

**Phytosanitary treatments**  
**Traitements phytosanitaires**

## **Disinfestation of production site against *Bemisia tabaci***

### **Specific scope**

This standard describes a treatment programme aimed at eradication of *Bemisia tabaci* in those parts of the EPPO region where it is not established, or for eradication of new and invasive biotypes. It is recognized that not all treatments (active substances) will be available in EPPO countries and emergency procedures (special restrictions) may be required to permit implementation of such an intensive treatment programme. A risk assessment of this programme will need to be made by individual countries in order to assess a particular situation. The programme may be adapted according to the national availability of the active substances and resistance profile of the pest.

### **Specific approval and amendment**

First approved in 2009–09.

### **Introduction**

*Bemisia tabaci* (Hemiptera: Aleyrodidae – EPPO A2 list), the tobacco whitefly, is a highly polyphagous pest, capable of introducing and vectoring a wide range of plant viruses, many of which are not present in EPPO countries. *B. tabaci* is very widely distributed in Africa, Asia, Australasia, Central America and also in several South American countries and in the southern parts of North America (EPPO/CABI, 1997). Hosts include a very wide range of protected ornamental and vegetable crops. Some European countries remain free of the pest and maintain protected zones under Annex I-B of the Plant Health Directive (2000/29/EC). There are also a number of special requirements in Annex IV of the Plant Health Directive, for appropriate treatments aimed at eradicating *B. tabaci* populations. Details on the identification are given in EPPO Diagnostic protocol PM 7/35 *Bemisia tabaci* (OEPP/EPPO, 2004).

### **Commodities/regulated articles**

Protected ornamental plants and shrubs.

### **Pest**

*Bemisia tabaci* (BEMITA).

### **Treatment schedule**

Treatment name: disinfestation of production site for ornamentals  
Treatment type: insecticide (physical and chemical)  
Application: spray, fogs, space treatment, soil drench, granular application.

#### **a. Schedule**

- (i) Apply *at least* one foliar spray and one space treatment per week, with a second foliar spray per week if possible. N.B. The second foliar spray may replace the space treatment if there are concerns over phytotoxicity.
- (ii) Apply a soil drench or granular application with systemic action, which should provide longer lasting protection against all feeding stages of the pest.

Week	Foliar spray 1	Foliar spray 2	Space treatment	Soil drench
1	Neonicotinoid	IGR	Active substance A	Neonicotinoid*
2	IGR	Antifeedant	Active substance B	
3	IGR	Antifeedant	Active substance C	
4	Neonicotinoid	IGR	Active substance A	
5	Ovicide	Antifeedant	Active substance B	
6	Neonicotinoid	IGR	Active substance C	

\*If plants have received a neonicotinoid drench, either do not spray with another neonicotinoid during this phase, or only use a single spray, i.e. avoid repeating applications of active substances with the same mode of action.

### b. Active substances (see note 1)

All active substances below are listed in Annex I of EU Directive 91/414/EEC. Other active substances may be available in non-EU countries.

*Foliar sprays* (see note 2)

Neonicotinoids = imidacloprid, thiacloprid, acetamiprid, thiamethoxam, clothianidin

Insect growth regulators (IGR) and juvenile hormone mimics = buprofezin, teflubenzuron, pyriproxyfen, novaluron (see note 3);

Ovicidal active substances = spiromesifen;

Antifeedant = pymetrozine;

Physical action = products based on, or containing, plant extracts, starch and plant oils, hydrated propylene glycol alginate, potassium phosphate.

*Space treatments* (see note 4)

Pirimiphos-methyl, deltamethrin fogs.

*Soil treatments* (see note 5)

Thiamethoxam, clothianidin, imidacloprid, oxamyl.

### c. Treatment conditions

A combination of a neonicotinoid active substance with an insect growth regulator (IGR) is recommended in order to target each of the life stages of *B. tabaci*. Neonicotinoids target all feeding stages, particularly first instar larvae and adults. However, a systemic product can take a number of days to take effect, so it is recommended that an IGR is applied between the first two applications of a foliar neonicotinoid spray. IGRs such as buprofezin and teflubenzuron target the immature stages ('scales'). To avoid

resistance developing, no more than two or three applications of a neonicotinoid insecticide should be made per crop. If circumstances permit, additional treatments of pymetrozine can be applied, as required, and will assist in resistance management. Pymetrozine is effective against adult whitefly. Space treatments, i.e. a fog or a smoke, target adults which are in flight, or resting in sites away from the crop, and should be applied as part of the clean-up procedure in glasshouses free from planting material.

### Efficacy of treatment

Applications of insecticides according to this treatment schedule have been found to be successful in eradicating outbreaks of *B. tabaci* on ornamental nurseries in the UK (Cannon *et al.*, 2005).

### Notes

1. Effective coverage of upper and lower leaf surfaces is important to ensure all of the pest population is targeted. If the glasshouse temperature is maintained below 12°C, the pest is less active and so chemical treatments are unlikely to be effective and so are they are not recommended.
2. For details of mode of action see Insecticide Resistance Action Committee (IRAC) Mode of Action Classification scheme (<http://www.irac-online.org/>)
3. Decision regarding the Annex I listing for the active substance 'novaluron' is pending.
4. These active substances should be used in rotation to prevent resistance. Opportunities for repeated applications will vary according to the label instructions and specific regulations in different countries.
5. If available in Europe as soil treatments.

### References

- Cannon RJC, Eyre D, MacLeod A, Matthews L, Malumphy C, Cheek S, Bartlett PW (2005) Interceptions and outbreaks of *Bemisia tabaci* in the UK. In: *The BCPC International Congress – Crop Science & Technology. Congress Proceedings* Vol. 2, pp. 1007–1012. Glasgow (GB).
- EPPO/CABI (1997) *Bemisia tabaci. Quarantine Pests for Europe*, 2nd edn, 121–127. CAB International, Wallingford (GB).
- OEPP/EPPO (2004) EPPO Standard PM 7/35 diagnostic protocol for *Bemisia tabaci*. *Bulletin OEPP/EPPO Bulletin* 34, 155–157.

### Enquiries

Central Science Laboratory, Sand Hutton, York, YO41 1LZ (GB).