ON THE YIELD & QUALITY OF GROUNDNUTS

(Arachis hypogaca)

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Introduction:

Continuous cropping leads to the depletion of available soil nutrients. Heavy rains and overirrigation may leach nutrients, away from the root zone of crops. Such nutrient losses must be remedied by the addition of fertilizer in correct amounts.

Carbon (C) is a major constituent of Carbohydrates, proteins and fats. Plants absorb carbon as carbondioxide (CO_2) from the atmosphere. The elements other than carbon oxygen and hydrogen are absorbed by plants from the soil water solution in the soil.

Important nutrient Elements:

1. Nitrogen (N) is essential to synthesis proteins such as storage proteins, enzymes, protoplasm and so on. Nitrogen imparts a green colour to the leaves and encourages rapid growth, increases plant hight, branching or tillering and the size of leaves and grains. Adequate availability of nitrogen improves quantity and quality of the crop yield Nitrogen can be supplied by adding ammonium sulphate (21% N), urea 46% N) and other sources that contain Nitrogen. Organic matter such as compost and cowdung contains Nitrogen in small amounts.

2. Phosphorus (P) is an important constitutes of protoplasm and proteins. To enhence growth and get better yields phophorus is required in adequate amounts. Stunted growth of plants is caused by phosphorus deficiency.

Phosphorous encourages development of the root system, making the crop tolerant to drought. Branching, flowering and fruiting are enhanced by phosphorus. Most phosphorus fertilizes do not dissolve easily. Therefore, they are applied mainly as basal fertilizers. Phosphorus is absorbed more during the flowering time. Irrigation water may have some phosphorus. When the Eh of the soil increases the availability of phosphorus is better. Concentrated super phosphate containing 50% P_2O_5 is an important phosphatic fertilizer.

3 Potassium (K) helps to build up carbohydrates and proteins. K imposes resistance to diseases and unfavourable conditions. Branching, size and weight of grain are increased by potassium. The respiratory mechanism of plant is controlled by potassium. Muriate of potash containing 50-60% K_2O is a common source of K.

In groundnuts thirty percent of the cotyledonary protein is utilized during germination and 75% in the next seven days. More nitrogen is required during flowering and fruiting. Roughly 5 kg N/ha/day is utilized as the crop matures. Nitrogen in the other parts of the plant is mobilized and translocated to the cotyledons of the seed. Application of nitrogen affects the rhizobial activity. Application of nitrogen improves the yield of groundnuts but the amount to be used varies with the amount already present in the soil. In soils where nodulation is very poor the application of nitrogen fertilizer is essential. In the other soils, the amount to be applied has to be determined by soil analysis.Phosphorus is readily conducted to plant parts where it is required more. If less phosphorus is absorbed through the root system during maturity phosphorus in the leaves and other organs are translocated to the grain or seed. P is required in very large amounts during maturity. About 85% of the phosphorus absorbed is stored in found in the seeds. Dry Zone soils are generally deficient in phosphorus.

Potassium is found in different proportions in all parts of plants. Highest amounts are found in the stems and lower leaves. This element is very quickly translocated and the cotyledonary reserve too is fully utilized in germination.

4. Sulphur is an important element in the protoplasm. Sulphur increases the number of pods attached to the plant at harvest by making the pegs stronger. Sulphur influences the uptake of nitrogen and improves the oil content of seed. Sulphur is present in the fertilizers which are used to supply other elements. e.g. Ammonium Sulphate, Super Phosphate, Gypsum and so on. The effects of such fertilizers depend partially on their sulphur content. Sulphur is absorbed from sulphur based fungicides through the leaves. It is also supplied by rains and irrigation water. Hence sulphur fertilizers are not in use.

5. Calcium plays an important role in the activity of cells. It activates breakdown of carbohydrates into simpler chemicals. It enhances growth of roots. It is a relatively immobile element in the plant body. Calcium deficiency causes abortion of developing embryos Calcium requirement of the seed is met by absorbtion through developing pods themselves. Therefore calcium must be present in adequate quantities in the fruiting zone. If calcium is deficient the percentage of empties and half-filled pods will be high and the shelling percentage will be low. Hence, it is possible to detect deficiency only after harvest.

The form of calcium to be applied to correct deficiency is also important. The nuetral salt like calcium sulphate (gypsum) is favourable.

Powdered calcium carbonate (lime stone) is also widely used. Lime stone increases the soil pH. Excess calcium inhibits absorbtion of other minonutrients. Gypsum 200 - 500 kg/ha or limestone 2000 - 10,000 kg/ha is used. The varieties with larger seeds require more calcium. Lime stone powder is applied 3 - 4 weeks before planting and ploughed into the soil. Gypsum dust is applied at the time of flowering. Darkening of plumule at the base is also a condition of calcium deficiency.

The viability of seed from a calcium deficient crop is poor. Those which germinate die or seedling growth is stunted. The leaf shape will be irregular. The varieties with larger seeds are more susceptible, to calcium deficiency.

6. Magnesium (mg) helps synthesis of chlorophyll, carbohydrates and fats. Magnesium deficiency reduces tolerance to cercospora leaf spot disease and plants show maturity before actual maturity. Yellowing of lower leaves and reddish brown margins are symptoms of magnesium deficiency. In magnesium rich soils the availability of calcium is low. Dolomitic lime stone supplies both calcium and magnesium. Magnesium in the cotyledons is utilized at germination. Magnesium is required in large amounts at flowering. Magnesium is much more mobile than calcium in the plant body but less mobile than potassium and phosphorus.

7. Iron (Fe) is required for chlorophyll formation. . Deficiency of iron causes yellowing of leaves. Availability of iron is low in soils of high pH.

The trace elements required by groundnuts are boron (B (Bo), Manganese (Mn), Copper (Cu) and Zinc (Zn). Availability of manganese depends on the availability of iron.

8. Manganese is an element of the enzymes involved in the oxidation reactions. Mangenese activates the enzyme catalase. Deficiency of Manganese causes yellowing or burning of young leaves. Leaves absorb manganese rapidly.

9. Boron deficiency causes, discolouration of cotyledons and embryo, reduced seed viability and deformation of leaves. Blackening and cracking of internodes, short thick roots and profuse nodulation are other symptoms. Poor efficiency of nodules, delayed flowering, less number of flowers, excessive formation of one-seeded pods and cracked pods are also sumptoms of boron deficiency. Early runner varieties are susceptible to Boron deficiency.

10. Copper deficiency reduces yield and its quality. Zinc deficiency causes bronzing of upper leaves.

Remedial Measures:

Deficiency diseases can be controlled by soil or foliar application of the needed nutrient element.