

United States Department of Agriculture,
DIVISION OF AGROSTOLOGY.

[Grass and Forage Plant Investigations.]

GRAM, CHICK-PEA, OR IDAHO PEA.*

HISTORY.

Gram, Idaho Pea, or Chick-Pea (*Cicer arietinum*), has been in cultivation in eastern countries longer than any other leguminous crop. Its native country is unknown, but it is supposed to have originated in Asia Minor. It was one of the plants of the Greeks at the time of Homer, and occupied a prominent place among the food plants of the lower classes during the time of the Roman Empire.

From Europe it was introduced in comparatively recent times into India, where it is estimated that there are now over 5,000,000 acres devoted to its cultivation either alone or as a by-crop with wheat. Next to the cereals, gram forms the largest part of the food used in India and in portions of northern Africa, Spain, and other countries bordering on the Mediterranean.

DESCRIPTION.

This plant is a branching annual, with many upright stems from the same root. The leaves resemble those of the vetch, having seven pairs of small leaflets. These are oblong, soft-hairy all over, one-half inch long or less, and sharply toothed on the margins. The flowers are borne singly in the axils of the leaves, on short stalks about one-half inch long.

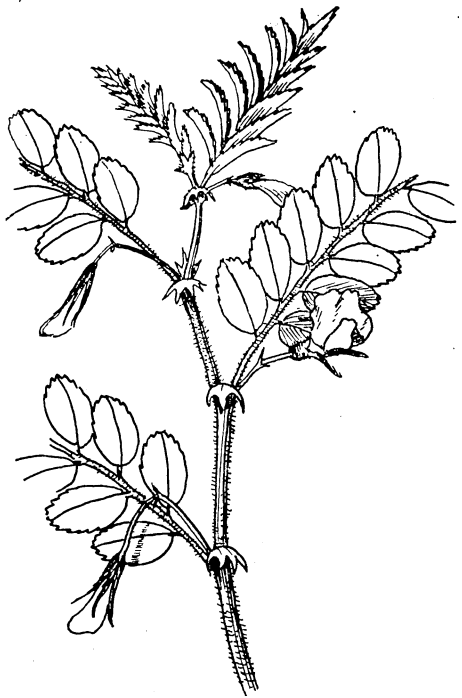


FIG. 1.—Gram (*Cicer arietinum*).

*An article has been going the rounds of some of the agricultural papers and the newspapers concerning a new forage plant, the Idaho pea, which is said to have been a native of the northern Rocky Mountains, first introduced into cultivation less than twenty-five years ago. Its cultivation has been highly recommended in the West, on account of the value of its seeds both as horse feed and as a coffee substitute.

The pods are bladdery, inflated, from one-half to three-fourths of an inch long, and finely pubescent with glandular hairs. Each pod contains one, or very rarely two, large seeds, which are wrinkled and bear a fanciful resemblance to a ram's horn, whence the Latin name *arietinum*. The seeds are a little larger than those of the common garden pea, to which they are quite similar.

USE AS AN ADULTERANT.

This crop is cultivated in Mexico, where it is known by the Spanish name "Garabanza." It is there used to some extent as food, but is considered inferior to corn. Gram has been introduced into this country at various times since 1864 as a substitute for coffee, but it should be remembered that there is no such thing as a coffee *substitute*. Various peas and beans, chickory, or even rye flour or bread crumbs, may be roasted and prepared in the same manner as coffee, but the beverage has none of the stimulating qualities of that drink and only resembles it in color and to some extent in taste. It can be used as an adulterant of coffee. The Idaho pea was cultivated at the Colorado Experiment Station in 1895 and 1896. Professor Cooke states that it "has demonstrated its ability to make a large growth with plenty of water and a fair growth with a very limited supply. It belongs to the pea family and is grown in rows, 30 inches apart, and the plants 6 to 12 inches apart in the rows. Its growth indicates that it can be raised for about 1 cent per pound."

SEED PER ACRE—GENERAL CLIMATIC CONDITIONS NECESSARY.

About 30 to 50 pounds of seed are used per acre, depending upon whether it is sown in drills or broadcast. In India the largest acreage is in the Northwest Provinces, where the soils are similar to those west of the one hundredth meridian, and the climate is much like that of New Mexico and Arizona. All authorities agree that it is better suited to arid and semiarid regions than to humid ones, the crop apparently requiring a great many sunny days during its season of growth. Better results are secured in growing it with irrigation than without, although it makes a fair yield on comparatively dry soils. If continued experiments with this plant in the West prove that its average yield is as high as has been claimed, it will undoubtedly prove a valuable addition to the list of forage plants suitable to semiarid regions.

TIME TO SOW SEED.

There are a number of varieties, which differ from one another in the color of the seed and length of season required for maturity. The forms which have been cultivated in Spain, Mexico and the Northwest Provinces of India are liable to prove more adaptable to American conditions than those from subtropical India. The gram plant is very sensitive to cold. The seed should be sown not earlier

than May 15, or at the higher altitudes about the 1st of June, and, if some of the short-season varieties are procured, there will be less danger of their being caught by early frosts. Gram is grown in India as a winter crop. The seed is sown there in October or November and the crop ripens in February, March, or April, according to the portion of the country in which it is grown. It is said to be adapted to almost any soil, from light sandy to heavy clays or loams, apparently preferring the latter. It might prove of some value in parts of the Southern States as a winter crop and soil cover, on lands which are unsuited to the vetches and the crimson clover. It requires only moderate amounts of moisture and is said to be injured by prolonged cloudy weather or abundant rains, which cause it to flower prematurely and thus materially affect the yield of seed.

AS A SOIL RENOVATOR.

Gram is one of the leguminous forage crops which has the power of absorbing gaseous nitrogen from the air, thus adding to the stores of nitrogen in the soil, and though the fact of nitrogen-absorption by leguminous plants has not been well understood until recent years, this has long been considered one of the best Indian crops for soil renovation and improvement. Watt states that over a large portion of India gram is grown either to check weeds or as green manure, and where this is the main object, only enough seed is saved to sow again the coming season.

FOR FEEDING PURPOSES.

Gram is a staple article of horse feed in India. The seed is also highly valued for fattening sheep and cattle. There is a considerable trade with England and other foreign countries where the peas are used for the same purposes. The total exports amounted in 1887 to over 15,000 tons. The average analyses of the seeds show that they contain about 20.5 per cent crude protein, 3.9 per cent fat, and 45.5 per cent carbohydrates, having approximately the composition of the seeds of the field pea commonly grown in the Northern States. Digestion experiments have not been made with them but their fattening qualities in use show them to be fully as valuable as the seeds of many of the other legumes.

Besides serving as a fattening ration for cattle and sheep the seeds and different parts of the plant find many uses among the natives of India. The green peas are eaten as a vegetable. The meal is used for porridge; and the parched peas are used either in the preparation of a beverage or in various confections and candies. The young plants are eaten as a salad and sometimes cooked like spinach.

OTHER USES—POISONOUS QUALITIES.

The leaves of the gram are viscid with a secretion which contains oxalic, acetic, and malic acids, the first of these predominating. In

India the secretion is collected by means of cloths spread over the plant at night and wrung out in the morning when wet with dew. The solution thus obtained is used in the preparation of cooling drinks and also finds sale as a vinegar. The forage is said to be actually poisonous to horses on account of the excess of oxalic acid in the leaves. Cattle eat it, but it often proves injurious to them, although to a less extent than to horses. However, this crop is not ordinarily grown as a forage crop, but for the seeds, and the seeds alone are used in India for feeding purposes.

PRODUCTION PER ACRE.

Gram has been grown experimentally at the grass garden in Washington, D. C., and seed has also been distributed to a limited number of farmers in various parts of the country. The reports concerning it were not very favorable except from some parts of Colorado, Wyoming, Utah, Idaho, and Montana. In the grass garden of the Department of Agriculture it did not grow higher than from 8 to 10 inches and the seed production was very moderate. The newspaper reports of this pea grown in the Rocky Mountain regions mention yields estimated at the rate of 90 bushels to the acre, but this is very unusual. The average crop in India is about 10 bushels to the acre and the highest yields do not exceed 25 bushels, the latter only when grown on the best soils under the most favorable conditions.

In common with other leguminous crops gram is dependent on the presence of certain organisms in the soil for its ability to absorb nitrogen from the air and it is possible that the lack of success with this crop in the Eastern States has been due to the absence of the particular tubercle-forming bacteria which are parasitic upon this plant. To determine finally upon this point importations could be made of soil upon which this crop has been grown, or pure cultures could be secured of the organism itself and the soil or seed inoculated before planting, as has been so successfully done in the case of the hairy vetch at the Alabama Experiment Station. If this crop will yield even 25 bushels per acre during average seasons, it will prove a valuable addition to Western forage crops on account of the high feeding value of its seeds, but until fuller and more extended trials have been made we would advise Western farmers to be cautious of investing too much money or devoting too much land to the cultivation of the Idaho pea, chick-pea, or gram.

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