POTASSIUM USE EFFICIENCY OF COTTON AS AFFECTED BY APPLICATION METHODS

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INTRODUCTION

Likewise, other cotton growing countries, the soils of the Pakistan has been characterized as potassium (K) deficient. The daily K requirement for cotton has been estimated up to 3-5 kg K ha^{-1} day^{-1}. Despite very high K requirement coupled with K deficient soils, cotton has been fertilized with very low K i.e. <1.0 kg K_2O ha^{-1}. Transgenic cotton is more susceptible to K deficiency. The cotton grown with insufficient K supply terminate its growth earlier (Pettigrew 2008) and produce low seed cotton yield with poor quality fibers. Generally, K fertilizers are soil applied where a remarkable portion became unavailable to plants due to fixation with clay minerals. The foliar application is an effective way of feeding plants with restricted root growth and adverse soil conditions. The cost of K fertilizers is increasing and farmers of resource poor countries are excluding K from their fertilizer programs. Thus, such issues force the researchers to elaborate the application methods impacts on K uptake and utilization efficiency.

MATERIALS & METHODS

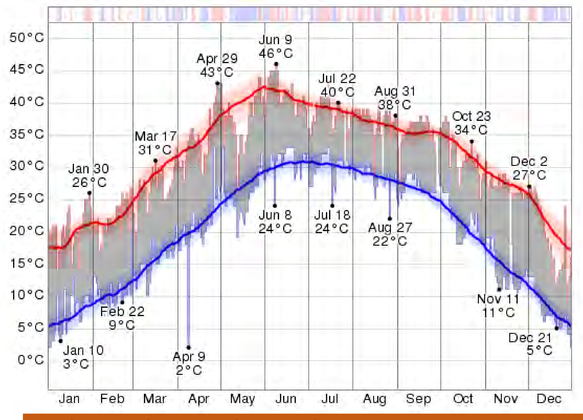
The soil of the experimental area was alkaline with poor fertility profile and climate is very hot in summer and cold in winter. The foliar sprays were repeated on 30th, 45th, 60th and 75th days after sowing. The basal dose of K in form of potassium sulfate was broadcasted and incorporated to relevant plots during last operation of seed bed preparation.

Experimental Plan

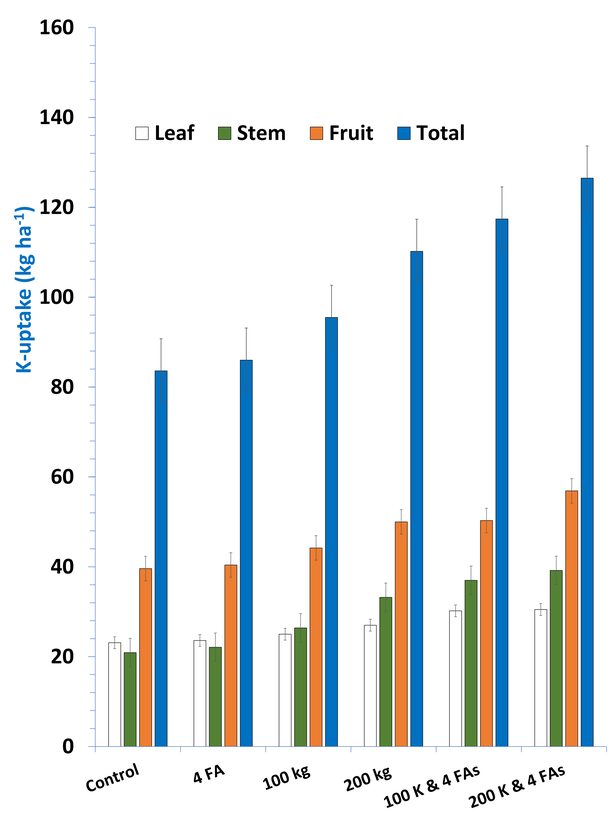
RESULTS & DISCUSSION

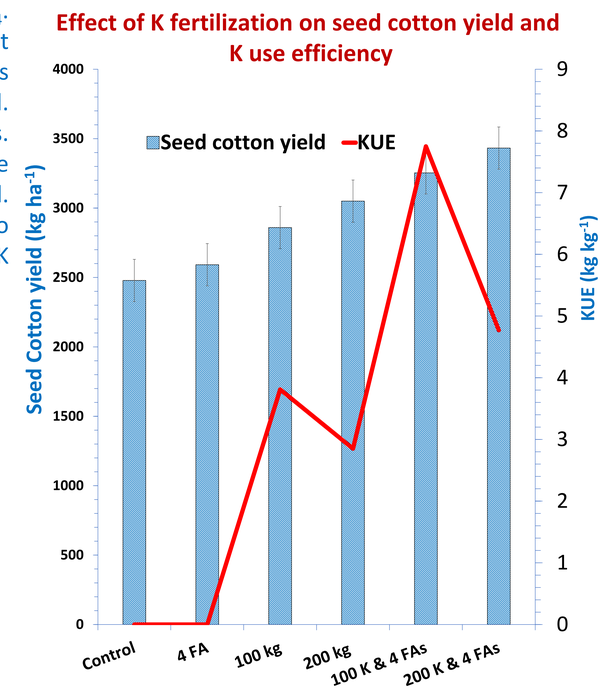
The minimum K uptake was recorded in plots where no K was added and it was followed by plots sprayed with 2% K_2SO_4. The combination of basal dose and foliar application produced significantly higher values for K content of various plant parts against their full dose basal application. It is also indicated that almost half of the total plant K was allocated to fruits (bur, lint and seed) which shows that K fertilizing is necessary for cotton from flowering through peak boll setting period. Because more K uptake and reproductive dry matter was achieved at 200 kg K_2O ha^{-1} supplemented with 2% foliar sprays. which resulted 38.4%, 32.4%, 20.0%, 12.5% and 5.5% higher seed cotton yield over T1, T2, T3, T4 and T5, respectively. The yield benefit of 20-30% with four foliar sprays of 2% KNO_3 over unfertilized plots has also been reported by Knowles et al. (1995). The agronomic K use efficiency (seed cotton yield/fertilizer applied) was improved from 3.81 to 7.75 and 2.85 to 4.77 (kg kg^{-1}) with foliar application of 2% K_2SO_4 at 100 and 200 kg K_2O ha^{-1}. It is evident that 3.81 kg seed cotton per kg K was obtained at 100 which decreased up to 2.85 kg at 200 kg K_2O ha^{-1}.

Mechanical hoeing for weed eradication



Daily weather conditions during cropping year (2014)





CONCLUSION

It is concluded that use efficiency of K fertilizers is high when 100 kg K per ha was applied which suggest that higher dose of K fertilization can be avoided by supplementary foliar application of K.

ACKNOWLEDGEMENT

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