



Evaluation of Application Methods with Imidacloprid for Controlling Cotton Aphid Cucumber under Greenhouse Farming

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Introduction

Cucumber has widely being cropped to meet the ever-increasing demands for fresh or processed vegetables throughout seasons all over the country. The crop has to be protected from diseases and insect pests by applying crop protection agents due to favorable environment for them under greenhouse farming in particular

Objectives

From the point of view of application methods this study was aimed to reduce the amount of imidacloprid for aphid control by in cucumber under greenhouse farming

Materials & Methods

- Crop : cucumber - planting date : April 12 , initiate date of harvesting : May 17
- Pest & Pesticide : cotton aphid & imidacloprid ; 2% granule(GR), 8% suspension concentrate(SC) , 10% wettable powder(WP)
- Applications - planting time : soil incorporation(GR ; 20 mg a.i./plant) , drip irrigation(SC ; 10, 20 mg a.i./plant)
 - harvesting season : foliar spray(WP ; 5 mg a.i./plant) , drip irrigation(SC ; 2.5, 5, 10, 20 mg a.i./plant)
- Investigation of control value: Remove upper leaf → Lay on culture medium → Inoculate the leaf against cotton aphids → Calculate the survival ratio
- Analysis of residue : HPLC/UVD, detection wavelength 270 nm

Results & Discussion

Soil incorporation of the granule formulation at planting time of the cucumber seedlings with dose of 20 mg/plant maintained 17.4mg/kg of the residue level in upper leaf of the plant seven days after treatment. More than 80% of efficacy on the aphids was lasted until harvesting time of the fruit, while the residue amount in the harvest was 0.034 mg/kg. Meanwhile, the residue level in upper leaf of the plant applied by foliar spray of wettable powder with dose of 5 mg/plant during harvesting season was kept 8.78 mg/kg one day after application and then fell sharply. Efficacy on aphid seven days after spray was only 47%, but residue level in the harvested fruits was 0.114 mg/kg. The residue in upper leaf and in the harvested fruit applied by drip irrigation of suspension concentrate(SC) with 10 mg/plant dose at planting time was recorded 0.41 and 0.023 mg/kg, respectively. Eighty or more % of efficacy on the aphid was conserved by harvesting time. On the other hand, 5 mg/plant dose by drip irrigation of SC during harvesting season gave residue level of 0.62 mg/kg in the leaf and 0.009 mg/kg in the fruit, and 64% of efficacy ten days after treatment. In consequent, drip irrigation of the insecticide for the aphid control in cucumber under greenhouse farming was able to reduce pesticide input by 50% from soil incorporation at planting time or 30% from foliar spray during harvesting season without any demerits. In addition, it is anticipated that labor saving for pesticide application practice and exposure curtailment to workers under enclosed structure as well as environment were achieved.

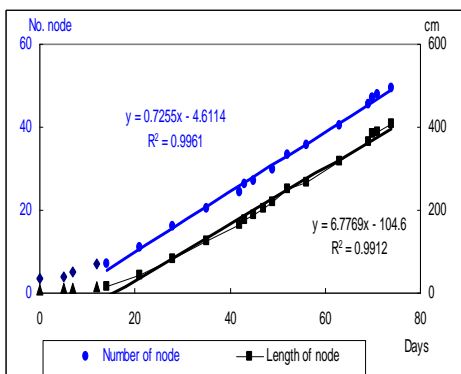


Fig. 1. Change of number and length of node in cucumber plant after transplanting.

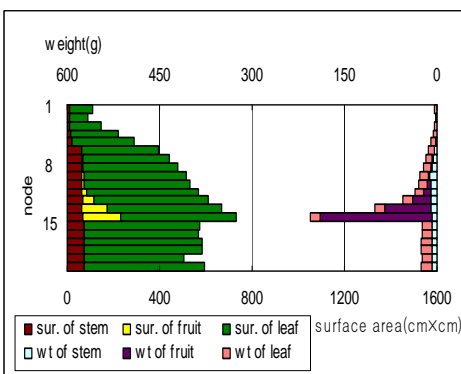


Fig. 2. Distribution of surface area and fresh weight of cucumber plant in harvest season.

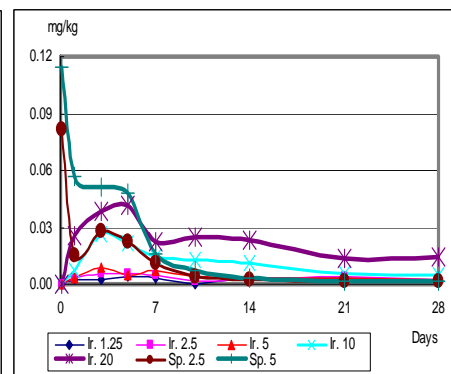


Fig. 3. Change of residue of imidacloprid in the fruit by applications at harvest season.

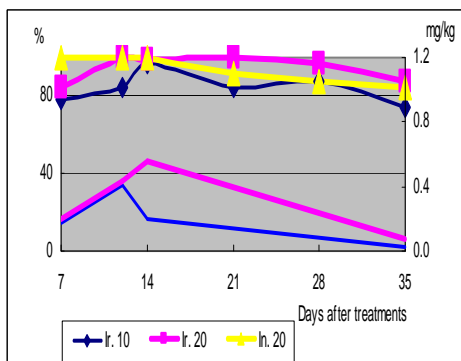


Fig. 4. Control effects on the cotton aphid and residue of imidacloprid in upper leaves by applications at planting time.

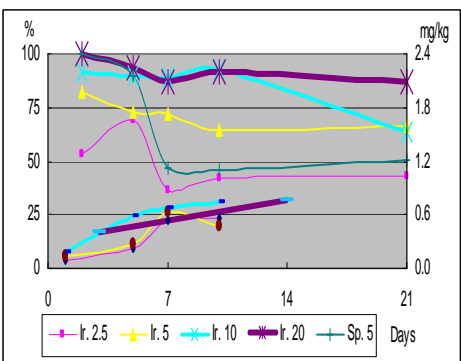


Fig. 5. Control effects on the cotton aphid and residue of imidacloprid in upper leaves by applications at harvest season.

Appli- cation time	Application (mg a.i.)	Residual effect (days)	Decreasing rate(%)
Planting time	In. 20	35	100 (basic)
	Ir. 10	35	50
	Ir. 20	35	100
Harvest season	Ir. 20	28	100
	Ir. 10	14	100
	Ir. 5	10	70
	Ir. 2.5	5	70
	Sp. 5	7	100(basic)

Table 1. Residual effects of imidacloprid on cotton aphid and decreasing rate by application of drip irrigation.

* In.:soil incorporation, Ir.:drip irrigation, Sp.:foliar spray

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