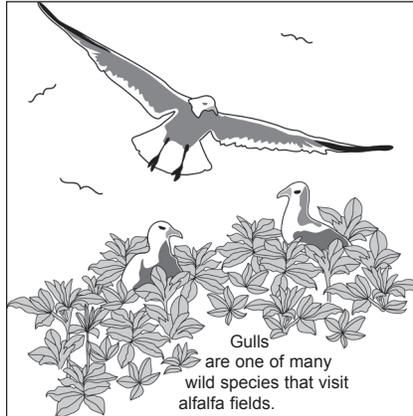


Commodity Fact Sheet

Alfalfa

Information compiled by the California Alfalfa and Forage Association

How Produced – Alfalfa is a perennial crop, which means it will grow for several years after planting. Alfalfa is planted in the spring or fall. Since the seeds are small (1-2 millimeters), they must be planted close to the surface of the soil. Between 15 and 25 pounds of seeds are planted per acre, which is about the size of a football field. After sprouting, the seedlings are relatively weak and must be protected from weeds. However, after developing a "crown," the swollen top of the root, alfalfa plants are vigorous and can re-grow many times after the tops are cut for hay, between 3 and 12 times per year, depending on the area. Roots can grow deeper than 15 feet but are typically 3-5 feet deep. The purple alfalfa flowers are pollinated by bees, whose hives are placed next to fields that are used for alfalfa seed production.



Varieties – Many alfalfa varieties are available to growers. Those that tolerate freezing are grown in the northern United States and Canada. Other varieties continue to grow during the winter months in areas such as Southern California and Arizona where growers may harvest 12 months of the year. Alfalfa breeders have developed many varieties of alfalfa that are highly resistant to diseases and insect pests, thereby reducing the need for pesticides.

Commodity Value – Among United States crops, alfalfa is third in value to US farmers, after corn and soybeans, about the same as wheat. This doesn't include the value in the dairy or other animal products, which are the final products of alfalfa. In California, alfalfa is planted on more than 500,000 acres.

Alfalfa is harvested with a swather, which cuts off the crop a few inches above the ground and places it in strips three to five feet wide where it dries in the sun. When the cut alfalfa is dry enough, the hay is raked and a baler is used to gather it up and compress it into a bale. Bales range in weight from 50 pounds to one ton and can be the shape of small rectangles or round bundles. Large square or round bales are moved by tractors or "squeezes," which are forklifts made specifically for hay. The hay-making process is highly mechanized, and most hay goes from field to barn without being touched by human hands.

Alfalfa can also be made into silage by harvesting the forage and storing it in a silo while it is still moist, where it is preserved in a process called fermentation. Alfalfa is sometimes grazed by sheep and cattle, which means the animals eat it while it is growing in the field. Other times alfalfa is made into small cubes or pellets for easy storage and delivery.

History – Remains of alfalfa more than 6,000 years old were found in Iran. The oldest writings about alfalfa are from Turkey, dating 1300 B.C. Alfalfa was important to the early Babylonian cultures, and to the Persians, Greeks, and Romans because of its importance for feeding horses used in war.

The eastern United States colonists, including Thomas Jefferson and George Washington, grew alfalfa on a few acres. However, it was not widely grown in this country until the California Gold Rush of 1849. From California, alfalfa spread eastward to Nevada, Utah, Kansas, and Nebraska. Today, alfalfa is grown on over 17 million acres from coast to coast and is the nation's fourth largest acreage crop.

Alfalfa is an important rotation crop as it adds nitrogen to soil and improves soil structure for future crops. Nodules on alfalfa roots contain bacteria that take nitrogen gas from the air and convert it to nitrogen plants can use. This process is called nitrogen fixation. The financial value of this soil improvement is significant. Crops grown in rotation with alfalfa can save most if not all nitrogen fertilizer applications, and the soil health after growing alfalfa is significantly better. Wildlife, including more than 130 bird species, use alfalfa fields for food and shelter.

Top Producing Counties – The leading counties in California are Imperial, Kern, Merced, Tulare, and Riverside. Imperial accounted for 21.3 percent of the total value, followed by Kern at 11.2 percent.

Nutritional Value – Alfalfa is considered the premier forage of dairy cows. It produces very high protein and energy. Thus, much of the milk, yogurt, cheese, cream, dried milk, and ice cream we eat are produced from alfalfa. Dairy cows today are capable of producing approximately 10 gallons of milk per day, and these cows need the nutrition that high quality alfalfa hay provides. A modern alfalfa field can produce 2,400 gallons of milk per acre. In addition, alfalfa seeds can be sprouted and eaten directly as a nutritious salad or sandwich ingredient.

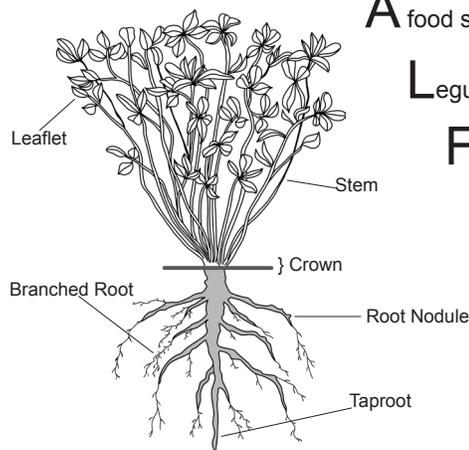
For additional information:

California Alfalfa and Forage Association
(916) 441-1064
calhay.org



Alfalfa Activity Sheet

The Benefits of . . .



A food source for dairy cows, beef cattle, sheep, horses and zoo animals.

Legumes such as alfalfa convert atmospheric nitrogen into forms that plants can use.

Facilitates soil conservation by reducing soil erosion.

A wildlife habitat for hundreds of animals, including some endangered species.

Lots of open space is created, which provides beauty.

Flowers on the plant make alfalfa honey, the main honey crop in the U.S.

A habitat for more than 1,000 diverse species of insects, spiders, and mites.

Lesson Ideas

- Investigate the root depth of alfalfa and other crops. Create a pictogram to compare different crops.
- Research the symbiotic relationship that exists between the bacterium *Rhizobium* and the roots of legumes such as alfalfa. Discuss the importance of symbiosis in biology using other examples from nature.
- Why is alfalfa such an important wildlife habitat? Discuss 'food webs' and the relationship between primary producers (alfalfa) and insects & herbivores & wildlife that occur there. Visit the California Alfalfa and Forage Association website (www.calhay.org). Read "Alfalfa, Wildlife and the Environment" and discuss.
- Determine the acres of lawn at your school. If those lawns were planted with alfalfa, how much nitrogen would be fixed annually if each acre produced 500 pounds of nitrogen from nitrogen fixation? If nitrogen was worth \$1 per pound as fertilizer, what would be the value added to your school?

Fantastic Facts

1. Dairy cows eat alfalfa, which gives them the energy and protein to produce milk products.
2. Alfalfa was domesticated 6,000 years ago.
3. George Washington was the first U.S. president to grow alfalfa.
4. Approximately 200,000 alfalfa seeds are in one pound.
5. Alfalfa roots can penetrate the soil more than 15 feet deep.
6. People eat alfalfa in the form of alfalfa sprouts or in the form of ice cream and cheese.
7. Honey is often made by bees after they visit alfalfa fields.
8. Alfalfa can be cut between 3-12 times and can last up to 25 years in the field.
9. More than 130 different bird species are known to visit alfalfa fields.

Lesson Plan: It All Began with Alfalfa!

Introduction: Alfalfa contributes to a wide range of nutritious foods that we enjoy every day. Alfalfa is fed to dairy cows and beef cattle. Much of the honey in the U.S. comes from alfalfa flowers.

Objectives: Students will analyze the ingredients of different foods and determine their relationship to alfalfa.

California Standards: CC ELA: SL.3-12.4; CC Math: 3.MD.3, 6.SP.5b; NGSS: 5-PS3-1

Materials: Obtain the following from a school lunchroom, grocery store or restaurant: cheeseburger, ice cream with chocolate syrup and whipped cream, beef taco with cheese and sour cream, chocolate milk, bread slice with butter and honey, pepperoni and cheese pizza, and a bowl of nutritious cereal with milk.

Procedure:

1. Create seven stations. Display one of the menu items and accompanying food containers at each station.
2. Divide the students into seven small groups and assign each group to a station.

3. Ask the students to closely examine the items, discuss the origin of each food, estimate how many different components began with alfalfa, and name other plants and animals that contributed to the food. They should write down their thoughts.
4. After a few minutes, have the groups rotate to another station and repeat the procedure. Continue until each group has visited all of the stations.
5. Have a representative of each group report their findings. Discuss concepts that may have been overlooked.
6. Create a bar graph that displays each menu item and the number of ingredients that could have originated from alfalfa.
7. Poll the class to determine which food item is most popular. Create a bar graph that depicts the popularity of the food items. Compare the two graphs. Are there any relationships that can be determined? Discuss the impact alfalfa has on the lives of students.