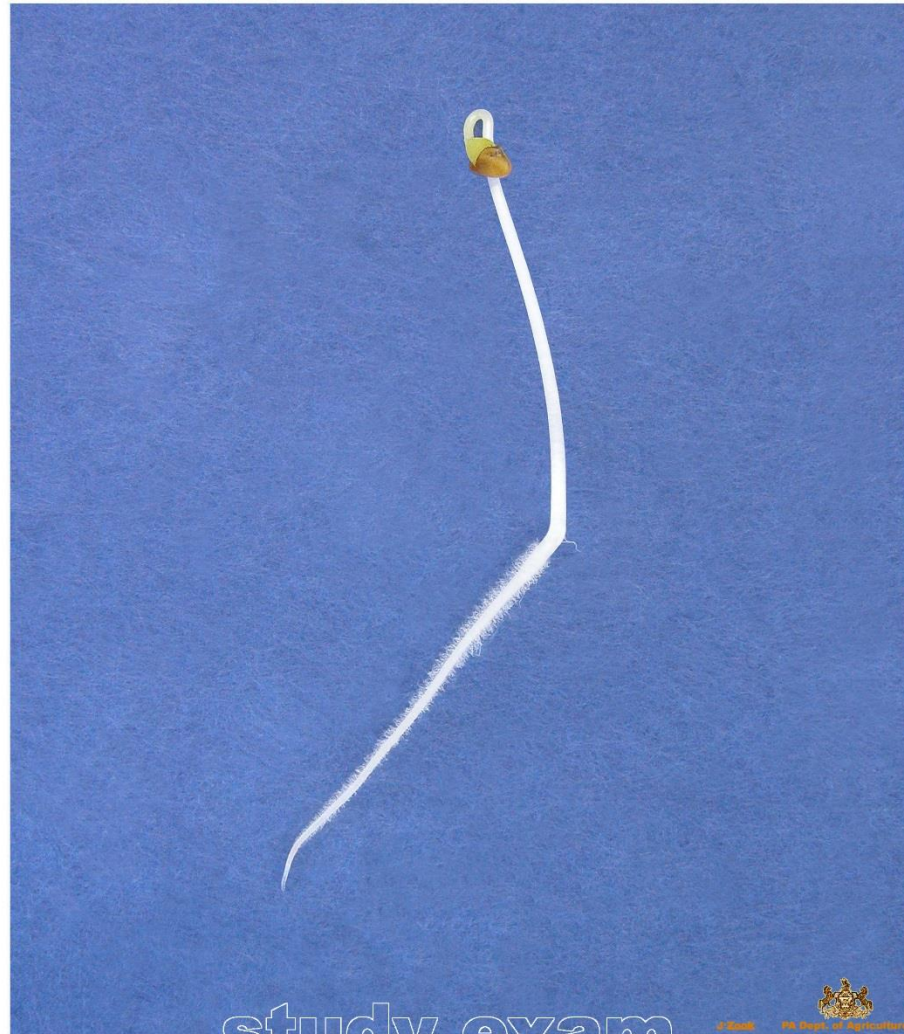


___ Normal **X** Abnormal ___ Hard Seed ___ Dead

Short hypocotyl, split root

Red Clover

5

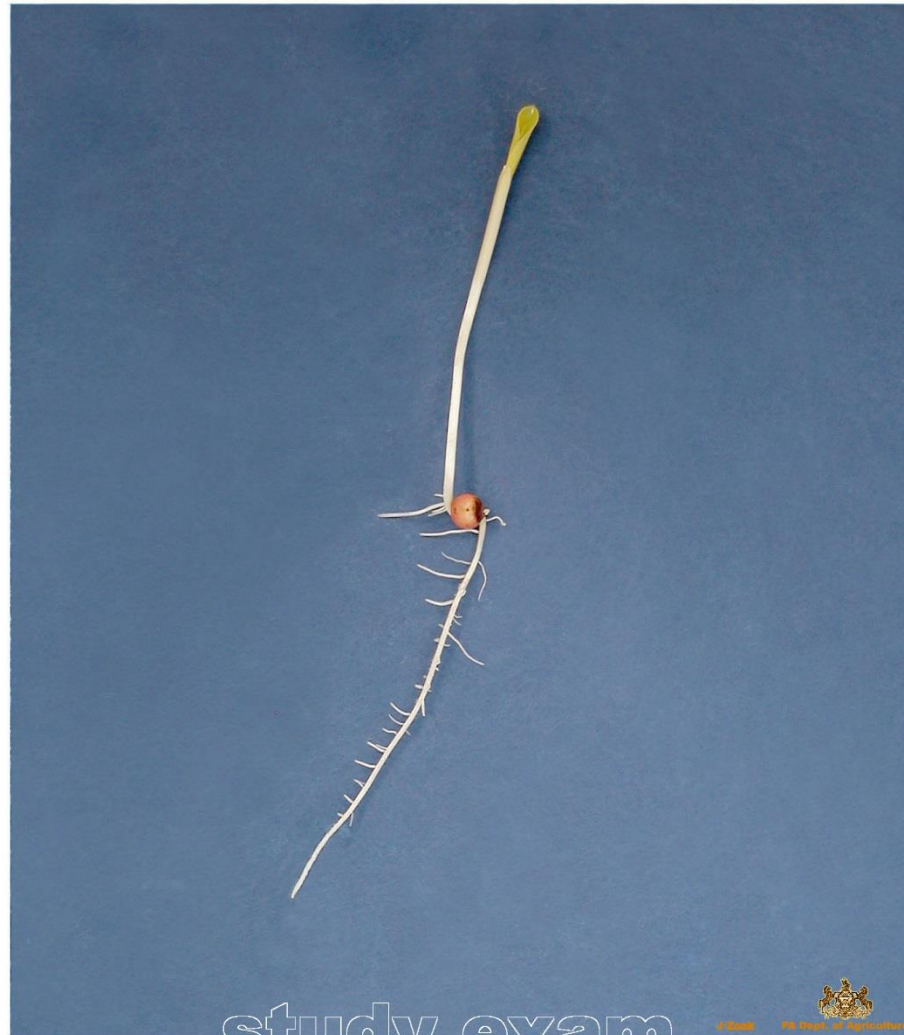


☒ Normal ☐ Abnormal ☐ Hard Seed ☐ Dead

(Intact Seedling)

Red Clover

1



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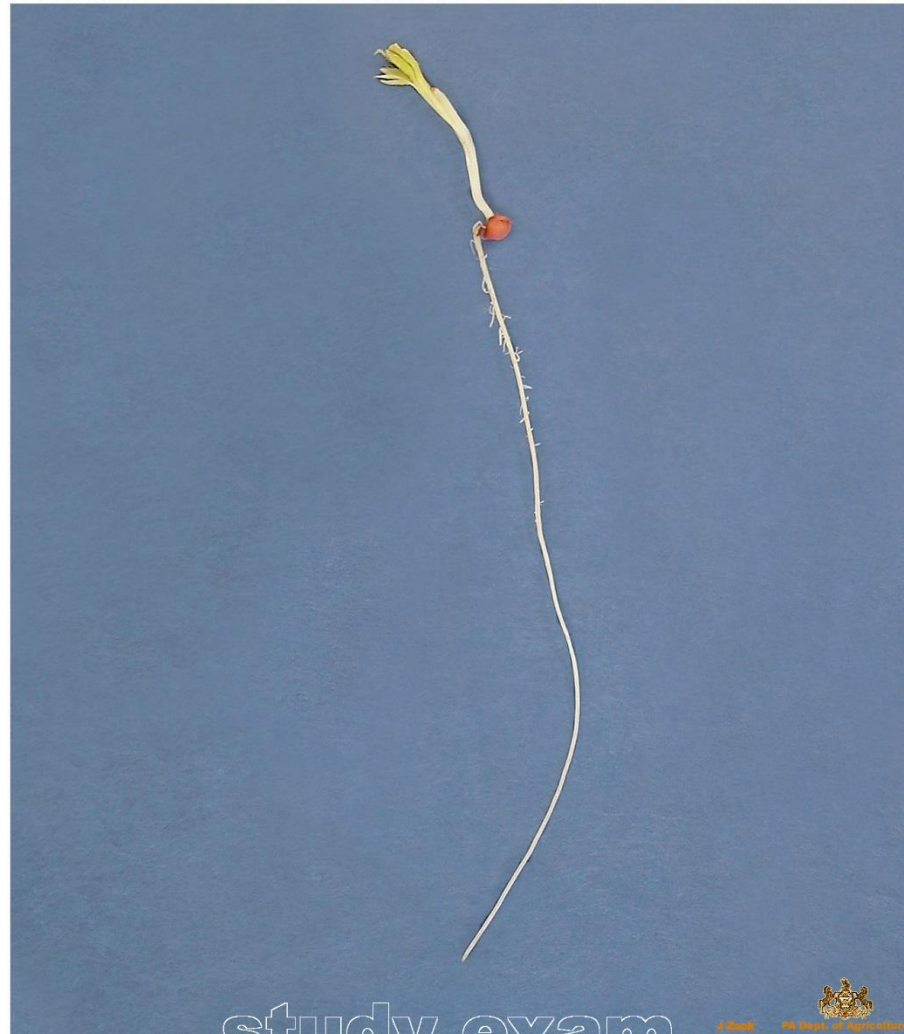
☒ Normal ☐ Abnormal ☐ Hard Seed ☐ Dead

(Intact Seedling)

Sorghum

2

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___ Normal **X** Abnormal ___ Hard Seed ___ Dead

**Leaf badly shredded or
longitudinally split**

Sorghum

3



☒ Normal ☐ Abnormal ☐ Hard Seed ☐ Dead

(Late-germinating seedling)

Sorghum

4



___ Normal **X** Abnormal ___ Hard Seed ___ Dead

No shoot

Sorghum

5



☒ Normal ☐ Abnormal ☐ Hard Seed ☐ Dead

(Split coleoptile)

Sorghum

1



☒ Normal ☐ Abnormal ☐ Hard Seed ☐ Dead

(Normal Seedling)

Tomato

2



study exam

☒ Normal ☐ Abnormal ☐ Hard Seed ☐ Dead

(Normal Seedling)

Tomato

3



___ Normal **X** Abnormal ___ Hard Seed ___ Dead

Primary root damaged, insufficient
Secondary roots

Tomato

4



___ Normal **X** Abnormal ___ Hard Seed ___ Dead

Hypocotyl short, thickened; primary root damaged; seed coat not shed

Tomato

5



study exam

___ Normal **X** Abnormal ___ Hard Seed ___ Dead

Hypocotyl malformed, thickened

Tomato

1



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study exam

☒ Normal ☐ Abnormal ☐ Hard Seed ☐ Dead

(Normal Seedling)

Watermelon

2



___ Normal **X** Abnormal ___ Hard Seed ___ Dead

Hypocotyl too short

Watermelon

3



___ Normal **X** Abnormal ___ Hard Seed ___ Dead

**Hypocotyl markedly shorten;
stubby root**

Watermelon

4



___ Normal **X** Abnormal ___ Hard Seed ___ Dead

Deep lesion

Watermelon

5



☒ Normal ☐ Abnormal ☐ Hard Seed ☐ Dead

(Cotyledons present but convoluted)

Watermelon