

## **Horticulture Student Learning Outcomes**

The Horticulture major has two options, the Professional Option and the Landscape Design and Construction Option. Both options are based in a common core of Horticulture courses which assures the students a well-rounded education in Horticulture. The options do not restrict student career choices within horticulture. The options do however, frequently assist students in identifying Horticulture as their career choice and they provide a guided choice of what otherwise would be directed electives within the major. Graduates from both options have gone on to have successful careers within the breadth of horticultural career opportunities. Horticultural career opportunities are numerous and it is imperative that a student's education prepare them for a changing world and changing opportunities within the discipline. When many students arrive as freshmen they frequently want to focus narrowly on one aspect within the discipline, however, it is in the student's best interest in the long term, for them to be prepared to participate in the breadth of horticulture which will help them adapt to changing market conditions over time. Therefore the focus of the Horticulture program is the development of a well rounded Horticulturist. Based on this philosophy, the program's assessment is conducted on the combined options simultaneously. Both groups of students should achieve the same set of learning outcomes that reflect a well-rounded, educated horticulturist.

**When students complete the Horticulture major, they will be able to:**

- 1. Demonstrate a working knowledge and appreciation of the diversity of plants, their culture and utilization.**
- 2. Apply horticultural principles to the successful growth and production of horticultural plants.**
- 3. Demonstrate the knowledge, skills and attributes to be successful contributing members of the horticulture profession.**
- 4. Recognize and apply ethical professional practices to horticultural applications.**
- 5. Synthesize and integrate information to solve horticultural problems.**
- 6. Be a critical "consumer" of information; understand the relevance and scientific basis of content they read and hear.**
- 7. Communicate effectively within the discipline and also be able to transmit knowledge and skills to lay-persons in the general public.**

## Horticulture Learning Outcomes with Curricular Map

May , 2005

I=Introduced; E= Emphasized; R = Reinforced

Program Learning  
Horticulture Courses  
Outcomes

Core Horticulture Courses

Supporting

*Students will be able to:*                    **161   169   200   270/370   310   352   455   485   245   250   268   327   347   368**  
**420   452**

1. demonstrate a working knowledge and appreciation of the diversity of plants, their culture and utilization.	I	I	E	R		E		E	E	E	E	E	E	E		E	E
2. apply horticultural principles to the successful growth and production of horticultural plants.		I	E	R	E		E		E		E	E	E	E	E	E	E
3. demonstrate the knowledge, skills and attributes to be successful contributing members of the horticulture profession.		I		R	E	R	R			E	I	R	R	R	R	E	E
4. recognize and apply ethical professional practices to horticultural applications.		I		R	R		R	E	R	R						I	I
5. synthesize and integrate information to solve horticultural problems.	I	E	R	R	E		R	R	R		R				R	E	E
6. be critical “consumers”																	

of information; understand the relevance and scientific basis of content they read and hear.	I	I		R	I	E		E				I	R	R		R	R	
7. communicate effectively within the discipline and also be able to transmit knowledge and skills to laypersons in the general public.		I		R	I			E				E	R	R		R	R	

### Horticulture Assessment Tools Used to Measure Outcomes

**The Horticulture faculty meet collectively to review and analyze the data. The program supports and encourages appropriate individual course level actions as well as collective programmatic level actions to address any identified deficiencies in student learning outcomes. Actions requiring resources beyond the programmatic level will be reported to the department, dean or other appropriate body that has the resources to address problems. The need for modifications in the learning outcomes and/or assessment measurement tools is continuously on going and embedded in every assessment discussion. Faculty will integrate and account for emerging issues, trends and technologies within the breadth of Horticulture locally, regionally, nationally and globally during assessment discussions.**

<i>Measures</i>	<i>Outcome 1</i>	<i>Outcome 2</i>	<i>Outcome 3</i>	<i>Outcome 4</i>	<i>Outcome 5</i>	<i>Outcome 6</i>	<i>Outcome 7</i>	<i>Use of Information</i>
<b>I. Pre and post horticulture knowledge exam.</b>  <i>(Direct Measure)</i>	<b>X</b>	<b>X</b>	<b>X</b>					A locally developed exam (Appendix A) is <b>given</b> to entering freshmen and to seniors <b>annually</b> . Scores from the exams are compared to assess knowledge gained. <b>Results are analyzed and discussed by the Horticulture faculty once every 3-4 years</b> . Curricular adjustments are recommended to address any identified deficiencies . First exam

								given 1997-98.
<p><b>II. Selected samples of student project work from internships and advanced horticulture classes (including HORT 310, 327, 347, 352, 369, 420, 452) are collected as samples of a students' ability to integrate classroom experience with problem solving activities.</b></p> <p><i>(Direct Measure)</i></p>	<b>X</b>	<b>X</b>	<b>X</b>		<b>X</b>	<b>X</b>	<b>X</b>	Horticulture Faculty meet and review/discuss the objectives and quality of student projects. Trends reflecting students learning outcomes are identified and any deficiencies noted with recommendations for modifications in curriculum.
<i>Measures</i>	<i>Outcome 1</i>	<i>Outcome 2</i>	<i>Outcome 3</i>	<i>Outcome 4</i>	<i>Outcome 5</i>	<i>Outcome 6</i>	<i>Outcome 7</i>	<i>Use of Information</i>
<p><b>III. Senior Seminar presentations evaluated by faculty and student peers.</b></p> <p><i>(Direct Measure)</i></p>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	Senior Seminar is regarded by the horticulture faculty as a capstone course. It requires the student to conduct library research using the scientific literature to examine a horticulture topic, synthesize and interpret the results / findings and present the information orally. The students are evaluated by faculty and their peers (Appendix B). <b>Faculty meet annually</b> to discuss observed

								strengths and weaknesses.
<b>IV. Internship Employer Evaluations of Students</b> <i>(Indirect Measure)</i>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>		<b>X</b>	Employer evaluations are collected from each student's internship experience. (Appendix C)The horticulture internship faculty coordinator evaluates the results for each student. The results are shared and discussed at a horticulture faculty meeting in the <b>fall semester of every year</b> . Student performance, trends and potential curriculum deficiencies are discussed and modifications in the curriculum recommended if appropriate. (Data collected annually 1998-present)
<i>Measures</i>	<i>Outcome 1</i>	<i>Outcome 2</i>	<i>Outcome 3</i>	<i>Outcome 4</i>	<i>Outcome 5</i>	<i>Outcome 6</i>	<i>Outcome 7</i>	<i>Use of Information</i>
<b>V. Alumni and current student surveys and the findings/comments of the outside and in-house reviewers, collected as part of the seven-year program review (audit) of the major.</b>	<b>X</b>		<b>X</b>		<b>X</b>		<b>X</b>	The surveys assess past graduates and current students' levels of satisfaction with their educational experience at UWRP. (Appendix D) The results are used to assess

<i>(Indirect Measure)</i>								achievement and appropriateness of current learning outcomes.
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### Timeline of On-going Horticulture Assessment Cycle

Submitted December 10, 2006

	Annually	Alternate Years	Once every 3-4 years	Every 6-7 years	Year initiated	Dates Implemented	Current Status
<b>Measurement Tool</b>							
<b>I. Administer Knowledge exam</b>	<b>X</b>				<b>1997-98</b>	<b>Annually since 1997-98</b>	<b>Data being collected</b>
<i>Compare results of pre and post knowledge exam</i>			<b>X</b>		<b>1997-98</b>	<b>To be done Fall 2007</b>	<b>Results to be compared and evaluated in Fall 2007</b>
<b>II. Selected samples of student project work from advanced horticulture classes</b>	<b>X</b>				<b>1997-98</b>	<b>1997-98</b>	<b>Data collected annually</b>

and internships are collected.							
Selected samples of student project work from advanced horticulture classes and internships are evaluated.		X Fall odd years			1997-98	1997-98	Data was evaluated informally about every other year over the past 9 years. Program modifications were recommended and/or implemented. Review and evaluation will be on a scheduled rotation starting 2007.

	Annually	Alternate Years	Once every 3-4 years	Every 6-7 years	Year initiated	Dates Implemented	Current Status
<b>Measurement Tool</b>							
<b>III. Senior Seminar presentations evaluated by faculty and student peers. <i>Data collection.</i></b>	X				1997-98	1997-98	Data has been collected annually.
Senior Seminar presentations evaluated by faculty and student peers. <i>Data is reviewed and discussed by the Horticulture faculty.</i>		X Fall even years			1997-98	1997-98	Data was evaluated informally about every other year over the past 9 years. Program modifications were recommended and/or implemented. Review and evaluation will be on a scheduled rotation starting 2007.
<b>IV. Internship Employer Evaluations of Students. <i>Data collection.</i></b>	X				1997-98	1997-98	Data has been collected annually.
Internship Employer Evaluations of Students. <i>Data reviewed and discussed by the Horticulture faculty.</i>	X Every fall				1997-98	1997-98	Data has been evaluated informally about every other year over the past 9 years. Program modifications were recommended and/or implemented. Review and evaluation will be on a scheduled rotation starting 2007.

	Annually	Alternate Years	Once every 3-4 years	Every 6-7 years	Year initiated	Dates Implemented	Current Status
<b>Measurement Tool</b>							
<b>V. Alumni and current student surveys and the findings/comments of the outside and in-house reviewers, are <i>collected</i> as part of the seven-year program review (audit) of the major.</b>				<b>X</b>	<b>1997-98</b>	<b>1999-2000 and Fall 2006</b>	<p>Data from the 1999-2000 program review was collected and intensely analyzed and discussed by the Horticulture faculty.</p> <p>The Horticulture faculty have conducted another survey Fall 2007. and will be discussing results in Spring 2007.</p>
<b>Alumni and current student survey data and the findings/comments of the outside and in-house reviewers, are <i>reviewed and discussed</i> as part of the seven-year program review (audit) of the major.</b>				<b>X</b>	<b>1997-98</b>	<b>1999-2000 and Fall 2006</b>	<p>Data from the 1999-2000 program review was intensely analyzed and discussed by the Horticulture faculty. Program modifications were recommended and/or implemented.</p> <p>The Horticulture faculty have conducted another survey Fall 2007 and will be discussing results in Spring 2007.</p>

APPENDIX A:

**Horticulture Assessment Test**

This test will be electronically scored and analyzed. In order to be able to intelligently analyze the results we need to have certain information about YOU as the individual who is taking this test. Again, this is purely for statistical purposes and all personal information will remain strictly confidential.

Do not mark on the test. Place all of your responses to the numbered questions on the electronic score sheet provided.

1. Please indicate your class rank by filling in the appropriate circle on your score sheet:

- A) Freshman      B) Senior

Please indicate which of the statements relative to the following 7 courses most accurately describes YOU relative to each course:

2. Hort./Agron. 161, Introduction to Plant Science

- A) I have never taken this course
- B) I am currently enrolled in this course
- C) I have completed this course with a passing grade
- D) I satisfactorily completed a similar course at another institution
- E) I must repeat this course

3. Hort. 169, Introduction to Horticulture

- A) I have never taken this course
- B) I am currently enrolled in this course
- C) I have completed this course with a passing grade
- D) I satisfactorily completed a similar course at another institution
- E) I must repeat this course

4. Hort. 200, Plant Propagation

- A) I have never taken this course
- B) I am currently enrolled in this course
- C) I have completed this course with a passing grade
- D) I satisfactorily completed a similar course at another institution
- E) I must repeat this course

5. Hort. 310, Greenhouse Management
- A) I have never taken this course
  - B) I am currently enrolled in this course
  - C) I have completed this course with a passing grade
  - D) I satisfactorily completed a similar course at another institution
  - E) I must repeat this course
6. Hort. 327, Vegetable Science & Production
- A) I have never taken this course
  - B) I am currently enrolled in this course
  - C) I have completed this course with a passing grade
  - D) I satisfactorily completed a similar course at another institution
  - E) I must repeat this course
7. Hort. 347, Fruit Science & Production
- A) I have never taken this course
  - B) I am currently enrolled in this course
  - C) I have completed this course with a passing grade
  - D) I satisfactorily completed a similar course at another institution
  - E) I must repeat this course
8. Hort. 352, Ornamental Plants
- A) I have never taken this course
  - B) I am currently enrolled in this course
  - C) I have completed this course with a passing grade
  - D) I satisfactorily completed a similar course at another institution
  - E) I must repeat this course

The rest of the questions, beginning with number 9, test your knowledge of horticultural information.

9. The light compensation point is:
- a. The photoperiod length that is critical to induce flowering.
  - b. That wavelength of light above which, photosynthesis will not occur.

- c. That light intensity at which photosynthesis will stop.
  - d. That light intensity at which photosynthetic rates=respiration rates.
  - e. That light intensity at which photosynthetic rates are greater than respiration rates.
10. A biennial deciduous hydrophyte would:
- a. love water and live for more than two years.
  - b. prefer dry soils and live for two years.
  - c. live for two years and lose all its leaves periodically
  - d. love drought and lose its leaves periodically
  - e. love water and live for one year
11. A plant with both perfect flowers and staminate flowers would be considered:
- a. monocious
  - b. dioecious
  - c. pistillate
  - d. imperfect
  - e. complete flowered
12. The cell membrane is important because:
- a. being the outermost structure of the cell it aids in protection
  - b. it genetically controls cell activities
  - c. it is meristematic and therefore responsible for producing xylem & phloem
  - d. it controls the flow of substances in and out of the cell
  - e. it controls cell division
13. The xylem of the plant is \_\_\_\_\_ ?
- a. responsible for transportation of sugars
  - b. translocation of water and sugars downward
  - c. found between the cambium and the phloem
  - d. found at the very outer ring in the cross-section of a tree
  - e. responsible for water distribution within the plant
14. The largest vein in the blade is called a:
- a. backbone
  - b. midrib
  - c. middle lamella
  - d. petiole
  - e. vessel

15. Most of the major plants providing the world's food supply are considered to be \_\_\_\_\_?

These are flowering plants with seeds enclosed in an ovary:

- a. heliosperms
- b. horticulturalists
- c. dictyosomes
- d. angiosperms
- e. tetrasperms

16. The light energy used by plants is only a small part of the total electromagnetic spectrum of incoming radiation received by the earth. The range of wavelengths used by plants for photosynthesis is best characterized by:

- a. 400 - 700nm
- b. 800 - 1400nm
- c. 1000 - 7000nm
- d. 1400 - 1700nm
- e. 660 - 1770nm

17. A short day plant would be expected to flower under which of the following conditions?

- a. short interrupted nights
- b. interrupted long nights
- c. long uninterrupted nights
- d. uninterrupted long days
- e. uninterrupted short nights

18. A plant with a  $2N=3X$  with a basic  $X=21$  would have how many chromosomes in cells from the non-reproductive portions of the plant?

- a. 21
- b. 42
- c. 63
- d. 126
- e. 31.5

19. A drupe is:

- a. a fleshy simple fruit with a hard exocarp
- b. a fruit with a hard pit and considered dehiscent
- c. a berry with a paper-like pericarp
- d. a fruit with a fleshy exocarp and mesocarp and a hard pit
- e. a pome derived from receptacle tissue

20. Three primary macronutrients are:

- a. B,K,N
- b. P,Ca,B
- c. K,P,N
- d. Mo,Mb,N
- e. Cu,Ca,C

21. A sandy soil would:
- have the smallest particle size of any soil type
  - have excellent nutrient retention
  - would have the best drainage of any soil type
  - tend to produce a later crop than heavier soils
  - would tend to encourage more disease problems
22. Tropic responses in a plant would be primarily due to:
- cytokinins
  - auxins
  - gibberellins
  - ethylene
  - abscissic acid (ABA)
23. Meristematic tissue would be characterized by:
- serving as a carbohydrate storage area
  - serving as the vascular region of the plant
  - serving as the site of growth and cell division
  - serving as the region of egg and pollen production
  - serving as the region for support of the plant stem
24. Parthenocarpic fruits:
- Have thicker exocarp
  - Have no seeds
  - Are formed from infertile ovaries
  - Have a pair of proteins that enhance to longevity of the fruit
25. Plants which have hairy or fuzzy leaves are said to be:
- verticillate
  - hirsitate
  - pubescent
  - hardy
26. A heading--back type of pruning cut will:
- promote branching
  - remove apical dominance
  - dwarf the plant
  - a&c
  - all of the above
27. A thinning out type of pruning cut



a. xanthophyll    b. chlorophyll    c. phytochrome                      d. plasma

37. A long day photoperiod will promote which plant response?

- a. branching in a short day plant                      b. flowering in a short day plant
- c. branching in a long day plant                      d. flowering in a long day plant

38. An asymmetrically balanced landscape design will utilize which design technique?

- a. planting in groups and masses                      b. planting in straight rows
- c. creating mirror images on either side of a center focal point                      d. all of the above

39. Which light quality promotes branching in plants?

- a. red            b. blue    c. yellow            d. green

40. Which choice best describes a clone?

- a. A highly inbred and selected line of seeds            b. A plant derived from a cutting
- c. The whole assemblage of plants all derived from a common ancestor
- d. Plants produced by layering
- e. None of these

41. Which of these statements is/are true?

- a. Mature seeds of monocot plants contain endosperm, while mature seeds of dicot plants do not.
- b. Seeds of Gymnosperms do not ever contain an endosperm at any time.
- c. Seeds of all Dicot plants do contain endosperm at some stage of development, but some don't when the seed is fully developed and some do contain it.
- d. The endosperm of all dicot plant seeds is fully absorbed by the developing embryo so that no endosperm is found in the mature seeds of any dicot plant.
- e. In the seeds of some dicot plants, the embryo is just a tiny fraction (<1 %) of the total volume of the inner part of the seed, the rest being endosperm.

42. Which of the following statements about apomixis is/are true?

- a. An apomict derived from recurrent apomixis is a clone of the plant from which it came.
- b. An apomict has a good chance of being free of nearly all plant pathogens.
- c. An apomict derived from the non-recurrent pathway is haploid.
- d. An apomict often exhibits juvenile characteristics.
- e. All of the statements are true

43. Which of the following is/are true statements?
- In culture indexing it is possible to detect fungal, bacterial and viral plant pathogens.
  - You cannot prove that a plant is free of with a viral pathogen using an electron microscope.
  - Tissue cultured plants are pathogen-free.
  - Established nursery plants that were originally produced under sterile conditions in a plant tissue culture laboratory are just as resistant to plant pathogens as plants propagated from cuttings.
  - The plant tissue culturing process actually promotes mutations in plants during culture.
44. Which one of the following plant growth regulatory substances is used to promote shoot formation in plant tissue cultures?
- Ethylene
  - Auxin
  - Abscisic Acid
  - Cytokinin
  - Gibberellic Acid
45. Which one of the following plant growth regulatory substances is used to promote root formation in plant tissue cultures?
- Ethylene
  - Auxin
  - Abscisic Acid
  - Cytokinin
  - Gibberellic Acid
46. Which of the following is/are true about plant chimeras?
- The best way to perpetuate a periclinal chimera in micropropagation is to use shoot apex culture combined with enhanced axillary branching.
  - Most plant chimeras are unstable in vitro and segregate, resulting in the loss of most desirable plant traits associated with the chimera.
  - Most plants are actually chimeras in the bulk of their somatic tissues with the exception of the shoot apical meristem.
  - Technically, a grafted plant could be called a chimeral plant.
  - All of the above statements are true regarding plant chimeras.
47. Which of the following is/are accepted as positive and absolutely definitive proof that incompatibility exists in a graft combination of the plants?
- A large percentage of the grafted plants die soon after the grafting has been done.
  - The scion develops fall color very early in the season, and loses its leaves before other plants of the same variety on different rootstocks or on its own roots.
  - The grafted plant may grow vigorously for several years and then the scion may separate in a clean break across the graft union from the rootstock.
  - The grafted plant may grow vigorously for a few seasons and then abruptly decline in vigor and die.
  - There are large differences noted between the growth rates of the scion and stock, such that one is much smaller in diameter than the other.

48. What is the concentration, in parts per million, of the active ingredient in Hormex(~) rooting hormone powder #45?  
 a. 45                      b. 450                      c. 4,500                      d. 45,000                      e. none of these
49. Which of the following is not a method of layering?  
 a. Marcottage      b. Serpentine      c. Trench      d. Inarch e. Stool
50. Two fungal organisms that commonly cause root rot in plants are:  
 a. Pythium and Phytophthora                      b. Fusarium and Septoria  
 c. Xanthomonas and Verticillium                      d. Cercospora and Rhizoctonia
51. What would be the injury symptoms of a two-spotted red spider mite infestation on a plant?  
 a. small pin-sized holes in the leaves                      b. chlorotic stippling of the leaves  
 c. necrosis of the leaf margins                      d. flower bud abortion
52. Ten years after being built which greenhouse glazing would have the best light transmission?  
 a. polyethylene                      b. bi-wall polycarbonate                      c. bi-wall acrylic                      d. fiberglass
53. What is the most common way to decrease relative humidity in the greenhouse?  
 a. heat and ventilate simultaneously                      b. lower the temperature  
 c. turn on the dehumidifier                      d. growers never decrease the humidity
54. What does the "LD50" of a pesticide represent?  
 a. the length of time it takes for 1 mg of the pesticide to kill the test animal  
 b. the mg of pesticide per kg wgt of the test animal required to kill 50% of the test animals  
 c. the mg of pesticide required to kill half of the test animals  
 d. the number of animals killed by 50 mg of the pesticide tested
55. Natural bi-carbonates in the water supply  
 a. decrease the pH                      b. increase the fertility requirement  
 c. hasten plant growth                      d. can increase soluble salts in the media
56. A horizontal air flow system is frequently used in greenhouses for:  
 a. reducing relative humidity                      b. disease control  
 c. pesticide application                      d. increasing photosynthesis

57. Chrysanthemums are short day plants. What physiological response does night interruption lighting have on short day plants?
- a. promotes flowering
  - b. promotes vegetative growth
  - c. causes bud abortion
  - d. promotes branching
58. Artificial lights are frequently used to enhance photosynthesis in greenhouse grown plants. Which light qualities are important in evaluating light sources for this purpose?
- a. green and red
  - b. far-red and orange
  - c. red and blue
  - d. yellow and blue
59. Which of the following would a commercial greenhouse grower use as a pre-plant incorporation to raise the pH of a peat-based media?
- a. iron sulfate
  - b. dolomitic lime
  - c. calcium nitrate
  - d. cupric oxide
60. A uniform soil-based media is put into each of a 6" standard, 4" geranium and a 2 1/4" pot. Which will have the best drainage?
- a. all will have equal drainage
  - b. 6" will have the best
  - c. 4" will have the best
  - d. 2 1/4" will have the best
61. How many ounces of a 20-10-5 would be required to prepare 100 gallons of a 300 ppm nitrogen fertilizer solution?
- a. 30
  - b. 8.6
  - c. 15
  - d. 20
62. DIF is used in the greenhouse industry to control plant height. Which regime would a grower use to keep his/her plants short?
- a. + DIF
  - b. 0 DIF
  - c. - DIF
  - d. + DIF with cooler temperatures
63. Greenhouse temperatures are monitored with an aspirated thermostat. An aspirated thermostat
- a. uses a small fan to move air across the sensor providing a more accurate reading of the true air temperature.
  - b. measures light intensity and air temperature and adjusts the temperature according to changes in the light intensity
  - c. is a small computer in the greenhouse which collects a reading every 10 seconds for improved temperature control
  - d. measures a wet bulb and dry bulb temperature and calculates the difference for a more accurate temperature reading

64. An ebb and flow irrigation system
- was designed to reduce root rot problems
  - allows a grower to reduce the amount of fertilizer used
  - irrigates plants more frequently but with less water each time and therefore decreases total amount of water used
  - is an irrigation innovation which saves time and is increasing in popularity because it is less expensive than other automated systems
65. Graphical tracking on a greenhouse crop is used for which purpose:
- timing the crop for holidays
  - monitoring plant height
  - predicting flower bud counts
  - timing fertilizer applications
66. The state with the second largest processing vegetable acreage is:
- California
  - Florida
  - Wisconsin
  - New Jersey
  - New York
67. Which would be true regarding a loam soil as compared to a sandy soil for vegetable production?
- poor retention of nutrients, later crop on loams
  - Earlier crop, low C.E.C.
  - Fewer disease problems, later crops
  - High yields, later maturity
  - Excellent nutrient retention, poor yields
68. The most economically important botanical vegetable family is:
- Cucurbitaceae
  - Solanaceae
  - Compositae
  - Cruciferae
  - Leguminosae
69. What is a "Center of Origin"?
- The location from which a shipment of vegetables originates from
  - The USDA importation quarantine center in Beltsville, Maryland
  - The first place at which a crop evolved; usually great diversity there
  - The USDA Lab recently established to determine the origins of plants using DNA

fingerprinting

e. Darwin's theory associated with evolutionary concepts

70. Modern-day plant breeding including biotechnology has made a large impact on the vegetable industry.

Which innovation has made the greatest impact within a crop?

- a. soluble solid (sugar) content of sweetcorn
- b. when to irrigate
- c. firmness of tomatoes
- d. gas mix ratios in controlled atmosphere storage
- e. dewpoint/humidity levels

71. Which vegetable would benefit the most from inoculation?

- a. corn
- b. potatoes
- c. asparagus
- d. beans
- e. cabbage

72. Which of the following would be most likely to cause problems in long term vegetable storage?

- a. auxins
- b. ethylene
- c. abscissic acid
- d. gibberellins
- e. abscissic acid

73. A tensiometer would be used to determine:

- a. soluble solid (sugar) content of sweetcorn
- b. when to irrigate
- c. firmness of tomatoes
- d. gas mix ratios in controlled atmosphere storage
- e. dewpoint/humidity levels

74. Which of the following would not be typical of a processing vegetable crop operation:

- a. highly mechanized
- b. increasing slower than fresh market production
- c. specially bred cultivars
- d. low profit margin
- e. relatively few crops involved

75. The highest quality potatoes would be required for:

- a. chipping
- b. potato salad
- c. boiling
- d. baking
- e. frozen hashbrowns

76. Initiation of onion bulbing is primarily influenced by:

- a. nitrogen fertilization
- b. moisturecontrol
- c. temperature
- d. photoperiod
- e. light quality (wavelength 400nm)

77. A typical disorder associated with tomatoes is:  
 a. Verticillium wilt                      b. Aster yellows                      c. Phytophthora root rot  
 d. Club root                                  e. Stewart's Disease
78. Choose from the following vegetable groupings, the plants correctly ordered by ease of transplanting from easiest to most difficult:  
 a. onion, cabbage, lettuce              b. tomato, onions, melons              c. cabbage, broccoli, tomato      d.  
 melons, eggplant, lettuce  
 e. pumpkins, eggplant, cucumbers
79. Which of the following would be most likely to be marketed through processing vegetable channels?  
 a. Ruby cabbage                      b. midget carrots                      c. thick-walled tomatoes  
 d. bicolorsweetcorn                      e. purple sweet peppers
80. The type of sprayer most typically used to control weeds in a commercial vegetable operation would be. Typically a dose would be required to obtain the same effect on a clay loam soil as compared to a sandy soil.  
 a. airblast, higher      b. airshear, higher                      c. boom, higher  
 d. airblast, lower                      e. boom, lower
81. Controlled atmosphere storage would be most typified by:  
 a. low CO<sub>2</sub>, high O<sub>2</sub>                      b. low ethylene, high O<sub>2</sub>                      c. low O<sub>2</sub>, high ethylene  
 d. low ABA, low O<sub>2</sub>                      e. high CO<sub>2</sub>, low ethylene
82. The most important temperate zone botanical family of fruit crops is:  
 a. Rosaceae                      b. Betulaceae                      c. Pomoidae                      d. Ericaceae                      e. Saxifragaceae
83. Which of the following is the correct rootstock-fruit crop combination  
 a. Malling 7 - pear                      b. Mahaleb - tartcherry                      c. Lovell - oriental plum  
 d. OH x F - apple                      e. St. Julian -apple
84. A typical disease of apples is:  
 a. Blackknot                      b. Fireblight                      c. Yellows disease                      d. Leafspot                      e. Redstele
85. \_\_\_\_\_ is typically the shortest period in fruit development:



93. Which of the following fruits would most likely require a pollinizer?  
 a. strawberry    b. sweet cherry    c. peach    d. european plum    e. grape
94. The largest volume of temperate zone fruits produced worldwide is:  
 a. plums    b. grapes    c. apples    d. bananas    e. peaches
95. Of the following fruits, which would be the most likely to be sold almost exclusively for processing?  
 a. blueberry    b. tartcherry    c. apple  
 d. peach    e. oriental plum
96. To accurately identify a pine using a botanical key, at a minimum you must have: |  
 a. a picture of the plant    b. a branch    c. a needle fascicle  
 d. a cone    e. a piece of the bark
97. Spruce trees and fir trees differ in the following ways:  
 a. Spruce needles are flat; fir needles are angular in cross section  
 b. Fir needles are flat; spruce needles are angular in cross section  
 c. Spruce cones hang down as they develop; fir cones are borne erect on the branches as they develop.  
 d. Fir cones hang down as they develop; spruce cones are borne erect on the branches as they develop.  
 e. At maturity as they dry fir cones shatter/ fall apart, while spruce cones remain intact.
98. An aril is a  
 a. Type of support mechanism a plant uses to help it climb, like a tendril  
 b. Part of the embryo in a gymnosperm type of a seed  
 c. Third integument  
 d. Type of seed
99. The precisely correct form of the scientific name of Crimson Pygmy Purple-Leaved Japanese Barberry:  
 a. *Berberis thunbergii* c.v. 'Atropurpurea' 'Crimson Pygmy'  
 b. *Berberis Thunbergii* var. *atropurpurea* 'Crimson Pygmy'

- c. *berberis thunbergli* 'atropurpurea' var. 'Crimson Pygmy'
- d. *Berberis thunbergli* var. *atropurpurea* 'Crimson Pygmy'
- e. none of these is precisely the correct form.

100. The monocots are believed to have directly evolved from the:

- a. Gymnosperms as we know them today
- b. Dicots
- c. Seed Ferns
- d. Cycads
- e. a division of plants separate from all of these

101. Which statement(s) would be true for all plants in the Oleaceae produce:

- a. Alternate leaves
- b. Catkins
- c. Opposite leaves
- d. Flowers with parts in fives or multiples of 5
- e. None of these is true for the whole family

102. Which of the following plant families contain plants which produce arils?

- a. Oleaceae
- b. Taxaceae
- c. Ginkgoaceae
- d. Magnoliaceae
- e. Celastraceae

103. Which of these plants would possess a high visual energy content in their form?

- a. Colorado Blue Spruce
- b. Pyramidal Arborvitae
- c. Emerald Mound Honeysuckle
- d. Creeping Juniper
- e. Weeping Willow

104. Which of the following plants produce pinnately compound leaves?

- a. Weeping Siberian Pea Shrub
- b. Marshall's Seedless Ash
- c. Schubert Canada Red Cherry
- d. Tatarian Honeysuckle
- e. Ohio buckeye

105. Which plant family contains plants that produce the following: Flowers with parts in fives or multiples of five and alternate leaves with stipules.

- a. Caprifoliaceae
- b. Elaeagnaceae
- c. Ericaceae
- d. Rosaceae
- e. Oleaceae

106. Which plant family consists of plants which don't produce root hairs and must grow on well drained but continually moist, acidic soils?

- a. Pinaceae
- b. Rutaceae
- c. Bignoniaceae
- d. Ericaceae
- e. Aceraceae

107. Which of the following plants produce fruits and/or seeds that are poisonous to humans?

- a. Ohio Buckeye
- b. Ginkgo

c. Japanese Yew  
e. Common Horse Chestnut

d. American Hazelnut