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Review paper

The impact of Maize (*Zea mays* L.) and it uses for human development: A review

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Abstract

Corn possesses significances nutrients, minerals and vitamins, which provides nutrition in animal diet as well as man. Its health benefits have been countless since the prehistoric era. Maize has been revealed to have the potential to sustained human health-related cases, raise standard of living of farmers, served as a soil fertility indicator crop, generate income and increase food-crop production for the increasing human population. Industrial utilization of maize has been shown to include: wet milling, production of bio-fuel, ethanol and other sub-byproducts.

Keywords: *Corn Silk; Maize Utilization; Maize Varieties; Nutrient Indicator; ZEA Mays.*

1. Introduction

Mankind has always utilized crops for his development and survival, achieving: nutrition, medical, pharmaceutical, herbal, economic, industrial, including research values from crops. Wheat, Rice and Maize are the three most explored food crops by Mankind, owning to the high value derived from these crops. Maize exploration has been high from its point of origin in Central American tropics and Mexico [1], [2], [3], to all parts of the globe, with its uses/utilization doubling as the day counts, and as Science attention has been on the crop for ages. Corn belongs to the grass family known as Poaceae. Corn is also called maize, with its botanical name as (*Zea mays* L.). It is one of the widely cultivated cereal crops in all ecological zones. Maize is one of the crops modified to adapt to areas of cultivation, resulting in its subspecies, which are identified and classified depending on the extent of starch each possess [4].
After wheat and rice, maize is the third most cultivated crops globally [5]. Different varieties of maize which include; flour corn, popcorn, dent corn, flint corn, sweet corn, Amylomaize and striped maize have been identified and cultivated by farmers in different parts of the world. Against food insecurity and to reawaken the relevance of maize to Mankind is the objective for conducting this review.

2. Distribution

USA produces the highest percentage of world maize with an annual average production of 310 million metric tons. United States cultivates 43% of global maize. 30 million hectares of land is cultivated to maize in USA. Other countries of high maize production include, China, which produces about 162.5 million metric tons of different varieties of maize, which gives about 20% of world maize production, with areas like Yuman and Kirin being the Corn Belt. Brazil cultivates an average of 55 million metric tons of maize annually [6]. Argentina, gives an annual average production of 20 million tones with region like Pampa, being its production belt. India is the 6th maize heavy producers, giving it annual average production at 18 million metric tons, with areas like UP, Biharbeing the production belt. Mexico, France, South Africa and Nigeria are also leading countries in maize production [6].
Maize is produce extensively in all agro-ecological zones of Nigeria, with its largest production in the Northern part of the country. Yellow and white maize are widely cultivated in Nigeria due to it adaptability. Maize production belt of Nigeria include; Adamawa, Bauchi, Borno, Yobe including Obubra (Cross River State), where the crop has been cultivated for multi-utilization.
About 34-98.3m or 48% hectares of land is cultivated to Nigerian maize production. Maize grain produced in Nigeria are sold as a commercial crop for industrial, agro-based, medical, pharmaceutical and other related uses [7].

3. Nutritional value/ utilization of maize

Maize contains protein, crude fibre; ether extract and carbohydrate. Maize provides a large amount of energy in the diet of Man and animal (livestock). The crop provides the body with amino acid, although it is deficient in some essential amino acid like lysine and tryptophan. IITA [8] reported 80% of carbohydrate, 10% protein, 3.5% fibre, in addition to 2% mineral and vitamin content in maize.
Maize can be consumed in variety of ways; eaten when still fresh on the cob after boiling or roasting, mill into flour (maize starch) which is further baked into maize-related products. Maize starch has been utilized in various ways, including the production of noodles. Edible oil which is obtained from maize grain has a low level of saturated fatty acids compared to other protein sources especially animal sources. Khawar et al. [9] reported high-fructose content of corn syrup and sweetener, which can be added to food to preserve its moisture content.
Dilip and Aditya [10] findings show that maize contains selenium that stimulates the thyroid gland and improve the immunity of

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humans. Maize silk has served as a source of treatment material in herbal medicine [11].

3.1. Health relative uses of maize

According to Dilip and Aditya [10]; Lans [12], maize extracts including corn silk have been used in the treatment of urinary system disorder and kidney-related problems. The traditional Chines uses maize silk to treat cases of fluid retention and jaundice. Corn silk has been used to improve blood pressure and support liver functioning as well as production of bile. Different part of the crop like root has serve as treatment materials for abdomen irregularities. Over the years, in various parts of the world, the crop extracts and decocted have been used as emollient for ulcer, wound, swelling, vomiting, nausea and other related health casas.

3.2. Economic importance of corn

Corn kernel provides oil, which can be used for; domestic cooking, industrial production of corn-related products, food additives, including its pharmaceutical uses. Oladejo and Adetunji [11] reported corn oil been used as an anti-freeing material. Over the centuries, Man keeps on unveiling new uses of corn. Corn is pounded or ground into flour, made into corn-garri (mounded corn) which is mixed with processed cassava, and eaten with soup. Corn provides man with raw material for further advancement, as it multipurpose nature provides a variety of uses. Corn industrial uses include; wet-milling, production of ethanol, production of finish-goods that contains corn extracts, production of bio-fuel/ bio-diesel. Maize has been utilized intensively in livestock nutrition, the crop provides greater percentage of calories. Apart from food, the crop is also useful as medicines; this was confirmed by the findings of Abdulrahaman and Kolawole [13]. IITA [8] report indicates the potential of maize to produce large volume of food and non-food-related products.

Production of maize in Nigeria has enhanced both food security and economic development, as the crop now serves as a "cash crop". The crop has been utilized by soil scientist as an indicator-crop in determining the fertility status of the soil. Maize can be used to fight global hunger; this was also examined by Ayeni [14]; Degrande and Duguma [15] who reported that food production can be used to reduce human hunger by cropping and utilization of corn.

4. Utilization of maize as an indicator-crop for soil fertility status assessment

As humanity continues to increase in population, then the quest to produce more food increases in other to feed and keep humanity in existence. As food plays a crucial role in human biological functioning, then the production of food becomes a necessity. Increase food production has been a problem in tropical lands, with cases of low soil-nutrient, soil acidity and low organic matter content [16]. To combat these problems then the need for soil fertility assessment arises, seeking an insight into the solutions to these problems in addition to generating methods favorable for soil-nutrient analysis. Crop responds to soil-nutrient is one of these approaches so developed, seeking to access the nutrient status of the soil.

Maize (*Zea mays* L.) is a crop that responded to either positively or negatively to soil-nutrient status, presenting a result in its leaf colour, height, number of leaves, leaf area, including leaves length. Survey of Adiaha [3] presented increased in soil nutrient status, as the experimented maize plant recorded significant ($p<0.05$) increased in maize growth parameters, illustrated in figure 1 and 2. Various fertilizer trial programmes have also recorded increased in soil nutrient status after accessing the behavior of maize growth parameters, experiment of Adediran and Banjoko [17] also confirms the potential of maize as an indicator crop, where they recorded increased: soil-nutrient status as observable by the maize plant growth parameters, presenting maize as one of the best crops used as an indicator-crop for soil fertility assessment.

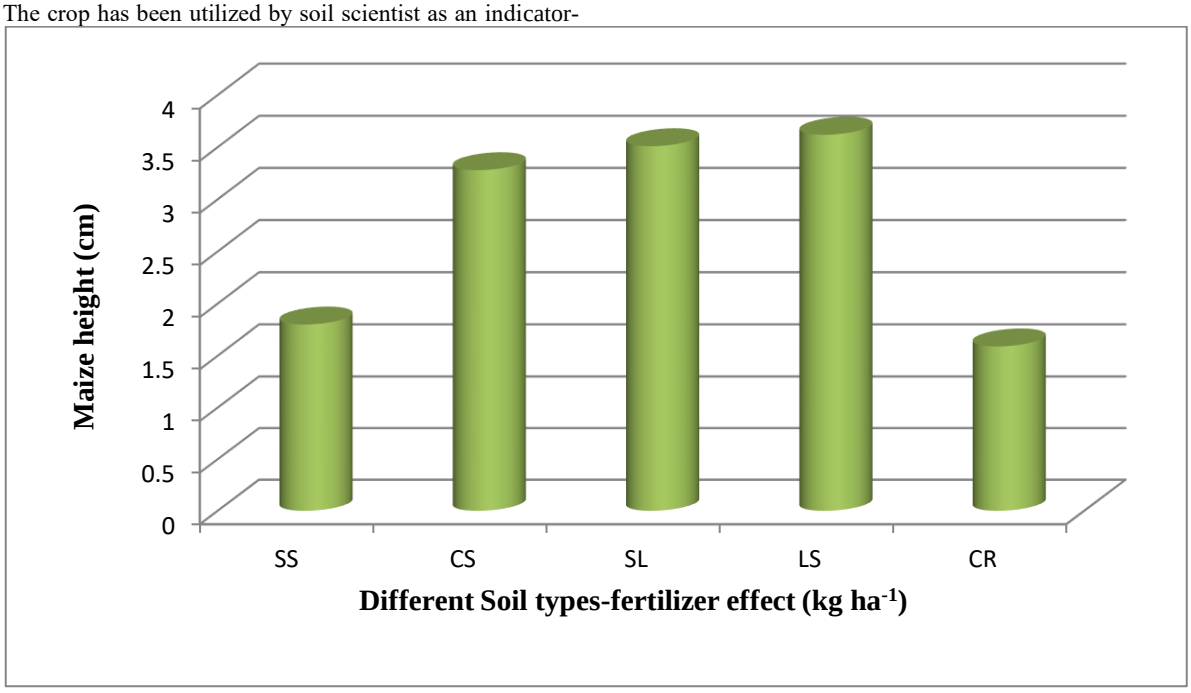


Fig. 1: Respond of Corn Height to Fertilizer as an Indicator Crop. Source: Adiaha (2016).

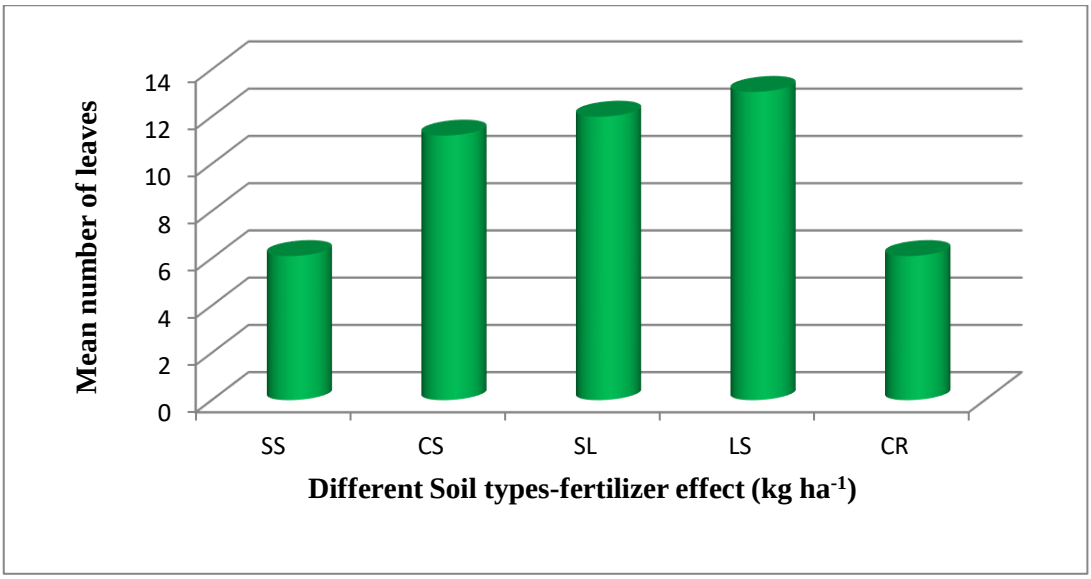


Fig. 2: Respond of Corn Number of Leaves to Fertilizer as An Indicator Crop. Source: Adiaha (2016).

5. Conclusion

The study revealed that corn stands as a multipurpose crop serving nutritional, medical, pharmaceutical, industrial and other economic uses. Hence, more land area is advice to be put into maize cultivation as the demand for corn, its by-product and corn-related products will continue to increase as human population increases, and as science further explores the crop for more beneficial uses.

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