
PHYSIO-MORPHIC INFLUENCE OF ALDICARB (TEMIK) 10G ON PAULOWNIA TOMENTOSA, PFI NO.19.

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ABSTRACT

Granular insecticide Temik 10G (Aldicarb) was used in five doses of 0.0 (control), 0.4, 0.8, 1.6 and 3.2 g/plot (1.33sq. ft.) to evaluate any phytotoxic or phytotonic impact on *Paulownia tomentosa* PFI No. 19, at nursery stage. Measurements of parameters recorded one month and twenty days after treatment were plant height, number of leaves per plant, fresh weight of leaves, fresh weight of stem, dry weight of leaves, dry weight of stem and percent dry matter. Five plants per treatment were selected at random, then data were converted on per plant basis. Plant height was the only parameter which significantly increased in response to Temik, while others were non-significant. Temik 10G at the dose of 3.2 g/plot increased 32.13 percent plant height over control.

INTRODUCTION

Systemic insecticides used for insect pest control are absorbed by plants into cell sap stream and translocated to various systems of plants. These absorbed chemicals become part of plant body and bring about changes in the physiology and morphology of the plant. These changes may be phytotoxic (negative impact) or phytotonic (Positive impact). Jones et al. (1986), reported that the subtle non-visible effects of pesticides on the crop physiology and its yield has generally been ignored by the entomologists, responsible for developing pesticide recommendations. Granular

insecticides being systemic are the pesticides which have conspicuous impact on physio-morphic characters of plants.

Chaudhry and Shah (1972) testing Bidrin injections by implanting into phloem region of poplar stem against bark borer, *Melanophila picta* Pall observed that growth in height as well as in girth in treated poplar trees was significantly more than healthy untreated trees. This was attributed to the favourable effect of systemic organophosphate compound (Bidrin) on the vigour and vitality of treated trees. The increase in growth was significantly related to the amount of Bidrin implanted. Similarly Heungens (1974) used aldicarb on container-grown, *Chamaecyparis lawsoniana* columnaris and found a pronounced stimulation of plant growth. Oetting et. al (1980) used eight insecticides, acephate, aldicarb, chlorpyrifos, fenvalerate, methidathion, methomyl, oxamyl and pirimicarb to evaluate their phytotoxic effect on *Pinus canariensis* (Pine), *Thuja orientalis* (Oriental arborvitae), *Ulmus parvifolia* (chinese elm), *Ficus retusa* (Indian laural), *Berberis thunbergi* (Japanese barberry) *Pittosporum tobira* (Japanese pittosporium), *Pyracantha coccinea* (Firethorn), *Ilex cornuta* (Burford holly), *Euonymus japonica* (Japanese spindle tree), *Ligustrum japonicum* (Japanese privet), *Lagerstromia indica* (Crape myrtle) and *Nerium oleander* (Oleander). Phytotoxicity did not result at the lowest dose rate, but that was observed at higher rates. They also found severe damage occurred on *N. oleander* treated with chlorpyrifos at the highest rate.

Similarly Regupathy and Subramanian, (1981) observed that application of aldicarb granules to the soil at sowing or 45 or 90 days after sowing cotton crop, increased the plant-height and seed-cotton yield but delayed maturity. They also found that due to the insecticide application, ginning percentage was decreased but the seed weight was increased. Womack and Schuster (1986), tested the positive growth response of cotton (*Gossypium hirsutum*), treated with aldicarb. They took growth parameters, like, number of squares, leaf area, plant wet weight and percent dry-matter and regressed them against the rate applied, the square of the rate applied and interaction of rate and date of application. They did not find any positive growth response on cotton rather, a negative response was found for the leaf area, wet weight and percentage dry matter to rates of aldicarb and interaction of rate and date of application. The number of squares was negatively correlated with the square of the rate applied.

Atkinson et al. (1991) applied aldicarb by sprinkling on the soil surface, 1-2 week after planting of Eucalyptus spp. They measured plant height at about one year old trees and found significant increase in that at the dose of 1.3g active ingredient per tree.

Present studies were undertaken with Temik 10G (aldicarb) in different dose rates on

Paulownia tomentosa PFI No. 19, being in its preliminary trials of introduction in Pakistan.

MATERIALS AND METHODS

Paulownia tomentosa PFI No. 19 was sown in December, 1992 and the seedlings were transplanted in plastic tubes in March 1993. One month and 25 days after transplanting, seedlings were treated in tubes with five doses of aldicarb (per plot of 1.33 sq.ft.) 0.00 (control), 0.4, 0.8, 1.6 and 3.2g including control by mixing the insecticides in sand in each tube. Experiment was laid out in RCB design with five treatments and replicated four times. One month and 20 days after treatment, observations on plant height, number of leaves per plant, fresh weight of leaves, dry weight of leaves, fresh weight of stem, dry weight of stem and percent dry matter were taken. All measurements were recorded on five plants per treatment and presented in mean values per plant.

RESULTS AND DISCUSSION

Data on seven physio-morphic characters of *Paulownia tomentosa* PFI No. 19, viz., plant height, number of leaves per plant, fresh weight of leaves, fresh weight of stem, dry weight of leaves, dry weight of stem and percent dry matter, treated with Temik 10G are presented in table 1.

Table 1. Physio-morphic influence of Aldicarb (Temik) 10G on *Paulownia tomentosa* PFI No. 19.

Treat-ments		PARAMETERS					
g/plot	plant height (cm)	No.of leaves	F.Wt.of leaves (g)	F.Wt.of stem (g)	Dry Wt.of Leaves (g)	Dry Wt.of stem (g)	% Dry matter
	**	ns	ns	ns	ns	ns	ns
0.4	33.23 bc	8.05	24.7	17.93	5.23	3.98	22.23
0.8	36.70 ab	8.05	27.6	19.90	6.48	4.03	22.81
1.6	37.80 ab	8.00	25.13	19.63	5.63	4.25	23.22
3.2	40.63 a	8.10	26.33	20.45	5.53	4.53	23.05
control	30.75 c	7.75	25.75	15.40	5.48	3.48	21.82

** = Significant at 1% level.

ns = Non-significant

- = Figures sharing same superscription are non-significant

A perusal of the table shows that the increment in plant height was significantly more in treated plots than in control. Temik 10G at the rate of 3.2 g/plot gave maximum increase (40.63 cm), followed by 1.6 g/plot (37.80 cm), 0.8 g/plot (36.70 cm) and 0.4g/plot (33.23 cm). The influence of three higher doses 3.2 gm, 1.6 g and 0.8g per plot was not significant among themselves. Similarly per plot dose rates of 1.6 g, 0.8g and 0.4g showed non-significant response

among themselves. The difference between the lowest dose (0.4g/plot) and control was insignificant.

The effect of Temik 10G at the given dose rates on the remaining six physio-morphic parameters of *P. tomentosa* PFI No. 19 was negligible. The percent increase or decrease, however, in various parameters under observation over control is presented in table 2.

Table 2. Mean percent Impact of Aldicarb (Temik) 10G on *Paulownia tomentosa* PFI No. 19

Treat- ments	P A R A M E T E R S						
	g/ plot	Plant height	No.of leaves	F.Wt.of leaves	F.Wt.of stem	D.Wt.of leaves	D.Wt.of stem
0.4	8.07	3.87	-4.08	16.43	-4.56	14.37	1.88
0.8	19.35	3.87	7.18	29.22	18.25	15.8	4.54
1.6	22.93	3.23	-2.41	27.47	2.74	22.13	6.87
3.2	32.13	4.52	2.25	32.79	0.91	30.17	5.64

Temik 10G at the rate of 3.2 g/plot increased 32.13 percent plant height over control was highly expressive. Similarly, 22.93% increase in plant height was recorded over control against Temik 10G 1.6 g/plot. This addition in the height was considerable over control but negligible with higher dose, (3.2 g/plot). The test insecticide at the rate of 0.8 g/plot and 0.4 g/plot enhanced plant height to the extent of 19.35% and 8.07%, respectively. The latter, increase, however, was not significant.

The number of leaves per plant, fresh and dry weight of stem and percent dry matter, though, were non-responsive, yet a regular pattern in changes was observed. These 4 parameters correlated positively to test doses. The maximum and minimum increases against the highest and lowest doses in number of leaves, fresh weight of stem, dry weight of stem and percent dry matter were, 4.52, 32.79, 30.17 and 5.64 ; and 3.87, 16.43, 14.37 and 1.88 percent, respectively. Fresh weight of leaves and dry weight of leaves, showed non-significant response to 10G Temik, but to lower dose (0.4 g/plot) gave negative response (-4.08%).

Above results clearly depict that Temik 10G at higher dose rates has profound effect on

plant height, while that in lower doses has marginal effect. The increase and dose rates correlated positively to each other, increase in dose increased plant height and vice versa. The rest of the six parameters were non-responsive at all test doses.

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