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Short Communication

DISTRIBUTION AND INVASION OF CLEARWING MOTH *Synanthedon tipuliformis* Cl., A PEST OF CURRANT, IN LATVIA

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The aim of the present study was to determine the distribution and prevalence of S. tipuliformis *in Latvia. In 2008–2009, trials were carried out in blackcurrant plantations aimed at establishing the distribution of* S. tipuliformis *across the territory of Latvia. To achieve this goal, 13 blackcurrant plantations were surveyed in 2008. The research was continued in three plantations in 2009. To assess of prevalence and level of damage caused by the* S. tipuliformis*, two methods were used: cutting of branches (five branches were cut from each bush) and pheromone traps with dispensers (distributed in each trial farm with density one trap per ha). The presence of* S. tipuliformis *was recorded in all 13 horticultural farms surveyed in 2008. Analyses of the branch samples demonstrated that the pest invaded from 3% to 70% of the branches. A total of 2.5 to 35 adults were caught per pheromone trap. The highest proportion of the branches invaded by the* S. tipuliformis *was in 2008 (70%) and the highest number of males in traps in 2009 was recorded in Jelgava municipality.* S. tipuliformis *is widely found in blackcurrant growing plantations across the whole territory of Latvia.*

Key words: *currant clearwing moth, distribution, damage in Latvia.*

The currant clearwing moth *Sinanthedon tipuliformis* Clerk. (Synonym *Spinx tipula*) (Lepidoptera: Sesiidae) is a cosmopolitan pest species found all over the world where black currants are grown and it is one of the most important pests for plants of the genus *Ribes* (Brock *et al*., 1964; Manko, 1965; Leska, 1966; Yakimova, 1968; Scott and Harrison, 1978; Hardy, 1981; Būda, 1993; Gottwald & Künzel, 1994) *S. tipuliformis* is a major pest in black currant plantations of Lithuania (Būda, 1993). In Latvia it has been little investigated and the distribution and density of its population is unknown here.

S. tipuliformis develops one generation per year. Females fly and oviposit their eggs from the beginning of June to the end of July. The eggs are laid singly on the bark of the black currant canes near buds. The hatched larvae chew their way inside the cane and feed on the medulla part of the black currant shoots. Before pupation, it gnaws a passage out of the trunk. The shoot then dies because of the damage. The damaged spots may be attacked by various fungal diseases (Manko, 1965; Hardy, 1981).

Due to the secluded lifecycle of *S. tipuliformis*, chemical treatment for pest control is hardly possible and the estimation of the population density in a farm is very complicated.

Traditionally, the population density of clearwing moth in a black currant field is estimated by branch analysis. Pheromone traps are more often used for determination of the beginning of flying and dynamics during the vegetation period. This application however is insufficient for monitoring of density (Subchev *et al.,* 1993; Gottvald & Künzel, 1994; James *et al*., 2001). Therefore, the two aforementioned methods were both used.

The aim of the study was to determine the distribution and invasion of *S. tipuliformis* in Latvia in 2008-2009.

The monitoring was carried out over the vegetation period in black currant (*Ribes nigrum* L.) plantations in different places of Latvia in 2008–2009. In 2008**,** the survey was performed in 13 private holdings scattered over different municipalities of Latvia: Dobele, Ikšķile (2), and Jelgava. The survey was continued in municipalities of Tukums (western part of Latvia), Jelgava (central part of Latvia), and Pārgauja (central-eastern part of Latvia) municipalities in 2009.

Two methods were used for establishment of damage level caused by *S. tipuliformis*:

(1) agrotechnical method — cutting of branches and seeking for larvae. Black currant bushes were randomly selected from the black currant field. Six bushes were selected and from each five branches were cut, i.e. altogether 30 branches from each field. The branches were cut at the root.

Samples were taken twice per vegetation period: in spring and in the autumn.

In the laboratory, the collected branches were cut in shorter pieces, marking shoots damaged by *S. tipuliformis* in previous years (no larvae) and branches with *S. tipuliformis* larvae inside;

(2) biological method — pheromone traps. At the beginning of the flying period of *S. tipuliformis* (mid-May), pheromone traps (PHEROBANK) with dispensers EZ-2, 13-18:Ac were placed in each plantation — one trap per ha according to Сорока, 2005. The traps were hung in the upper part of black currant bushes, i.e. the most efficient location for pheromone trapping (Buda, Karalius, Mozūtaitis 2003). Recording was made once a week, changing the sticky liners each time. Following the recommendations of PHEROBANK (www.pherobank.nl) the dispensers were changed every four weeks after placement in the field.

The recorded data in plantations surveyed in Latvia (13 in total) over the vegetation period of 2008 demonstrated the presence of *S. tipuliformis* in the whole territory of Latvia. In the 1980s, however, abundant populations of *S. tipuliformis* were observed only around Rīga (Priedītis, 1996). Mass breeding of this pest can cause extensive damage to currant plantations over the whole country.

The branch analysis established the presence of one *S. tipuliformis* larvae on average for every invaded branch. The highest proportion of damaged shoots was found in municipalities of Pārgauja and Viesīte where in spring up to 96.7% of shoots were damaged (Fig. 1) in 2008. The high number of the damaged shoots may be explained by failure of the black currant growers to ensure appropriate agro technical measures: the damaged shoots have not been timely removed. In spring of 2008, the proportion of damaged shoots ranged from 3 to 96.7% while in autumn it decreased from 3.3 to 56.7%.

The proportion of invaded shoots with *S. tipuliformis* in spring of 2008 was from 3 to 70%, in autumn — 3–56%. In autumn, in municipalities of Tukums, Jelgava, Ikšķile 2, Ikšķile, Dobele, Saldus 2, Pārgauja and Lubāna, the invasion level declined, while in municipalities of Tukums 2, Talsi, Viesīte and Ķekava it had increased. These black currant plantations are situated close to residential areas where people grow black currants in small private gardens. In Saldus municipality, the number of damaged shoots both in spring and autumn monitoring was 23% (Fig. 2.).

Since the monitoring in 2008 confirmed the presence of *S. tipuliformis* in all studied black currant plantations, further survey in 2009 was continued only in three locations, in western, central and central-eastern Latvia (Fig. 3.).

In the vegetation season of 2008, on average 10–20 *S. tipuliformis* males per trap per season were caught in the studied 13 plantations. In 2009, the number of males caught was 32–35 males per trap per season.

The proportion of branches with larvae was lower in Tukums municipality (western Latvia), both in the vegetation season of 2008 and spring of 2009. Recording of larvae in the branches in the fall of 2009 showed an increase of number larvae-infested branches by 14% (Fig. 4.). In Jelgava municipality (central Latvia) the poportion of infested branches declined from 70% (in spring of 2008) to 10% (in the autumn of 2009). In Pārgauja municipality (central-eastern Latvia), proportion of branches with *S. tipiliformis* larvae declined from 57% (spring of 2008) to 7% (autumn of 2009). The proportion of invaded shoots was 3%, while at the time of formation of new generation it was estimated to be approximately 7% in spring of 2009. A large number of *S. tipuliformis* was captured by pheromone traps in the central-eastern part of Latvia (28 *S. tipuliformis* individuals on the average over the flying period) in 2008, and increased to 32 individuals in vegetation period of 2009 (Fig. 5).

The first survey in black currant plantations in Latvia, carried out in 1980, described a large *S. tipuliformis* population only in Rīga municipality (Priedītis, 1996). The surveys carried out in 2008 and 2009 showed that *S. tipuliformis* popu-

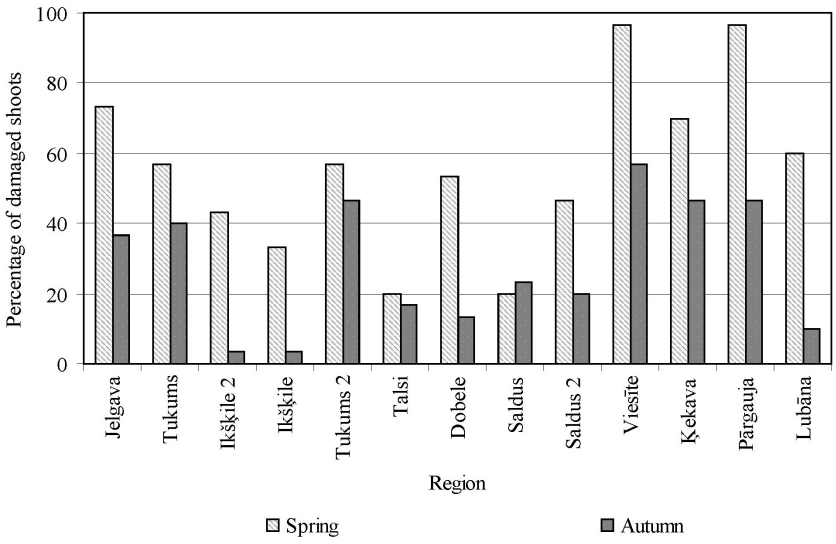

Fig. 1. Proportion (%) of damaged shoots in 2008.

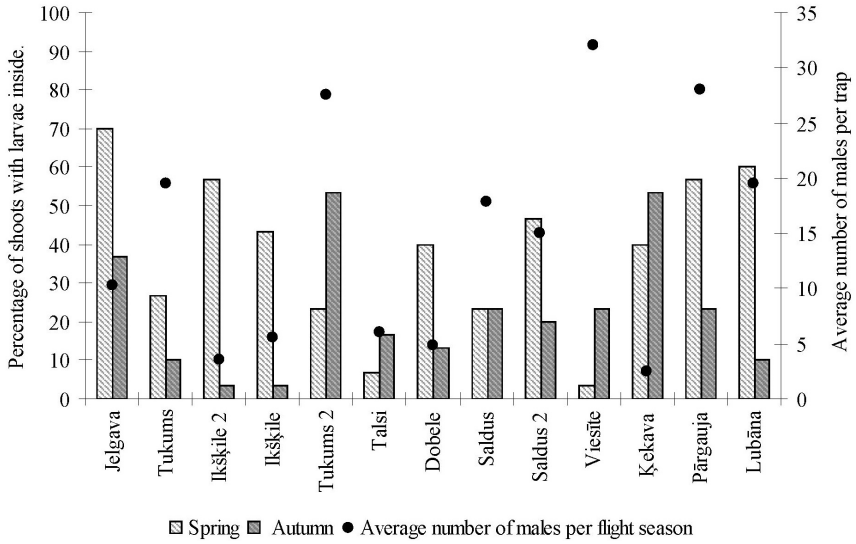

Fig. 2. Proportion of black currant shoots with *Synanthedon tipuliformis* larvae and average flight activity of males per season in each plantation.

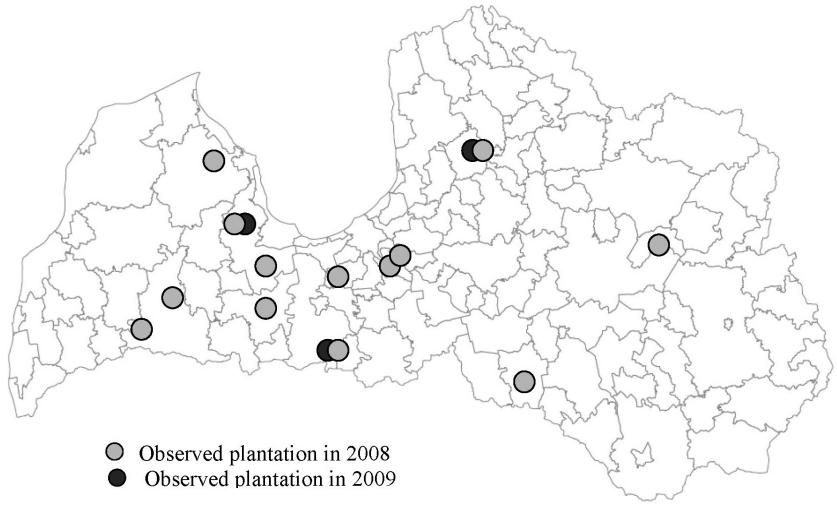

Fig. 3. Schematic map with sites of the observed black currant plantations

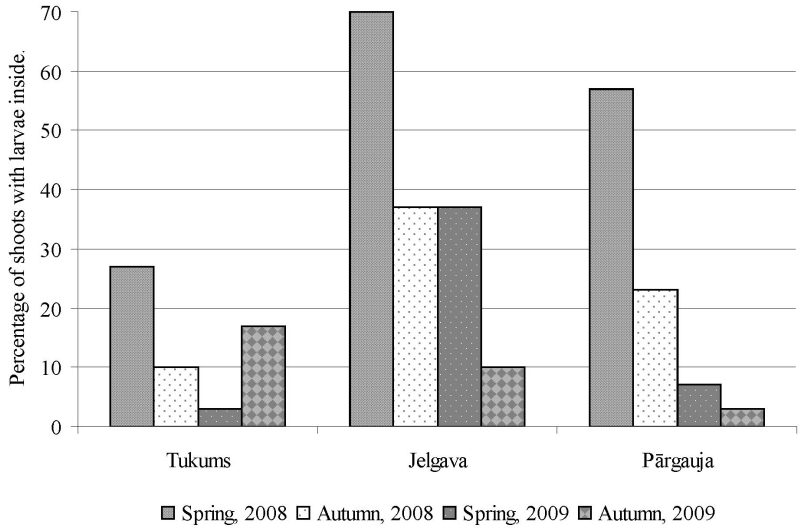

Fig. 4. Proportion of black currant shoots with *S. tipuliformis* larvae in 2008 and 2009.

lation was spread over the whole territory of Latvia. The invasion level of currant shoots invaded by *S. tipuliformis* in Lithuania was recorded as 1.4–9.2% in 1989, while in 1990 it was 1.2–68.8%. The monitoring was carried out for a second year in seven holdings, and after application of the pheromone traps, the number of invaded shoots was reduced 1.77 times. The invasion level was reduced only in one holding (Karalius *et al*., 2003). Investigations in Latvia showed that in Tukums (Western part of Latvia), Jelgava (Central part of Latvia) and Pārgauja (Central–Eastern part of Latvia) municipalities the invasion level in spring of 2008 was 24–50% higher than in the same period in 2009.

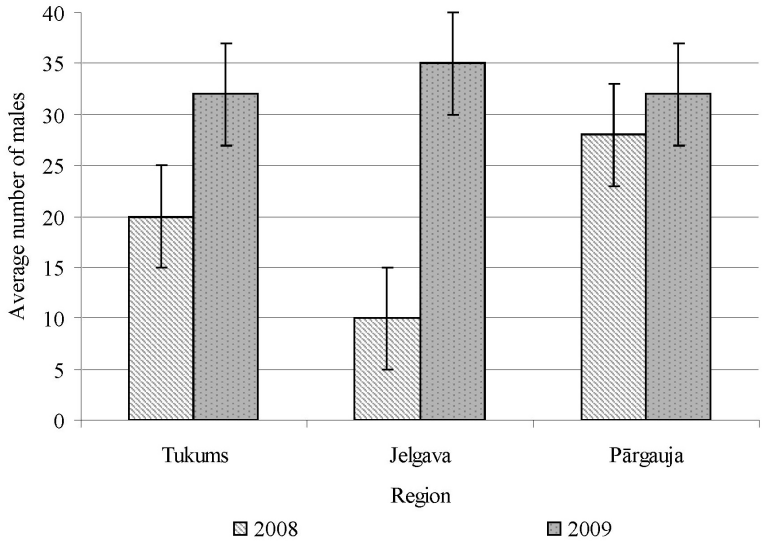

Fig. 5. Average number of *S. tipuliformis* males per trap in 2008 and 2009.

The current research indicated *S. tipuliformis* as the most important pest of black currant in Latvia. Population control of *S. tipuliformis* in Latvia is required, by both cutting of invaded branches and use of pheromone traps.

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JĀŅOGU STIKLSPĀRŅA (*Synanthedon tipuliformis* Cl.) IZPLATĪBAS UN UPEŅU BOJĀJUMU PAKĀPES NOTEIKŠANA LATVIJAS TERITORIJĀ

Pētījuma mērķis bija noteikt jāņogu stiklspārņa izplatību un upeņu bojājumus Latvijas teritorijā. Lai noteiktu jāņogu stiklspārņa populācijas izplatību, 2008.–2009. gados tika veikti pētījumi upeņu stādījumos. 2008. gadā tika apsekotas 13 saimniecības (Dobeles, Ikšķiles, Jelgavas, Ķekavas, Lubānas, Pārgaujas, Saldus, Talsu, Tukuma un Viesītes novados), kurās ir upeņu stādījumi. 2009. gadā pētījums tika turpināts Jelgavas, Pārgaujas un Tukuma novados. Stiklspārņa konstatēšanai un bojājuma pakāpes noteikšanai tika izmantotas divas metodes: zaru griešana un kāpuru meklēšana. Upeņu laukā randomizēti tika izvēlēti upeņu krūmi. No katra no sešiem krūmiem tika izgriezti pieci zari, kopā 30 zari no katra lauka. Katrā saimniecībā tika izlikti feromonu (PHEROBANK) ķeramslazdi ar dispenseriem — viens slazds uz vienu hektāru upeņu stādījumu. 2008. un 2009. gadā jāņogu stiklspārnis tika konstatēts visās 13 apsekotajās saimniecībās. Zaru analīzes rezultāti parādīja, ka invadēti tiek 3–70% no analizētajiem zariem. Feromonu ķeramslazdos tika uzskaitīti 2.5–35 pieaugušie indivīdi. Lielākais invadēto zaru īpatsvars 2008. gadā (70%) kā arī tēviņu daudzums feromonu ķeramslazdos 2009. gadā (35 indivīdu slazdā) bija Jelgavas novadā. Jāņogu stiklspārņa populācija ir izplatīta visā Latvijas teritorijā.