

Exam Questions for CSS330 - 1st Midterm NAME:

How much more energy is in ethanol, as compared to energy required to produce maize?

- a -25%
 - b 0
 - c 25%
 - d 100%
 - e 250%
- A: c

Which of the following did NOT contribute to origin of food production?

- a End of the Ice Age
 - b Increased climatic variation
 - c Expanding human population
 - d Readily domesticated plants
 - e Weedy relatives of wheat and barley
- A: b

Which of the following DOES NOT contribute to the genetic diversity of crop plants?

- a Mutations
 - b Migration
 - c Drift
 - d Monoculture
 - e Chromosome rearrangements
- A: d

In developed countries, wheat is the largest contributor of calories for human nutrition. Which crop is the largest contributor of calories for 'developing' countries?

- a Wheat
 - b Cassava
 - c Potato
 - d Rice
 - e Bean
- A: d

Which of the following does NOT apply to a C4 plant:

- a They have Kranz anatomy
 - b They are adapted to Arid Tropical climates
 - c Photorespiration significantly reduces photosynthetic efficiency
 - d They have high water use efficiency
- A: c

Which is NOT a characteristic of C3 plants:

- a Optimal growth rate is between 15 to 25 degrees C
 - b Photosynthesis rate is generally lower than for C4 plants
 - c Growth rate is higher than for C4 plants
 - d They prefer temperate climates
 - e They require more water than C4 plants to produce an equal amount of dry matter
- A: c

Southern corn leaf blight became an epidemic in the US in 1970 because:

- a Farmers were growing GM corn
 - b Farmers applied high levels of fertilizer
 - c Many commercial hybrids had T cytoplasm
 - d Much of the corn crop was grown under irrigation
- A: c

Which statement about a utility patent is NOT true?

- a Allows single genes to be patented, as well as whole plants
 - b Patented items must be useful and novel in relation to 'prior art'
 - c Patented items must be non-obvious to one of 'ordinary skill in the art'
 - d Anyone can save seed and sell seed of patented varieties
 - e Ownership is established, but lasts for only 20 years
- A: d

World grain production more than doubled, from 700 to 1,900 million tons, from 1950 to 1992. Approximately how much additional cropland was cultivated in 1992 compared with 1950?

- a 50%
 - b 25%
 - c 15%
 - d <5%
- A: d

The CGIAR International Agricultural Research Centers conducts research that:

- a Private sector is unlikely to undertake
 - b National research programs are unable to undertake
 - c Where international coordination is needed and beneficial
 - d Private companies are unwilling to undertake because of low profit potential
 - e All of the above
- A: e

Maize is an ideal organism for genetic studies and breeding because:

- a It is a tetraploid
 - b Genetic variation is limited
 - c It is relatively easy to make crosses by hand
 - d It is perennial
- A: c

In the United States, approximately 1/2 of the grain produced from maize is used for:

- a Ethanol
 - b High fructose sweeteners
 - c Corn chips
 - d Animal feed
 - e Export
- A: d

Which is not a characteristic of maize?

- a High in lysine, tryptophan, and beta carotenes
- b Relatively high water and nitrogen requirement
- c C4 photosynthesis
- d Monoecious and cross pollinated
- e Primary energy source for Mayan and Aztec societies

A: a

List 5 major factors that will impact global food security in the next 30 years. (5pts)

A:1 Land resources; Water resources; Global warming; Demand for biofuels;
Biotechnology (and other technologies);

A:2 Demand for meat (over cereals); Pests and pathogens; Loss of genetic resources;
Government policies; Corporate R&D and role in food chain; Ownership and
property rights

Why did infectious disease become more prevalent with agriculture? (2 pts)

A:1 Proximity and clustering of people and animals

What are 2 negative impacts of agriculture on the environment (2 pts)

A:1 Soil depletion, pollution, reduced biodiversity

Approximately when (in years B.C.) was the start of the domestication of wheat? When was the start of domestication of maize? (2pts)

Wheat:

Maize:

A: Wheat: 9-10,000 BC; Maize 7,000 to 7,500 BC

What are 4 negative consequences or problems associated with early agriculture. (4 pts)

A:1 Dependency on few plants; Greater vulnerability to weather; Complete dependency
on harvest times; Need for intense physical labor;

A:2 Pollution; Population growth; Infectious disease; Pests and pathogens;
Monoculture and soil depletion

Darwin used several examples from the domestication of plants as evidence in support of his 'Origin of Species' theory. List one of the evidences or examples used by Darwin: (3 pts)

A:1 Adaptation of plants to man's use or 'fancy'

A:2 Strongly domesticated varieties could not survive in a wild state

A:3 Gigantism of harvested organs (seeds)

A:4 Increased diversity of economically important traits, like pods, tubers, leaves, seeds,
flowers, etc.

List four examples of plant traits that changed during domestication (4 pts).

A:1 Vine to bush habit ; Increase seed size; loss of seed dormancy;

A:2 non-shattering, non-brittle rachis non-dehiscence; Suppression of twining;

A:3 determinacy; changes in seed antinutritional composition such as

A:4 toxic compounds, phenols; reduced internodes, internode length (shorter plants)

Where would you look for wild relatives of wheat and barley? Why? (2 pts)

A: Near east, fertile crescent, as the center of origin and domestication.

Name 2 important crops that originated in each of the following Centers: (6 pts)

A:1 China - Asian rice, proso and foxtail millets ; soybean, adzuki bean ; turnip, yams ;
rape seed ; Chinese hickory, chestnut, quince; persimmon, litchi, apricot, peach ;
Chinese cabbage, ginger ; tea, ginseng, camphor

- A:2 South America - amaranth, chenopodium;peanut, Phaseolus beans, jack bean, lupins, Inga spp. ; rracacha, achira, cassava, jicama, oca, potato, añu, yacón, ullucu, mashua, unchuc ; eanut, cotton ; cashew, pineapple, guanábana, cherimoya, Brazil nut, papaya, avocado, guava; pepper, squash; coca, maté
- A:7 Meso-America - Maize, Amaranth, Chenopodium, Phaseolus Beans, sweet potato, cassava, cotton, agave, papaya, avocado, guava, prickly pear, peppers, squash, tomato, vanilla, cacao

What is the leading oil crop in terms of world production? (2 pts)

A: Soybean

What are two important nutrients that are considered deficient in cereals such as maize and wheat? (2 pts)

A: Lysine, tryptophan, vitamin C, carotene (vitamin A)

What three crops account for approximately 60% of all the calories and 56 % of the all the protein that people derive from plants? (3 pts)

A: Wheat, Rice, Maize

Why is genetic diversity important for crops and crop improvement? (3 pts)

- A:1 Respond to changing pathogens
- A:2 Sustain genetic improvement, breeding
- A:3 Buffering to weather or disease fluctuations
- A:4 Reduce genetic vulnerability

Give one example of genetic vulnerability (2 pts)

A: Potato late blight; maize t cytoplasm; coffee rust; wheat rust; others.....

Why were utility patents and plant variety protection laws established? (3 pts)

- A:1 Encourage investment, reward investors, means for financial
- A:2 return on investments, public disclosure of inventions,
- A:3 stimulate technological advances

The Supreme Court established that 'anything under the sun made by man' can be patented. What are the 3 standards, or requirements, an invention must meet to obtain a patent? (3pts)

A:1 1) Novel; 2) Useful; and 3) Non-obvious

List three of the major criticisms of the Green Revolution: (3 pts)

- A:1 Increased pesticide use, fertilizer use, and increased dependency on inputs
- A:2 Decreased biodiversity; Inequitable sharing of benefits
- A:3 High water use; Soil erosion

What were the three primary components (technologies) that contribute to the Green Revolution: (3 pts)

- A:1 Semidwarf gene
- A:2 N management
- A:3 Irrigation

Name two major sponsors of the Consultative Group for International Agricultural Research (CGIAR). (2 pts)

A: **FAO – Food and Agriculture Organization of the United Nations; UNDP – United Nations Development Program; UNEP – United Nations Environment Program; World Bank; USAID**

What is striga and where is it a problem? (3 pts)

**A:1 Parasitic weed of maize and sorghum that flourishes on
A:1 degraded soils and has seeds, seeds persists for years in soil.
A:1 A problem of savannah areas of Africa.**

There are approximately 1 billion people in the world considered as hungry or underweight due to inadequate food intake.

**T F
 T**

Increasing demand for meat is contributing to increased world-wide demand for cereals, especially maize.

**T F
 T**

Plant domestication resulted in increased vulnerability of humans to changes in weather.

**T F
A: T**

Climate change was an important factor which enabled the first Agricultural Revolution

**T F
A: T**

The process of domestication also improved the ability of crop plants to compete 'in the wild'.

**T F
A: F**

Genes that a major impact on plant domestication are often few in number and simply inherited.

**T F
A: T**

Crops have been modified to improve taste, texture, and processing

**T F
A: T**

Concepts regarding the centers of crop origins were developed and proposed by Vavilov, based on extensive plant explorations.

**T F
A: T**

Lysenko was a proponent of genetics in the Soviet Union, and considered genetics as an important positive contribution to the Marxist philosophy of dialectical materialism.

**T F
A: F**

Root and tuber crops are considered a 'nearly perfect food', as they are high in protein, minerals and vitamins compared with cereal crops.

**T F
 F**

Genetic vulnerability is no longer a concern or issue for world food security due to advances in crop breeding and crop management.

T F
A: F

There are over 6 million accessions in genebanks, which is more than adequate to preserve genetic diversity of our modern food crops.

T F
A: F

A weakness of the Green Revolution was inadequate training and extension programs for small farmers of India and Pakistan

T F
A: T

Sweet corn carries one or more genes which interfere with the conversion of sugar to starch

T F
A: T

Maize has C3 photosynthesis, meaning it is adapted to hot climates.

T F
A: F