Response of nitrogen on the fodder yield and quality of different varieties of sorghum: A review

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Abstract

Food of animal is termed as fodder. Green fodder is highly advantageous for feeding livestock because it enhances the production of milk and other milk-based products. Fodder can be fed to the animals either in the form of green fodder or silage. No doubt green fodder is an important component for increasing the milk production but silage plays a vital role in upgrading the level of milk and milk-based products. The fodder is highly responsive to nitrogen level and density of crops. Higher the level of the nitrogen, higher will be the quality parameters i.e. 120kg N/ha and for growth attributes lower levels of nitrogen is also effective. The fodder will result better at 70-80kg N/ha.

Keyword: nitrogen, sorghum, attributes, parameters, fodder

Introduction:

Food for animals is called fodder. Fodder can be fed to animals in two forms i.e. silage and green fodder. Silage is the best feed of the animals (Pholsen et al., 1998). Same as humans fodder is significant for the animals for some reasons like attaining better milk production, and other milk derived products so it is important to serve the healthy nutritious fodder to the animals. To cope out the high demands of the fodder 62-54% is present fodder production that is quite less than actual need (Bhatti, 1988).

There are many fodders like Sorghum bicolor, Zea mays, Avena sativa, etc., and all have their own characteristic feature to overcome the hunger of livestock. But nowadays stresses are major cause due to what it is hard to meet the required demand of fodder and those stresses include moisture and nutrient stress (Rockstro and De Rouw, 1997; Zand-Parsa et al., 2006). The challenge is the high demand for the fodder and deteriorated the health of the soil. The rising demand of fodder is creating urgency in higher production of the fodder (Singh et al., 2004) for what reason level of fertilizers especially nitrogen is to be planned for high yield, better growth and quality parameters.

Nitrogen is very important primary nutrient and plays a vital role in healing in the growth of the crop and a commonly available source of Nitrogen is Urea but in some nations cost of urea is too high to afford like Africa. FYM is rich in micronutrient and is composed of 0.5%N, 0.2% P2N5, and K2O, 0.5 %, and nitrogen are in organic form (Nasir et al., 2010). Mahi et al., 2018 proved that dry matter, crude protein, and other things are significant enough for the production of the fodder. These parameters are enhanced with the application of nitrogen.

Nutrients play a significant role for physiochemical, functions, yield and other yield attributed vision point (Alloway et al., 2008). The role of nutrients decided the type of result expected. Suitable dose illustrates healthy crop but the excess dose can deteriorate soil condition converting land barren and soil infertile for further use. The plant stand is another chief thing desired and it is possible if the optimum amount of nutrients are checked (Reddy et al., 2010).

Sorghum fodder contains a high amount of quality parameters viz., above 50% digestible nutrient with 2.5% ether extract and near about 8% crude protein and approximately 45% nitrogen-free extract. Valuable nutrients
quantity in fodder sorghum is identical to corn i.e. it's considered over it. The main characteristics feature of the fodder sorghum is its high palatability and digestible nature. Animals like feeding on it (Wheeler, 1950).

**Interaction of fodder with distinct nitrogen levels:**

Growth parameters like plant height, number of leaves, girth, etc. gives best results under 40kg N/ha the dose of 70kg N/ha can increase the green forage yield than 120kg N/ha (Singh Pushpendra and Sumeriya H.K. 2012). The dose of the nitrogen plays an inverse role with proximate components i.e. crude protein and crude fiber. These two components i.e. crude protein and crude fiber are inversely related to each other. Some researchers even proved that guano fertilizer also improves the growth parameters in a better way in comparison to other manures Rahetlahet et al., (2014). There are scientists who told that if nitrogen levels and seed rate of fodder are inversely proportional. Increased rate of nitrogen level can increase yield but the increasing rate of nitrogen fertilizer with increased seed rate can decrease the yield. The density and fertilizer play a major role in attaining the desirable output Aslam et al., (2011). As far as dual purpose fodder is considered than at same rate i.e. 120kg N/ha better yield can be attained the same rate of fertilizer can lead a better result Hajighasemiet al., (2016).

The nitrogenous fertilizers are more beneficial than urea. Some even tried the application of nitrogen in combination with other nutrients especially micronutrients they proved that there work concluded good yield if nitrogen is applied separately or in combined form S.S. et al., (2005). The high rate of nitrogen significantly affect the CP% and CF %, dry matter is also affected widely with different levels of nitrogen. The nitrogen plays a significant role in the startup dose that initial dose at sowing plays a major role in getting optimum yield and plant stand. The 100% dose of nitrogen in beginning functions till the last stage of the crop.

**Interaction with soil:**

The soil plays a motherly role in the development of any crop. The health of soil should be the supreme priority of crop and it is important to get over the issues related to the soil. Excessive dose of any fertilizer is hazardous to the crop health therefore, it is important to cope out with problems relating to soil because the protection of the environment is a human right. The Valikiet et al., (2015) mentioned after working that it is hard to manage soil if we are using high rates of fertilizers and therefore, lowering the rate of nitrogen. Some scientist proves that yield can be improved with the application fewer fertilizers also which can preserve the nutrients within the soil.

Soil is very reactive in nature and it undergoes many biochemical changes. To maintain the fertility of the soil it is important to cover it with vegetation and prefer the leguminous crops that fix the atmospheric nitrogen and demand for fewer fertilizer applications. Some farmers apply the fertilizers before sowing and this leads to excessive loss of fertilizers from the soil via volatilization.

**Interactions with manures:**

The manures play a vital role in optimizing the yields and other growth attributes of fodder. The chicken manure, compost, FYM, and guano manures is quite beneficial in elevating yield, growth and quality parameters. Rahetlah et al., (2014) proved that guano enhances the health, growth attributes and yield of the fodder. Chicken manures significantly affect crop health like nitrogenous fertilizers and higher the rate of fodder yield O. AbusuwarAwad and A. El ZilaHala (2010) as it is very good fertilizer. A. Baghdadi et al., (2017) in his team work stated that FYM is beneficial for attaining the desired output. Manures are having long-lasting effect on soil and crops sown and supplies micronutrients along primary nutrients where straight fertilizers supply the selected nutrients in this way manures are more affecting and useful than chemical fertilizers. Manures enrich the soil with loads of nutrients, increase the fertility of the soil. They have longlasting effect and provides preservation of microorganism. Manures enhance moisture level and permit the free movement of microorganism so that organic fertilizers can be converted into inorganic forms i.e. readily available form of nutrients.
Quality Parameters:

The quality parameters are standard that is significant for all the producers to meet with impartiality, reliability, consistency, and quality of the products. These parameters determine the validity of the fodder that is why it is considered as vital attributes for announcing the purity, complexity, potency, and stability of the fodder and related products. Many scientists and researchers performed experiments on different fodders among them Abusuwar, A. O., & El Zilal, H. A. (2010) concluded in their work done on Effect of chicken manure on yield, quality and HCN concentration of two forage Sorghum (Sorghum bicolor (L) Moench) cultivars that with the application of the manure the rate of protein content and other proximate composition get enhanced. Quality parameters of fodder were found increasing with the application of 240-250kg N/ha. Identical results were shown in the Effect of nitrogen on growth and yield of sorghum forage (Sorghum bicolor (L.) Moench CV.) under three cutting system by Afzal M., Ahmad A. and Ahmad A.U. H. (2012). Identical results like the ether extract were inversely proportional to other quality parameters as it content decreased with increase in other parameters were shown by Mishra et al., (2010) and even crude protein replies to high levels of the nitrogen. When the amount of nitrogen is high than Crude protein percent increases. It got increased between the range of 0-240kg N/ha (Bilal Keskin et al.,2005). Sindhu et al. (2006) proved that crude fiber always decreases with increase in crude protein and crude fat i.e. crude fat with each dose of 75 kg N/ha.

Green Fodder Yield:

Ayub et al., (2002) in his research on Effect of different levels of nitrogen and harvesting times on the growth, yield, and quality of sorghum fodder showed that yield of forages increases with the application of the nitrogen levels. Rohitashav Singh et al. (1995) in his work on the topic entitled as Suitability of forage maize to different levels of nitrogen under late sown conditions proved that high amount of nitrogen yields more production than low levels of nitrogen. As a dose of 100-120kg N/ha gives more yield than 40-50kg N/ha. And identical results regarding green forage production was given by (Sahoo and panda, 1997) it was also concluded that successive increase in nitrogen levels increases the fodder yield as well. Bali Amarjit et al. (1998) yield of oats increases by 50-150kg N/ha and 200kg N/ha in case of baby corn was proved Thakur et al. (1998). Girija Devi (2002) in Forage yield of maize (Zea mays L.) as influenced by nitrogen levels and biofertilizers concluded that 125kg N/ha gave a maximum yield of green forage therefore, this dose rate helps not only in enhancing the yield but other growth and quality attributes.

Conclusion:

The different levels of nitrogen affect the yield and quality of fodder. Farmers should use organic manures like FYM, composts this will not only supply nitrogen but other micronutrients also and these are cheaper than synthetic fertilizers. Organic fertilizers also increase the shelf life of micronutrients. As we know nitrogen is the primary demand of every crop so as fodder, it would be productive to grow nitrogen-fixing fodder crops like berseem (Trifolium alexandrinum). Protection of the environment is human right so farmers can even increase the density of the plant stand than to use a high rate of fertilizers. The HYV-varieties should be sown that demands fewer fertilizers and gives more yield.
References:


