



SUMMARY

Two independent pot experiments were carried out at the Experimental farm of the Agricultural Botany Department, Faculty of Agriculture at Moshtohor during 1999 and 2000 seasons; to study the effect of two nitrogen sources combined with potassium in the first experiment as well as their separated addition on growth and yield of karkade (Hibiscus sabdariffa L .cv. Dark Red) plant.

Experiments included ammonium nitrate and ammonium sulphate as nitrogen sources in two levels of each source either combined with two potassium levels first experiment or separately were applied (second experiment).

During the growth seasons; three samples (at 37,97& 173 days after sowing) were collected for determination growth and yield characteristics.

The obtained results can summarize as following:

I- Root growth

a- at 37 days after sowing :

Ammonium sulphate at the two applied levels combined with the two K levels gave the highest increase of dry matter accumulation in roots. Also,

increasing N level mostly was accompanied with reduction of the dry matter accumulation. Meanwhile, in case of separated nutrients; K was the first in this respect.

b-at 97 days after sowing :

The ammonium sulphate treatments separately applied or combined with K significantly increased dry matter accumulation more than the all other treatments.

c-at 173 days after sowing :

The ammonium sulphate treatment also gave the highest values of dry matter being accumulated in roots this stage of growth, yet, the lowest values were existed in case of nitrate treatment. Meanwhile, K gave the highest significant increase of this parameter especially in the low level when separately were applied.

II-Vegetative growth

***Shoots (stem)**

a-at 37 days after sowing :

Different treatments separately or in combinations applied significantly increased the dry matter being accumulated in stem at this early stage of growth.

a-at 97 days after sowing :

The ammonium sulphate treatment combined with K was superior regarding dry matter accumulation followed by nitrate at the low level meanwhile its high level did not show any significant effect-while K separated applied gave the highest value followed by ammonium sulphate, yet, nitrate source was the last in this respect.

b-at 173 days after sowing :

Here, also ammonium sulphate gave the highest significant increase in the final dry matter being accumulated at this late stage of growth. In addition, separately K applied exhibited the highest values in this respect.

**** Leaves**

a-at 37 days after sowing :

The treatment of ammonium sulphate at the high level combined with K at the high level gave the highest significant increase of dry matter accumulations in leaves at this early stage of growth, yet, its high level combined with K at the low level did not show insignificant effect. On the other hand, mostly separated significantly increased this parameter.

b-at 97 days after sowing :

The ammonium sulphate combined with K was superior for increasing dry matter accumulation in leaves followed by nitrate form. Meanwhile, different applied separated treatments increased dry matter accumulation in leaves to reach significant level.

c-at 173 days after sowing :

Each of the two N sources separately applied or combined with the two K levels significantly increased dry matter accumulation in leaves in this last stage of growth.

III-Reproductive growth and final yield

*** Dry matter accumulation in fruits / plant:**

Exception, nitrate the high level; rest of treatments significant increased dry matter accumulation in fruits / plant. Meanwhile each of ammonium sulphate and K separately significantly increased this parameter, yet, nitrate was less effective in this respect.

**** Fruit characteristics:**

-Regarding dry matter accumulation either intact fruit or only in sepals; ammonium sulphate was preceding in this respect followed by the nitrate one

mostly at its low level. Also, in case of separated treatment ammonium sulphate and K each alone were the more effective in this respect.

-Concerning, seeds number / fruit; highest significant increase was existed with nitrate treatment, yet, the only K separately applied increased this number to reach the significant level but the two N sources did not.

-Asfor the distribution percentage of dry matter accumulated in fruits or sepals during 1999 season the ammonium sulphate at the low level combined with K also at the low level gave the highest value followed by nitrate combined with K at the low level for each. Nearly the same results were also obtained when the dry matter accumulated in sepals or fruits calculated in relation to the control.

-Also, during 2000 season the ammonium sulphate combined with at the low level for each significantly gave highest increase of both of dry matter distribution percentage and the percentage of increase as related to the control for each of sepals and fruits as well.

-In general, the low level of ammonium sulphate followed by the low level of ammonium nitrate combined with the low level of K for each gave highest significant increases of the economic value (i.e. sepals dry weight) especially at 2000 season. With regard to the separated treatments of different applied nutrients; K was the more effective concerning the economic yield of this plant.

Finally, from the present study it could be concluded that nitrogen is essential nutrient for karkade plant but mostly in low level when growth behaviour and the final economic yields were considered. Also, present study strongly admit the use of K in relatively medium or high rates-to some extent-when compared with nitrogen element.