

MANURES AND FERTILIZERS

Manures:

What are manures? Manure consists of animal excrement, usually mixed with straw or leaves. The amount and quality of the excrement depend on the animals feed. Good manure contains more than just excrement and urine. Straw and leaves are added and it is aged. Ageing is necessary to retain all the nutrients. Using aged manure is an ideal method to retain and increase soil fertility.

Goals of applying manure:

- Increase the level of organic matter
- Increase the available nutrients.
- Improve the structure (aggregate formation) and water retention capacity of the soil.
- Improve the activities of microorganisms in the soil.

Types of manures

- i. Farmyard manure
- ii. Compost
- iii. Green manures
- iv. Concentrated organic manures

Farmyard manure:

When animals are kept in a shed and proper care and good management practices are observed in utilization of all dung, urine and litter for use as farmyard manure, nearly all the elements originally present in the excreta of the animals can be saved and returned in the soil. Fresh stable manure is not very suitable for immediate use. The C:N ratio of fresh manure is high, which can cause nitrogen immobilization. On the average, well rotted farmyard manure contains 0.5% nitrogen (N), 0.2% phosphorus (P) and 0.5% potassium (K)

Compost :

Compost is well-rotted vegetable matter which is prepared from and town refuse. Farm refuse consists of straw, crop residues such as groundnut husks, sugarcane refuse, waste fodder, hedge clippings and dried leaves. Town waste consists of sewage, sludge, street and dust bin refuse, factory waste, wool and cotton waste etc. After the compost had decomposed for about three months and allowed to stay above the ground, well covered by earth for another one or two month, they are ready for use. The N, P and K contents of farm compost are on the average of 0.5%, 0.15% and 0.5% respectively while those of town compost are 1.4%, 1.0% and 1.4%, respectively.

Green manures:

Green manuring is the practice of growing and ploughing in green crops to increase the organic matter content of the soil. A green manure (preferably a leguminous one), should be sown at the beginning of the rainy season. It should be completely decomposed before sowing the next crop.

Concentrated organic manure:

Concentrated organic manures are those that are organic in nature and contain higher percentages of nitrogen, phosphorus and potash than bulky organic manures (farmyard, compost and green manure). Concentrated organic manures are made from raw materials of animal or plant origin. The common concentrated manures are oil cakes, blood meal, fish manure, meat meal and cotton and wool wastes (shoddy).

Assignment: List various types of organic manures you are familiar with. State the components, nutrient composition, merits and demerits of each manure.

Immobilization of Nitrogen (N) and the C:N ratio

Microorganisms decompose organic matter, which releases nutrients. However, the micro-organisms themselves also need carbon and nutrients including nitrogen. The tissue of all organic material is made up nearly half of carbon. The level of nitrogen varies widely between different types of organic material. In general, organic material that is old and tough has a high C:N ratio, in other words the nitrogen content is low compare to the amount of carbon. Young and succulent material generally has a low C:N ratio, that is, it has a high nitrogen content. If organic material is added, that is old and tough (straw for example), then the micro organism initially needs more N than it released from the material. They will then absorb not only all of the nitrogen that is release from the straw but also all the nitrogen that was already available in the soil (for example as nitrate-nitrogen (NO_3^-) or ammonium –nitrogen (NH_4^+)). After the straw is worked into the soil, there is thus a period of time in which all of the available nitrogen in the soil is taken by the micro organisms. This is called **immobilization**. Little or no Nitrogen is then available for the plants. Once the straw is completely decomposed, there is no longer food available for all the micro-organisms. A large proportion of the micro-organisms dies and decomposes. The nitrogen that the micro-organisms had adsorbed becomes once again available for the plants. In warm, moist conditions this circle occurs quickly, and the period of immobilization is short (weeks). In the dry areas the period of immobilization is long (more than a growing season).

Fertilizers:

What are fertilizers?

A fertilizer is a manufactured product containing a substantial amount of one or more of the primary, secondary macronutrients or micronutrient.

Most often the terms "chemical fertilizer", "mineral fertilizer" are used to distinguish the manufactured products from natural organic fertilizers of plant or animal origin which are called "organic fertilizers".

Nutrient elements that are required in relatively large amounts are called macronutrients e.g. carbon, hydrogen, oxygen, nitrogen, phosphorus, potassium, calcium, and magnesium.

The elements that are required in small amounts are known as micronutrients e.g. boron, chlorine, copper, iron, manganese, molybdenum, and zinc.

Types of fertilizers

We have three major fertilizers; nitrogen fertilizers, phosphate fertilizers and potassium fertilizers.

Nitrogen fertilizers;

1. Sodium nitrate (NaNO_3 - chile saltpeter) 16% N.

Definitions

1. Straight single Fertilizer: contains one nutrient element.
2. Complete fertilizer: contains the three major elements: NPK.
3. Fertilizer carrier or material: Any chemical compound which contains one or more plant nutrient element.
4. Mixed/compound/complex fertilizer: One that contains two or more fertilizer material e.g. SSP (Single super phosphate) and urea containing P&N respectively or urea + KCl containing K&N different from KNO_3 having only K and nitrate. It contains two elements but it is in a single fertilizer.

5. Fertilizer formulation: is defined as a chemical compound in a fertilizer consisting of two or more plant nutrients element and manufactured from two or more raw materials.
6. Fertilizer formula: this is an expression of the quantity and analysis of the materials making up a mixed fertilizer.
7. Fertilizer ratio: refers to the relative percent (%) of N, P₂O₅ and K₂O.
8. Fertilizer filler: is any material added to mix fertilizer or any fertilizer to achieve a specific grade. E.g. 900 kg + 100 kg = 1000 kg. e.g. inert materials, sand groundnut hull.
9. Fertilizer brand: this is the name, trade mark or company name for fertilizers.
10. Fertilizer analysis: this is a statement of the proportion of the nutrient element in a fertilizer. The analysis of a straight fertilizer is a % of the nutrient element it supplies e.g. urea supplies 46% N. For a compound fertilizer it is the % of the various elements it supplies.
11. Fertilizer grade: the grade of a fertilizer is the nutrient content in weight percentage of N, P₂O₅ and K₂O in the order N-P-K. The grade is only the amount of nutrient found by prescribed analytical procedures, excluding any nutrient that is unavailable to plants. For example a grade of 10-15-18- indicates a fertilizer containing 10% N, 15% P₂O₅ and 18% K₂O. The grade may also be called "analysis" or "formula". Analysis is graded. Any fertilizer that supplies <15% of the total active nutrient element is referred to as having "Low analysis"

i.e. <15 % - Low analysis

15-25 % - medium analysis fertilizer

25- 30 % - High analysis fertilizer

>30 % - concentrated fertilizer.