

Data Sheets on Forest Pests

## *Phyllonorycter issikii*

### IDENTITY

- Name:** *Phyllonorycter issikii* (Kumata)  
**Synonym:** *Lithocolletis issikii* Kumata  
**Taxonomic position:** Insecta: Lepidoptera, *Gracillariidae*  
**Common name:** Lime leaf miner (English); Липовая минирующая моль-пестрянка (Russian).  
**Bayer computer code:** PRYCIS

### HOSTS

Larvae of *P. issikii* make folded mines in the lower side of leaves of *Tilia* spp (preferred host). The native hosts in the Far East are, *T. cordata*, *T. amurensis*, *T. mandshurica*, *T. maximowicziana* and other *Tilia*, but also *Betula platyphylla* (Ermolaev, 1977; Kozlov, 1991; Orlinskii *et al.*, 1991b). In the West of Russia, *Tilia cordata* is the preferred host (and also where it is introduced in the East). *P.issikii* has not specifically been recorded on *Tilia platyphyllas* or the hybrid *T europea*, most widely oplanted in western Europe.

### GEOGRAPHICAL DISTRIBUTION

**EPPO region:** Lithuania (recently introduced), Russia (South of the Far East; South and centre of the European part – introduced: cities of Voronezh, Samara, Ufa, Moscow and their vicinities), Ukraine (introduced).

**Asia:** Korea, Russia (South of the Far East), Japan (Kumata *et al.*, 1983; Kozlov, 1991; Orlinskii *et al.*, 1991).

**EU:** Absent.

### BIOLOGY

The caterpillars of the first generation of *P. issikii* pupate in the second half of June; moths fly from the end of June till the middle of July. The second generation develops from the end of July till the end of August; moths fly from the middle of August till the beginning of September. Folded mines are located on the lower side of leaves. Mines of the first generation mainly occur on leaves at the base of annual shoots and do not occur on leaves following the 6<sup>th</sup> leaf from the base of the shoot. Mines of the second generation occur mainly on leaves situated in the middle of annual shoots: the maximum is observed on the 3<sup>rd</sup> leaf for shoots with 3 – 5 leaves and on the 4<sup>th</sup> leaf for shoots with 6 – 9 leaves. Most mines made by European (introduced) populations on *T cordata* occur in the central part of the leaf around the central nerve. In the Far Eastern populations, most mines occur at the borders of the leaf near its base. Overwintering stages are pupae and adults (Ermolaev, 1977; Kozlov, 1991; Orlinskii *et al.*, 1991).

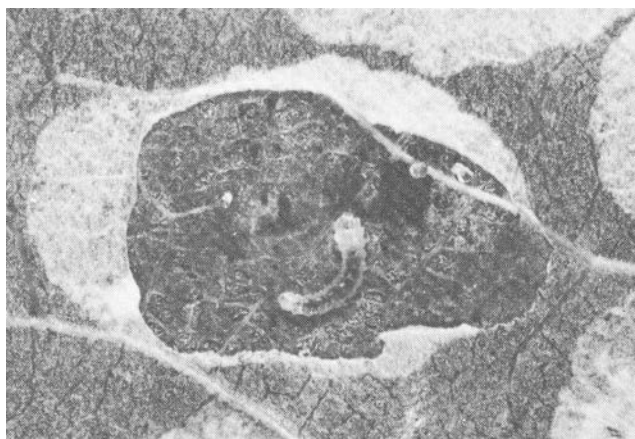


Fig. 1 *Phyllonorycter* larva in blotch mine on underside of a leaf (Furniss & Carolin, 1977)



Fig. 2 Lime leaf damaged by *Phyllonorycter issikii* (Kozlov, 1991)

## DETECTION AND IDENTIFICATION

### Symptoms

Occurrence of *P. issikii* mines in leaves is easily detected (Fig. 1 & 2). Leaves with numerous mines are deformed. The average number of mines usually reaches 4 to 6 per leaf, but a maximum of 27 mines per leaf has been observed. The ornamental value of city *Tilia* plantations is much decreased (Kozlov, 1991; Orlinskii *et al.*, 1991).

### Morphology

#### Eggs

No information available.

#### Larva

Larva of *P. issikii* is 4 – 5 mm long like all *Phyllonorycter* larvae (Furniss & Carolin, 1977).

#### Pupa

No information available.

## Adult

Adults of *P. issikii* are characterized by seasonal dimorphism. Summer and autumn (overwintering) generations moths are of different colour. Moths of the first generation (summer form) have goldish-ochre crest, thorax and fore wings, which have a whitish-grey pattern (Fig. 3). Moths of the second generation (autumn form) have black (or in some cases white) crest, dark brown thorax and dark grey fore wings formed by a mixture of white and dark brown scales regularly distributed on all wing surface. Wingspan is 7 – 7,5 mm. Male genitals (Fig. 4) are asymmetric. The right valve is wide and the filament based on the top of the lower lobe does not reach the top of the valve. The left valve is 4 – 5 times narrower than the right valve and the filament reaches 2/5 of its length. The tegmen is narrow, membranous (Kusnetsov *et al.*, 1988; Kozlov, 1991; Orlinskii *et al.*, 1991).

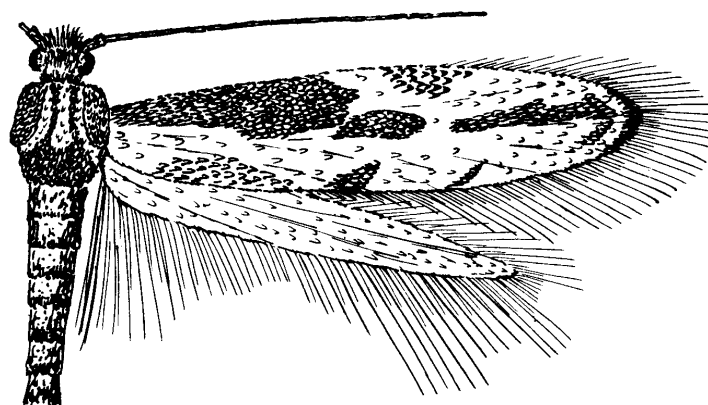


Fig. 3 Moth of *Phyllonorycter issikii* of the first generation (Kozlov, 1991)

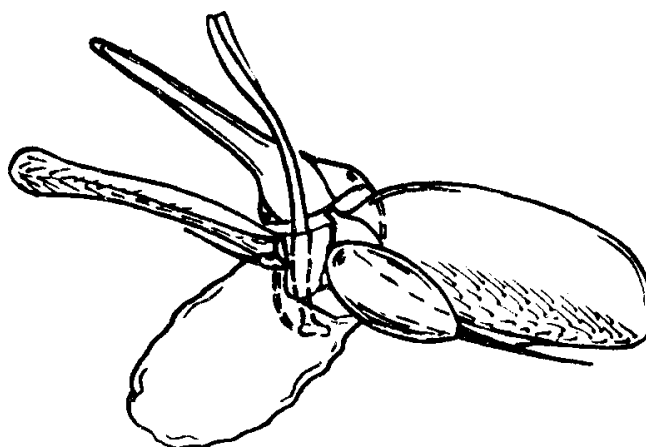


Fig. 4 Male genitals of *Phyllonorycter issikii* (Kozlov, 1991)

## MEANS OF MOVEMENT AND DISPERSAL

Means of movement of *P. issikii* have not been studied, but it presumably behaves like other gracillariid leaf miners. The introduction of eggs, larvae and pupae of the pest to new areas is possible with plants for planting with leaves originating from areas where it occurs. Pupae can be introduced with fallen leaves (with soil).

## PEST SIGNIFICANCE

### Economic Impact

*P. issikii* stresses its host plants by larval damages to leaves. In 1987 in Voronezh region of European Russia, 70% of lime leaves were damaged, from 1988 to 1998 around 98% of leaves were damaged i.e. almost all leaves. The presence of up to 27 mines per leaf was recorded. The damage leads to considerable reduction of ornamental value of trees, which are widely used for city plantations and losses in vigour of trees both in cities and forests (Kozlov, 1991; Orlinskii *et al.*, 1991).

### Environmental Impact

By damaging a large proportion of leaves (up to 98%) on widely used ornamental plants, *P. issikii* disturbs city ecology and environment. Leaves with numerous mines (up to 27 per leaf) are deformed and rolled, which considerably decreases ornamental value of trees (Kozlov, 1991; Orlinskii *et al.*, 1991).

### Control

In cases of outbreaks of *P. issikii*, treatments with organophosphorus insecticides, or with hormones is recommended. Inhibitors of chitin synthesis (e.g. dimilin and alzistin) in dosage of 0,1 to 1 kg/ha are especially efficient. Treatments should strictly be performed strictly at the beginning of the oviposition period (Kozlov, 1991).

### Phytosanitary risk

*P. issikii* is not listed as a quarantine pest by any NPPO nor recommended to be listed by any regional plant protection organization. The pest causes serious damage to *Tilia* species and some other trees in countries and areas where it occurs. The moth has recently entered and established in several new regions and is able to establish in many EPPO countries. It is very likely that it could cause serious damage on *Tilia cordata* in western Europe and possibly also to *T. platyphyllas*, *T. europea* and other species and hybrids planted in western Europe (although this point requires further study).

## PHYTOSANITARY MEASURES

To prevent introduction of *P. issikii* to many EPPO countries, the effective measure would be to prohibit import of soil with leaves and plants for planting of *Tilia* with leaves from countries and areas (or places of production) where the pest occurs. Cleaning and disinfection of vehicles coming from infested areas could also be proposed. Phytosanitary inspection can detect pest mines on the imported regulated articles.

## ACKNOWLEDGEMENT

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