

GROUNDNUT PRODUCTION

Under Barani Conditions

In the

NORTH WEST FRONTIER PROVINCE

of

PAKISTAN



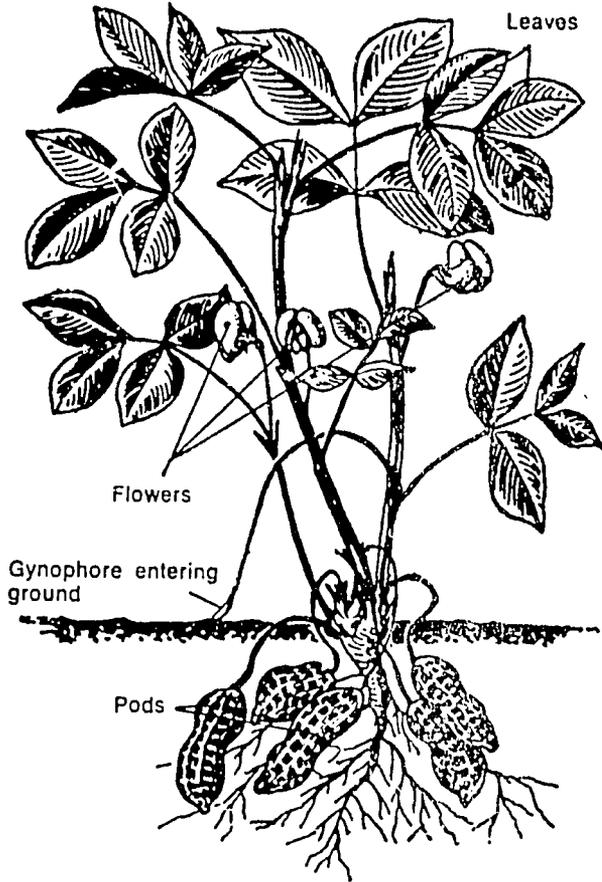
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NORTH WEST FRONTIER PROVINCE; PESHAWAR

1978

GROUNDNUT PLANT



Pod



Shell

Seeds

PRODUCTION OF GROUNDNUTS IN THE NORTH WEST FRONTIER PROVINCE

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INTRODUCTION

Too much can scarcely be said in favor of the groundnut as a money crop for barani area farmers wherever the character of the soil, the climate, and the local conditions are adapted to its production.

It is ideally suited for cultivation in the light type of soils and can bring handsome returns to producers, if proper management practices are carried out. At present, the majority of the cultivators are getting yields much below the potential yields that can be realized through the adoption of improved production practices.

The main factors which limit the yield of groundnuts in the Province are inadequate plant population; inadequate and imbalanced use of fertiliser, insufficient moisture at critical stages of the crop; almost complete absence of plant protection measures and delayed harvesting of the crop. There is no doubt that if the causes of low yield are properly identified and appropriate remedial measures taken by the farmers, the yield of groundnuts can be appreciably increased.

CLIMATE

The groundnut plant being extremely hardy can resist long spells of drought. It requires a fairly warm climate and an annual rainfall of more than 15 inches. An ample supply of moisture during the months of July and August when the crop is forming pods underground is essential. It has been observed that it can grow successfully where the well scattered rainfall is more than 10 inches during the growing period, that is April through September. Medium-late maturing varieties grown in the Province require approximately 180-200 days from planting to harvest. For highest yield the growing season should be long, warm, and moist, and the harvest season should be dry.

SOIL SELECTION

An ideal groundnut soil may be described as a soil with a light color, a loose, friable sandy loam or loamy sand plow layer with a well drained permeable subsoil. The soil should have a moderately deep rooting zone easily penetrated by air, water and roots. It should have a balanced supply of nutrients, particularly calcium, and a moderate amount of organic matter. This soil should hold water between rains but allow the excess to pass through and be of such a nature that it has little problem with both wind and water erosion.

Soils which possess a tendency to harden after rain should be avoided as hardening of the soil creates conditions unfavorable to peg penetration, pod development and harvesting. A light textured soil that will not harden or bake is best because :

1. plants established in relation to seed sown will be enhanced
2. pegs are better able to penetrate the soil and pods to develop normally
3. harvesting is easier and fewer pods are lost or injured in harvesting
4. fewer malformed and or discoloured pods are produced

Both strongly acid and alkaline soils are unsuitable for growing groundnuts. This crop grows best on soils having a slightly acid reaction. A pH of 5.6 to 6.8 is considered ideal.

Groundnuts are a soil remunerative crop but should not be grown year after year on the same land because of the likelihood of accumulation of soil borne diseases.

Since the tap root of the groundnut plant frequently penetrates to a depth of 18 inches, it is important that the subsoil be deep, free of hard pan, well drained, and without tendencies to become excessively dry. As with other crops when groundnuts are planted on sloping land, planting should be on the contour to prevent soil erosion.

SEED SELECTION AND TREATMENT

Seed selected for sowing should be well matured as well as disease-free and of a selected variety of known performance. *Do Not* plant immature seed. Since groundnut flowers are self-fertile and varieties seldom cross in the field, the seed of a given variety may be considered genetically uniform.

The time to select good seed for sowing is at the time the seed are shelled from the pods, throwing away any seed showing damage from insects or disease and any misshapen or immature seed. A misshapen seed is unlikely to produce well and if the seed germ has been damaged the seed will not germinate.

Seed should be shelled from pods only a few days before sowing otherwise the seed will dry out and the germination will be lower. Care should be taken to hold to a minimum the scratching, skinning, or damaging of the seed in any manner. Any form of injury to the seed coat is harmful, and breaking or splitting the kernels renders them useless for seed. Very dry groundnuts, those having 4 to 5% moisture, are skinned and broken easily during shelling. With 7 to 8% moisture, the damage is usually much less. Shelled groundnut seed should not be roughly handled. Much skinning and breakage may result from pouring seed from one metal container into another. After planting, soil organisms may enter damaged seed and cause rotting of the seed.

Seed should always be treated with a fungicide before planting. Good results generally have been obtained

through the use of a single fungicide treatment. The fungicide and treatment rate recommended at this time for the N.W.F.P. is listed below.

Chemical and Rate of Application	Precautions and Restrictions
DITHANE M-45 8 oz./60-70 lbs of bernel	Do not use seed treated with a fungicide as food or feed

When treating seed, always exercise care in handling seed to prevent breaking skins and to insure uniform, adequate coverage of all seed with the fungicide material.

Fungicides are poisonous so care must be taken by the operator during the treating process. Hands of the operator should be well washed after using a fungicide and never leave treated seed where children can reach them and never feed treated seed to animals. Treated seed should either be planted or destroyed.

A poor stand is the most common and perhaps the most important factor responsible for low yields of groundnuts. Therefore, growers should make every effort to obtain a full stand, including the use of viable treated seed.

SEED INOCULATION

The groundnut is a highly efficient legume. It begins to supply its own nitrogen about 30 days from planting if the correct soil bacteria are present. The use of

groundnut inoculate is an excepted practice in many parts of the world where the crop has developed major importance.

Inoculation of the seed or soil is needed when groundnuts are planted on land where they have not been grown with inoculated seed or where some means of inoculating the soil has not been employed in the last three years.

Chemicals used to protect seed from insects and diseases tend to render inoculum ineffective. To help overcome this problem when seed are treated with a fungicide and or insecticide the *seed should be inoculated immediately befor planting*. Care should be taken to protect inoculated seed from sunlight or drying winds. Covering of the seed by planking should be carried out in such a way that the inoculum is not rendered ineffective due to prolonged exposure to the sunshine.

LAND PREPARATION

Increasing the acreage devoted to groundnut production and stimulating the development of a groundnut industry in the Province will depend chiefly upon increased efficiency in production.

A well prepared seedbed is essential in groundnut culture. A smooth, uniform seedbed contributes to efficiency in all phases of production from planting through harvest. To do this the soil must be plowed deep. Deep plowing is not only essential to proper

seedbed preparation, it also helps control weeds, and insects and provides for better root penetration.

For fine tilth and a smooth seedbed 4 or 5 deep thorough plowings followed by planking are usually required.

PLANTING

The crop should be planted in furrows and planked or with a khurpa at 2 to 3 inches deep depending upon moisture conditions at time of planting.

Groundnuts should be planted high enough so that no soil will be moved to the plants during the cultivations to control weeds and grasses. Close row spacing is recommended and is designed to use the production area fully through balanced plant spacing. Close row spacing may also result in better early season weed control under the canopy.

SEEDING RATES AND SEED SPACING

The following seeding rates and row and plant spacings are recommended,

SEED REQUIREMENTS

Variety	Pods Per Acre	Shelled Seed Per Acre
No. 334	40 Seers or 82 pounds	30 Seers or 60 pounds
Banki	50 Seers or 100 pounds	35 Seers or 70 pounds

RECOMMENDED SPACINGS

Variety	Line To Line	Seed To Seed
No. 334	24"	9"
Banki	18"	6"

TIME OF PLANTING

The time of planting will vary for different areas of the Province. In general from March 15 through April when moisture conditions are good is the optimum-planting period. Early planting, consistent with settled weather and a well warmed soil is usually desirable.

VARIETIES

A great deal of credit for continuous increase in per acre yield, improvement in quality of edible groundnuts is due to improved varieties.

Generally there are two types of groundnuts suitable for growing in the Province based on growing habit i.e., spreading and erect.

Varieties recommended for growing in the Province include a variety of the spreading and the erect types.

SPREADING TYPE:

Variety No. 334

This is a medium late (180 - 200 days) maturing variety approved for general cultivation. It is high yielding with high kernel percentage of 70 to 75. It is suitable for table use and oil extraction purposes due to the high oil content of the kernel (48 - 50%) and low free fatty acids.

ERECT TYPE:

Variety Banki :

This is a medium late (180 - 200 days) maturing variety having an erect or bunch growth habit approved for general cultivation in the Punjab since 1973. It is a good yielder among the bunch types and selection can well be considered for the advantage they offer in ease and economy of digging at harvest. Banki is easier to dig especially in soil having a medium to high clay content.

INTERCULTURE

Interculture by hand-hoeing is necessary to successful production of groundnuts. The critical periods occur in the control of weeds in groundnuts, first, when plants are very small and, second, after the plants start setting fruit i.e., before the start of peg formation in the month of July. In this operation which in addition to controlling weeds, conserves moisture, the soil should be well pulverised to make it adaptive for penetration of pegs as well as pod development.

FERTILIZATION

The groundnut plants response to direct application of fertilizer has been less predictable than with most other field crops. However, at this time the following fertilizer rate per acre is suggested for barani areas of the N.W.F.P.

N	P ₂ O ₅	K ₂ O
20	80	0

The fertilizer application should be broadcast just *Before* the land is plowed the last time before planting. In practice the application of 1 bag of DAP 18-46-0 plus 166 lbs of single superphosphate or 174 lbs of DAP would adequately meet the above suggested application. If farm yard manure is to be applied, it should be incorporated into the soil preferably in the month of January or up to the middle of February.

GYP SUM (Ca SO₄)

Gypsum should be applied at the early bloom stage at the rate of 100 pounds per kanal over the entire fruiting area of the groundnut plant. Gypsum will promote pod filling and development and good yields of high quality groundnuts. Gypsum does not materially affect soil pH, however applied as recommended it supplies a high level of soluble calcium in a quickly available form in the top few inches of the soil where pods are formed. Gypsum will not be effective if broadcast or applied in the rows before planting.

BORON

Boron is a micronutrient essential for normal seed development. "Hollow Heart", an irregularly shaped cavity on the inner faces of groundnut kernels, is due primarily to boron deficiency. Boron deficiency is likely to be more common on the light textured soils, particularly during dry seasons. Therefore, boron when needed is recommended for light textured soils at the rate of 1/2 pound per acre for the partial control of "Hollow Heart". Boron may be harmful to yield and quality when used at the rate of one pound or more per acre. The rate used must not exceed 1/2 pound of actual boron evenly distributed per acre.

PROBLEMS RELATED TO ENTOMOLOGY

Protecting the groundnut crop by controlling insects which damage the plants will result in a better stand being

established, higher production of better quality groundnuts as well as more and better quality hay for feed or soil improvement.

At this time, there is no need for a routine insect control program in the field. It is necessary, however, to watch conditions closely and apply control measures as needed.

TERMITES

Of the insect pests which damage groundnuts, termites (white ants) apparently are the most destructive. This insect can do severe damage to groundnut pegs and pods. Its occurrence is most prevalent in the arid areas and especially so during abnormally dry seasons.

In areas where termites are prevalent the application of "Dieldrin 20% EC" used as a soil treatment before planting will give adequate control. Two pounds of "Dieldrin 20% EC" mixed with 40 pounds of dry soil per acre spread evenly over the field is recommended.

APHIDS

When discovered, spray "Dimecron 100%" at the rate of 1/2 pound per acre mixed with 50 gallons of water. Spray applications should continue until the aphids are under control which usually requires one to two applications. For application on very young plants the rate should be 1/3 pound mixed with 50 gallons of water.

STORAGE INSECTS

Dusting unshelled groundnuts before storing with "Sevin 10% Dust" is a standard practice for controlling storage insects.

RODENTS

Rats are the major rodent pest which growers must control if profitable yields are to be harvested.

For control farmers should check fields and field edges for open burrows and signs of rat colonies from the time of field selection through harvest. When burrows are found it is recommended to "gas" the burrows using "Detia" tablets which are readily available to the extension field staff and farmers from the District Assistant Plant Protection Officer. Use these tablets under wet or moist soil conditions as they tend to be ineffective in dry soil. Under dry soil conditions a rat bait can be used. An effective bait can be "Home Made" using zinc phosphide. For instructions for making bait, farmers and extension agents should consult the District Assistant Plant Protection Officer.

PROBLEMS RELATED TO PATHOLOGY

Limited information is available on diseases affecting groundnuts in Pakistan. However, there is general recognition among groundnut researchers that "tikka"

(*Cercospora* leafspot) is a prevalent groundnut disease and perhaps the only one at this time in the Province. Research in the area may prove fusarium wilt and root rot are economically troublesome diseases in groundnuts grown in the Province.

TIKKA (*Cercospora* leafspot)

When discovered, spray the field using "Dithane M-45". At early stage of growth use one pound in 50 gallons of water per acre and at later stages of growth 2 pounds in 100 gallons of water should be used per acre. Three sprayings at 15 day intervals are usually required for control.

HARVESTING

Production of high quality marketable groundnuts require timely and careful harvesting and curing.

As with most crops, timely harvesting is important to realizing highest yields. Early digging will result in shrivelled kernels and lower yields. Late digging results in higher labor cost, more pods damaged in digging, and a higher percentage of pods left in the ground largely due to soils becoming dry and harder to work. Late digging can also increase losses as a result of diseases, insects and molding.

It should be recognized that the groundnut plant remains green even after the pods mature underground. To determine the right time to harvest, dig a few plants

with pods and count the mature pods. Pods are considered mature when the inside of the shell shows a characteristic dark veining and harvesting should commence when 75-80% of the pods are mature.

To harvest, use a groundnut digger, bullock drawn or tractor mounted, * to dig the plants with the pods attached. If these implements are not available, a desi plow, spade or khurpa can be used. Tops of plants *should not be removed* before digging as this practice results in a much greater loss of pods, due to pods being left in the ground.

Groundnuts must be properly dried immediately after digging. To accomplish this 10 to 15 days of sun-drying is required. Drying will allow the crop to retain kernel flavor and quality and to be safely stored. Pod moisture content at digging time can be as high as 40 to 50% and must be reduced to 8 to 10% for safe storage.

* Inquire about obtaining the use of these diggers from the District EADA.