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Orijinal araştırma (Original article)

Population density and prevalence of *Polyphagotarsonemus latus* (Banks) on tea-producing areas (*Camellia sinensis* (L.) O. Kuntze) in Rize, Türkiye

Türkiye Rize ili çay (*Camellia sinensis* (L.) O. Kuntze) üretim alanlarındaki *Polyphagotarsonemus latus* (Banks)'un popülasyon yoğunluğu ve yaygınlığı

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ABSTRACT

Tea (*Camellia sinensis* (L.) O. Kuntze) is one of the most economically important crops worldwide. Since that time, *Polyphagotarsonemus latus* (Banks), commonly known as the broad mite, has emerged as a significant pest in tea-producing regions, causing considerable yield losses. Despite the increasing number of reports, our understanding of the population dynamics of this tea pest remains limited. This study aimed to determine the population density and prevalence of broad mites in Rize province, Türkiye, during the period 2017–2019. At the time of this study, plant samples were collected from 73 tea gardens during the first shoot period, 107 tea gardens during the second shoot period, and 97 tea gardens during the third shoot period. The broad mite was detected in 15 gardens during the first shoot period, in 32 gardens during the second shoot period, and in 81 gardens during the third shoot period. Population densities were subsequently determined in the gardens where the broad mite was present. According to the results, the prevalence of the mite varied by growth period and district. The highest prevalence was recorded in the Derepazarı district during the first shoot period (44%), the Fındıklı district during the second shoot period (29.9%), and the Güneysu district during the third shoot period (99%). Overall, the results showed that *Polyphagotarsonemus latus* is widespread in tea-producing areas of Rize Province.

INTRODUCTION

The tea plant (*Camellia sinensis* (L.) O. Kuntze) is a woody perennial that has long been cultivated for its leaves, which are used to make the widely consumed beverage tea. The continuous cultivation of this plant has made tea production a significant economic driver worldwide. *Camellia sinensis* is native to mainland China and South and Southeast Asia but is currently cultivated worldwide in tropical and subtropical regions, particularly in countries such as India, Sri Lanka, Kenya, and Japan (Wang et al. 2022). According to FAO statistics, Türkiye ranks eighth

globally in terms of tea cultivation area, after China, India, Sri Lanka, Kenya, Indonesia, Vietnam and Myanmar. Tea production is practised in the Eastern Black Sea Region, in a zone beginning from the Georgian border up to the Fatsa district in Ordu. The main tea production area is Rize with 65.96%, followed by Trabzon, Artvin, Giresun and Ordu. No pesticides are used in our tea-growing areas. Turkish tea is generally recognized as a natural tea product compared with many other teas produced worldwide (Yurteri et al. 2019).

Studies on the biology and ecology of tea pests are conducted at many research institutes worldwide (Hazarika et al. 2009). Globally, 1034 arthropod species are associated with tea, of which about 3% are common pests worldwide (Chen and Chen 1989). Mites belonging to this group of pests: *Acaphylla theae* (Watt), *Calacarus carinatus* (Green), *Brevipalpus californicus* (Banks), *Oligonychus coffeae* (Nietner), *Polyphagotarsonemus latus* (Banks), *Tetranychus kanzawai* Kishida, *Tetranychus urticae* Koch. (Zeiss and Den Braber 2001, Anonymous 2025, Hamasaki et al. 2008, Mamun and Iyengar 2010).

Polyphagotarsonemus latus (Banks) (Tarsonemidae) is one of the major mite pests in tea-growing regions (Zhang 2003). This species, a pest of food and ornamental plants, occurs on hosts from about 60 plant families worldwide (Weintraub et al. 2003, Kowsika 2022). First described as *Tarsonemus latus* from mango terminal buds in a greenhouse in Washington, USA (Banks 1904, Denmark 1980), it has been known in Türkiye since the work of Çobanoğlu (1995). The species was later reported from Turkish tea plantations by Özman-Sullivan et al. (2006, 2007). Various alternative hosts have been documented in different regions of Türkiye (Çobanoğlu 1995, Uygun et al. 1995, Yabaş and Ulubilir 1995, Bulut and Göçmen 2000, Can and Çobanoğlu 2010, Akyazı et al. 2016, 2017, 2019, Soysal and Akyazı 2018, Diler et al. 2022).

Female mites are about 0.2 mm long, oval, and pale yellow-green with a faint median stripe, while males are smaller (0.11 mm), unstriped, and more active (Peña and Campbell 2005, Kowsika 2022). *Polyphagotarsonemus latus* injects a toxin that liquefies epidermal cells, leading to deformation of developing tissues; this toxin may continue to cause damage even after mites are removed (Lindquist 1986, Gerson 1992, Vacante 2016, LeFors 2018, Fasulo 2022). Mites occur mainly on young leaves, buds, and small fruits, where infestations cause leaf downward curling, copper or purple discoloration, shortened internodes, and increased lateral bud break; severe cases show pronounced leaf distortion (Denmark 1980, Wilkerson et al. 2005, Hamasaki et al. 2008, LeFors 2018, Fasulo 2022, Kowsika 2022). Feeding may also result in fruit discoloration and premature fruit drop (Peña and Campbell 2005, LeFors 2018, Fasulo 2022).



Figure 1. Damage caused by Polyphagotarsonemus latus on tea plants

Although some acaricides are used to control these mites, insecticidal oils and soaps are preferred for their greater efficacy and lower environmental toxicity. Indeed, in 2015, Vacante (2016) compiled a comprehensive list of 37 chemicals evaluated against broad mites. However, one of the most important features of tea in our country is that no chemical pesticides are used at any stage of its cultivation or processing. Several Phytoseiid predatory mite species have been reported to control *P. latus* including *Amblyseius swirskii* (Athias-Henriot), *A. cucumeris* (Oudemans), *A. californicus* (McGregor), *A. herbicolus* (Chant), *A. aerialis*., *A. tamatavensis* and *Neoseiulus barkeri* (Hughes), *Neoseiulus anonymus* (Chant & Baker), *N. gracilis* (Muma), *N. idaeus* (Denmark & Mumma), *Iphiseiodes zuluagai* (Denmark & Muma), *Proprioseiopsis cannaensis* (Muma), *P. mexicanus* (Garman), *P. neotropicus* (Ehara), *P. ovatus* (Garman), *Phytoseius guianensis* (De Leon), *Typhlodromalus aripo* (De Leon), *T. peregrinus* (Muma), *Typhlodromips mangleae* (De Leon) (Shipp and Wang 2003, Weintraub et al. 2003, 2007, van Maanen et al. 2010, Calvo et al. 2015, Duarte et al. 2015, Silva et al. 2016, Lopez et al. 2017, Rodriguez-Cruz et al. 2017, LeFors 2018, Fasulo 2022).

The study was conducted from 2017 to 2019 due to the high intensity of *Polyphagotarsonemus latus* in Rize province and producer complaints. Understanding the bioecology of the broad mite, a significant pest, is crucial for developing effective control strategies. This study aimed to assess the population density and prevalence of broad mites in tea-growing areas.

MATERIALS AND METHODS

Mite survey

The study was carried out in tea plantations located in Rize province, Türkiye, where *Polyphagotarsonemus latus* (Banks) was observed causing visible damage. Field surveys were conducted from May to October during three consecutive years (2017–2019) across the districts of Ardeşen, Çayeli, Çiftlik, Derepazarı, Fındıklı, Gündoğdu, Güneysu, İyidere,

Kalecik, Kalkandere, Kendirli, Merkez, Ortapazar, Pazar, and Selimiye. The surveys were designed to assess the prevalence of *P. latus* during the first (May–June), second (July–August), and third (September–October) vegetative shoot periods of tea. A stratified random sampling method was used to ensure spatial representation across the region. Therefore, surveys were carried out in 73 tea gardens during the first shoot period, 107 during the second shoot period, and 97 during the third shoot period. Surveys were conducted to achieve representative sampling of tea-growing areas in Rize province, with sampling error maintained between 0.05% and 1% to for the tea-growing area in Rize province (Yazıcıoğlu and Erdoğan 2004). The number of collected leaves in each tea orchard is given in Table 1. The leaves were collected in polyethylene bags and were placed in an ice-chill box. Both stereoscopic microscopy and extraction with a Berlese funnel were used to examine the mites on the leaf samples (Boller 1984). Hoyer's medium was used to mount all mites on slides. Species identification was carried out using a Leica DM LB 2 phase-contrast microscope.

Table 1. The number of leaves in which the study was carried out in Rize province

Tea orchard size (da)	Number of leaves sampled
0-1	25
1-5	30
5-10	35
10'dan fazla	40

Population density and prevalence of broad mites

Polyphagotarsonemus latus was counted in a 2 cm^2 area of 4 different places of both the upper and lower leaf surfaces to determine the population density. The number of mites per unit area was determined by averaging the total counts obtained from each orchard (Perring et al. 1996). The simple average formula was used to determine the infection rate in the tea orchard. For this purpose, the number of infected plants determined in the counts made on the leaves collected in 5 different places in the tea orchard was proportioned to the total number of plants.

The rate of orchard infestation = (Number of infested leaves / Total Number of Plants) x 100.

The district-level infestation rate was calculated using the weighted average method. The infestation rate obtained for each orchard was multiplied by the size of its corresponding field. All weighted values were then summed, and this sum was divided by the maximum possible infestation value to determine the overall provincial contamination rate (Bora and Karaca 1970).

RESULTS AND DISCUSSION

This study was conducted to investigate the prevalence and population density of *Polyphagotarsonemus latus* in Rize province. Despite the pest's high infestation levels and concerns from local tea producers, no prior research has comprehensively addressed these parameters in the region. Surveys were conducted in tea orchards across three shoot periods to assess the prevalence of *Polyphagotarsonemus latus.* During the first shoot period, 73 orchards were examined, of which 15 (20.5%) were infested, and 58 (79.5%) were pest-free (Figure 1). During the second shoot period, 107 orchards were surveyed, revealing infestation in 32 (29.9%) and leaving 75 (70.1%) pest-free. In the third shoot period, a marked increase in infestation was observed, with 81 orchards (83.5%) affected and only 16 (16.5%) pest-free. These results suggest an increase in the prevalence of the broad mite over the shoot periods (Table 1). In infested orchards, mite population densities were calculated based on mean counts per 2 cm^2 of leaf area. Results are summarized in Tables 2, 3, 4 and Figures 2, 3, 4. The mean densities varied significantly across shoot periods: in the first shoot period, densities ranged from 0.1 to 10.8 mites per leaf; in the second, from 0.1 to 5.68; and in the third, from 0.1 to a peak of 44 mites per leaf, indicating exponential population growth during late season.

The results of this study show that the population density of *Polyphagotarsonemus latus* differs significantly between shoot periods and districts. During the first shoot period, mite population density remained low and showed an irregular distribution among districts. The highest district prevalence rate was recorded in Derepazarı during this period (44%), followed by Fındıklı (36.5%) and then Pazar (17%). The results suggest that the *P. latus* population had not yet become dominant during the early season.

During the second shooting period, the mite exhibited an expanded spatial distribution, with significant increases in specific areas. In the second shoot growth period, the mite exhibited an expanded spatial distribution, with pronounced increases recorded in certain districts. During this period, the mite population density increased to moderate levels, with both prevalence and density rising in comparison to the first shoot period.

The prevalence and population density of *P. latus* both reached their highest levels during the third shoot period in almost all districts. The highest district-level prevalence was recorded in Güneysu (99%), followed by Merkez (95.6%), Kalkandere (87%), İyidere (82.6%) and Derepazarı (75%). The increase in infestation levels to 80–100% across many districts during this period indicates a rapid late-season population growth and widespread dispersal of the mite.

Table 2. District infestation rate (%), orchard infestation rate (%), average mite density per leaf in orchards with *P. latus* detected in the first shoot period

District	Rural	Average mite density per leaf (2 cm²)	Orchard infestation rate (%)	District prevalence rate (%)
Derepazarı	**Çalışkanlar Mah.**	**10,8**	**73,3**	44,43
	Uzunkaya	3,36	20	
	Subaşı	2,56	20	
	Merkez	2,8	20	
Pazar	Sulak	4,96	33,3	17
	Subaşı	0,2	5,5	
	Güzelyalı Mah.	1,28	6,6	
	Boğazlı	0,64	5,8	
Kalkandere	**Çağlayan**	**0,1**	**4,9**	15
Fındıklı	Derbent	3,68	26,6	36,5
	Derbent 2	5,7	40	
	Sümer	0,64	6,1	
İyidere	Sarayköy	1,12	6	10
Selimiye	Ayane köyü	1,02	6	10
Gündoğdu	Yenimahalle	0,5	5,6	10



Figure 2. District-wise infestation rates of *Polyphagotarsonemus latus* during the first shoot period (The bar height is a measure of the value)

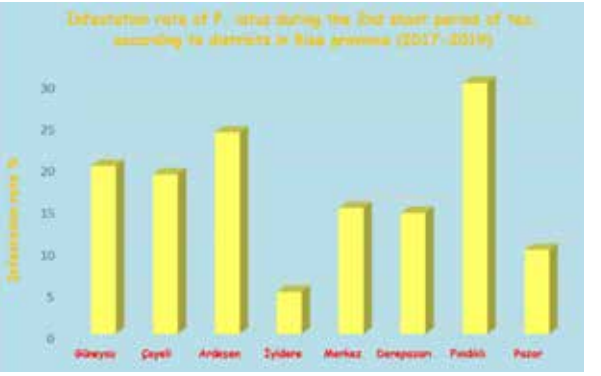


Figure 3. Spatial distribution of infestation rates of *Polyphagotarsonemus latus* in the second shoot period (The bar height is a measure of the value)

This study revealed that the intensity of *Polyphagotarsonemus latus* infestation increased significantly as shoot periods progressed. There were also significant differences between districts. The results obtained suggest that the population density of this mite depends on environmental factors, the structural characteristics of tea orchards and the phenological development stages of the host plant. The higher prevalence and infection rate in young, pruned tea gardens with high shoot production suggest that actively growing tissues offer favourable conditions for the growth and reproduction of *P. latus*. This situation is consistent with previous studies showing that the pest prefers young plant tissues and can multiply rapidly under suitable climatic conditions.

The results of this study largely correspond with those of previous research conducted in Türkiye and other

Table 3. District infestation rate (%), orchard infestation rate (%), average mite density per leaf in orchards with *P. latus* detected in the second shoot period

District	Rural	Average mite density per leaf (2 cm²)	Orchard infestation rate (%)	District prevalence rate (%)
Güneysu	Pazarköy Merkez	2,6	20	20
Çayeli	İncesırt	0,64	6,6	19
	Madenli	**5,68**	**40**	
	Sarısu	1,92	13,33	
	Yamaç	2,8	20	
	Aşıklar Şairler deresi	1,12	6,9	
	Büyükköy	0,6	6,5	
Ardeşen	Sesli kaya girişi	4,32	26,66	24
	Düz mahalle Merkez	1,44	7	
	Merkez	2,2	13,33	
İyidere	Sarayköy	1,5	12	5
Merkez	Pekmezli	1,2	7,1	15
	Akarsu	3,7	26	
	Dörtyol	2.56	20	
	Pekmezli	0,8	6,5	
	Hayrat mah.	1,32	6,9	
	Kambursırt Mah.	1,44	7	
	Gölgeli	3,04	20	
	Azaklıhoca	2,96	19	
	Topkaya	1,5	13,33	
	Çiftekavak	1,12	7	
	Muradiye	5,1	33,33	
	Melek	1,3	7,2	
	Salarha	0,8	6,9	
	Portakallık Ramanoz girişi	**0,1**	**5,5**	
Derepazarı	Bürücek	1,2	6,5	14,4
	Bahattinpaşa	1,4	6,6	
Fındıklı	Çınarlı	3,6	26,6	29,9
	Sulak	2,1	13,33	
	Ihlamurlu	2,7	20	
Pazar	Kocaköprü	1,28	6,5	10
	Kesikköprü	1,4	7,3	

Table 4. District infestation rate (%), orchard infestation rate (%), average mite density per leaf in orchards with *P. Latus* detected in the third shoot period

District	Rural	Average mite density per leaf (2 cm²)	Orchard infestation rate (%)	District prevalence rate (%)
Ardeşen	Akyazı Köyü	10,45	72	65,6
	Işıklı Köyü - Yakıcı Mahallesi	1,6	36	
	Işıklı Köyü - Köprübaşı (Orta yaşlı çaylık)	3,45	44	
	Işıklı Köyü - Giriş kısmı	3,25	64	
	Pirinçlik Mahallesi	4,75	68	
	Yeniyol (Oce) Köyü	1,35	44	
Çayeli	Aşıklar Deresi - Çatak mevkii	1,35	28	50
	Buzlupınar Köyü	**10,2**	**76**	
	Buzlupınar Köyü (Budanmış çaylık)	0,1	16	
	Kaptanpaşa	0,3	44	
	Kaptanpaşa (Orta yaşlı çaylık)	0,15	16	
	Kaptanpaşa (Orta yaşlı çaylık)	5,6	68	
	Sabuncular Mahallesi	2,9	80	
	Selimiye Köyü	1,9	48	
	Seslidere Köyü	1	28	
	Yenipazar Mahallesi (Genç çaylık)	9,2	80	
	Yeşiltepe Köyü (Budanmış çaylık)	4,65	60	
Derepazarı	Aşağı Subaşı Mahallesi	4	64	75
	Kaf Dağı mevkii	11,75	100	
	Kirazdağı (Yaşlı çaylık)	6,5	64	
	Kirazdağı	14,7	80	
	Kirazdağı (Genç çaylık)	7,05	100	
	Sandıktaş Köyü	11,8	92	
	Tersane Mahallesi - Cumhuriyet Sok.	0,55	28	
	Yanıktaş Köyü	17.11	100	
	Yanıktaş Köyü (Genç çaylık)	17,15	96	
	Yukarı Fıçıcılar Mahallesi	16,55	100	
Fındıklı	Hara Köyü Melepe mevkii (Genç çaylık)	6,4	68	51
	Karaali Köyü	0,65	28	
	Kozmağa Köyü (Yaşlı çaylık)	0,2	20	
	Meyvalı Köyü - Orta Mahalle	2,5	32	
	Paçva Köyü (Yenimahalle)	7,65	74	
	Sahil Caddesi	6,3	68	
	Şentürktepe (Genç çaylık)	**0,1**	**16**	
Güneysu	Adacami Köyü	1,55	64	99
	Aşağı Kiremit Köyü	10,9	100	
	Ayane yolu	29,6	100	
	Çankana Mahallesi	8,25	86	
	Dumankaya Köyü	8,2	80	
	Tepebaşı Köyü (Yaşlı çaylık)	30,7	100	
	Yüksekköy	0,7	40	
	Yüksekköy	4,25	40	
	Yeşilköy	44	100	
	Zincirliköprü Köyü (Genç çaylık)	9,6	100	

İyidere	Büyükçiftlik Köyü	10	88	82,6
	Hazar mah. (genç çaylık)	8,15	100	
	Hazar Mahallesi (Genç çaylık)	18,32	100	
	Kalecik Köyü	19,1	100	
	Kalecik Köyü	2,35	48	
	Kalecik Köyü (Yaşlı çaylık)	1,95	52	
	Köşklü Mahallesi	15,05	100	
	Köşklü Mahallesi (Genç çaylık)	9,85	72	
	Küçükçiftlik Köyü (Genç çaylık)	17,25	100	
	Sarayköy	6,4	84	
Kalkandere	Adalar Mahallesi	11,9	100	87
	Çağlayan Köyü	7,8	80	
	Çağlayan Köyü	1,6	52	
	Çağlayan Köyü - Karamanlar Mahallesi (Yaşlı çaylık)	12,45	100	
	Çağlayan Köyü - Meşe mevkii	18,45	84	
	Çağlayan Köyü (Budanmış çaylık)	21,4	100	
	Çağlayan Köyü - Seymenler Mahallesi	6,9	84	
	Çağlayan Köyü - Eminoğulları Mahallesi	4,1	68	
	Geçitli Köyü - Asmalı Mahallesi	6,4	40	
	Kuruköy	4,75	56	
	Merkez Medrese Mahallesi	7,35	76	
	Seyrantepe Köyü	12,2	76	
	Ünalan Köyü	7,75	60	
	Yumurtatepe Köyü	3,4	44	
Merkez	Hamzabey mah.	27,7	100	95,6
	Hamzabey mah.	19,41	100	
	Yolveren köyü (genç çaylık)	34,47	96	
	Çaykent	6,6	64	
	Çorapçılar mah. Boyama mevki	4,8	96	
	Çorapçılar mah. Boyama mevki	10,9	100	
	Ambarlık Köyü (Yaşlı çaylık)	32.61	96	
	Karayemiş Köyü	16,72	100	
	Kömürcüler Köyü (Genç çaylık)	33,26	100	
	Kömürcüler Köyü (Yaşlı çaylık)	4,75	96	
	Yeşildere Köyü	37,25	100	
	Yeşildere Köyü - Güzeldere mevkiisi	9,71	40	
	Yeşildere Köyü - Güzelyurt mevkiisi (Genç çaylık)	6,65	60	

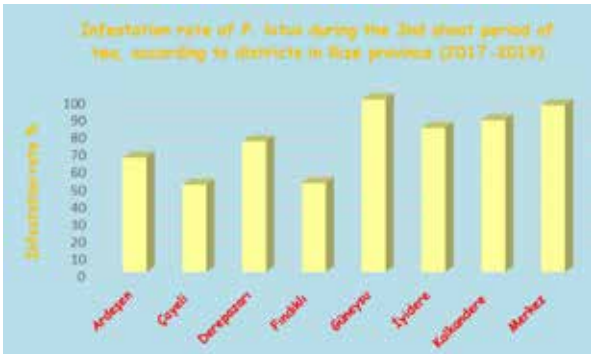


Figure 4. Spatial distribution of infestationrates of Polyphagotarsonemus latus in the third shoot period (The bar height is a measure of the value)

geographical regions. The first record of *P. latus* in Türkiye dates back to 1992 in Antalya, where the species was reported to concentrate on young plants introduced into greenhouses, particularly during autumn (Tunç and Göçmen 1995). This observation supports the high infection rates detected during the early growth stages of tea plants in the present study. Similarly, findings identifying the pest as widespread and economically significant in pepper greenhouses in the province of Mersin (Yabaş and Ulubilir 1995), and demonstrating that *P. latus* thrives on peppers and aubergines in the Eastern Mediterranean region but not on tomatoes (Vatansever and Ulusoy 2002), show that host plant characteristics and growth stage play a critical role in determining population density.

The seasonal population trends identified in this study are consistent with findings reported in different agroecological regions. Pepper plants were found to have high population densities in March (Bathari et al. 2016), with peak levels being reached during September–November (Vichitbandha and Chandrapatya 2011, Monika 2014, Roopa and Kumar 2014). Furthermore, higher mite densities were reported in summer crops (April–June) (Anonymous, 1996), which clearly demonstrates that *P. latus* populations increase rapidly under warm conditions. The significant increase in population observed in Rize province during the third shoot period is consistent with these findings, suggesting that late-season climatic conditions strongly supported the reproduction and spread of the mite. Although lower population densities have been reported for peppers in Pakistan's Sindh region (Kethran et al. 2014), this study's observation of an increase in population over time once again demonstrates the decisive role of temperature and seasonal factors in population dynamics.

Overall, the strong agreement between the findings of this study and those of previous research confirms that regional climatic conditions, the phenological state of the host plant and cultivation techniques are the key determinants of *P. latus* population development. In this context, it is essential to monitor pests in tea gardens that produce heavy shoots, especially during the late growth period of those shoots, and to implement appropriate control strategies promptly.

CONCLUSION

This study determined the prevalence and population density of *P. latus* in tea plantations in Rize, one of Türkiye's major tea-producing regions, providing insights into the current status of this pest. *Polyphagotarsonemus latus* feeds on the leaves of the tea plant, resulting in symptoms such as bronzing, curling of the leaf margins, and reddening of the shoot tips. Such symptoms impair photosynthetic performance and physiological functioning in plants, posing a significant risk to both yield and product quality.

The study reveals that *Polyphagotarsonemus latus* attains its peak infestation level and damages during the third shoot period, identified as the most critical among the three phenological phases for tea production.

A key finding of the study is that the damage caused by *Polyphagotarsonemus latus* is often confused with that caused by *Ricania japonica* (Walker 1851) (Hemiptera: Ricaniidae). This resemblance can lead to the misidentification of pests in tea cultivation areas, resulting in the implementation of inappropriate control measures. The study shows that the main damage to the tea plant is caused by *P. latus*, not *R. japonica*. This highlights the importance of accurate diagnosis once again. As *P. latus* cannot be detected directly through visual inspection in tea plantations, it is essential to conduct training and awareness-raising activities. This will enable tea growers to implement appropriate and timely control measures.

This study may serve as a basis for future research and support the development of long-term and effective management strategies for tea cultivation. Accurate differentiation between damage caused by *P. latus* and *R. japonica* could prevent unnecessary pesticide applications, ultimately reducing economic losses and environmental impacts.

In conclusion, the study has filled a significant knowledge gap, providing a fundamental basis for improving the sustainability of pest management in Turkish tea cultivation.

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Author's Contributions

Authors declare that each author's contribution is equal.

Statement of Conflict of Interest

The authors have declared no conflict of interest.

ÖZET

Dünya'da çay (*Camellia sinensis* (L.) O. Kuntze), ekonomik açıdan önemli bir üründür. Bu zamana kadar birçok ilde *Polyphagotarsonemus latus* (Banks)'un çay üretim alanlarına zarar verdiği ve verim kaybı olduğu bildirilmiştir. Bu çay zararlısı ile ilgili yeni bilgiler elde edilmesine rağmen, popülasyon dinamikleri hakkında çok az şey bilinmektedir. Rize ilinde 2017-2019 yıllarında gerçekleştirilen bu çalışmada, *Polyphagotarsonemus latus*'un popülasyon yoğunluğu ve yaygınlığı belirlenmiştir. Buna göre birinci sürgün döneminde 73 çay bahçesinden, ikinci sürgün döneminde 107 çay bahçesinden ve üçüncü sürgün döneminde 97 çay bahçesinden yaprak ve sürgün örnekleri toplanmıştır. *Polyphagotarsonemus latus* birinci sürgün döneminde 15 bahçede, ikinci sürgün döneminde 32 bahçede ve üçüncü sürgün döneminde 81 bahçede tespit edilmiş ve tespit edildiği bahçelerde popülasyon yoğunlukları belirlenmiştir. Elde edilen sonuçlara göre, bu akarın yaygınlığı sürgün dönemlerine ve ilçelere göre farklılık göstermiştir. Birinci sürgün döneminde en yüksek yaygınlık Derepazarı ilçesinde (%44), ikinci sürgün döneminde Fındıklı ilçesinde (%29.9) ve üçüncü sürgün döneminde ise Güneysu ilçesinde (%99) belirlenmiştir. Genel olarak değerlendirildiğinde, *Polyphagotarsonemus latus*'un Rize ilindeki çay üretim alanlarında oldukça yaygın olduğu ortaya konmuştur.

Anahtar kelimeler: *Polyphagotarsonemus latus*, sürgün dönemi, bulaşma oranı, çay, Tarsonemidae

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