

EFFECT OF DAY TIME ON FOLIAR SPRAYING OF SEVERAL LEVELS OF NITROGEN FERTILIZER, NPKS SOLUTIONS AND ITS COMPONENTS, ON COMMON BEAN LEAVES (<sup>1</sup>)

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SUMMARY

An experiment was carried out in order to determine the effect of day time of foliar spraying of several levels of nitrogen fertilizers, N-P-K-S slution, and its components on common bean leaves. Results, based on the visual observations, indicated the maximum levels of each fertilizer that did not cause injuries and showed that the foliar spraying early in the morning is the best day time.

GARCIA and HANWAY, 1976, at Iowa State University, USA, showed that the foliar fertilization with a NPKS solution (Hanway solution), during the seed filling period, increased soybean yield.

NEPTUNE and MURAOKA, 1977, under the IAEA Co-Ordinated Programme on the Use of Isotopes in Fertilizer Efficiency Studies in Grain Legumes, carried ou an experiment in order to study the influence of foliar fertilization on common bean, using the Hanway solution, with ammonium nitrate instead of urea as the nitrogen component of this solution. This experiment indicated that the ammonium nitrate in that concentration caused a severe burning of the leaves.

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To obtain more informations, another experiment was conducted, with the aim to fix a dose which would not cause injury to the leaves. For this purpose, several nitrogen sources and doses, two potassium sulphate doses were utilized. The basic solution was the Hanway solution, with the following composition 80 kg N + 22.42 kg P<sub>2</sub>O<sub>5</sub> + 35.00 kg K<sub>2</sub>O + 4.48g S per 1000 litres (equivalent to 171.31 g urea + 86.23 g potassium poliphosphate + 24.89 g K<sub>2</sub>SO<sub>4</sub>). The spraying was done early in the morning before the sunrise and late noon after the sunset.

## MATERIAL AND METHODS

The soil used in this experiment is a Red Yellow latossol, sandy phase, of low fertility and the common bean, cv. Carioca was planted (18.3.1977). The solution were sprayed on april 15<sup>th</sup>.

The treatments were the following.

- 1) Hanway solution (N as urea).
- 2) 50% of the Hanway solution.
- 3) Hanway solution (N as NH<sub>4</sub>NO<sub>3</sub>).
- 4) 50% of Hanway solution (N as NH<sub>4</sub>NO<sub>3</sub>).
- 5) Potassium polyphosphate alone, dose contained in Hanway solution.
- 6) 50% of the treatment 5.
- 7) urea alone, in different concentration; a) 20%; b) 17.13% (dose corresponding to the urea concentration in Hanway solution); c) 10%; d) 5%; e) 2.5%; f) 1.25%.
- 8) ammonium nitrate alone in different concentrations: a) 22.86% (corresponding to the N concentration in Hanway solution), b) 20%, c) 10%, d) 5%, e) 2.5%, f) 1.25%.
- 9) ammonium sulphate: a) 10%, b) 5%, c) 2.5%, d) 1.25%.
- 10) potassium sulphate: 0,86% (corresponding to the S dose of Hanway solution).
- 11) potassium sulphate 0,86% + urea 17.13% (corresponding to the N and S concentration in Hanway solution).

The nutrients spray solution were applied at a rate of 250 litres/ha.

## RESULTS AND DISCUSSION

The results are based on visual observations made the day after the foliar spraying.

Urea: the foliar spraying of this fertilizer early in the morning did not cause leaf burn up to the concentration of 10%. Even with the 20% concentration, only few plants showed slight burning on the margin of the leaves. At late noon spraying the concentration of 10% caused severe leaf burn, but with 5% concentration, any injurious effect was observed.

Ammonium nitrate: the difference between the effect of foliar spraying done at early in the morning and of late noon was more striking with this fertilizer. Any injurious effect was observed up to 5% concentration, when spraying was done early in the morning, but when spraying was done at late noon, slight leaf burn was observed even with 2.5% concentration. However, in both day times, the injury was severe at 10% concentration.

Ammonium sulphate: the effects observed were similar to those of ammonium nitrate.

Hanway solution (with urea); it caused slight leaf burn in both day time. With 50% of this solution (treatment 2), any leaf burn was observed.

Hanway solution (with  $\text{NH}_4\text{NO}_3$ ). Even with 50% of this solution, generalized leaf burn was verified.

Regarding the components of Hanway solution, it can be inferred that the concentrations of potassium sulphate and potassium polyphosphate utilized was not harmful. However, when potassium sulphate was applied with urea, slight leaf burning was observed.

The best day time of the foliar spraying was at early in the morning; it was cloudy until eleven o'clock, whereas, at late noon, it was very hot and dry.

## RESUMO

### EFEITO DO PERÍODO DO DIA DA PULVERIZAÇÃO FOLIAR DE VÁRIAS DOSES DE SOLUÇÕES NPKS NO FEIJOEIRO (*Phaseolus vulgaris*, L.)

Um experimento foi levado a efeito, para determinar o efeito do período do dia na pulverização foliar de várias doses de fontes de nitrogênio, da solução de nutrientes de Hanway e seus componentes, nas folhas do feijoeiro. Os resultados, baseados em observações visuais, indicaram os níveis de cada fertilizante utilizado na pulverização que não causou injúrias, sendo o período da manhã, entre 6 e 7 horas, o melhor.

## LITERATURA CITADA

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