Occurrence of glasshouse Thysanoptera in the open in the Netherlands

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Abstract: In 1994 the Dutch Plant Protection Service (PPS) started a limited survey on the occurrence of glasshouse Thysanoptera in the open in the Aalsmeer area (Vierbergen, 1995). In 1995 the survey of the PPS became national and was continued yearly. Samples were taken along roadsides, in private and public gardens and in waste places, in general close to glasshouses. From 1994 until 2000, in a total of 359 samples 41 thrips species were collected. Of the exotics *Frankliniella occidentalis* (Pergande) was found in 34.8% of the samples), whereas both *Echinothrips americanus* Morgan and *Parthenothrips dracaenae* (Heeger) were found only once. *Dendrothrips degeeri* Uzel is recorded here new for the Dutch fauna. Native species, which were infrequently found before in the Netherlands, are *Dictyothrips betae* Uzel, *Haplothrips senecionis* Bagnall and *Thrips discolor* Haliday.

Introduction

In the Netherlands the glasshouse area is very large (Ministry of LNV: 1999: 10565 ha) and this area contains micro-climatic conditions comparable to the sub-tropics and tropics. For several insects, Thysanoptera included, these glasshouses create a new ecological niche in regions far away from their original distribution area. In the Netherlands 10 species of exotic Thysanoptera have been reported to have settled in glasshouses and several others may be on the way (Vierbergen, 1999). In 1994 the Dutch Plant Protection Service (PPS) started to investigate the possible occurrence of these species in the open with an investigation of the Aalsmeer area (Vierbergen, 1995). At that time very little was known on the occurrence of glasshouse thrips in the open. From 1995 collecting by the PPS became national and continued yearly. The results of this survey are presented here.

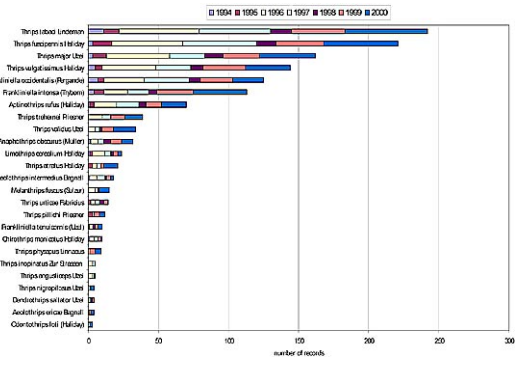
Material and methods

From 1994 till 2000 respectively 1, 12, 9, 12, 17 and 18 inspectors of the PPS beat plants belonging to 92 genera and 37 families at roadsides, in public and private gardens and in waste places, in general close to glasshouses (Fig. 1). In and around 117 villages, towns and cities thrips were collected and send in labelled vials with alcohol to the entomology laboratory of the PPS at Wageningen. The author carried out the identifications by low magnification (40 x) and if necessary specimens were prepared on microscope slides (lactic acid, Berlese solution and Canada Balsam) for study at higher magnifications. From 1996 till 2000 not only adults, but also second stage larvae were identified to species level as much as possible, with the help of Priesner (1964) and Nakahara (unpublished).

Fig. 1. Distribution of the sampling areas (5 x 5 km) of the survey 1994-2000.

Results

In Table 1 the numbers of the 8128 identified individuals are given and in Figure 2 the number of records. A total of 41 thrips species were found in the 359 samples of the field survey. *Thrips tabaci* was present in most of the samples and was found in the highest numbers. This species was followed by some common flower living thrips: *Thrips fuscipennis* Haliday, *Thrips major* Uzel and *Thrips vulgatissimus* Haliday. Several species were caught in very low numbers, and some of these are rarely found in The Netherlands (*Dictyothrips betae* Uzel, *Haplothrips senecionis* Bagnall and *Thrips discolor* Haliday). *Dendrothrips degeeri* Uzel, a species with a European distribution, is new to the Dutch fauna. On 28 June, 2000, P. Wassink beat a male and a female of this species from an unknown shrub in the garden of the flower auction 'Flora' at Rijnsburg. *Echinothrips americanus* Morgan, *Frankliniella occidentalis* (Pergande) and *Parthenothrips dracaenae* (Heeger) are glasshouse species, which overwinter in heated places. *E. americanus* and *P. dracaenae* were collected only once: respectively 2 females beaten from *Potentilla* sp. at Veen on 6 September, 1999, and 1 male on *Rosa* sp. at Aalsmeer on 16 August, 1994 (Vierbergen, 1995).



Species recorded once or twice: *Aeolothrips albicincthus* Haliday: 1997, *Baliothrips dispar* (Haliday): 2000, *Ceratothrips ericae* (Haliday): 1996, *Dendrothrips degeeri* Uzel: 2000, *Dictyothrips betae* Uzel: 1997, *Echinothrips americanus* Morgan: 1999, *Euchaetothrips kroli* Schille: 1997, 2000, *Frankliniella pallida* (Uzel): 1997, 2000, *Haplothrips aculeatus* (Fabricius): 1997, *Haplothrips* cf. *leucanthemi* (Schrank): 1996, 1997, *Haplothrips senecionis* Bagnall: 1997, *Limothrips denticornis* Haliday: 1996 (2),*Odontothrips biuncus* John: 1997, *Parthenothrips dracaenae* (Heeger): 1994, *Taeniothrips picipes* (Zetterstedt): 1995, *Thrips discolor* Haliday: 1996.

Fig. 2. Thysanoptera collected close to glasshouses (field survey 1994-2000, 359 samples)

Discussion

Of the ten species of exotic Thysanoptera known to have settled in Dutch glasshouses, three were found during the field survey. *Frankliniella occidentalis* was introduced to The Netherlands in 1983 (Mantel & Van de Vrie, 1988), and is the most common thrips in glasshouses. The species is easily taken with annuals and other fast growing flowering plants out of the glasshouses into gardens. Probably the winged adults of the species leave glasshouses through opened windows also. Very likely the species can compete with native thrips species, because it is encountered in high numbers: fifth in number of individuals (table 1) and in number of records (fig. 2). In 1993 *Echinothrips americanus* invaded Dutch glasshouses (Vierbergen, 1998), but the few specimens at a single location (2 females at Veen in 1999) indicate that this polyphagous species is not easily settling outside glasshouses. The record of a single male of *Parthenothrips dracaenae* (Aalsmeer, 1994) was discussed by Vierbergen (1995).

Quarantine species for the EU, which have caused infestations in glasshouses incidentally (*Scirtothrips dorsalis* Hood, *Thrips palmi*, Vierbergen, 1994), were not encountered.

The single female of *Dictyothrips betae* beaten from *Galinsoga* (Wellerlooi, vii-1997) was the second in The Netherlands (first recorded from Veenendaal, 1937, 1 female; Franssen & Mantel, 1962). *Dictyothrips betae* has been found in many parts of Europe and is known as far as Siberia (Bhatti, 1978). The species is found rarely and in low numbers and its feeding habits are unknown. A second attempt by the inspector (H. Lemmen) at the same location did not reveal more individuals.

Haplothrips senecionis was reported by Zur Strassen (1983) for the Netherlands, and since 1987 the species was found at more coastal localities (Wassenaar, Ouddorp, Scheveningen) living on and damaging *Senecio jacobaea*. The larval stages feed on the leaf rosettes and can have a considerable impact on the reproductive success (Vrieling et al, 1991). The record from this survey (3 males, *Trifolium pratense,* Leiden, 29-vii-

Species	1994		1995		1996			1997			1998			1999			2000			Totals
	♂	♀	♂	♀	♂	♀	LII*	♂	♀	LII*	♂	♀	LII*	♂	♀	LII*	♂	♀	LII*	
Thrips tabaci Lindeman	149		63		237		9	298	1	2	54		12	235		39	385	2	82	1568
Thrips fuscipennis Haliday	2	6	117	209	209	76	4	104	148		44	58	1	162	116	5	143	136	6	1546
Thrips vulgatissimus Haliday	40		11		271		14	109			121		16	324		10	270		78	1264
Thrips major Uzel	1	2	23	29	229	157	23	20	45		57	34	10	95	36	7	157	144	15	1084
Frankliniella occidentalis (Pergande)	23	5	26	16	109	30	16	131	75	2	65	10	4	48	14	5	80	18	7	684
Frankliniella intonsa (Trybom)	3	25	17	48	45	11	4	30	11		15	9	4	96	72	19	96	65	22	592
Aptinothrips rufus (Haliday)	5		9	1	67	2	4	29	1		28	1	2	20		1	39		7	216
Thrips trehernei Priesner					34	26		7	13					26	34		43	27		210
Thrips validus Uzel					10	3		5	3		1		9	29	8	4	25	17	9	123
Thrips physapus Linnaeus					1	1								3	4	3	57	46		115
Anaphothrips obscurus (Müller)	1		1		8		2	14			6		4	4		13	8		31	92
Limothrips cerealium Haliday	1	2	2	1	29	23	3	4	2		2			3			3			75
Thrips atratus Haliday			3	2	11	3		3	1					5	3		9	4	1	45
Melanthrips fuscus (Sulzer)					5		10	5	1		2						1	6	1	31
Thrips urticae Fabricius			2		3			2	1		6	3		8		3				28
Frankliniella tenuicornis (Uzel)				2	9	3					2			1	1		1	1	1	21
Thrips pillichi Priesner			6	2				2	1					4	1		2	1	2	21
Chirothrips manicatus Haliday		1			5			4						9			1			20
Thrips angusticeps Uzel					17	1		1			1									20
Aeolothrips intermedius Bagnall	1				5			7			1			3			1	1		19
Thrips inopinatus Zur Strassen					1	2	11	1	3											18
others (20)		1	2		6	1		10	3		2	2		4			12	3	1	47
Total	226	42	282	310	1311	339	100	786	309	4	407	117	62	1079	289	109	1333	471	263	7839

Table 1. The identified second stage larvae and adults of the field survey 1994-2000

1997) is the most northern occurrence observed in The Netherlands. Probably *H. senecionis* is restricted to a coastal form of *S. jacobaea* with radiating capitules (Meijden, 1976). The thrips is also known from France and Britain and is widespread in northern Britain (Mound et al., 1976), but it is not found in Germany and Denmark (Zur Strassen, in litt., 1990).

Thrips discolor has been collected from unknown weeds in the Netherlands: 1960 (1 macropterous female, Bennekom; Franssen & Mantel, 1961), 1995 (7 brachypterous females, 2 brachypterous males, Wateringen, leg. F. Hanbali) and 1996 (1 macropterous female, Berkel, leg. F. v. Holsteijn). The species probably develops on *Ranunculus* and occurs in Europe and North America (Nakahara, 1994).

New to the fauna of the Netherlands is *Dendrothrips degeeri*, a species that feeds on *Fraxinus* spp. leaves, and that is distributed throughout Europe including Turkey (Anatolia) and the Transcaucasus (Zur Strassen, 1988).

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References

Bhatti JS. 1978. Systematics of *Anaphothrips* Uzel 1895 sensu latu and some related genera. *Senckenbergiana biologica* **59**, 85-114.

Franssen CJH and Mantel WP. 1961. De Thysanopteren-fauna van de Bennekomse. *Meent. Entomologische Berichten Amsterdam* **21**, 141-144.

Franssen CJH and Mantel WP. 1962. Lijst van in Nederland aangetroffen Thysanoptera met beknopte aantekeningen over hun levenswijze en hun betekenis voor onze cultuurgewassen. *Tijdschrift voor Entomologie* **105**, 97-133.

Mantel WP and van de Vrie M. 1988. De californische trips, *Frankliniella occidentalis*, een nieuwe schadelijke tripssoort in de tuinbouw onder glas in Nederland. *Entomologische Berichten*, *Amsterdam* **48**, 140-144.

Meijden R van der. 1976. Het verspreidingsgebied van *Senecio jacobaea* L. var. *nudus* Weston. *Gorteria*: 57-61.

Mound LA, Morison GD, Pitkin BR and Palmer JM. 1976. Thysanoptera. *Handbooks for the Identification of British Insects* **1**(11), 1-79.

Nakahara S. 1994. The genus *Thrips* Linnaeus (Thysanoptera: Thripidae) of the New World. *USDA, Agricultural Research Service, Technical Bulletin* **1822**, 1-183.

Priesner H. 1964. Ordnung Thysanoptera (Fransenflügler, Thripse). *Bestimmungsbücher zur Bodenfauna Europas* **2**, 1-242.

Vierbergen G. 1994. A *Citrus* pest: *Scirtothrips dorsalis*: eradicated from a greenhouse. *Verslagen en Mededelingen* **170** (PPS Annual Report 1992), 45-46.

Vierbergen G. 1995. Thrips species occurring close to greenhouses. *Verslagen en Mededelingen* **177** (PPS Annual Report 1994), 34-35.

Vierbergen G. 1996. After introduction of *Frankliniella occidentalis* in Europe: prevention of establishment of *Thrips palmi* (Thysanoptera: Thripidae). *Acta Phytopathologica et Entomologica Hungarica* **31**, 267-273.

Vierbergen G. 1998. *Echinothrips americanus* Morgan, a new thrips in Dutch greenhouses (Thysanoptera: Thripidae). *Proceedings of the section Experimental and Applied Entomology of the Netherlands Entomological Society* (N. E. V.) **9**, 155-160.

Vierbergen G. 1999. Risks of Thysanoptera detected on imported plant products: the Dutch experience. *Proceedings sixth international symposium on Thysanoptera* (eds. G. Vierbergen & I. Tunç), Antalya, Turkey, April 27- May 1, 7-12.

Vrieling K, Soldaat LL and Smit W. 1991. The influence of pyrrolizidine alkaloids of *Senecio jacobaea* on *Tyria jacobaea, Brachycaudus cardii* and *Haplothrips senecionis*. *Netherlands Journal of Zoology* **41**, 228-239.

Zur Strassen R. 1983. Thysanopterologische Notizen (6) (Insecta: Thysanoptera). *Senckenbergiana biologica* **63**, 191-209.

Zur Strassen R. 1988. On some Thysanoptera of an agricultural area located on woody slopes in Northern Umbria, Italy. *Redia* **70**, 203-228.