

# Origins of Agriculture

## Foraging Societies and Their Diets

### Early foragers

Fossilized remains of both plants and animals have been found in early settlements (see fig. 11.1)

Plants in the diet of early humans have been identified from charred seeds and preserved fruits or other plant parts

Animals in the diet have been identified from bones, teeth, feathers, scales, fur, and shells

Coprolites (fossilized fecal materials) provide direct evidence of the diet – some plant materials, especially seeds and pollen, can pass through the digestive tract largely intact

Middens (dump sites) from human encampments provide a concentrated source of plant and animal remains

In the Nile Valley of Upper Egypt, charred remains of fruits, seeds, and tubers from 25 plant species have been found (ca 17,000 to 18,000 years old)

The most abundant plant remains were the tubers of wild nut grass, a type of sedge; this tuber served as one of the dietary staples, along with acacia seeds, cattail rhizomes, and palm fruits

Evidence from various Paleolithic (Old Stone Age or pre-agricultural societies) sites indicates that early foragers had a remarkably varied plant diet

### Modern foragers

Much has been learned from studying modern foraging societies such as the !Kung of the Kalahari Desert of southern Africa, who have foraged in that area for at least 10,000 years

Extensive studies of the !Kung during the 1960s revealed that they used more than 100 species of plants and 50 species of animals

Plants included a mixture of fruits, nuts, berries, melons, roots, and greenery (fig. 11.2)

## Agriculture: Revolution or Evolution?

Archeological evidence indicates that about 10,000 years ago human cultures began the practice of agriculture in several parts of the world

Some workers believe that agriculture was the discovery of a brilliant sage who, with a flash of insight, realized that if you sow seeds, the crops will grow

Theories around such an enlightened discovery view agriculture as a revolution; i.e., the discovery that a dependable food source could be easily grown rather than collected from the wild spread quickly among societies

A later view suggests that the origin of agriculture was not a revolution but the result of a gradual cultural evolution

It is reasoned that hunter-gatherers knew the wild plants, knew how they grew, and used farming along with foraging as part of an overall food-collection strategy when necessary

Many archeologists believe that there was a transitional stage, lasting several thousand years in some locations, between simple foraging and agriculture

## Early Sites of Agriculture

### The Near East

Some of the oldest sites of agriculture are in southwestern Asia, in the foothills around the area known as the Fertile Crescent, which today includes parts of Iran, Iraq, Turkey, Syria, Lebanon, and Israel (see fig. 11.3)

Remains of both plants and animals date back 9,000 to 14,000 years

Early plant domesticates include einkorn wheat, emmer wheat, barley, pea, lentil, and vetch; animals include dogs, goats, and sheep

Evidence indicates that barley may have been the first crop domesticated in the Near East

### The Far East

Agriculture arose at several locations in the Far East, including Spirit Cave in Thailand and sites in both the Yellow River and Yangtze River valleys of China (see fig. 11.3)

Earliest domesticated plants were rice, foxtail millet, broomcorn millet, rape, and hemp; animals were cattle, pigs, dogs, and poultry

Studies indicate that in China rice cultivation began about 11,500 years ago; foxtail millet was domesticated about 8,000 years ago and became a dietary staple

## The New World

Evidence from Mexico and Peru indicates that the earliest domesticated crops were squash, corn, chili peppers, amaranth, avocado, gourds, beans, white potato and sweet potato; the only domesticated animals were dogs and llamas

Evidence indicates that corn had been domesticated in central Mexico by 5,500 years ago (see fig. 11.3 and 11.4)

Agriculture became more important as additional plants (tomato, peanut, guava), the dog, and later the turkey were domesticated

In Oaxaca, Mexico, seeds and the fruit rind of a domesticated squash have been dated to between 10,000 and 8,000 years ago, indicating that farming appeared in the Americas more or less at the same time as it did in the Fertile Crescent and Asia

The eastern half of what is now the United States and Canada was another New World center of plant domestication, developing independently at least four domesticated seed crops – sunflower, marsh elder, goosefoot, and wild gourd

## Characteristics of Domesticated Plants

Domesticated plants are genetically distinct from their wild progenitors

Natural selection leads to traits that maximize the chances of survival in the natural environment

Artificial selection used to domesticate plants leads to traits that suit human needs and do not necessarily have survival value

Some traits are even detrimental to survival in the natural environment:

Modern corn with its sheathing husks cannot disperse its seeds

Domesticated wheat and other cereals have nonshattering heads, a trait that limits seed dissemination (most wild grasses have shattering fruiting heads, which break apart easily)

Selection for larger seeds, fruits, or tubers gave rise to domesticated varieties that were larger than their wild counterparts (e.g., domesticated barley – see fig. 11.5)

## Centers of Plant Domestication

In the Near East, wheat and barley were the dietary staples; in the Far East, rice; in Africa, sorghum and millet; in Mesoamerica, corn; in South America, potato and other root crops

Early work proposed eight centers of origin for the major domesticated plants, six in the Old World and two in the New World (see fig. 11.6)

Recent work has expanded the number of centers and questioned some of the earlier conclusions; e.g., certain New World crops such as cotton and cassava appear to have been independently domesticated in both Mesoamerica and South America

## Main Points from A Closer Look 11.1 – Forensic Botany

Archeologists have made extensive use of plant remains (e.g., seeds, wood, pollen, phytoliths, fibers) in reconstructing the lifestyles of ancient foraging and early agricultural peoples

The first criminal case that used botanical information was the 1935 trial of Bruno Hauptmann for the kidnapping and murder of the son of Charles and Anne Morrow Lindbergh

A homemade wooden ladder used for the kidnapping and left at the scene of the crime contained wooden planks from Hauptmann's attic floor

In another case, botanical evidence disputed the testimony of an accused rapist

Fragments of tree leaves and bark in his pants cuffs indicated that he had climbed a tree to get into a window of the victim's home, rather than being admitted through the front door as he claimed

Trained botanists and mycologists are routinely called to hospital emergency rooms to identify plant materials or mushrooms (intact or from stomach contents) suspected in poisonings

From the *Annals of the Absurd*, a hunting guide killed a grizzly bear he claimed was eating his supply of alfalfa hay

Botanical evidence showed no alfalfa in the bear's stomach, and the guide was fined and imprisoned for killing an endangered species

This lecture outline was prepared mainly from *Plants and Society*, by Levetin and McMahon, 2003 (3<sup>rd</sup> edition), and may contain phrases or entire sentences taken verbatim from that source.