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EFFECT OF NAPHTHENATES ON SOME PHENOLOGICAL CHARACTERS OF COTTON[1,2]

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Abstract

Using *Gossypium hirsutum* L. (cv. M-100) an experiment was conducted, under pot culture conditions, to study the effect of seed soaking with K-Nap (0.00, 0.01 or 0.05%) and/or spray (0.01, 0.05 or 01.%) made at 60, 70 or on 60 and 70 days after sowing. Maximum flowering occurred between 64-74 days and flower drop was highest between 72-79 days after sowing. Shedding generally occurred within 4-5 days after flower opening and nearly 60% of them dropped at his stage. Seed soaking or spray with K-Nap had no beneficial effect on plant characters studied.

Introduction

Although the use of naphthenates in biological experiments is quite old (Neuberg & Sandberg, 1921) but it was much later that the chemical attracted the attention of plant scientists. Over the past twenty years the investigations of Russian, Bulgarian and Canadian workers have shown that naphthenates possess plant growth stimulating properties. Increase in yield upto the extent of 14-42% alongwith improvement in quality of various crops has been reported (Guseinov *et al.*, 1956; Husseinov, 1960; Ataullaev, 1965; Wort & Patel, 1970; Wort *et al.*, 1973). The present work therefore deals with the use of potassium naphthenate (K-Nap) on cotton.

Material and Methods

Seeds of cotton (*Gossypium hirsutum* L. cv. M-100) were soaked for 24 hr in 0.00 (distilled water), 0.01 or 0.05% K-Nap prior to sowing. The pots were filled with 6.5 Kg of a loamy soil into which a basic dose of nitrogen as $(NH_4)_2\ SO_4$ at 90 Kg N/ha. and T.S.P. at 50 Kg. P_2O_5/ha were thoroughly mixed. After germination one plant per pot was maintained and sprayed with 0.00 (distilled water), 0.01, 0.05 or 0.1% K-Nap solution at 60 and 70 days (single dose) after sowing or at both the times (double dose). The experiment was replicated three times and pots were arranged in a randomized complete block design. Observations were recorded daily regarding flower opening and shedding

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Table 1. Effect of K-Nap spray of seed soaking on cotton.

Seed soaking with K-Nap (%)	SPRAY K-NAP (%) 0		0.01			0.05			0.1		Seed soaking average
	60 & 70	60	70	60 & 70	60	70	60 & 70	60	70	60 & 70	
Number of flowers opened per pot											
0	11	11	14	9	10	11	13	15	14	11	12
0.01	10	10	10	13	11	8	12	11	14	9	11
0.05	12	12	13	13	13	11	13	13	12	11	12
Spray Average.	11	11	12	12	11	10	13	13	13	10	–
Number of flowers dropped per pot											
0	6	7	6	5	7	7	6	10	8	7	7
0.01	5	5	6	9	5	5	6	6	8	5	6
0.05	9	9	6	7	6	5	7	9	6	7	7
Spray Average.	7	7	6	7	6	6	6	8	7	6	–
Days from sowing to flowering											
0	66	69	69	67	70	65	65	70	69	67	68
0.01	69	70	67	71	71	68	68	72	68	66	69
0.05	70	68	67	71	66	68	68	71	70	66	69
Spray Average.	68	69	68	70	69	67	67	71	69	66	–

Days from flowering to shedding											
0	3	5	4	4	4	4	5	4	5	4	4
0.01	4	4	4	5	4	5	4	4	5	5	4
0.05	4	4	4	4	5	4	5	3	4	5	4
Spray Average.	4	4	4	4	4	4	5	4	5	5	–
Seed cotton yield (Dry wt. g/pot)											
0	11.2	8.9	10.0	10.6	9.2	10.3	10.9	10.5	10.9	11.6	10.4
0.01	10.4	8.7	9.2	9.0	10.0	7.9	10.6	8.9	9.4	11.7	9.8
0.05	10.5	12.4	10.8	8.8	10.2	8.0	11.7	8.0	9.9	9.7	10.0
Spray Average.	10.7	10.0	10.0	9.5	9.8	8.7	11.1	9.1	10.1	11.0	–
Dry weight of plants (Dry wt. g/pot)											
0	28.5	29.3	27.3	27.7	26.7	27.2	26.7	30.2	26.8	27.2	27.8
0.01	25.2	25.0	25.8	26.5	28.2	29.0	28.0	25.3	28.3	26.7	26.8
0.05	30.0	28.5	27.7	30.8	28.5	29.0	28.3	27.7	29.8	25.8	28.6
Spray Average.	27.9	27.6	26.9	28.2	27.8	28.4	27.7	27.7	28.3	26.6	–
Height (cm).											
0	39.5	40.3	38.5	39.2	41.0	39.3	44.2	43.8	42.3	38.0	40.6
0.01	35.6	39.5	40.2	44.0	40.6	39.2	41.5	41.2	43.5	40.5	40.6
0.05	40.9	40.3	44.2	46.0	41.8	40.5	42.2	40.8	45.3	42.3	42.4
Spray Average.	38.9	40.0	41.0	43.1	41.1	40.0	42.6	41.9	43.7	40.3	–

from the date of appearane of the first flower. Seed cotton was picked and stored in separate bags at appropriate times. Height as well as dry weight of plants was recorded at the termination of experiment.

Results and Discussion

Data on the number of flowers opened or dropped, irrespective of the K-Nap treatment, during the growth period show that nearly 60% of the flowers dropped after opening (Fig. 1). Flowering started at 52 days from sowing which gradually increased and was maximum during the period of 64-74 days after sowing. The maximum number of flowers opened on a single day was 63 which occurred on the 72nd day after sowing. After the peak flowering period (64-74 days) its opening gradually decreased. The first shedding occurred at 64th day and reached its maximum during the period 72-79 days after sowing. Maximum shedding (60%) was observed between 72nd and 76th day.

There was generally no significant effect of seed soaking or spray on the number of flowers opened or dropped except in plants sprayed with 0.1% K-Nap at 60 or 70 days after sowing. At this treatment and stage of growth there was a slight increase in the number of flowers (Table 1). Number of days from sowing to flowering or flowering to shedding was not affected due to any of the treatments administered (Table 1). It is interesting to note that shedding generally occurred within 4-5 days after flower opening and

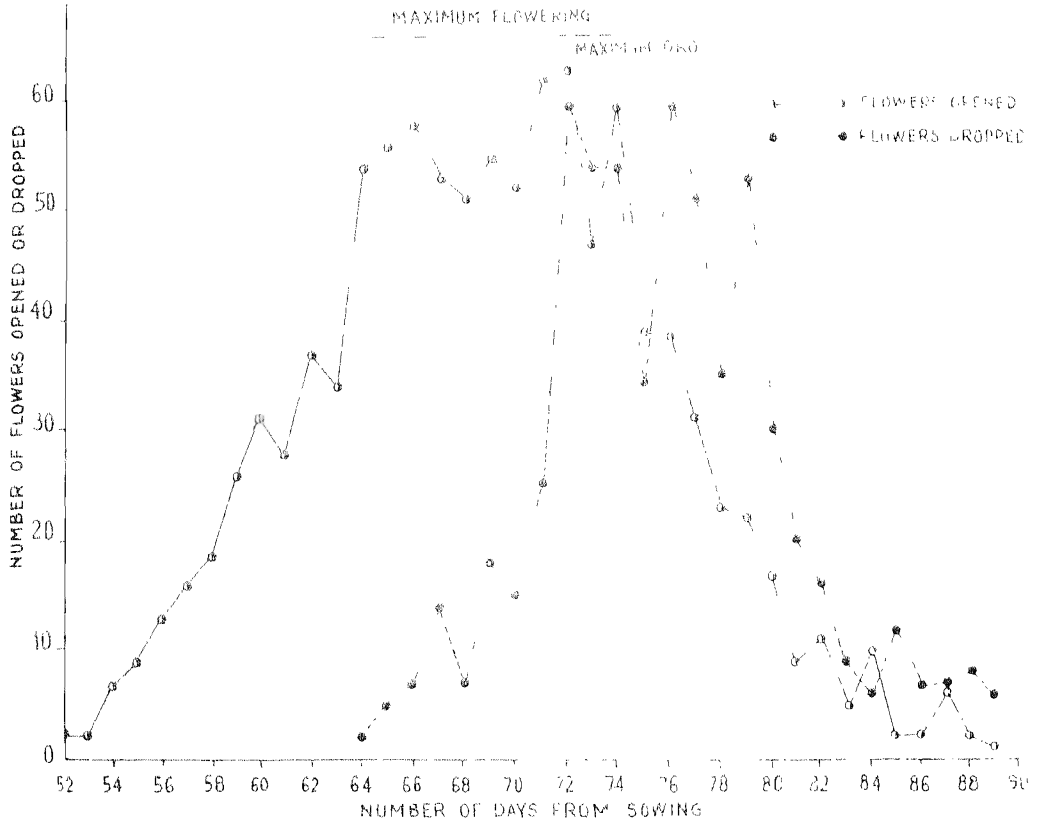

Fig. 1. Flowering pattern of cotton (cv. M 100) during its life cycle

those which survived this critical period lasted till the crop was harvested. Similarly there was no effect of K-Nap treatments on seed cotton yield, dry weight or height of plants at maturity (Table 1).

A variety of plants have been reported to be beneficially affected by naphthenates (Ansari *et al,* 1978). The time, dose and mode of K-Nap application may vary with crop or even within one crop. Under the present experimental conditions no beneficial effect of K-Nap treatment on cotton was observed. This lack of response may have been due either to the concentrations used or the time of application which may not have been suitable. However, the study has provided very useful phenological information on the cultivar tested.

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