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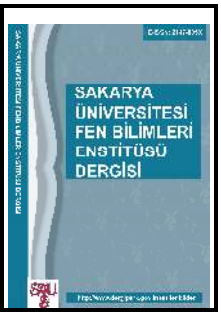

Monthly variation of oribatid mite subspecies Eremaeus hepaticus cordiformis Grandjean, 1934(Acari)

Tunahan Bezci[1], Ayhan Altun[2], Şule Baran[*1]

ABSTRACT

This study comprises the relationship between the climatic factors and the monthly distribution of oribatid mite subspecies *Eremaeus hepaticus cordiformis*. The analysis put in evidence that there is a strong negative correlation between temperature (both air and soil) and number of individual, as the temperature increases the number of individual decreases. There is a weak positive correlation between rainfall and number of individual. The number of individual increases at the humidity increases.

Keywords: Acari, Oribatida, *Eremaeus hepaticus cordiformis*, monthly distribution, Turkey

Oribatid akar alttürü *Eremaeus hepaticus cordiformis* Grandjean, 1934 (Acari)'in aylık dağılışı

ÖZ

Bu çalışmada oribatid akar alttürü *Eremaeus hepaticus cordiformis* Grandjean, 1934 (Acari)'in aylık dağılışı ile iklimsel faktörler arasındaki ilişki incelenmiştir. Yapılan analizler sıcaklık (hava ve toprak sıcaklığı) ile birey sayısı arasında güçlü bir negatif korelasyon olduğunu, dolayısıyla sıcaklık arttığında birey sayısının azaldığını ortaya koymuştur. Yağış ve birey sayısı arasında ise zayıf pozitif korelasyon bulunduğu tespit edilmiştir. Nem arttığında birey sayısının da arttığı belirlenmiştir.

Anahtar Kelimeler: Acari, Oribatida, *Eremaeus hepaticus cordiformis*, aylık dağılış, Türkiye

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1. INTRODUCTION

Oribatid mites are one of the most important components of soil fauna in undisturbed and forested habitats. They play important role in ecosystem functioning, on account of their importance in nutrient cycling processes and decomposition [1] [2] [3].

Temperature has a great effect on oribatid mites because like other invertebrates they are exothermic. Moisture was the second abiotic factor that affects oribatid mites [4]. Variable tolerance to moisture differs one species to another and the different life stages within a species. Oribatid mites that are more frequently found to inhabit the upper layers of the soil are more tolerant to desiccation [5].

The family Eremaeidae Oudemans, 1900 have generally Holarctic distribution and lots of their genera tend to prefer cold environments. While in the more temperate areas their species restricted to forest habitats, in the tundra zone of the Northern Hemisphere and mountainous areas of the Holarctic they are common on open fields [6].

This family comprises 6 genera, 72 species, 4 subspecies. Eremaeid mites are typical occupier of the litter of various types of forests in temperate and arctic regions [7]. Members of this family are known to feed primarily on fungi. The genus *Eremaeus* Koch 1835, is one of the members of family Eremaeidae and includes 26 species and two subspecies. The main characteristics of the genus are: median part of prodorsum with parallel and longitudinal costula, 10 or 11 pairs of notogastral setae, tuberculate or granulate cerotegument on body surface, notogaster without posteromarginal sclerite, ventral plate without postanal process, 4–10 pairs of anal, 4–7 pairs of adanal setae [8] [9] [10].

This study comprises the relationship between the climatic factors and the monthly distribution of the subspecies *Eremaeus hepaticus cordiformis* is investigated in this study. While is a strong negative correlation between temperature (both soil and air) and number of individual, there is a weak positive correlation between rainfall and number of individual.

2. MATERIAL AND METHODS

This study carried out for 12 months between April 2013 and March 2014. Mites were extracted by a Tullgren funnel apparatus form the soil samples collected from Sakarya province monthly. They were fixed and stored in 70% ethanol. Mites were sorted from the samples under a stereomicroscope (Olympus SZX51) and mounted on slides in modified Hoyer's medium or 35% lactic acid.

3. RESULTS AND DISCUSSION

Hitherto two species and one species belonging to this genus *Eremaeus hepaticus hepaticus* Koch, 1836, *Eremaeus hepaticus cordiformis* Grandjean, 1934 and *Eremaeus translamellatus* Hammer, 1952 were recorded from Turkey [11] [12, 13]. In this study monthly abundance of the subspecies *Eremaeus hepaticus cordiformis* have been investigated. SEM images of the investigated subspecies *Eremaeus hepaticus cordiformis* are given in Figure 1.

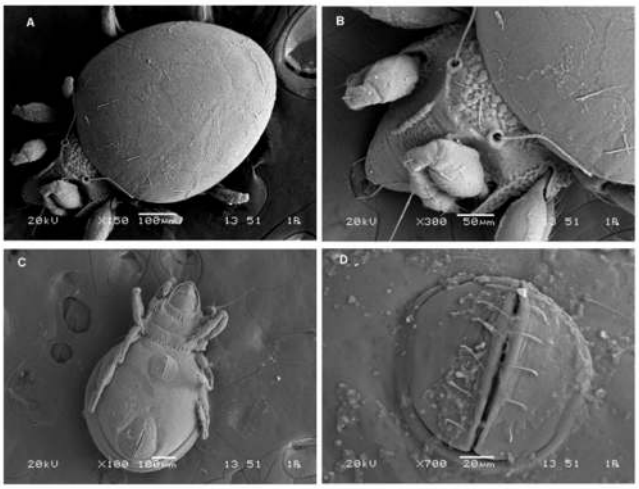

Figure 1. *Eremaeus hepaticus cordiformis*, SEM images A- dorsal view, B- Prodorsum, C- ventral view, D- genital plate

The graphs showing the relationship between occurrence of *E. hepaticus cordiformis* and rainfall and humidity is given in Figure 3 and Figure 4 and the graphs showing the relationship between occurrence of *E. hepaticus cordiformis* and air temperature and soil temperature is given in Figure 2.

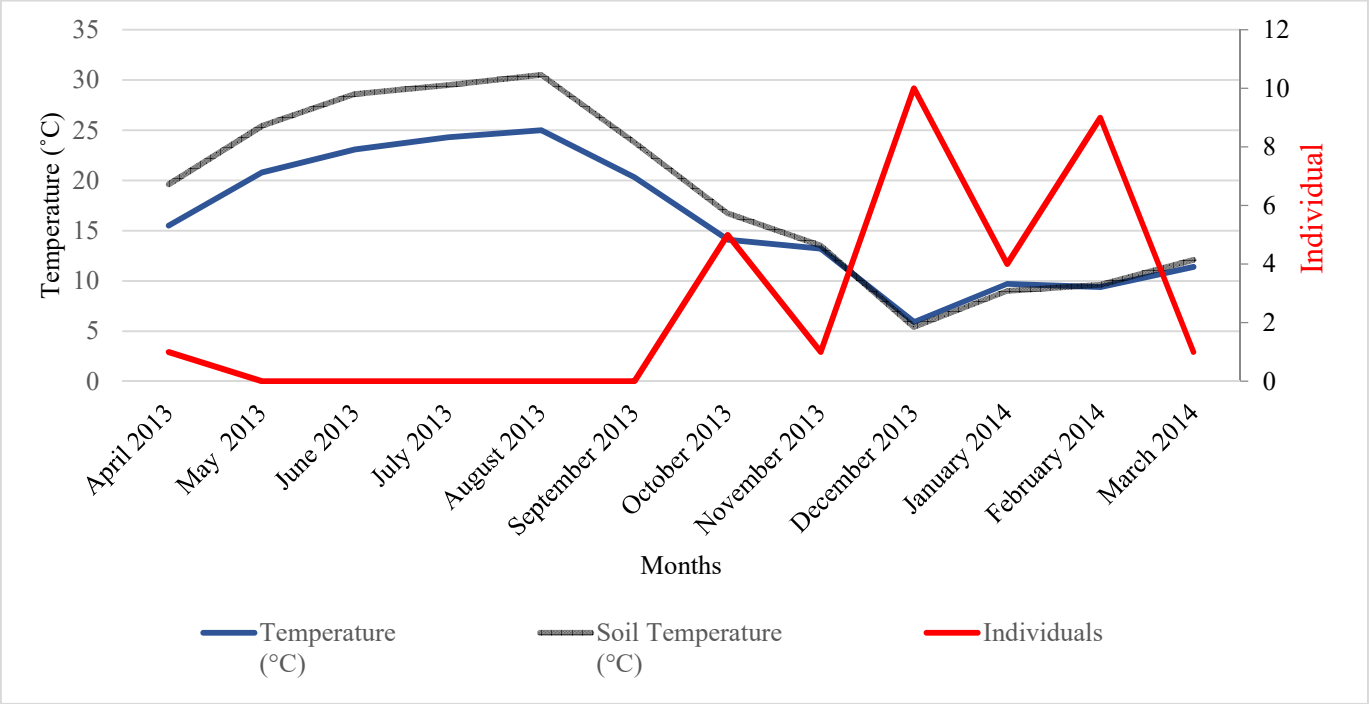

Figure 2. Relationship between occurrence of Eremaeus hepaticus cordiformis and air and soil temperature

Results of the analysis indicates that there are correlation between the number of individuals and the environmental conditions such as air and soil temperature, rainfall and humidity. Investigation has revealed that there is a considerable relation with temperature. Correlation between temperature and the number of individuals is negative. The correlation coefficient depending on temperature is -0.793 for air temperature and -0.775 for soil temperature. Correlation coefficient are 0.224 for humidity and 0.213 for monthly rainfall (Table 1).

As a result it can be claimed that the number of individuals decreases as the temperature increases (Figure 2). However, the amount of humidity and rainfall in the environment doesn't seem to have a great effect on the occurrence of the species (Figure 3 and 4). Nevertheless, there is a slight positive correlation between the amount of water as humidity and rainfall, and the number of individuals.

Table 1.The correlation coefficient between environmental conditions and the occurrence of Eremaeus hepaticus cordiformis

	Temperature (°C)	Humidity (%)	Rainfall (mm/month)	Soil Temperature (°C)	Individuals
Temperature (°C)	1,000				
Humidity (%)	-0,289	1,000			
Rainfall (mm/month)	-0,241	0,468	1,000		
Soil Temperature (°C)	0,996	-0,280	-0,213	1,000	
Individuals	-0,793	0,224	0,213	-0,775	1,000

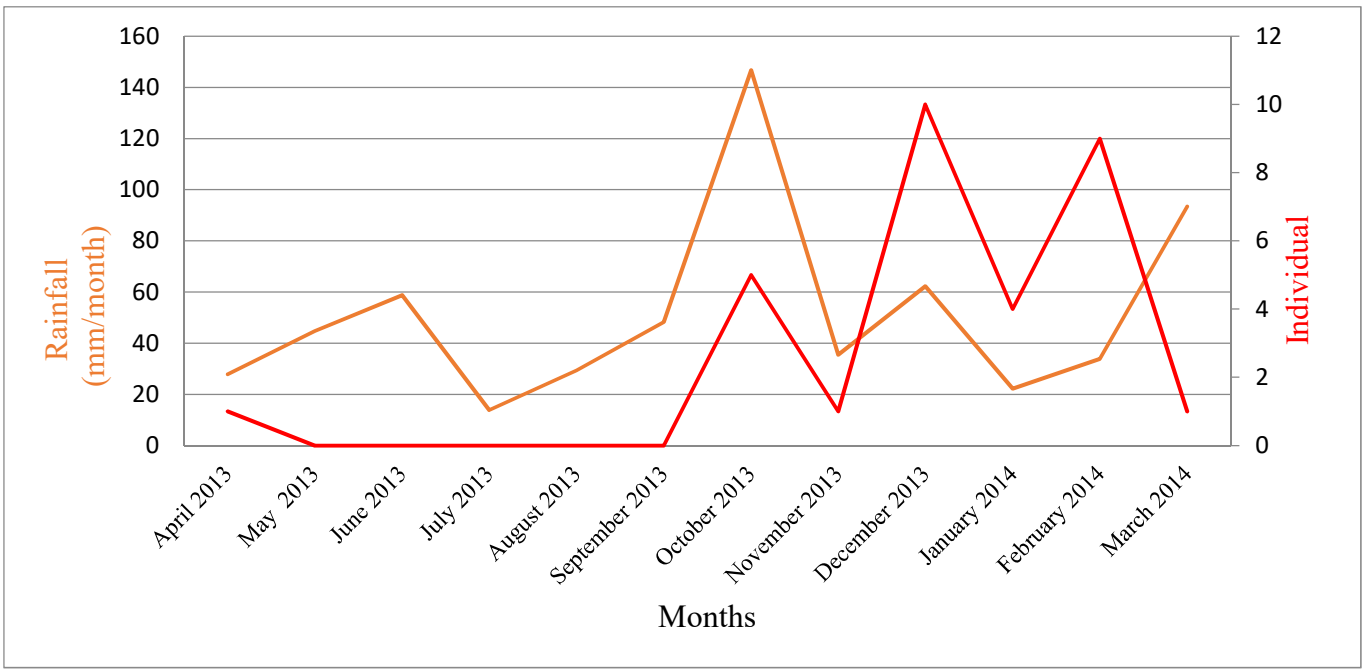

Figure 3. Relationship between occurrence of Eremaeus hepaticus cordiformis and rainfall (mm/month)

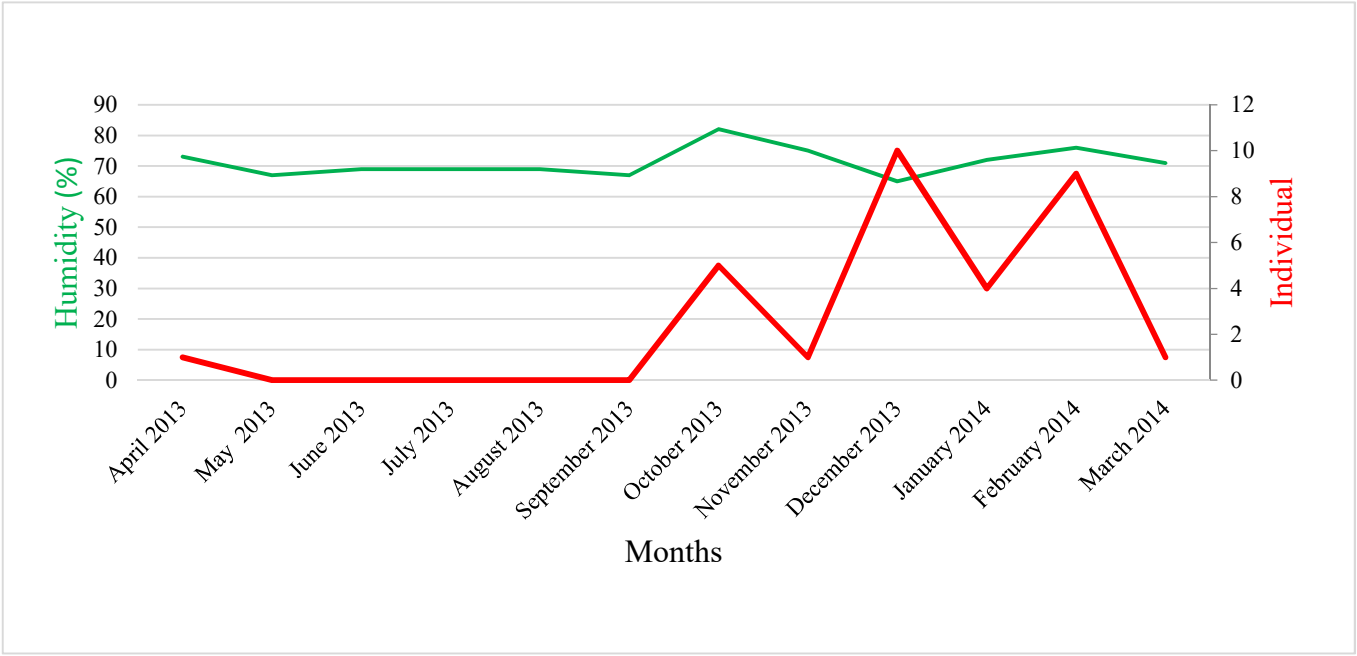

Figure 4. Relationship between occurence of Eremaeus hepaticus cordiformis and humidity (%)

Variable tolerance to temperature differs one species to another and the different life stages within a species. It seems that *E. hepaticus cordiformis* prefer cold environmental conditions and and the amount of water in the environment doesn't have an important effect on the occurence of the species. According to Woas [5] many of the genera of oribatid mite family Eremaeidae tend to prefer cold environments, our findings confirms this previous data.

4. ACKNOWLEDGEMENT

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