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PROEFSTATION VOOR DE GROENTEN- EN FRUITTEELT ONDER GLAS,
TE NAALDWIJK.

Comparison of soil potassium figures determined in an extract with water
or with Morgan's solution.

door:

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Comparison of soil potassium figures determined in an
extract with water or with Morgan's solution.

M. Mostert and
P.A. van Dijk.

Introduction

At the Horticultural Research and Experiment station at Naaldwijk, the Netherlands, as well as at An Foras Talúntais at Dublin, Eire, samples of glasshouse soils are tested on their nutritional contents.

At Naaldwijk water and at Dublin Morgan's solution is used as the extractant. In order to compare the potassium figures obtained by both methods, a part of the one day charge of routine samples at Naaldwijk was taken apart, and subsequently with Morgan's solution and analysed.

The samples, taken January 1971, were from glasshouses in the Westland area, mostly on marine loamy sands or sandy loams. A few samples came from humous loams in the neighbourhood of Rotterdam.

Characterization of the soil samples

The organic matter content of about two thirds of the samples were in between 5 and 11%, few had lower percentage and one quarter had percentages spread between 11 and 19%.

The average organic matter content was 8.4%

The carbonate content of about two thirds of the samples were in between 0.6 and 2.9%. Halve of the number of the other samples had percentages below 0.4% and halve between 3.0 and 5.9%. The average content was 1.9% CaCO_3 .

About two thirds of the samples had pH (in water) of 6.5 to 7.0. Few samples had a somewhat lower value and a quarter of the samples had values in between 7.0 and 7.4.

The average pH-water was 6.9

The analyzing procedure

The fresh soil samples were dried overnight at 45°C, than ground.

K-water

After mixing the dried soil, about 20 g was shaken during 15 minutes at room temperature with demineralized water in a weight ratio of 1 part of soil and 5 parts of water. Potassium concentration in the filtrate was measured by flame-photometer. The results are expressed in mg K_2O per 100 g dry soil. More details are given by Dekker & Van Dijk (1963).

K-Morgan

After mixing the dried soil, about 10 g was shaken during 30 minutes at room temperature with Morgan's solution in a ratio of 1 to 5 (w/v). Morgan's extractant is a solution of 10% Na-acetate with 3% glacial acetic acid and buffered at pH 4.8 . After filtering, potassium content was measured as indicated above.

The results are expressed in ppm on dry soil. More detail are given by Byrne (1968).

Byrne E. : Methods of analysis. Johnstown Castle (Wexford),
Soil Division of An Foras Talúntais, 1968.

Dekker, P.A. den & P. A. van Dijk : Voorschriften analyse-
methode. Proefstn. Groenten Fruitt. Glas, Naaldwijk,
Intern Rapp. 1963.

FIGURE 1.

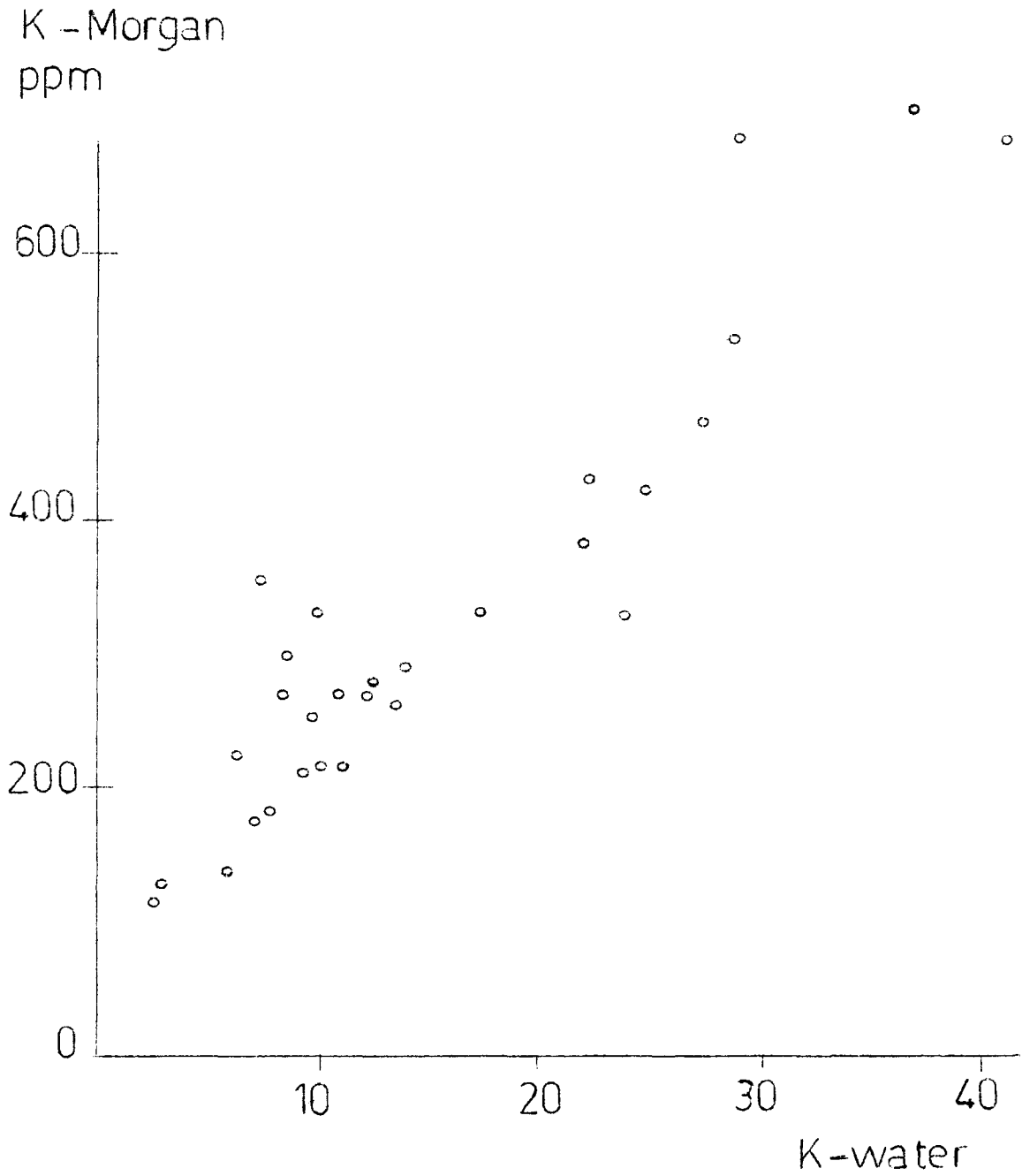


Fig. 1 Relation between K-water and K-Morgan.

Results

A clear linear relationship was found between the results of the potassium determinations according to both methods ($r = 0.93^{++}$), as is shown in fig. 1.

This figure also shows the level of soil potassium in Dutch commercial glasshouses in the beginning of January. The samples with a low potassium content were mostly from glasshouses which had been leached recently or in which lettuce was growing. High levels were found especially in glasshouses with tomatoes or cucumbers.

Formulae

The following formulae can be used for calculating K-Morgan from K-water :

$$\text{K-Morgan} = 15 \times \text{K-water} + 95,$$

and for the reverse the following formulae can be used :

$$\text{K-water} = 0.06 \times \text{K-Morgan} - 3\frac{1}{2} .$$