**Answer key**
Canola Watch 2016 CCA exam
<ol> <li>An article called "More heated canola than usual" explains how heated canola, which results from spoilage in the bin, will greatly increase free fatty acids in canola oil. Free fatty acids reduce the stability and shelf-life a canola oil. Good quality new canola seeds will have about% of their fatty acids in the free form.</li> </ol>
0.1 0.5 (A) 1.0 5.0
http://www.canolawatch.org/2015/12/02/more-heated-canola-than-usual-2/
2. The Manitoba clubroot risk map is based primarily on clubroot spore levels in soil samples. Municipalities in red on the map have had at least one soil sample with spore levels above per gram, which is considered the minimum spore population thresholds for gall formation in field conditions.
8 800 80,000 (A) 8,000,000
http://www.canolawatch.org/2016/02/03/clubroot-maps-what-do-they-tell-you/
3. The best way to stop the continued advance of clubroot is for farmers outside the hot zone to use all the tools available, including resistant varieties, to keep the disease at bay. In a February article, Canola Watch compared this strategy to what?
Containing a grass fire (A) Keeping warm in winter Obeying traffic speed limits Performing a symphony
http://www.canolawatch.org/2016/02/03/clubroot-put-a-firebreak-around-your-farm/
4. In general, fields with very low organic matter and dry conditions are most likely to show yield-reducing levels of boron deficiency. Unfortunately the current soil test for boron does not seem to be a reliable indicator of available boron. What is this test commonly called?
Acid extraction Electron gun Plant root simulation Hot water extraction (A)
http://www.canolawatch.org/2016/02/03/boron-understanding-the-soil-test/
5. Boron was a focus of the 2015 Ultimate Canola Challenge (UCC). In 2016, UCC provided protocols for two on-farm trials – variety testing and?
Seeding depth Nitrogen rates (A) Fungicide for blackleg Swath timing
http://www.canolawatch.org/2016/02/03/ultimate-canola-challenge-2016-get-involved/ (through the 2016 plans link)
6. The article "Top 10 highlights from canoLAB 2016" includes a comment from Rigas Karamanos on the chronic under-application of phosphorus. According to his graph, what was the deficit in tonnes between applied phosphate and crop removal of phosphate in Western Canada in 2015?
35,000 199,000 (A) 251,000 384,000
http://www.canolawatch.org/2016/03/18/top-10-highlights-from-canolab-2016/
7. The article "Top 10 highlights from canoLAB 2016" includes short video of a cutworm. What does the cutworm do to the canola seedling?
Snips it off Eats one of the leaves Lays eggs on it Pulls it underground (A)

8. Though it works on cleavers, quinclorac is not currently a recommended control option in canola due to trade uncertainties. In an article on cleavers management, Canola Watch says to prioritize cleavers control in cereals. What is the key reason?

Cleavers are a bigger problem in cereals

Cereal roots exude a toxin that kills cleavers seeds

 $\underline{http://www.canolawatch.org/2016/03/18/top-10-highlights-from-canolab-2016/}$ 

Cereals are more competitive against weeds Cereals provide a wider selection of control options (A) http://www.canolawatch.org/2016/03/18/make-a-cleavers-management-plan/ 9. What is this statement describing: 25% is immediately available as N03-, 25% is NH4+ and the other 50% is CO(NH2)2. UAN (A) DAP S15 Agrotain http://www.canolawatch.org/2016/03/18/nitrogen-review-sources-and-plant-availability/ 10. The amount of nitrogen mineralized each year depends on moisture, temperature and the percentage of organic matter in the soil. On occasion, moist soils in Manitoba or Central Alberta, for example, could release close to \_ \_\_ pounds of nitrogen per percentage point of soil organic matter. 10 20 (A) http://www.canolawatch.org/2016/03/18/nitrogen-review-sources-and-plant-availability/ 11. The article "Why MRLs matter" includes a video. In the video, CCC president Patti Miller says: "One challenge is that products can be registered in Canada before the maximum residue limits are set in our export markets. That means effectively We can't sell to these countries These products are banned Canada sets the export standard The residue limit is zero (A) http://www.canolawatch.org/2016/03/18/why-mrls-matter/

12. An article describes situations where cover crops would most likely work in Canada. Of those situations, one included canola in the mix. What is it?

An intercrop of canola, peas and alfalfa (A)

Vetch and canola in a relay

A combination that includes canola, oats and alfalfa for silage

A post harvest cover crop of canola and buckwheat that would winter-kill

http://www.canolawatch.org/2016/03/18/cover-crops-benefits-challenges-and-tips/

13. If considering a spray for weeds in early to mid April, make sure weeds are present and growing, that days are sunny and warm and overnight lows are \_\_\_\_ \_°C or higher.

5 (A)

10 15

http://www.canolawatch.org/2016/04/06/how-early-is-too-early-for-weed-spraying/

14. On the topic of spraying in April, promotion of "fully loaded" glyphosate is more of an American concept where glyphosate doesn't have the full load of adjuvant. Pretty much all glyphosate sold in Canada comes with sufficient adjuvant. The same paragraph mentions the term "over-surfactanting". What can result when too much surfactant is added?

Spray gels in the tank Spray can't enter leaves Spray runs off leaves (A) Spray evaporates too quickly

http://www.canolawatch.org/2016/04/06/how-early-is-too-early-for-weed-spraying/

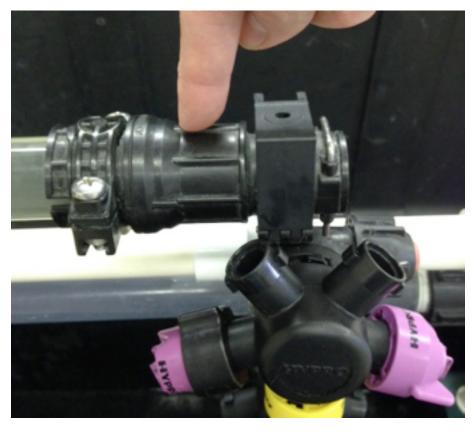
15. This person is pointing at an add-on end cap that reduces product accumulation at sprayer boom ends, which are common trap areas for sprayer contamination. What else does this particular model do?

Filters grit in the solution Senses boom line pressure Measures delivery rate Removes air from lines (A)

http://www.canolawatch.org/2016/04/06/get-the-sprayer-ready-for-the-season/

16. Verticillium wilt of canola was renamed verticillium stripe. Why?

Verticillium stripe is what they call it in Europe Verticillium wilt was already taken by potato and sunflower The pathogen doesn't appear to produce wilt symptoms in canola (A) Wilt made people think of fusarium



## http://www.canolawatch.org/2016/04/06/verticillium-stripe-in-canola/

17. An article on what you need to know about phosphorus mentions soil test methods. Recommended soil tests are \_\_\_\_\_\_ for Alberta and \_\_\_\_\_ for Manitoba. Both tend to be used in Saskatchewan.

Modified Kelowna (AB), Olsen (MB) (A) Modified Kelowna (AB), Bray (MB) Olsen (AB), Bray (MB) Olsen (AB), Modified Kelowna (MB)

http://www.canolawatch.org/2016/04/12/need-to-know-phosphorus-p/

18. That same article talks about three "philosophies" when it comes to phosphate fertilizer rates. One, the "build and maintenance" approach of applying more than the crop needs on soils that are deficient, can work with P because it will remain in the soil if not used in the year of application. The article mentions one other immobile nutrient that suits this approach. What is it?

Potassium (A) Calcium Sulphur Boron

http://www.canolawatch.org/2016/04/12/need-to-know-phosphorus-p/

19. An article on what you need to know about sulphur (S) notes that soil with less than \_\_\_ lb./ac. of S in the top 6" is deficient. Canola grown on that field will often benefit from applied S — even if S levels at 6-24" depth are adequate.

10 (A)

20 30

40

20. An article on what you need to know about potassium (K) notes that sandier soils with low clay levels are most likely to be at or near deficiency levels. Alberta soil fertility expert Ross McKenzie estimates that about \_\_\_\_\_\_% of Prairie soils are K deficient, and overall soil K levels are in a slow decline.

2 to 5 5 to 10

10 to 20

20 to 25 (A)

http://www.canolawatch.org/2016/04/12/need-to-know-potassium-k/

21. When it comes to seeding date and frost risk, Canola Watch asks: Are you OK with a 50% probability of a killing frost? Or does 25% or 10% suit you better? At Lacombe, Alberta, 50% probability of a -3°C frost is around May 4: Half the time the last -3°C frost will occur after that date, and half before. At what date does that probability drop to 25%?

May 7 May 9 May 11 (A) May 13

http://www.canolawatch.org/2016/04/27/spring-frost-risk-and-seeding-date/

22. A May Canola Watch quiz asks: With a mix of perennial, winter annual and annual weeds growing in the field, how much time should you wait between spraying and seeding to let a pre-seed glyphosate application do its job? Assume weather is warm and sunny. (Hint: Take the quick quiz to find the answer.)

A day 3 days (A) 5 days 10 days

http://www.canolawatch.org/2016/05/04/may-4-quiz-pre-seed-burnoff/

23. Products available for pre-seed applications ahead of canola are limited. The short list includes glyphosate and which other actives?

bromoxynil and carfentrazone (A) saflufenacil and 2,4-D bromoxynil and saflufenacil carfentrazone and 2,4-D

http://www.canolawatch.org/2016/05/04/tank-mix-glyphosate-for-pre-seed-burnoff/

24. Hard water tends to reduce glyphosate performance, especially at higher water rates. When tank mixing with glyphosate and increasing water volume, it is important to consider water quality. If "total hardness" is below \_\_\_\_\_ ppm, the water source is good as is. For harder water, a conditioner such as spray-grade ammonium sulphate can be added to negate the effect of hard water cations.

http://www.canolawatch.org/2016/05/04/tank-mix-glyphosate-for-pre-seed-burnoff/

25. Canola Watch wrote that seeding into dry soil in early May is preferable to waiting until after a rain. The article provided three reasons. Which is the first one?

Seeding early should always be the first objective

Muddy conditions do not always result in ideal seed placement

Seeding could be further delayed if rains are heavy (A)

Moist conditions will increase the amount of soil — and potentially clubroot — spread around the farm

http://www.canolawatch.org/2016/05/04/dry-soil-seed-now-or-wait/

26. A recent AAFC study on canola seed size found that seed size effects on canola emergence, yield or seed quality were not significant. But it did find that plants growing from larger seed did what?

Produced more early-season biomass (A) Flowered later Flowered longer Produced smaller seeds

http://www.canolawatch.org/2016/05/11/calculate-how-many-plants-your-seeding-rate-provides/

27. Wind trajectory maps for early May 2016 showed that winds from the southern States had arrived on the Prairies. Why does this matter to Canola Watch?

These winds tend to be very dry These winds bring much needed rain These winds can carry canola pest insects (A) These winds carry disease spores

http://www.canolawatch.org/2016/05/11/insect-update-winds-arrive-from-the-south/

28. Of the common pathogens that cause seedling diseases in canola, which one tends to be worse when canola emergence is delayed due to cool, dry conditions?

Fusarium Pythium Rhizoctonia (A)

١,	_	*	-	ωı	li.	ım	

http://www.canolawatch.org/2016/05/18/scouting-the-critical-first-21-days/

29. To make the right flea beetle spray decision, consider the crop stage. Even if flea beetles are feeding, the economic threat is likely over after the \_\_\_\_\_ stage.

2-leaf

3-leaf

4-leaf (A)

5-leaf

http://www.canolawatch.org/2016/05/18/8-steps-to-make-the-right-flea-beetle-decision/

30. Cutworms and seedling diseases are fairly common causes for toppled or missing plants in the first few weeks after emergence. What does the article suggest is one way to distinguish cutworm feeding from disease damage?

Cutworm damage causes plant tissue to brown.

Cutworm damage is at the soil surface.

Cutworm damage is in patches in the field. (A)

Cutworm damage causes seedlings to dry up and disappear.

http://www.canolawatch.org/2016/05/26/damage-id-cutworms-or-seedling-diseases/

31. If grassy weeds are providing early-season competition to canola, tank mixing the in-crop herbicide with a graminicide may be required. As for timing, if this later-emerging grassy weed has germinated, it indicates that most annuals are popping.

Barnyard grass Green foxtail (A) Yellow foxtail Wild pats

http://www.canolawatch.org/2016/05/26/weed-management-timing-scenarios/

32. An article on reseeding includes a graph showing that canola plants produce a lot more pods when plant density is low. This Saskatchewan research found that at 76 plants per square metre (around 7 per square foot), canola has just over 100 pods per plant. At 10 plants per square metre (one per square foot), what was the pod count per plant?

200 300 500

700 (A)

 $\underline{\text{http://www.canolawatch.org/2016/05/26/help-for-the-reseeding-decision/}}$ 

33. The herbicide application window varies slightly for each HT canola system. The crop staging window of "2- to 7-leaf stage" is for which product?

Ares (A) Glyphosate Liberty Odyssey Ultra

http://www.canolawatch.org/2016/06/01/strategies-to-improve-weed-control-in-canola/

34. The mixing order is unique when tank mixing clethodim with Liberty. What is the mixing order?

Liberty, then clethodim, then surfactant Liberty, then surfactant, then clethodim Clethodim, then surfactant, then Liberty Surfactant, then Liberty, then clethodim. (A)

http://www.canolawatch.org/2016/06/01/strategies-to-improve-weed-control-in-canola/

35. In June, the CCC launched a new video "Harvest management & mitigating loss". In the video, canola grower Darcy Sarafinchan says he's heard of people losing how much canola out the back of the combine?

4-6 bu./ac. 6-8 bu./ac. 8-10 bu./ac. (A) 10-12 bu./ac.

http://www.canolawatch.org/2016/06/01/new-harvest-management-video/

36. In the same video, what does canola grower Jack Moser suggest is an acceptable amount of loss out the back of the combine?

1 bu./ac. (A) 2 bu./ac.

3 bu./ac.

4 bu./ac.

http://www.canolawatch.org/2016/06/01/new-harvest-management-video/

37. If applying a nitrogen top-up in season, Canola Watch says at least% of the target nitrogen rate is recommended. For example, if the goal is to apply 100 lb./ac. of actual nitrogen, the top dress should be at least lb./ac.
10 20 (A) 30 40
http://www.canolawatch.org/2016/06/08/top-dress-tips-for-nitrogen-and-sulphur/
38. Fill in the blank as it is written in Canola Watch: A recent blackleg study in western Canada found that fungicide applied at the 2- to 4-leaf stage of the crop can reduce blackleg severity and increase yield <b>when and</b> when the disease risk is moderate to high.
the same variety is grown back to back varieties have the RLM3 gene varieties are highly susceptible to the disease (A) seed is untreated
http://www.canolawatch.org/2016/06/08/spraying-for-blackleg-the-decision/
39. The article where you'll find the answer to question 38 includes an embedded video: "Blackleg disease and resistance management." The video explains one type of plant resistance that kills cells around an infection, stopping its spread. What is this resistance called?
Adult plant resistance Minor gene resistance Major gene resistance (A) Quantitative resistance
http://www.canolawatch.org/2016/06/08/spraying-for-blackleg-the-decision/
40. Complete this line, as spoken in the same blackleg video. "The best tool for combating the disease is"
Crop rotation Tillage Burning residue Resistance (A)
41. Cabbage seedpod weevil is a fairly common pest of canola in southern Alberta and southwest Saskatchewan. The goal with an insecticide spray is to stop adults from laying eggs in newly formed pods. If adult numbers are at economic threshold numbers, the time to spray them is
At the bud stage 10-20% flower (A) 50% or "full" flower When at least half the pods are formed
http://www.canolawatch.org/2016/06/15/cabbage-seedpod-weevil-when-to-spray/
42. An article called "When you see something new," provides a few details on a rare micronutrient toxicity with symptoms that can be confused with sulphur deficiency, cold stress or herbicide damage. What is micronutrient in question?
Boron Iron Manganese (A) Zinc
http://www.canolawatch.org/2016/06/23/when-you-see-something-new/
43. At canolaPALOOZA in Portage la Prairie, the soil station included a message about mycorrhizae: Canola does not need mycorrhizae to source phosphorus, which means mycorrhizae levels drop considerably when canola is grown. Since mycorrhizae are essential to flax and very beneficial for corn, pea and lentils, growing these crops immediately after canola may result in lower yields. However mycorrhizae levels rebound very well with
a cereal crop in between (A) a balanced nutrition program tillage to incorporate residue seed-placed or granular inoculant
http://www.canolawatch.org/2016/06/23/top-10-highlights-from-10-stations-at-june-21-canolapalooza/
44. Customers can detect pesticide residues in parts per billion on a shipment. At canolaPALOOZA, the "Keep It Clean" station used a super-B truck to demonstrate what one part per billion looks like. One part per billion is equivalent to how many seeds in a super-B truck full of canola?
9 (A) 90 900 9,000
http://www.canolawatch.org/2016/06/23/top-10-highlights-from-10-stations-at-june-21-canolapalooza/

45. In a Canola School video on sweep netting, John Gavloski explains proper techniques. For lygus bug scouting in canola, where does he say to position the net while making sweeps?

Tilt the net so it hits the canopy at 180° Have the net fully within the canopy Aim the centre of the net at top flowers Have the upper rim about 1"-2" above the top flower. (A)

http://www.canolawatch.org/2016/06/23/how-to-videos-on-scouting-and-sweep-netting/

46. What is the key factor in sclerotinia stem rot risk?

Temperature Crop rotation Variety susceptibility Moisture (A)

http://www.canolawatch.org/2016/07/06/sclerotinia-management-common-questions/

47. What caused this lesion Alternaria Blackleg



Verticillium Sclerotinia (A)

http://www.canolawatch.org/2016/07/13/july-13-quiz-lesions/

	explains the process that can lead to the death of plants submerged too long. Fill in the blank for this excerpt: As ro	
oxygen levels decline, energy	generation from root stored sugars switches from aerobic respiration to less-efficient anaerobic processes. The cyto	)-
plasm of root cells becomes _	, which then causes cell death.	

oxygen deficient acidic (A) calcium deficient abiotic

http://www.canolawatch.org/2016/07/13/mid-to-late-season-waterlogging/

49. Research and data on canola yield loss due to waterlogging is minimal. Canadian studies on 2-leaf **cereal** crops found that one day of flooding caused 0% yield loss, but seven days of flooding caused \_\_\_\_\_\_ % yield loss.

5-10 20-30 40-60 (A) 80-100

50. This worm presents no economic risk to canola, but what is it? Leopard cutworm Checkered white butterfly larva (A) Cabbage butterfly larva Zebra caterpillar

http://www.canolawatch.org/2016/07/13/insect-update-lygus-bertha-checkered-white-butterfly/

51. Aphid can cluster by the hundreds on single plants, but clusters are rarely on more than a few plants here and there. The nominal thresholds for turnip aphid or cabbage aphid in canola is when \_\_\_\_\_\_% of stems have aphid clusters.

1-2 5-10 10-20 (A) 25-50

http://www.canolawatch.org/2016/07/20/aphids-they-cluster-like-crazy-but-is-spraying-economical/

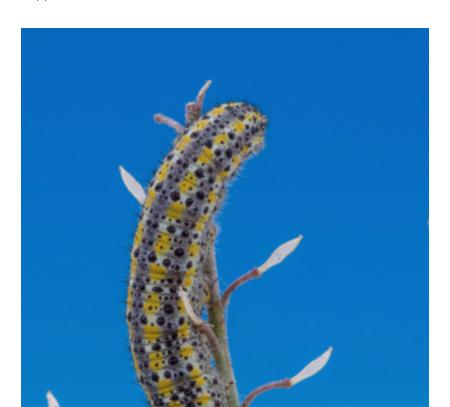
52. Three thrips species will feed on canola in Canada but only one causes pod curling. What is its latin name?

Frankliniella occidentalis (A) Thrips tabaci Frankliniella brassicaesae Thrips vulgatisimus

http://www.canolawatch.org/2016/07/27/curled-pods-is-usually-thrips-damage/

53. With very low plant populations, the swath timing decision should be based entirely on what is happening on side branches. At 10 plants per square foot, about half the yield will come from main stem pods and half from branches. The ratio is 1:1. At 3 plants per square foot, what is the ratio of side-branch yield to main-stem yield?

2:1 3:1 (A)



5:1 10:1
http://www.canolawatch.org/2016/08/04/swath-timing-plant-population-and-scc/
54. What disease does this describe: "Disease symptoms in canola include leaf chlorosis, early ripening, stunting and shredding of the stem tissue Once the plant is fully ripe, the stem peels to reveal tiny black microsclerotia which resemble ground pepper in appearance."
Blackleg Grey stem Sclerotinia stem rot Verticillium stripe (A)
http://www.canolawatch.org/2016/08/04/pre-harvest-disease-scouting-7-diseases/
55. Containment tips for areas of a field known to have clubroot include: harvest them last, clean off tires before leaving these areas, avoid tillage and possibly grass them in until spore loads are reduced to a manageable level. If grassing them in for localized management, include
a buffer area (A) "keep out" signs bait-species of forages fumigant applications
http://www.canolawatch.org/2016/08/31/yield-damaging-clubroot-in-cr-varieties/
56. Swath timing should always be based on the stage of plants that
will contribute the most to yield (A) will mature first are most likely to shatter due to disease have more seeds in side branches
http://www.canolawatch.org/2016/08/10/swath-timing-and-disease/
57. Pre-harvest products are not necessary for straight combining canola, but they can help. Each product has different recommended application timing. Which product is associated with this timing: "Apply at 80-90% seed colour change"?
Glyphosate Heat Reglone (A)
http://www.canolawatch.org/2016/08/31/pre-harvest-herbicide-timing-for-straight-combining/
58. The clubroot quiz asks: Tillage is the fastest way to spread clubroot within a field. If distributed evenly, just one gram of heavily infested soil (the volume of a Smartie) contains enough spores to seriously infest how much canola?
10 square feet one acre (A) one quarter section a whole farm's worth
http://www.canolawatch.org/2016/09/08/canola-watch-quiz-clubroot/
59. Canola seeds are much less likely than cereal seeds to sprout while in standing crop or windrows. It won't germinate unless seed moisture drops down to around% moisture, then gets wet again.
5 8 10 (A) 12
http://www.canolawatch.org/2016/09/08/rain-delays-harvest-what-to-do/
60. Under cool, wet weather, moisture loss in the seed will be less than one percentage point per day, and seed may even gain moisture with rain. Or an average early fall day, moisture loss may be percentage points per day.
1-2 (A) 2-3 3-4 4-5

61. In an article on conditioning canola, PAMI provides four quick reminders on the relationship between air temperature, grain temperature and drying. Fill in the blank for this one: Warm air and cool grain = \_\_\_\_\_\_.

drying wetting (A) quick drying some wetting

http://www.canolawatch.org/2016/09/08/rain-delays-harvest-what-to-do/

http://www.canolawatch.org/2016/09/08/conditioning-tips-for-stored-canola-2/
62. That same article notes that airflow rate is key for aeration and natural air drying of canola. An airflow rate of 0.1 to 0.2 cfm/bu can be enough for temperature conditioning, but to efficiently remove moisture from the seed you need cfm/bu.
0.25 to 0.5 0.5 to 1 0.75 to 1.5 (A) 1.5 to 3
63. With a killing frost, immature seeds (moisture content higher than%) will be damaged. Seeds with less than% moisture will normally escape damage.
15 20 (A) 25 30
http://www.canolawatch.org/2014/08/27/swathing-after-a-frost/
64. In late September, Canola Watch heard a report of tough canola starting to heat after days in the bin.
2 (A) 4 7 14
http://www.canolawatch.org/2016/09/28/tough-canola-can-heat-quickly/
65. At a soil compaction workshop, attendees learned that the first pass over a field causes% of the compaction.
20 40 60 80 (A)
http://www.canolawatch.org/2016/09/28/tips-to-prevent-and-manage-soil-compaction/
66. Several freeze-thaw events are needed to break apart the soil properly, which means our winters — during which soil tends to freeze once and thaw once per year — have little effect on subsurface compaction. What is this freeze-thaw effect called?
argilliturbation cryoturbation (A) gelifluction graviturbation
http://www.canolawatch.org/2016/09/28/tips-to-prevent-and-manage-soil-compaction/
67. The key strategy of fall fertilization is to store nitrogen over the winter in the ammonium form. Without strategies to achieve this, losses from a fall application can be % in moist and warm conditions.
10-20 30-40 (A) 50-60 70-80
http://www.canolawatch.org/2016/10/13/how-to-reduce-fall-n-fertilizer-losses-2/
68. For fall soil test results as close as possible to the situation next spring, the ideal time to take samples is when soil temperatures drop below 10°C and as close to freeze-up as possible. Why?
At those temperatures, nitrogen molecules are in a fixed state Cold soils are also drier soils, making samples more accurate Microbial mineralization processes in the soil have slowed (A) Other fall work is done and farmers have more time
http://www.canolawatch.org/2016/10/13/fall-soil-sampling-and-snow/
69. A late-season alert about canola heating in bins includes the grading tolerance for heated seed. No.1 canola can have no more than% heated seed?
0.1 (A) 0.5 1.0 2.0

http://www.canolawatch.org/2016/11/30/alert-canola-is-heating/

70. This is a clump of rotten heated canola that went into storage at 12% moisture. This specific image is the end result from a U of M study into what?

Aeration systems



Drying systems Bag storage (A) Static pressure