
Module 3
Fumigant
Reregistration

Maximizing Fumigant Efficacy

Why?

- *Alternative fumigants are not as forgiving as methyl bromide*
- *Alternative fumigants have slightly less efficacy than previously used formulations of methyl bromide*
- *For sustainability of methyl bromide alternatives, a full system program must be implemented*
- *No currently registered methyl bromide alternative can 'clean up' a poorly managed field*

Fallow Pest Control Program

- Programmatic approach
  - Must be a concentrated continuous effort
- Easier for a single crop system, difficult for a multi-crop system
- Components
  - Quick crop termination/pest destruction
  - Combination of cultivation and herbicides
    - Reduces weeds and volunteer crops, preventing nematode and disease population increases
  - Correct use of cover crops
    - Reduces annual grass and broadleaf emergence, preventing nematode and disease population increases

Soil Moisture

- Affects both shank and drip applications of fumigants
  - Soil-borne pest control = fumigant concentration x exposure time
- Dry soil
  - Fumigant retention is reduced
  - Weed germination during time of fumigant presence is reduced
  - Lateral movement of drip applied fumigants reduced
- Wet Soil
  - Reduced volatization of fumigants (reduced concentration)
  - For drip applications, will cause poor distribution of the fumigant in the bed resulting in movement of the fumigant deep in the soil providing little control in the top 4 inches of the bed
  - Can seal in the fumigant and increase the plant back interval for the crop

Bed Compression

- The compression (compaction) of the bed affects pore spaces and thus affects fumigant movement
- Fumigants move through the path of least resistance so uniformity is the key
  - Loose edges will promote movement of the fumigant to the edges of the bed and reduce concentration of the fumigant in the crop planting zone
- Soil moisture can affect the bed compression
- Much as one calibrates their fumigant applicator, one should adjust their application equipment to maximize the benefit of soil compression
  - Modifications may be as simple as adjusting the pre-bedder or bed pan shovels to improve soil distribution or lengthening the top link

Bed Compression

Equipment Modifications

Equipment Modifications

Water Tank for Extra Weight

Soil Type and Field Location

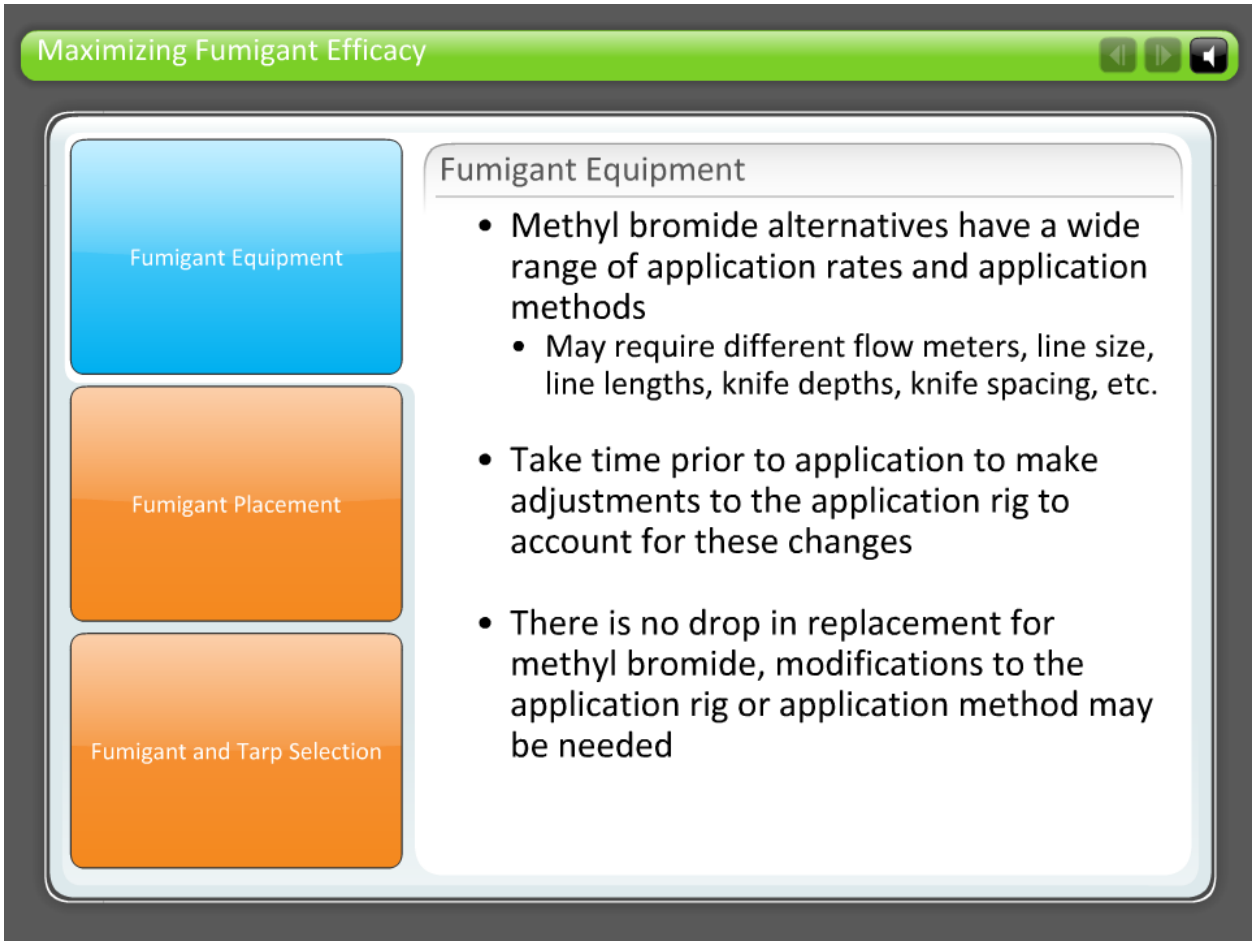
- Certain areas have Karst topography preventing the use of 1,3-dichloropropene containing products
- Certain fields have poor drainage on a given farm
- Manage the application of the fumigant to a farm by waiting until the moisture conditions are correct in these wet areas of the field
- Field known to flood in the offseason may have lower nematode populations but may have larger levels of water favoring weeds
  - Knowing the field history can help in fumigant selection that is tailored for the specific pests present

Soil Temperature, Weather Conditions, Fumigation Season

- Soil temperature affects fumigant movement in the soil
  - High temperature increases fumigant off gassing and may require the maximum rate allowable and a high barrier tarp for efficacy
  - Low temperature decreases the rate of fumigant off gassing and may require an increase in the interval to crop planting
- Weather conditions
  - Do not make a fumigant application if heavy rains are expected within 7 days of the application
- Fumigation season
  - Tailor fumigant and tarp selection to take advantage of the fumigant season. If temperatures are hot then a high barrier tarp should be used in most cases. If temperatures are cold and the fumigant label allows it, then a standard tarp may be the correct choice

Maximizing Fumigant Efficacy

Fumigant Equipment



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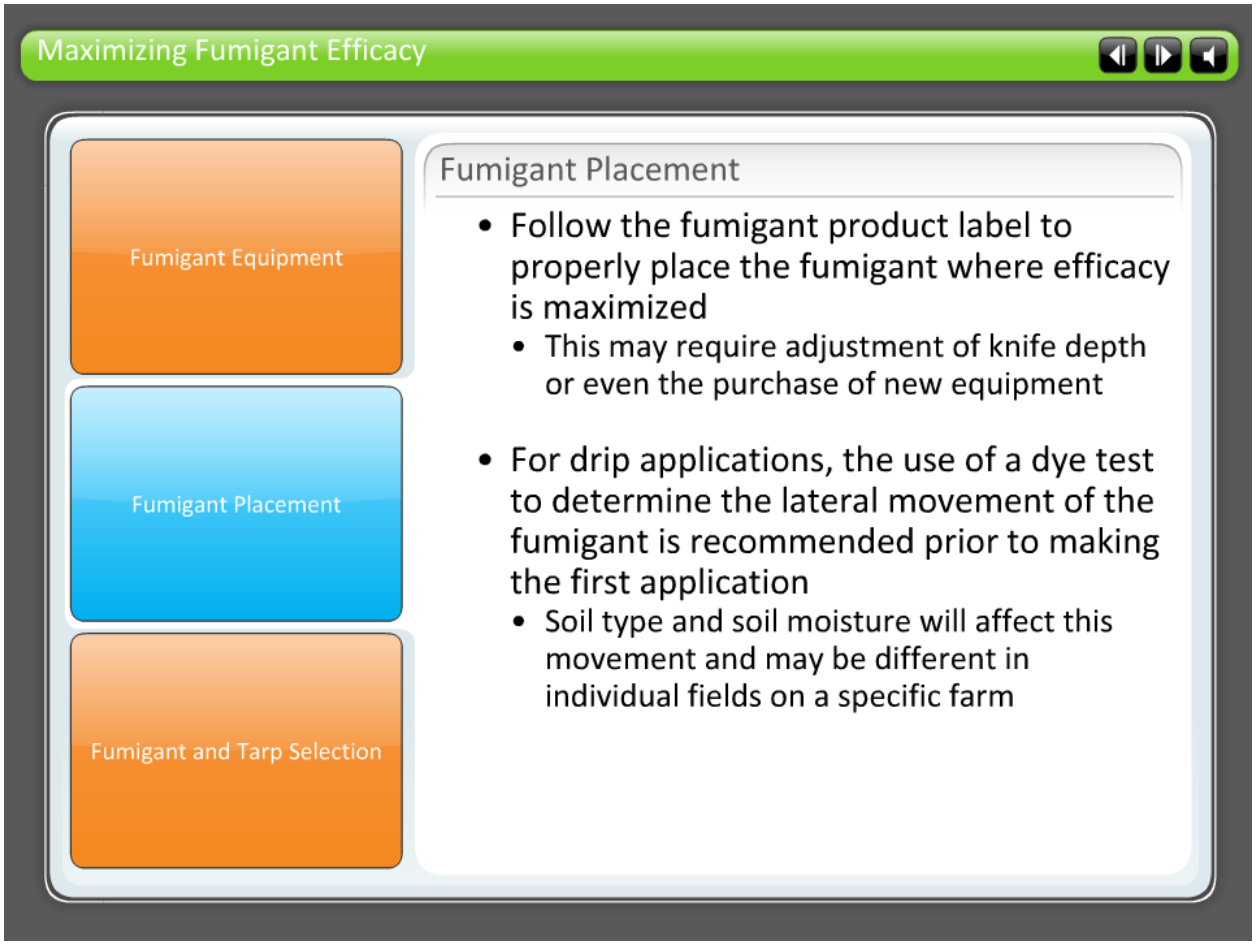
- Methyl bromide alternatives have a wide range of application rates and application methods
  - May require different flow meters, line size, line lengths, knife depths, knife spacing, etc.
- Take time prior to application to make adjustments to the application rig to account for these changes
- There is no drop in replacement for methyl bromide, modifications to the application rig or application method may be needed

Fumigant Placement



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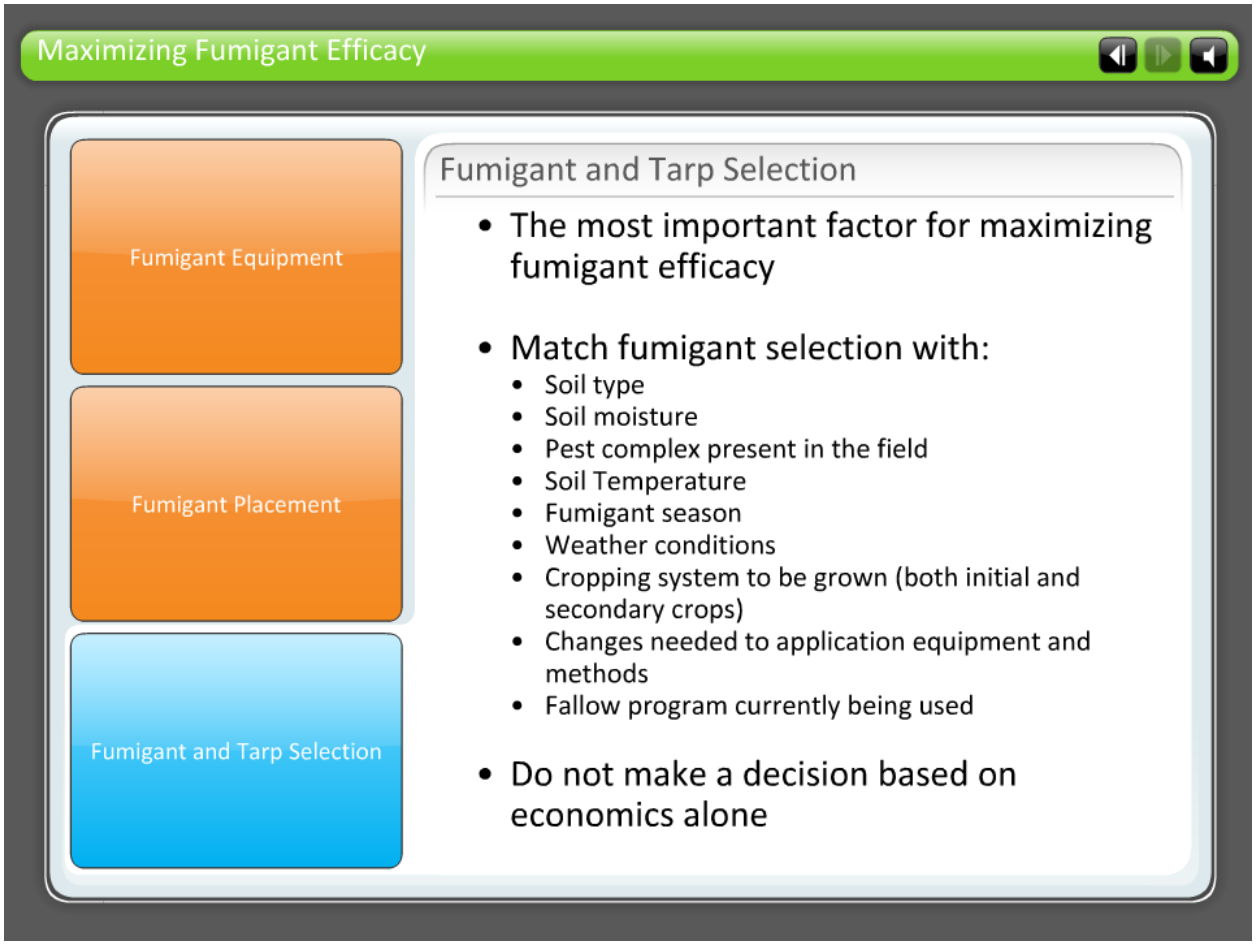
- Follow the fumigant product label to properly place the fumigant where efficacy is maximized
  - This may require adjustment of knife depth or even the purchase of new equipment

- For drip applications, the use of a dye test to determine the lateral movement of the fumigant is recommended prior to making the first application
  - Soil type and soil moisture will affect this movement and may be different in individual fields on a specific farm

Fumigant and Tarp Selection



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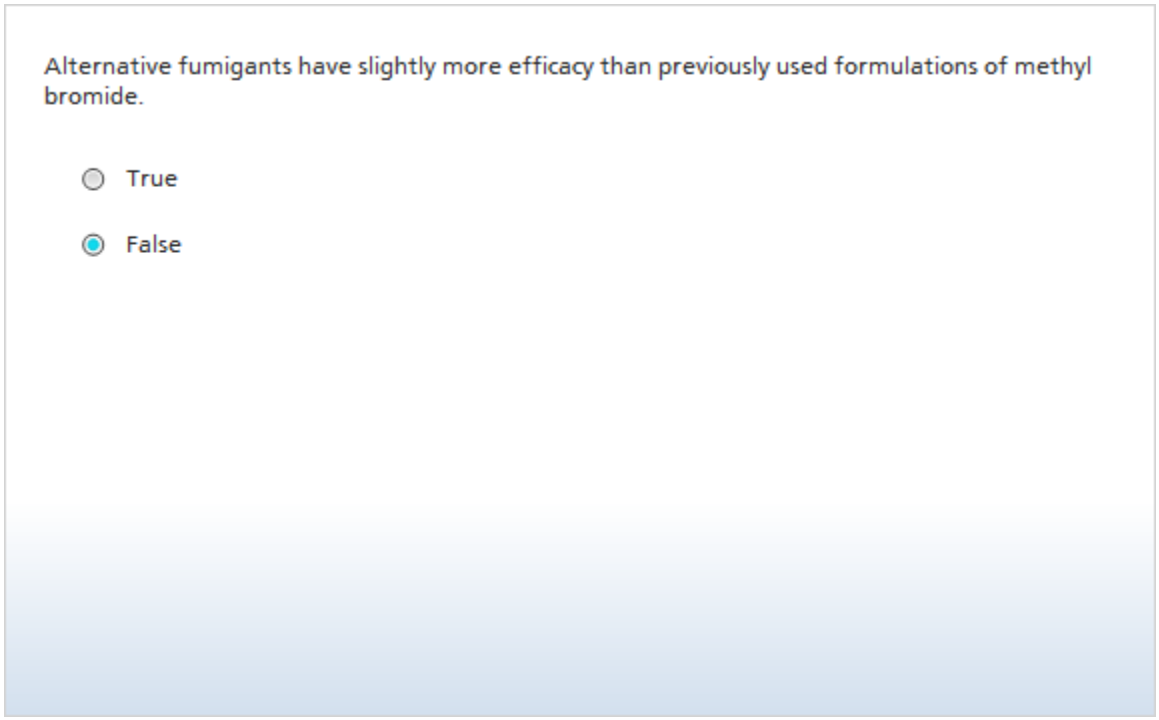
- The most important factor for maximizing fumigant efficacy
- Match fumigant selection with:
  - Soil type
  - Soil moisture
  - Pest complex present in the field
  - Soil Temperature
  - Fumigant season
  - Weather conditions
  - Cropping system to be grown (both initial and secondary crops)
  - Changes needed to application equipment and methods
  - Fallow program currently being used
- Do not make a decision based on economics alone

Module Three Review Questions

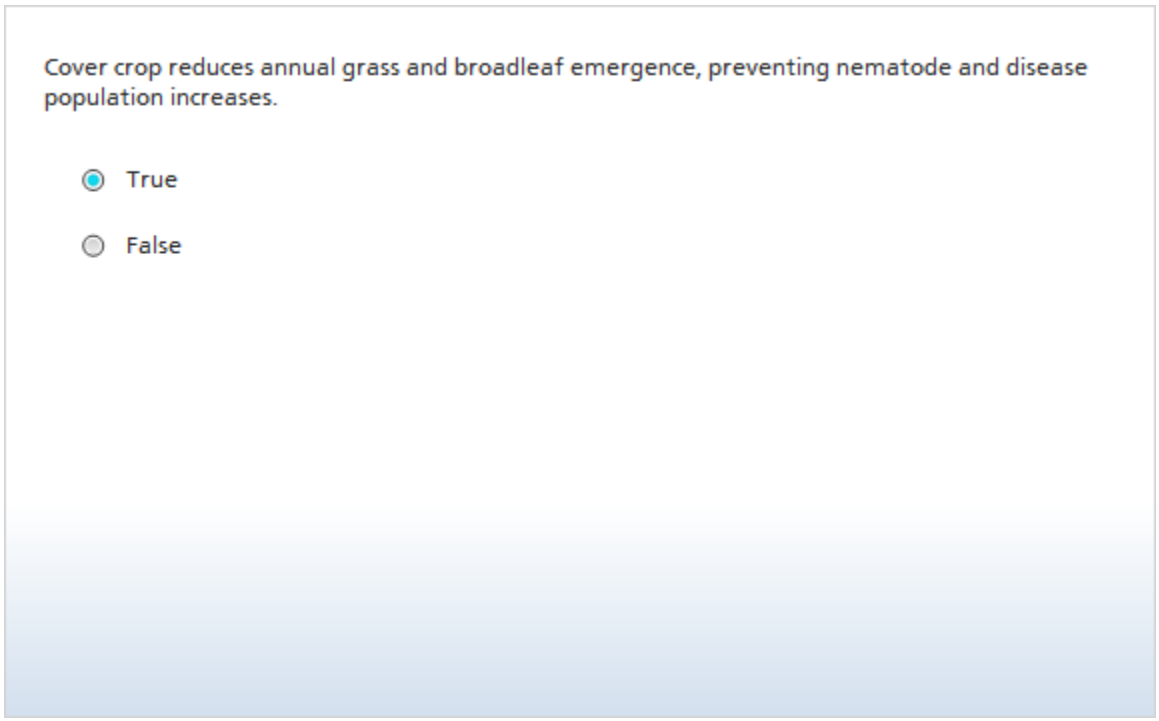
Questions

1. Alternative fumigants have slightly more efficacy than previously used formulations of methyl bromide.



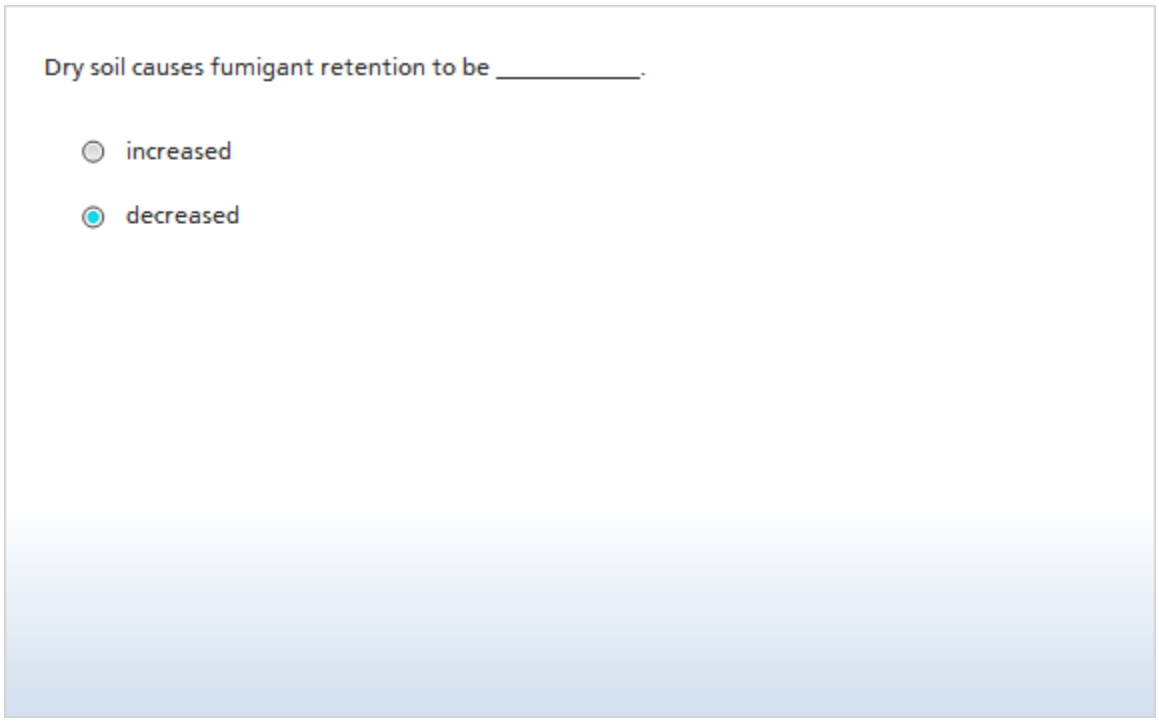
Correct	Choice
	True
X	False

2. Cover crop reduces annual grass and broadleaf emergence, preventing nematode and disease population increases.



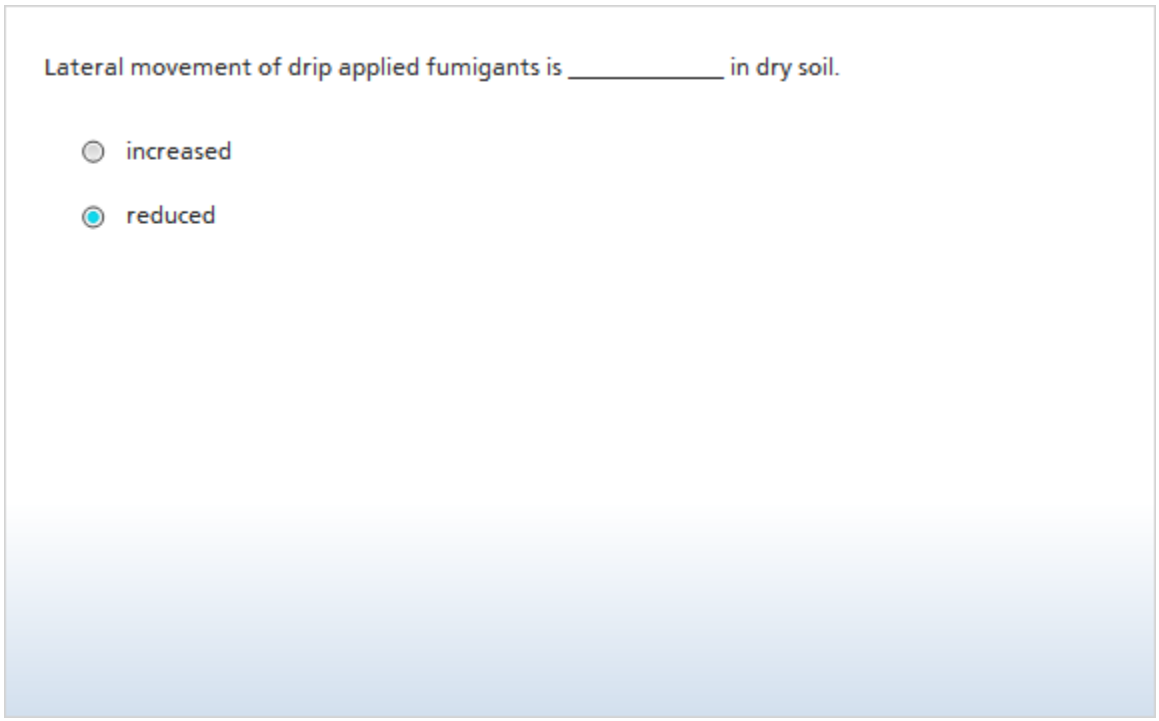
Correct	Choice
X	True
	False

3. Dry soil causes fumigant retention to be _____.



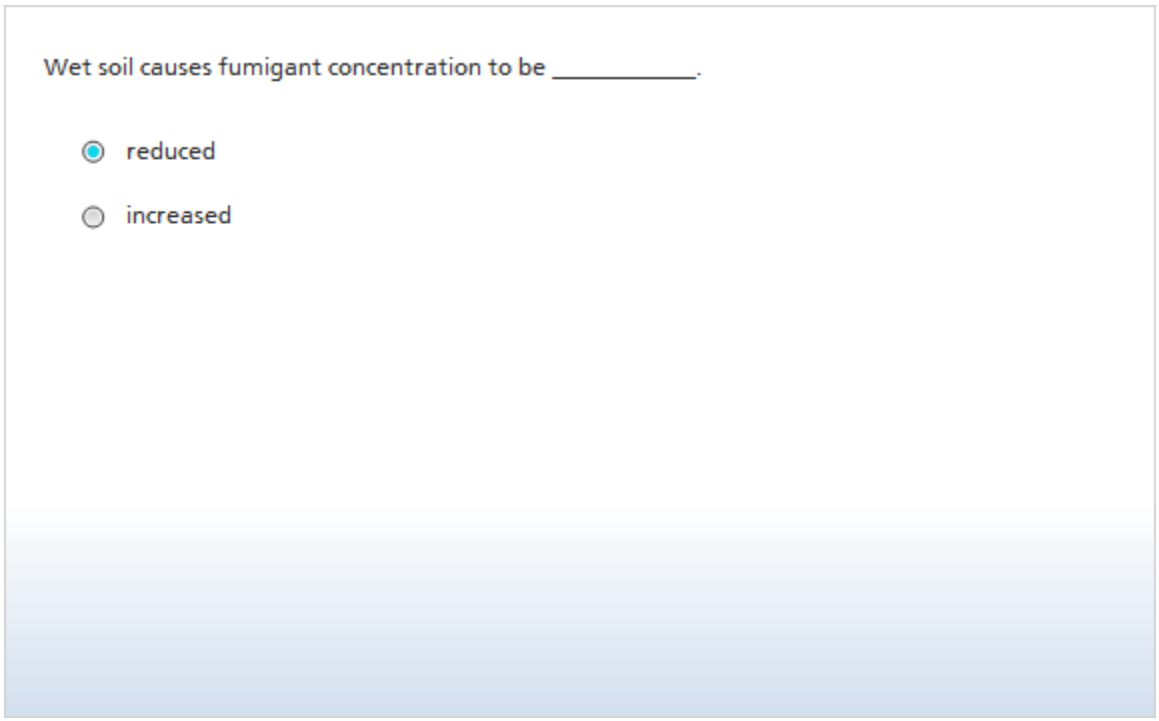
Correct	Choice
	increased
X	decreased

4. Lateral movement of drip applied fumigants is _____ in dry soil.



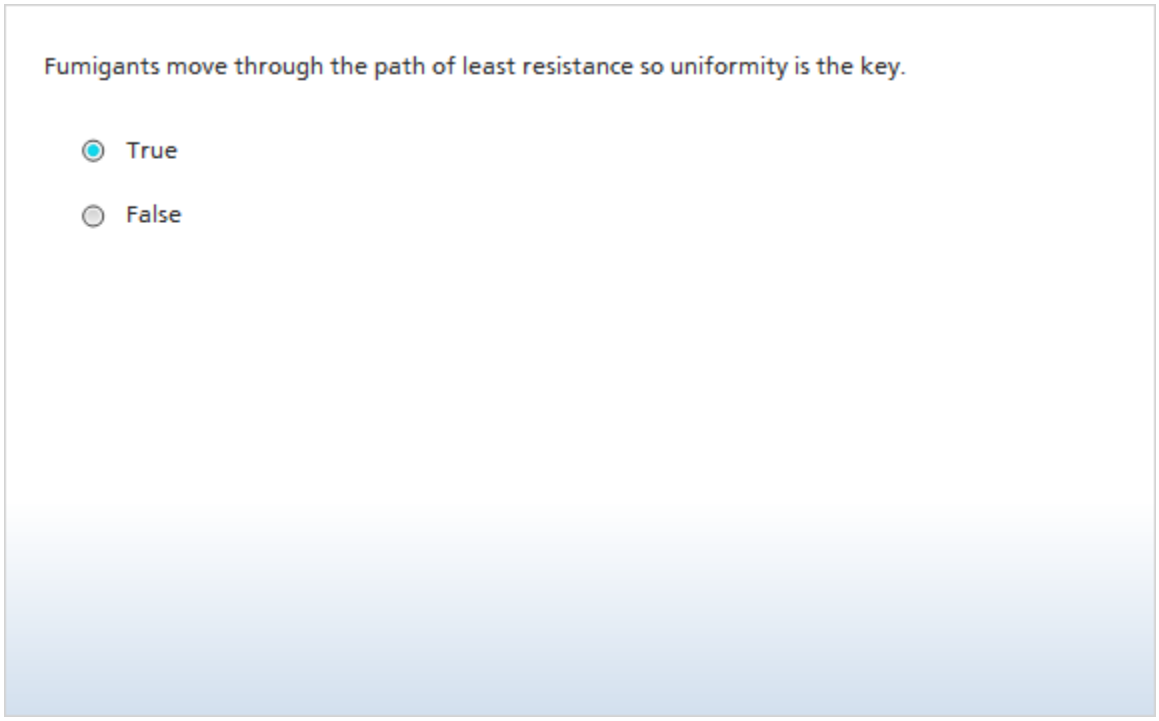
Correct	Choice
	increased
X	reduced

5. Wet soil causes fumigant concentration to be _____.



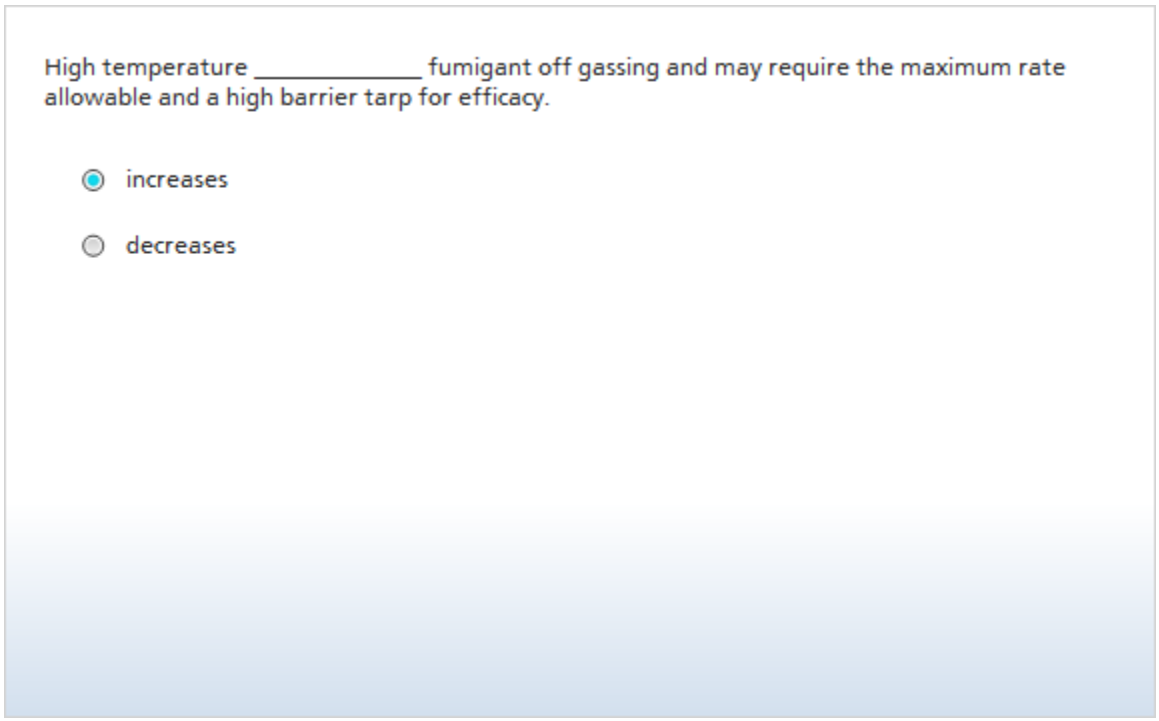
Correct	Choice
X	reduced
	increased

6. Fumigants move through the path of least resistance so uniformity is the key.



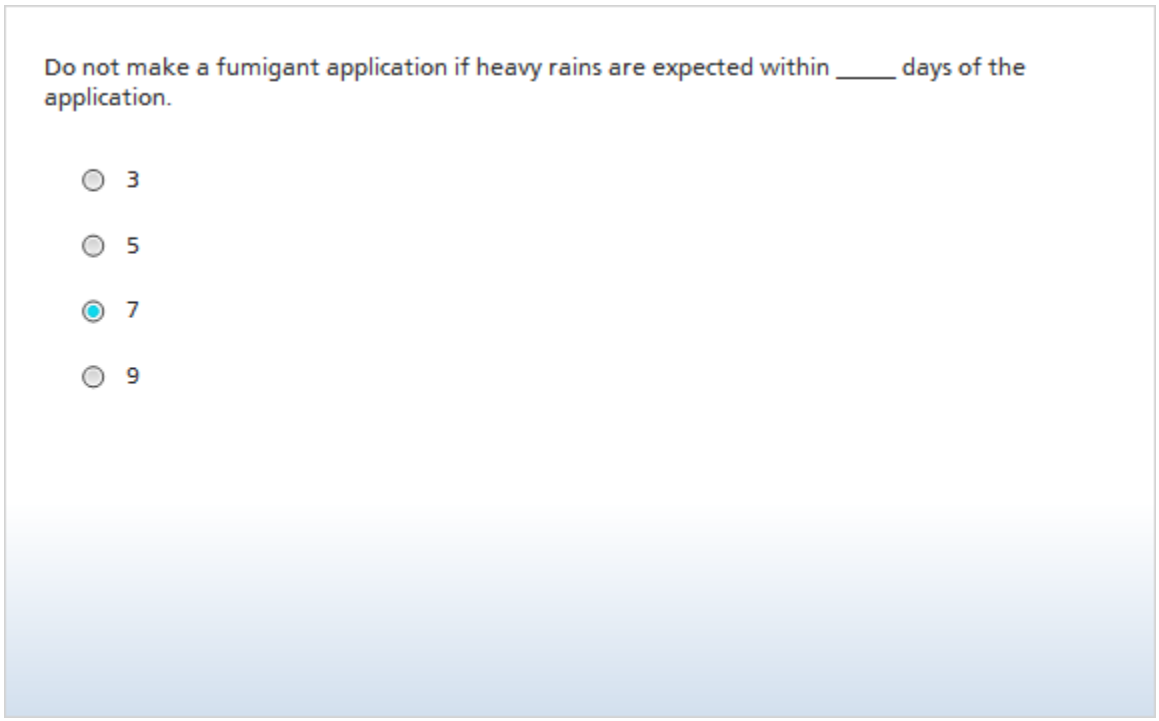
Correct	Choice
X	True
	False

7. High temperature _____ fumigant off gassing and may require the maximum rate allowable and a high barrier tarp for efficacy.



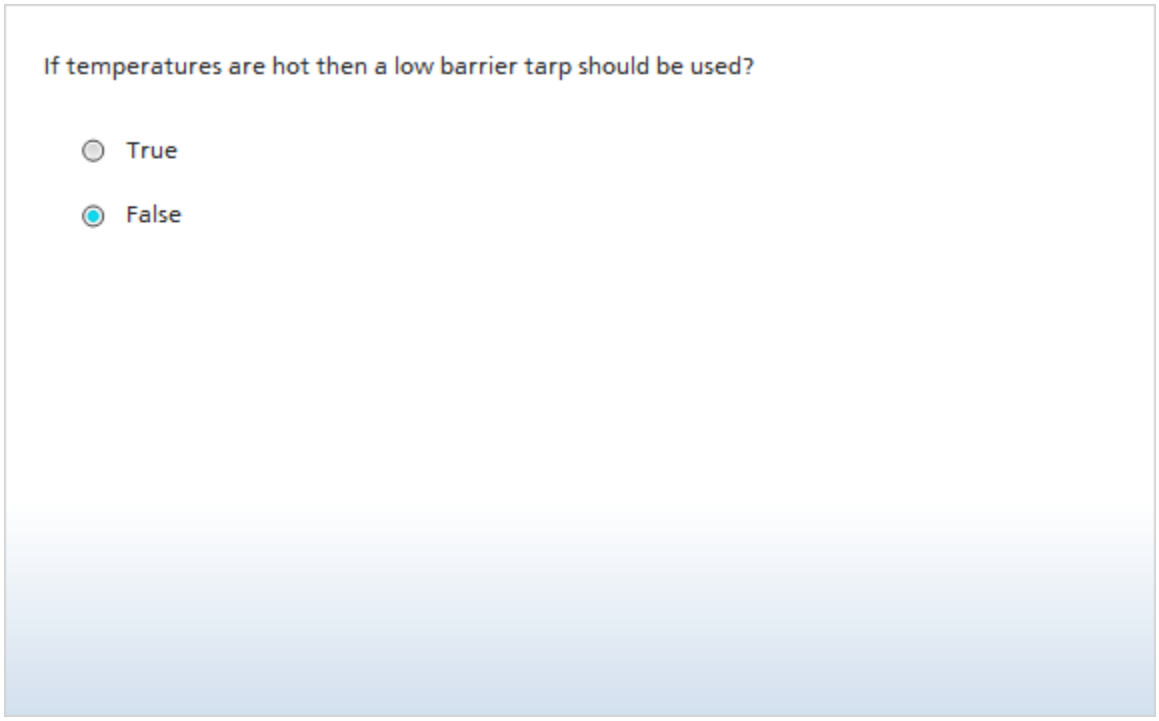
Correct	Choice
X	increases
	decreases

8. Do not make a fumigant application if heavy rains are expected within _____ days of the application.



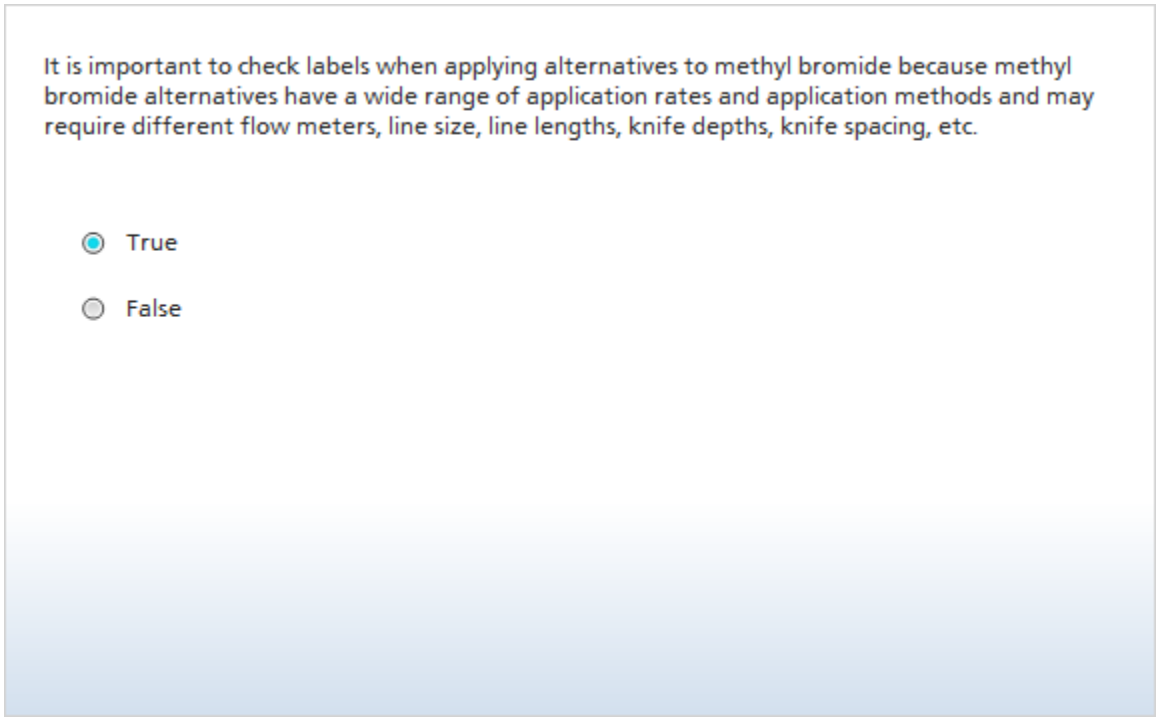
Correct	Choice
	3
	5
X	7
	9

9. If temperatures are hot then a low barrier tarp should be used?



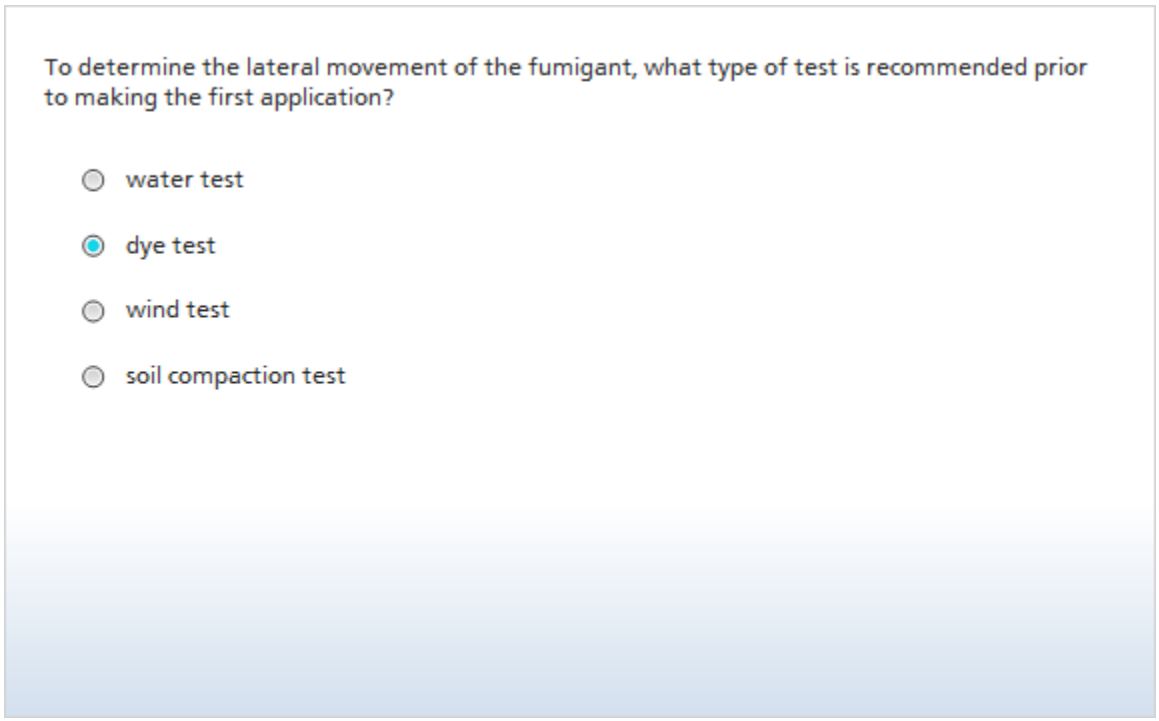
Correct	Choice
	True
X	False

10. It is important to check labels when applying alternatives to methyl bromide because methyl bromide alternatives have a wide range of application rates and application methods and may require different flow meters, line size, line lengths, knife depths, knife spacing, etc.



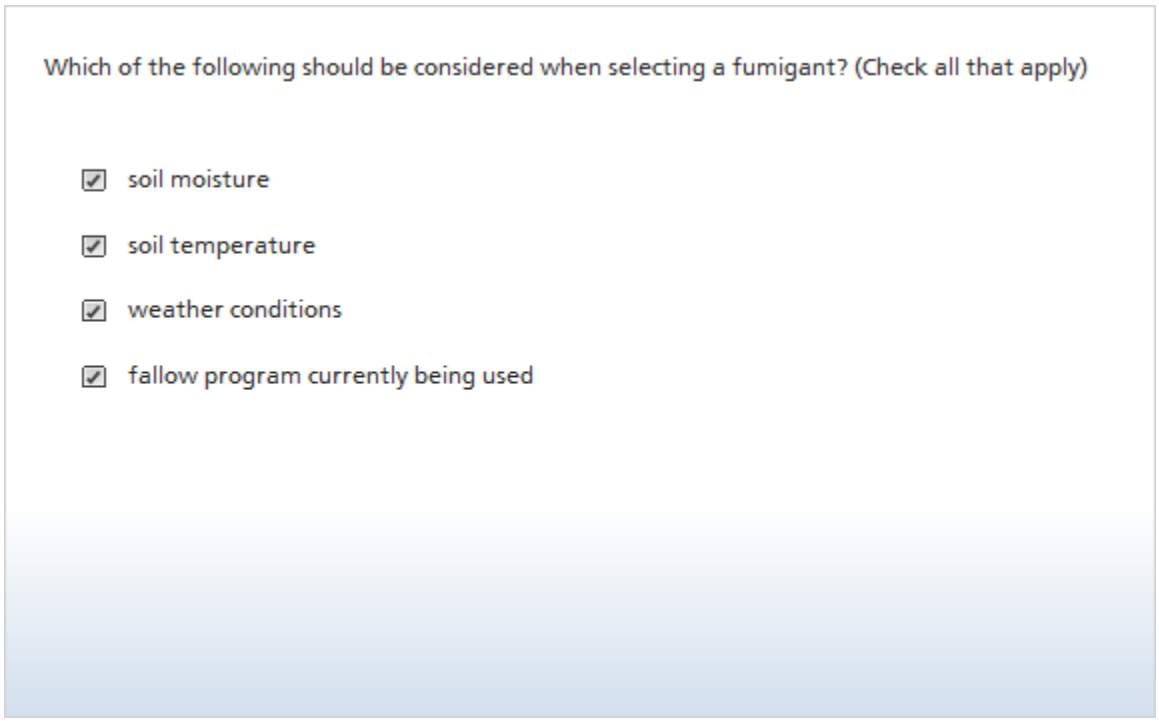
Correct	Choice
X	True
	False

11. To determine the lateral movement of the fumigant, what type of test is recommended prior to making the first application?



Correct	Choice
	water test
X	dye test
	wind test
	soil compaction test

12. Which of the following should be considered when selecting a fumigant? (Check all that apply)



Correct	Choice
X	soil moisture
X	soil temperature
X	weather conditions
X	fallow program currently being used