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Occurrence of Japanese Gall-forming Thrips, *Ponticulothrips diospyrosi* Haga et Okajima (Thysanoptera: Phlaeothripidae) in Korea

감관총채벌레(신칭: *Ponticulothrips diospyrosi* Haga et Okajima) (Thysanoptera: Phlaeothripidae)의 발생

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Abstract - A thysanopteran pest was collected from the damaged leaves of Fuyu persimmon (*Diospyrosi kaki*) at Changwon, Gyeongnam province in June, 2000. The thrips was identified as Japanese gall-forming thrips, *Ponticulothrips diospyrosi* (Phlaeothripidae), which is newly recorded in Korea. Brief morphological and ecological characters, damage symptoms, and distribution in Gyeongnam province were provided.

Key Words - Japanese gall-forming thrips, *Ponticulothrips diospyrosi*, morphological characters, damage symptoms

초 록 - 경남 창원의 단감 과수원에서 2000년 6월 하순에 해충에 의한 피해 잎에서 총채벌레를 채집하여 분류한 결과, 우리나라에서는 처음으로 보고되는 관총채벌레科(Phlaeothripidae)의 감관총채벌레(신칭) (*Ponticulothrips diospyrosi*)로 확인되었다. 이 종의 간략한 형태 및 생태학적 특성, 피해증상, 경남 도내에서의 분포현황을 마련하였다.

검색어 - 감관총채벌레, *Ponticulothrips diospyrosi*, 형태적 특징, 피해증상

The persimmon (*Diospyrosi kaki* Thunb.) cultivation has been increased to be the largest fruit tree in acreage in Korea in 2000 (Anonymous, 2001). However, researches on insect pests and diseases associated with the persimmon are relatively inactive compared with other fruit trees. Although 99 insect pests have been recorded from persimmons including Fuyu persimmon and lotus persimmon in Korea (Anonymous, 1986), not all these insects have given economic damage in commercial persimmon orchards because many of them have been cited from unreliable literatures. According to our 2 years' survey in Fuyu persimmon orchards from 2000, hemipteran bugs were the key pests. Two scale insects, *Cerostegia japonicus* and *Eriococcus lagerstroemiae*, which were reported by other observers as important insect pests (Park *et al.*, 1992; Kwon *et al.*, 1995; Kim *et al.*, 1997) occurred as low density and were rarely found in commercial persimmon orchards in Korea. In

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the course of the survey we confirmed a large number of thrips damaging in the rolled persimmon leaves. That thrips was identified as Japanese gall-forming thrips *Ponticulothrips diospyrosi* Haga et Okajima (Thysanoptera: Phlaeothripidae). We report here its brief morphological and ecological characters and damage symptom with its distribution in Gyeongnam province.

Thrips finding and identification

A persimmon grower, Bu Dol Gam, found insect damage at his orchard in Changwon on 20 June, 2000. He brought damaged leaves to our laboratory for identification. The insects were sent to Dr. S. Okajima who is expert in thrips identification at Tokyo University of Agriculture and identified as Japanese gall-forming thrips, *P. diospyrosi.* The book entitled "Compendium of insect pests of fruit trees in Korea with color plates" included two photos of phlaeothripid thrips from persimmon and just described it as 'a kind of phlaeothripids' (Anonymous, 1988). The thrips in the book is doubted to be *P. diospyrosi* by an adult appearance and damage symptom of young persimmon but the photos were not enough for identification without specimens. Thus *P. diospyrosi* may be firstly recorded in Korea.

Distribution in Gyeongnam province

We investigated *P. diospyrosi* distribution at Fuju persimmon orchards in Gyeongnam province in 2000. Three to 10 trees were randomly selected for thrips observation based on the size of orchards and 10 new shoots were selected at random from each tree. The number of damaged and undamaged leaves and fruits was counted. Out of investigated orchards one orchard in Changwon and one in Gimhae were infested with thrips (Table 1). The percentages of damaged leaves were 0.7 and 2.3% at the two orchards, respectively, but no fruit damage was observed from the samples. However we found fruit damage at other trees in the same orchard (Park *et al.*, unpublished data).

Damage symptom

Adult thrips migrated into orchard from hibernated sites feed on young persimmon leaves. The infested leaves were longitudinally rolled up from edge (Fig. 1-A, B). The thrips keep feeding in the rolled leaf. The damaged fruits had about 0.5 mm brown or purplish brown spots on the surface and the spots sometimes forms a band of spots as the fruit grows (Fig. 1-C, D). Because this thrips infests only the Japanese persimmon and induces a horn-shaped gall from a leaflet, these damage symptoms are useful keys for the occurrence of this thrips (Umeya *et al.*, 1988; Koji and Ohguchi, 1998).

Morphological characters

Adult female and male uniformly black to brownish black; larva yellowish brown (Fig. 1-E, F). Adult 3,040 μm (2,540 μm to 3,171 μm) in length (n = 21); Antennae moderately elongate, 8 segmented (Fig. 2-A), and 550 ± 29 μm in length; segment I dark brown; II concolorous to I but apex paler; III to VI pale brown; basal third of VII pale brown; other parts of VII and VIII brown (Fig. 1-F). Sense cones of antennal segments VI longest and followed by the V's (Fig. 2-B). Haga and Okajima (1983) reported this thrips as a new species with detailed description on the morphological characters. Umeya *et al.* (1988) also described those

Table 1. Field survey on the occurrence of Japanese gall-forming thrips, *Ponticulothrips diospyrosi*, in Gyeongnam province in 2000

Date of survey	Location	No. orchards surveyed	No. trees observed	No. leaves observed	No. fruits observed	% damaged	
						Leaves	Fruits
Jul. 6	Sancheong	1	10	1,083	187	0.0	0.0
	Hamyang	1	10	988	149	0.0	0.0
Jul. 7	Sacheon	3	20	2,259	323	0.0	0.0
	Jinju	2	13	1,397	174	0.0	0.0
	Changwon[1]	1	5	560	74	0.71	0.0
	Changnyeong	1	10	838	139	0.0	0.0
	Jinyeong	1	10	912	149	0.0	0.0
	Gimhae	1	5	472	71	2.33	0.0
Total		11	83	8,509	1,266	0.18	0.0

[1] A Fuyu persimmon orchard where the *P. diospyrosi* was first collected in Korea.

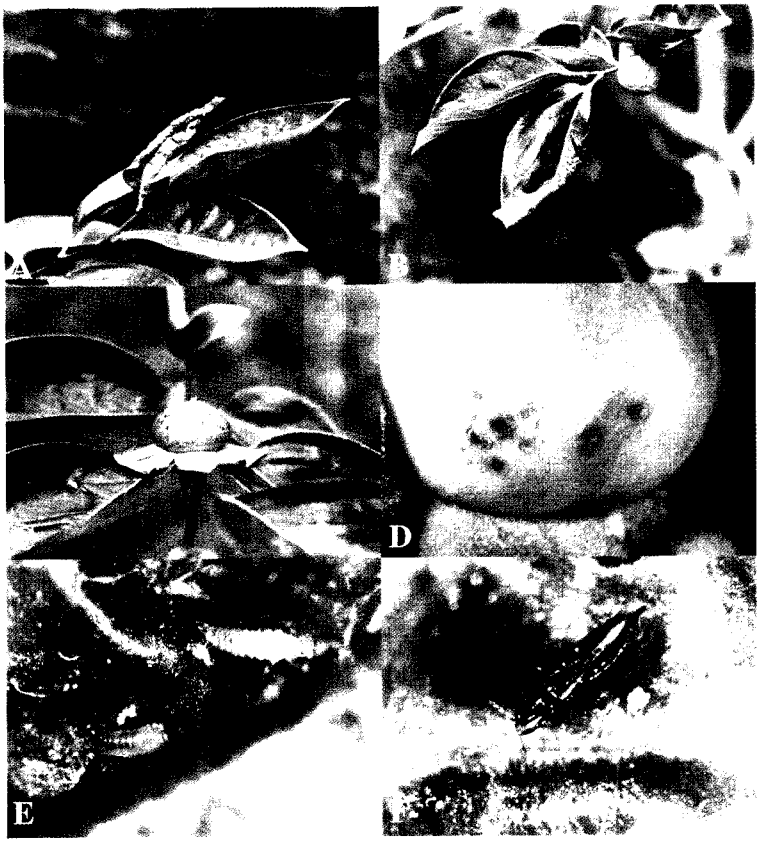

Fig. 1. Damage symptoms on leaves (A, B), fruits (C, D enlarged), and *Ponticulothrips diospyrosi* larvae (E) and adult (F).

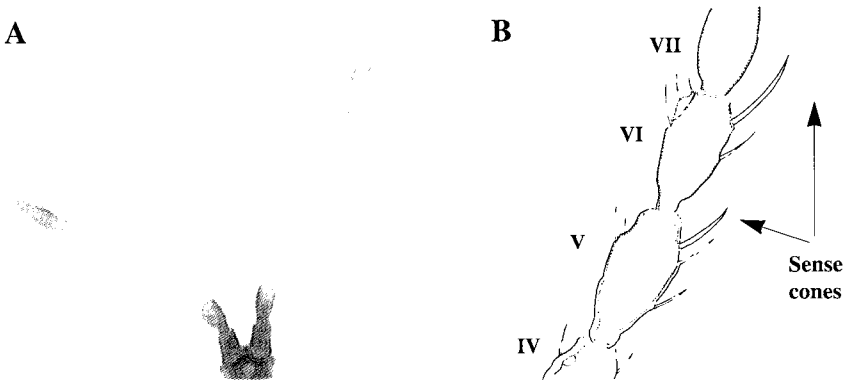

Fig. 2. Antennae of *Ponticulothrips diospyrosi*.

characters.

Ecology of *P. diospyrosi*

P. diospyrosi has been distributed throughout Japan since the pest was first found in Okayama prefecture in 1975 (Takashi, 1979; Haga and Okajima, 1983; Yamada, 1987; Uchiyama *et al.*, 1996). Many ecological studies on *P. diospyrosi* has been performed in Japan as follows. This insect undergoes one generation a year and occasionally a small number of 2nd generation offspring are formed in galls on secondary shoots in summer (Koji and Ohguchi, 1998). Adults aestivate and hibernate from summer to winter under the barks or in the crevices of persimmon trees, pine trees, Japa-

nese cypress, and oak trees, make a gall in the following spring, and oviposit within the gall. The adults of the following spring move to young shoots of persimmon in Okayama and Fukuoka prefectures in Japan from late April to early May. Adults of 1st generation emerge from early June and move to hibernating sites from mid June (Yamada, 1987; Umeya *et al.*, 1988). We assumed its life cycle in Korea is similar to in Japan. A persimmon grower brought infested leaves to our laboratory on 21 June, 2000. When the leaves were observed, several tens of larvae, pupae, and adults were found in the rolled leaves. However, we could not find any thrips in the leaf rolls at the farmer's orchard on 6 and 7 July, 2000 when we visited that orchard on our way to distribution survey. A few adults were found in some leaf rolls in other orchards. Further ecological study should be made for getting more information on the ecology of this important insect pest of persimmon.

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