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PEST CONTROL PRODUCTS BOARD

Guidelines For Efficacy and Crop Safety Data Extrapolation





Cut Flowers

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Contents

Efficacy and Crop Safety guidelines	.2
Cut Flowers	.2
Introduction	.2
Indicator pests and representative commodities for extrapolation of efficacy data in cut flowers commodity group	. 2
Indicator pests and representative commodities for extrapolation of crop safety data in Cut flower group (herbicides, fungicides, insecticides, seed treatment, etc.)	.3
Table 1: Diseases on Cut Flowers (Group I)	.4
Table 2: Insects/Mites on Cut Flowers (Group I)	.6
Table 3. Nematodes in cut flowers	.8

Efficacy and Crop Safety guidelines

Cut Flowers

Introduction

Horticulture sub-sector is one of the top foreign exchange earners for the country contributing to the national GDP. Flower exports contribute the highest percentage compared with fruits and vegetables. It has grown in significance to a vibrant flower industry worldwide, making Kenya the leading exporter of rose cut flowers to the European Union (EU). It is estimated that in Kenya, over 500,000 people, including over 100,000 flower farm employees depend on the floriculture industry impacting over 2 million livelihoods. The main production areas are around Lake Naivasha, Mt. Kenya, Nairobi, Thika, Kiambu, Athi River, Kitale, Nakuru, Kericho, Nyandarua, Trans Nzoia, Uasin Gishu and Eastern Kenya. The main cut flowers grown in Kenya are roses, carnations, and Alstromeria. Other flowers cultivated include, Gypsophilla, Lilies Eryngiums, arabicum, hypericum, Statice, a range of summer flowers amongst many others.

Currently, agrochemical companies have to generate efficacy data for every crop/pest combination for purposes of registration, making it very expensive and sometimes growers lack necessary tools to manage pests and diseases. This guideline provides for crop grouping and data extrapolation to facilitate efficacy data generation in cut flowers.

Indicator pests and representative commodities for extrapolation of efficacy data in cut flowers commodity group

Globally, flower crops are minor crops, with very limited hectarage. However, these crops are of high value in Kenya, they constitute more than two thirds of the export value of horticultural commodities. For instance in 2020, floriculture industry contributed KES 108.7 billion through export earnings. Despite, economic significance lack of appropriate registered PCPs has been identified as main challenge faced by grower of cut flowers.

Cut flowers are minor crops in the world and currently there are no guidelines for efficacy data extrapolation. These guidelines propose crop groups to enable extrapolation of efficacy data for cut flowers plants. Indicator crops within cut flowers were selected from range of cut flowers grown in Kenya to align the guideline to the principles of data extrapolation as guided by EPPO. Recognizing that most cut flowers plants are considered "minor crops", flower groups with some similarities to other cut flowers as adopted from Kenya Flower Council Certification Scheme, were identified as indicator crops. Pests and diseases were also identified in the indicator flower groups as representative species for the efficacy trials. Data generated for the identified crop/pest combination can be used for extrapolation to various cut flowers in column 6. For details, refer to the extrapolation tables.

Cut flowers have different growth habit, canopy sizes and GAPs from the representative indicator crops in the efficacy tables. In order to ensure adequate coverage of the crop with the pesticide during application and to reduce incidences of residues, applicants are advised to carry out calibrations for the various cut flowers to establish appropriate spray volumes per hectare. This

information will be used together with the dosage established through efficacy trials on the representative crop and/ or species for extrapolation.

Note: Use of herbicides for management of weeds in cut flowers and ornamental plants is generally not recommended in many countries due to market restrictions. As such guidelines on herbicide use in flowers is omitted and these may be considered in the future.

Indicator pests and representative commodities for extrapolation of crop safety data in Cut flower group (herbicides, fungicides, insecticides, seed treatment, etc.)

Phytotoxicity is particularly relevant to all products (herbicides fungicides, insecticides, bactericides, miticides, molluscicides, avicides and nematicides) some types of applications and some for specific variety. It can vary considerably between different crop species, cultivars/variety of the same crop, and between different plant protection products. Crop safety extrapolation in cut flowers would be difficult because sensitivity varies greatly even within varieties of the same species.

Table 1 below shows the indicator diseases and indicator crops in the cut flower group and possible areas of extrapolation. Table 2 shows the indicator insect/mites and indicator crops in the cut flower group and possible areas of extrapolation. Table 3 shows the indicator nematodes and indicator crops in the cut flower group and possible areas of extrapolation.

Table 1: Diseases on Cut Flowers (Group I)

Roses; Carnation; Clematis; Alstroemeria; Allium; Ammi majus; Antirrhinum spp.; Ammi spp.; Crocosmia (Montbretia); Gerbera (Germin); Begonia; Bupleurum; Iris; Carthamus; Chrysanthemum; Cofrena; Gompherna; Gypsophylla; Heliconia; Lisianthus; Molucella; Phlox; Scabiosa; Snap Dragon; Sunflower; Stock; Lathyrus; Lavender; Limonium; Solidago; Solidaster; Statice; Astrantia (Masterwort); Celosia (Coxcomb); Craspedia; Delphinium; Dianthus; Eryngium; Aster; Hypericum; Ruscus ; Anthurium; Orchids; Helleborous; Astilbe.

Pests		Crops: within Cut flowers		Crops: outside Cut flowers	
1	2	3	4	5	6
Pathogen species	Disease group name	Indicator crops	Extrapolation to other crops	Data from these crops on the same pathogen can support the indicator crops(reduced data or no data *)	Extrapolation to crops(reduced or no data*)
<u>Podosphaera</u> <u>pannosa</u> Erysiphe polygoni	Powdery mildew	Roses	Statice, Solidago, Aster, Carnations, Gypsophylla, Chrysanthemum, Phlox, Scabiosa, Limonium,		
<u>Peronospora sparsa</u> Peronospora statices	Downy mildew	Roses	Statice, Sunflower, Snap Dragon, Gypsophylla Chrysanthemum,		
<u>Botrytis cinerea,</u>	Botrytis blight	Roses	Alstroemeria, Carnations, Statice, Gypsophylla, Lisianthus,		

Pests		Crops: within Cut flowers		Crops: outside Cut flowers	
1 Pathogen species	2 Disease group name	3 Indicator crops	4 Extrapolation to other crops	5 Data from these crops on the same pathogen can support the indicator crops(reduced data or no data *)	6 Extrapolation to crops(reduced or no data*)
<u>Uromyces dianthi</u> Uromyces spp Phragmidium mucronatum	Rust	Carnations	Statice, Solidago, Snap Dragon, Roses Hypericum		
<u>Fusarium</u> <u>oxysporum f.sp</u> <u>dianthi</u> Fusarium spp.	Fusarium wilt	Carnations	Roses, Statice, Gypsophylla, Lisianthus, Limonium		
Phytophthora spp, Pythium spp	Root rot	Carnations	Roses, Alstroemeria, Gypsophylla, Statice		
Rhizoctonia spp Sclerotium spp, Verticillium ssp	Other Root rot	Carnations	All Cut flower,		
Diplocarpon rosae	Black spot	Roses	Rose varieties		

Table 2: Insects/Mites on Cut Flowers (Group I)

Roses; Carnation; Clematis; Alstroemeria; Allium; Ammi majus; Antirrhinum spp.; Ammi spp.; Crocosmia (Montbretia); Gerbera (Germin); Begonia; Bupleurum; Iris; Carthamus; Chrysanthemum; Cofrena; Gompherna; Gypsophylla; Heliconia; Lisianthus; Molucella; Phlox; Scabiosa; Snap Dragon; Sunflower; Stock; Lathyrus; Lavender; Limonium; Solidago; Solidaster; Statice; Astrantia (Masterwort); Celosia (Coxcomb); Craspedia; Delphinium; Dianthus; Eryngium; Aster; Hypericum; Ruscus ; Anthurium; Orchids; Helleborous; Astilbe.

Pests		Crops: within Cut flowers		Crops: outside Cut flowers	
1 Insect/mite species	2 common name	3 Indicator crops	4 Extrapolation to other crops	5 Data from these crops on the same pathogen can support the indicator crops (reduced data or no data *)	6 Extrapolation to crops (reduced or no data*)
<u>Frankliniella spp</u> . <u>Thrips tabaci</u> <u>Scirtothrips dorsalis</u>	Thrips	Roses or carnations	Carnation Gypsophylla Lisianthus and all relevant cut flowers		
<u>Tetranychus urticae</u>	Mites	Roses	Carnations Gypsophylla Lisianthus and all relevant cut flowers		
<u>Trialeurodes</u> <u>vaporariorum</u> Bemisia tabaci	Whiteflies	Roses	Carnations Gypsophylla Lisianthus and all relevant cut flowers		

Pests		Crops: within Cut flowers		Crops: outside Cut flowers	
1	2	3	4	5	6
Insect/mite species	common name	Indicator crops	Extrapolation to other crops	Data from these crops on the same pathogen can support the indicator crops (reduced data or no data *)	Extrapolation to crops (reduced or no data*)
<u>Macrosiphum rosae</u> , Acythrosiphon rosae Myzus persicae	Aphids	Roses or or Gypsophylla	Carnations Gypsophylla Lisianthus and all relevant cut flowers		
<u>Thaumatotibia</u> <u>leucotreta</u>	False codling moth	Roses	All relevant cut flowers		
<u>Helicoverpa armigera</u> Spodoptera spp.	Caterpillars	Roses	All relevant cut flowers		
<u>Planococcus citri</u> Planococcus kenyae	Mealybugs	Roses	All relevant cut flowers		
<u>Phyllophaga spp</u>	Soil insect pests eg grubs or cut worms	Carnations or Gypsophylla	All relevant cut flowers		

Pests		Crops: within Cut flowers		Crops: outside Cut flowers	
1 Insect/mite species	2 common name	3 Indicator crops	4 Extrapolation to other crops	5 Data from these crops on the same pathogen can support the indicator crops (reduced data or no data *)	6 Extrapolation to crops (reduced or no data*)
Liriomyza spp	Leafminer	Lisianthus or Alstroemeria;	All relevant cut flowers		

Table 3. Nematodes in cut flowers

		Crops within cut flowers			
1	2	3	4	5	6
Pest spp	Pest group name	Indicator crop	Extrapolation to other crops	Data from these crops can support the indicator crops (reduced data or no data *)	Extrapolation to other crops (reduced or no data*)
Meloidogyne spp.	Root knot nematodes	Carnations	Roses and any other relevant cut flowers		
Pratylenchus spp.	Lesion nematodes	Roses	Carnations and any other relevant cut flowers		