The nature of response to K-fertilization and factors affecting it

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5. SUMMERYThe study comprised field experiments involving wheat, sorghum and faba beans assessing the response to increased K rates under conditions of N and P; and a pot experiment involving barley to assess the comparative effect of KCl and K2SO4 as sources of K. . Rates were as follows: K: 0, 45, 90, 180 and 270 kg K/ha for wheat, sorghum, or beans; and 0, 50, 100 and 200 mg K/kg soil for the barley pot experiment. N rates were 0, 110 and 220 kg N/ha for wheat or sorghum; and 0, 25 and 50 for beans. Yields and some growth and yield parameters were recorded for the field crop experiment. Plant growth of the barley experiment was recorded in terms of weight of plant (fresh and dry) was recorded. Macronutrients in plant (N, P and K) were also measured.The nature of response for the field experiment:The parameters most positively responsive to K application were (according to the overall main effect):First: Yields produced by the crop in terms of grains (forwheat or sorghum), and seeds (for beans).Second: Yield in terms of straw (wheat) or stover (sorghum or beans).Third: The weight of sorghum panicle in particular. Magnitude of response ranged from about 3 to 25%.Fourth: The 1000-grains (or seed) weight which showed slight positive response.Summary & Conclusion199Fifth: Plant macronutrient (N, P and K) particularly their uptake to a greater extent than their content in grains or seeds. The magnitude of positive response relating macronutrient uptake ranged from about 20 to 35%. Contents and uptake of K in particular was the most responsive parameter.Sixth: The 1000-grain weight or the 1000-seed weight, but with a slightly less magnitude of positive response were the 1000-gram (or 1000-seed) weight.There were some negative responses, though slightly negative, were most of the growth parameters such as plant height and leaf area. For the field crops. However for barley seedlings, there were positive responses to K application in terms of plant growth as determined by the weight of plant above-soil-parts (50-day-growth).The nature of response in the pot experiment was mainly in terms of plant growth with a response magnitude approaching as high as 300% or more. The magnitude in terms of K in plant was rather restricted to the uptake rather than the contents in plant tissues.Factors affecting response to K:First: Presence of nitrogen increased the magnitude ofresponse; particularly the medium rate.Second: Presence of phosphorus increased the magnitude of response.Summary & Conclusion200Third: When both of nitrogen and phosphorus were present, the range of positive progressive response to K was greater.Fourth: where contents of available (NH4-acetate extractable) K in soil were low as occurred with the pot experiment (contents of about 150 mg K/kg) response was extremely high. where contents were high (more than 400 mg K/ha) the magnitude of response was medium or low.Fifth: The chloride source affected the response in a lesspositive manner especially at the high rate. However, it gave greater fresh yield than the sulphate source.Summary & Conclusion201