

## pH AND HYDROGEN + ALUMINUM CONTENTS IN OXISOL OF BRAZILIAN SAVANNAH CROPPED WITH DRY BEAN IN THE NO TILL SYSTEM

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The strip of soil pH that permits the best conditions for the development of the dry bean (*Phaseolus vulgaris L*) locates among 5,8 to 6,2 (soil :water 1:2,5). In this strip, almost all the nutrients are in the maximum availability to the plantas or in enough concentrations for the development and production for most of the more explored cultures in the Brazilian Center West Region. In lower pH, it has been observed low concentrations of phosphorus, calcium, magnesium and other nutrients. At the same time the presence of aluminum in the soil and other toxicant ions are observed in condition of low soil pH.

Most of the savanna soil is worldwide known by its low natural fertility. Those soils when not well amended or intensely cultivated present low exchangeable bases that are removed by the grains or parts of the plants. In response of calcium, magnesium and potassium withdrawing the soil pH is reduced resulting in low productivity due to the low availability of several essential nutrients to the plant.

**Table 1.** Bean productivity and parameter of production, Pérola cultivar, on crop residues in no till system at Fazenda Santa Fé, Municipality of Santa Helena de Goiás, Goiás State, Brazil.

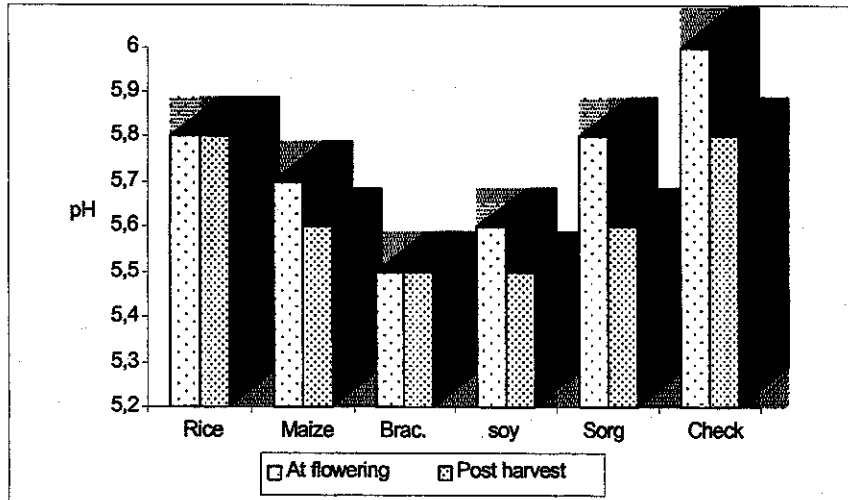
Crop residue	Plant/m <sup>2</sup>	Pod/plant	Grain/pod	Weight of 100 grains	kg/ha
Maize /Brac.	22,8 ab	12,3 ab	4,4 a	26,09 b	3.508 a
Rice	21,9 ab	12,0 ab	3,0 b	28,01 a	2.486 b
Brachiaria	25,3 a	11,98 ab	4,3 a	23,11 c	3.255 a
Soybean	22,2 ab	11,5 b	4,5 a	25,99 b	3.273 a
Sorghum	21,2 b	13,4 a	4,5 a	23,10 c	3.136 ab
CV %	25,26	17,42	24,40	11,44	21,02

The means in the column followed by the same letters are not significantly at P<0.05.

With the objective of knowing the effect of the high dry bean productivity in the soil acidity in no till system an experiment carried out using the Pérola cultivar, at Fazenda Santa Fé in Santa Helena of Goiás, State of Goiás during the years 1999 and 2000. In the first year, the area was occupied with maize + brachiaria, rice, soybean and sorghum and in the second year the dry bean was cultivated in these same areas where the residues of those different crops were stored. The dry bean production presented the following order: corn + braquiária (3 508 kg/ha) > soy (3 273 kg/ha) > brachiaria (3 225) > sorghum (3 136) > rice (2 486) (Table 1).

The high productions of dry bean obtained in the parcel where maize + brachiaria residues were stored can be explained by the high production of vegetable residue of both crops besides the control that the brachiaria exercises on several dry bean diseases. Other good productions were obtained in the parcels where the single brachiaria was cultivated. Besides its well-known qualities it presents high mass productions without the competition between the crops. Although the soybean not be a high vegetable mass production, the dry bean produced well on parcel with soybean residue is due to the improvement in the soil fertility and nitrogen incorporation thought biological fixation. The good performance the dry bean cultivated on

sorghum residue is due to its high mass production besides the high capacity to recycle nutrients from the deepest layers for the soil surface.



**Figure 1.** Variation of soil pH during the flowering and post harvest in areas cultivated with dr bean, Pérola cultivar, on residue of maize in consortium with *Brachiaria brizantha* and in residue of single crops of rice, soybean and sorghum. Fazenda Santa Fé, Santa Helena de Goiás GO, 2000. (Brac=brachiaria and Sorg=sorghum)

The pH of the soil varied with the culture (Figure 1). The most exhausting cultures removed the highest amounts of exchangeable bases, contributing to the decreasing of soil pH or increasing of soil acidity. The lowest variation in soil pH was observed in areas where the rice and the braquiária were grown; the rice for demanding small amounts of nutrients in relation to the other crops and the braquiária for coming back to the soil high amounts of nutrients. The other crops studied removed the nutrient through the grains and parts of plant influencing the variation of soil acidity.

#### Reference

Thung, M.D.T.; and I.P. Oliveira. 1998. Problemas abióticos que afetam a produção do feijoeiro e seus métodos de controle. Santo Antônio de Goiás: EMBRAPA-CNPAP, 172p.