



Contributions to the records of *Dysmachus praemorsus* (Loew, 1854) (Diptera, Asilidae) in Turkey and some notes on its seasonal activity

Hakan ÇALIŞKAN*¹
ORCID: 0001-0001-7879-6449

¹ Eskişehir Osmangazi University, Faculty of Science and Arts, Department of Biology, Eskişehir, Turkey

Abstract

The genus *Dysmachus* is one of the richest species in the Palearctic region of the Asilidae (Diptera) family. It is known that *Dysmachus praemorsus* (Loew, 1854) (Diptera: Asilidae), which is one of the common species with wide habitat preference, is also in our country. In this study, *D. praemorsus* species were identified in 76 different habitats throughout the country in the summer months of 2002, 2003, 2005, 2006, 2007, 2008, 2018 and 2019, from sea level to 2200 meters. As a result of the study, new locality records contributed to the knowledge of distribution of the species in our country. The species was reported from 19 provinces for the first time. However, the distribution of the species depending on the height and temperature and the change in seasonal activity in different habitats were investigated.

Key words: *Dysmachus*, *D. praemorsus*, Asilidae, robberflies, biology

----- * -----

***Dysmachus praemorsus* (Loew, 1854)'ün (Diptera, Asilidae) Türkiye'deki kayıtlarına katkılar ve mevsimsel aktivitesi üzerine notlar**

Özet

Dysmachus cinsi Asilidae (Diptera) familyasının Palearktik Bölge'de en zengin tür çeşitliliğine ve geniş yayılışa sahip cinslerinden bir tanesidir. Cinsin geniş habitat tercihi ile yaygın türlerinden biri olan *Dysmachus praemorsus* (Loew, 1854) (Diptera: Asilidae) türünün ülkemizde de yayılış gösterdiği bilinmektedir. Bu çalışmada *D. praemorsus* türü 2002, 2003, 2005, 2006, 2007, 2008, 2018 ve 2019 yılları yaz aylarında ülke genelinde deniz seviyesinden 2200 metre yüksekliklere kadar 76 farklı habitatda tespit edilmiştir. Çalışma sonucunda yeni lokalite kayıtları ile türün ülkemizdeki yayılış bilgilerine katkı sağlanmıştır. Tür 19 ilden ilk kez bu çalışmada rapor edilmiştir. Bununla birlikte türün yüksekliğe ve sıcaklığa bağlı olarak yayılışı ve farklı yaşam alanlarındaki mevsimsel aktivitesinin değişimi incelenmiştir.

Anahtar kelimeler: *Dysmachus*, *D. praemorsus*, asilidae, robberflies, biology

1. Introduction

Robber flies (Asilidae), one of the largest families of true flies, have an important role as a prey in balancing insect populations in terrestrial ecosystems. These animals, with more than 7000 species, live in all terrestrial habitats from the deserts to the tundra. The 60 species of *Dysmachus*, known in the Palearctic region, are one of the largest genus in terms of the number of species. In the faunistic studies conducted so far, 17 species belonging to this genus have been reported from our country [1].

D. praemorsus, which is one of the common species in our country, was recorded by different researchers in May, June, July and August in 8 different provinces ([2, 3, 4]). The members of the species are medium-sized (20 mm) strong flies. Body color is grayish, wings are transparent and wing veins are brown-gray. The legs are black and the male and female genitalia are shiny black [5].

* Corresponding author / Haberleşmeden sorumlu yazar: Tel.: +905055617945; Fax.: +902222393578; E-mail: hakan@ogu.edu.tr

D. praemorsus is known as a steppe species [6]. Populations of the species show adult activity from May to July. Individuals of the species are more common in clay-alluvial soils and mesophytic meadows. It is known that they prefer meadow areas covered by plant species such as *Alopecurus pratensis*, *Poa pratensis*, *Poa trivialis* and *Clementis integrifolia* and grassland areas on the borders of cultivated fields. In general, species belonging to the genus *Dysmachus* are placed on the stems of plants with a height of 20-30 cm in the meadow areas and lay eggs in appropriate parts such as the spikes of plants. The larvae hatching fall into the soil with the spikes and continue to live as larvae predators on the ground and under the ground [5].

In this study, specimens collected from different regions of Turkey in 2002, 2003, 2005, 2006, 2007, 2008, 2018 and 2019 and data such as temperature obtained from sampling studies were used. Starting from the end of Edirne in western Turkey, at the eastern end to Kars (about 1450 km between the two cities) from different habitats of up to 2212 m above sea level examples of *D. praemorsus* have been determined. Changes in seasonal activity of the species between May and July were observed depending on the altitude and temperature.

2. Materials and methods

Collecting studies were done in May-September 2002, July 2003, April 2005, April-June 2006, April 2007, April 2008-April 2008, June-July 2018, May-September 2019. Sampling sites are from west to east in following provinces; Edirne, Çanakkale, Balıkesir, Kırklareli, İstanbul, Kocaeli, Eskişehir, Burdur, Antalya, Karabük, Kastamonu, Çorum, Ordu, Samsun, Amasya, Yozgat, Kayseri, Adana, Sivas, Kahramanmaraş, Erzincan, Tunceli, Bingöl, Tatvan, Erzurum, Kars and Ağrı. 76 different sampling localities range from 2212 meters above sea level. Sampling localities were determined by considering high mountain ranges which may affect the spread of animal organisms such as Anatolian diagonals. The geographical information, sampling dates, measured temperature and altitude values of collecting sites are given in Table 1 and Map 1. Temperatures are measured as the temperature value 1 meter above the ground.

Adult *D. praemorsus* specimens were collected with hand net with sweeping method, preserved in bottles contaminated with etil asetat. 189 male and 182 female total 371 adult individuals were evaluated. Preparations of samples were performed in the laboratory. The end of the abdomen was cut out and the male genitals were removed. Aedeagus, epandrium, gonococyte, dististylus and hypandrium were separated and measured with Leica MZ 16 and Leica Microsystems Framework. Male terminalia were placed in small capsules filled with glycerin and attached to pinned the specimens. All specimens were deposited in Entomology Laboratory of the Department of Biology, Eskişehir Osmangazi University. Following literature were used for species identification [7].

The vegetation in the collecting sites was photographed and the plant species, especially which these flies lay on, were identified by experts.

In order to monitor the seasonal activity changes of *D. praemorsus* due to temperature and altitude, the sampling localities were divided into 5 groups as 0-500 meters, 500-1000 meters, 1000-1500 meters, 1500-2000 meters and 2000-2500 meters.

Table 1. Geographic informations of collecting sites with dates and temperature data

No	Province	Lokalite Name	Date	Latitude	Longitude	Alt (m)	°C
1	Edirne	Kurttepe	06.06.18	41°22'K	26°41'D	106	25
2	Edirne	Beyköy	02.06.02	40°39'K	26°30'D	38	25
3	Edirne	Lalapaşa	29.05.02	41°51'K	26°42'D	181	20
4	Edirne	Çukurköy (Bakışlar)	06.06.18	41°27'K	26°49'D	66	31
5	Edirne	Çavuşköy Göleti	02.06.02	40°40'K	26°11'D	50	25
6	İstanbul	Çilingir köyü	21.05.02	41°10'K	28°40'D	129	21
7	İstanbul	Akalan-Kalfa	03.06.18	41°15'K	28°25'D	117	23
8	Kırklareli	Vize-Pınarhisar	25.05.02	41°36'K	27°43'D	241	20
9	Kırklareli	Madara Deresi	26.05.02	41°52'K	27°54'D	35	19
10	Kırklareli	Dereköy	27.05.02	41°54'K	27°21'D	453	22
11	Kırklareli	Kömürköy	04.06.18	41°37'K	27°52'D	280	23
12	Çanakkale	Yeniköy	05.06.02	40°37'K	26°55'D	43	24
13	Tekirdağ	Malkara	06.06.02	40°55'K	26°52'D	199	24
14	Tekirdağ	Karababa Köyü	06.06.02	41° 7'K	27° 1'D	111	27
15	Tekirdağ	Palamut Köyü-	09.06.02	40°45'K	27°10'D	600	24
16	Tekirdağ	Yeniceköy	10.06.02	41° 6'K	27°44'D	75	22
17	Tekirdağ	Yakuplu	11.06.02	41° 2'K	27°54'D	52	21
18	İstanbul	Şileye 7 km	13.06.02	41° 7'K	29°33'D	27	22
19	Kocaeli	Uzuntarla	19.05.02	40°45'K	30° 6'D	187	20
	Kocaeli	Uzuntarla	19.06.02				22
20	Kocaeli	İsaklı	14.06.02	41° 3'K	29°56'D	216	24
21	Kocaeli	Balcı Köyü	02.06.18	41° 3'K	30°11'D	55	25

Table 1. Continued

22	Kocaeli	Pirceler	02.06.18	40°54'K	30° 3'D	232	24
23	Kocaeli	Kargalı Köyü	20.06.02	40°54'K	29°38'D	309	27
24	Sakarya	Karapınar	17.06.02	41° 3'K	30°37'D	24	22
25	Sakarya	Arifiye	18.06.02	40°40'K	30°21' D	104	26
26	Ordu	Ünye	27.06.18	41° 6'K	37°20'D	14	34
27	Yalova	Elmalık	21.06.02	40°36'K	29°19'D	176	35
28	Eskişehir	Yazılıkaya	08.06.18	39°12'K	30°42'D	1295	26
29	Eskişehir	Oynaş Köyü	12.06.18	39°10'K	30°37'D	1107	26
30	Eskişehir	Çukurca	06.07.18	39°17'K	30°40'D	1257	25
31	Eskişehir	Yenisofça	01.06.19	39°38'K	30°22'D	838	24
32	Karabük	Eflani	22.06.18	41°25'K	32°56'D	905	21
33	Karabük	Sine	22.06.18	41°21'K	32°44'D	1019	20
34	Kastamonu	Pınarbaşı	21.06.18	41°35'K	33° 5'D	684	22
35	Kastamonu	Kastamonu	20.06.18	41°28'K	33°26'D	877	23
36	Kastamonu	Karafasıl Köyü	21.06.18	41°34'K	33°10'D	1023	23
37	Kastamonu	Bahçeköy	22.06.18	41°18'K	33°33'D	1151	21
38	Çorum	Kuşsaray	25.06.18	40°36'K	35° 7'D	1069	18
39	Çorum	Yeni Hayat	25.06.18	40°23'K	34°43'D	842	26
40	Samsun	Ahmet Saray	27.06.18	40°59'K	35°53'D	765	20
41	Samsun	Ağaçpınar Köyü	26.06.18	40°56'K	35°54'D	981	23
42	Amasya	Destek Köyü	26.06.18	40°50'K	36°10'D	644	29
43	Amasya	Yeşilöz	26.06.18	40°33'K	36° 8'D	855	25
44	Yozgat	Sazlıdere	21.06.19	39°41'K	35°40'D	1235	24
45	Kayseri	Dikme	28.05.19	38° 1'K	35°32'D	1330	25
46	Kayseri	Avlağa	28.05.19	37°58'K	35°32'D	1265	24
47	Kayseri	Şihliya 2 km	28.05.19	38° 4'K	35°36'D	1422	26
48	Kayseri	Küçük Künye Yolu	28.05.19	38° 9'K	35°48'D	1500	30
49	Kayseri	Yahyalı-Dikme	27.05.19	38° 2'K	35°24'D	1370	26
50	Adana	Hanyeri	28.05.19	38°12'K	36° 1'D	1668	26
51	Sivas	Divriği Madenli	15.05.19	39°27'K	38°16'D	1160	27
52	Sivas	Zaraya 10km	03.07.18	40° 1'K	38° 1'D	1542	26
53	Sivas	Yıldızeli 5km	03.07.18	39°50'K	36°31'D	1389	23
54	Sivas	Nasır/ Zara	22.06.19	39°49'K	37°53'D	1365	24
55	Kahramanmaraş	Yalak Yol	29.05.19	38°14'K	37°30'D	1355	27
56	Kahramanmaraş	Doğankonak	28.05.19	38°13'K	36°25'D	1577	26
57	Erzincan	Mustafabey	01.07.18	39°48'K	40°31'D	1645	19
58	Erzincan	Köroğlu	02.07.18	39°53'K	38°56'D	1722	26
59	Erzincan	Altköy	02.07.18	39°57'K	38°38'D	1566	22
60	Erzincan	Gemecik	25.06.19	39°53'K	38°26'D	1785	26
61	Erzincan	Aydıncık	22.06.19	39°49'K	38°50'D	1789	23
62	Erzincan	Refahiye	22.06.19	39°53'K	38°46'D	1555	25
63	Tunceli	Çoban Yıldızı	02.07.18	39°27'K	39°53'D	1393	38
64	Tunceli	Pülümür	02.07.18	39°30'K	39°52'D	1627	28
65	Tunceli	Pişi Köyü/ Tunceli	02.07.18	39°39'K	39°44'D	1162	33
66	Erzurum	Sarıkamış 15km	28.06.18	40°15'K	42°38'D	1998	34
67	Erzurum	Nenehatun Termal	30.06.18	39°58'K	41°26'D	1836	25
68	Erzurum	Nenehatun	30.06.18	39°54'K	41°20'D	1979	26
69	Erzurum	Çimenli Köyü	30.06.18	40°11'K	41°54'D	2145	31
70	Erzurum	Alaca/Erzurum	01.07.18	39°59'K	40°58'D	1873	20
71	Erzurum	Hacıhamza	01.07.18	39°52'K	40°38'D	1935	19
	Erzurum	Hacıhamza	25.06.19			1860	23
72	Erzurum	Yukarı Çat	01.07.18	39°40'K	41° 0'D	2136	32
73	Kars	Sarıkamış	28.06.18	40°16'K	42°25'D	2212	25
74	Kars	Sarıkamış 2	23.06.19	40°19'K	42°32'D	2050	25
75	Kars	Yenigazi Köyü	23.06.19	40°24'K	42°44'D	1830	25
76	Kars	Horasan Yolu	23.06.19	40°17'K	42°23'D	2110	24

3. Results

Dysmachus praemorsus was recorded from 24 provinces and 76 localities. The species was firstly reported from 19 provinces (Edirne, Çanakkale, Balıkesir, Kırklareli, İstanbul, Kocaeli, Karabük, Kastamonu, Çorum, Ordu, Samsun, Amasya, Yozgat, Kayseri, Adana, Sivas, Kahramanmaraş, Tunceli, Kars) in this study.

Basic taxonomic characteristics of the species are listed below, with details of the distribution in the world and Turkey.

Dysmachus Loew, 1860

Tip tür: *Asilus trigonus* Meigen, 1804

Dysmachus praemorsus (Loew, 1854)

Body length: 13-19,5 mm, Wing length: 9-11,5 mm

They are mostly gray or grayish-brown. One hundred tubercles are large, hairs are dense on the face. In the thorax, the dorsocentral cetas reach the anterior edge of the mesonotum. Discal cetas are well developed in the abdomen and they are observed in a large number of lateral and posterior parts of the tergites. Male genitalia and female ovipositor are triangular. The eighth tergite is short and a quarter circle on the sides. The eighth sternite is long and ends with the ninth tergite. The length of the ninth tergite is half or slightly longer than the length of the eighth sternite. Serci sides are flat and wide. It is located at the tip of the ninth tergite. Male genitalia is covered with black hair and yellow hairs. The eighth sternite carries tassel-shaped hairs. The apical apex of the gonococcus is angular and is often dark red or orange. The general appearance of individuals (male Figure 1, female Figure 2 and ovipositor of female in Figure 3) and male genitalia (Figure 4) are given.

Examined material: Edirne (Kurttepe), 106 m, 06.06.2018, 1 ♂, 1 ♀; Edirne (Beyköy), 38 m, 02.06.2002, 1 ♂; Edirne (Lalapaşa), 181 m, 29.05.2002, 1 ♂; Edirne (Çukurköy- Bakışlar), 66 m, 6.06.2018, 1 ♂; Edirne (Çavuşköy Göleti), 50 m, 2.06.2002, 2 ♂♂, 2 ♀♀; İstanbul (Çilingir köyü), 129 m, 21.05.2002, 3 ♂♂, 2 ♀♀; İstanbul (Akalan-Kalfa), 117 m, 3.06.2018, 1 ♀; Kırklareli (Vize-Pınarhisar), 241 m, 25.05.2002, 9 ♂♂, 2 ♀♀; Kırklareli (Madara Deresi), 35 m, 26.05.2002, 2 ♂♂, 1 ♀; Kırklareli (Dereköy), 453 m, 27.05.2002, 11 ♂♂, 3 ♀♀; Kırklareli (Kömürköy-Küçükyayla), 280 m, 4.06.2018, 9 ♂♂, 5 ♀♀; Çanakkale (Yeniköy), 43 m, 5.06.2002, 6 ♂♂, 7 ♀♀; Tekirdağ (Malkara), 199 m, 6.06.2002, 5 ♂♂, 3 ♀♀; Tekirdağ (Karababa Köyü), 111 m, 6.06.2002, 1 ♂, 5 ♀♀; Tekirdağ (Palamut Köyü-Radar), 600 m, 9.06.2002, 3 ♂♂, 1 ♀; Tekirdağ (Yeniceköy), 75 m, 10.06.2002, 1 ♀; Tekirdağ (Yakuplu), 52 m, 11.06.2002, 3 ♂♂, 7 ♀♀; İstanbul (Şileye 7 km), 27 m, 13.06.2002, 5 ♂♂, 3 ♀♀; Kocaeli (Uzuntarla), 187 m, 19.05.2002, 1 ♂, 2 ♀♀; Kocaeli (İsaklı), 216 m, 14.06.2002, 2 ♂♂, 2 ♀♀; Kocaeli (Balcı Köyü), 55 m, 2.06.2018, 3 ♂♂, 8 ♀♀; Kocaeli (Pirceler), 232 m, 2.06.2018, 8 ♂♂, 5 ♀♀; Kocaeli (Kargalı Köyü), 309 m, 20.06.2002, 2 ♂♂, 6 ♀♀; Sakarya (Karapınar), 24 m, 17.06.2002, 16 ♂♂, 22 ♀♀; Sakarya (Arifiye), 104 m, 18.06.2002, 5 ♂♂, 4 ♀♀; Ordu (Ünye), 14 m, 27.06.2018, 1 ♀; Yalova (Elmalık), 176 m, 21.06.2002, 4 ♂♂, 4 ♀♀; Eskişehir (Yazılıkaya), 1295 m, 8.06.2018, 3 ♂♂, 1 ♀; Eskişehir (Oynaş Köyü), 1107 m, 12.06.2018, 2 ♀♀; Eskişehir (Çukurca), 1257 m, 6.07.2018, 1 ♀; Eskişehir (Yenisofça), 838 m, 1.06.2019, 1 ♂, 2 ♀♀; Karabük (Eflani), 905 m, 22.06.2018, 3 ♂♂; Karabük (Sine), 1019 m, 22.06.2018, 1 ♂, 2 ♀♀; Kastamonu (Pınarbaşı), 684 m, 21.06.2018, 2 ♀♀; Kastamonu (Daday Çıkışı), 877 m, 20.06.2018, 1 ♂, 9 ♀♀; Kastamonu (Karafasıl Köyü), 1023 m, 21.06.2018, 6 ♂♂; Kastamonu (Bahçeköy), 1151 m, 22.06.2018, 4 ♂♂, 6 ♀♀; Çorum (Kuşsaray), 1069 m, 25.06.2018, 1 ♀; Çorum (Yeni Hayat), 842 m, 25.06.2018, 2 ♂♂, 2 ♀♀; Samsun (Ahmet Saray), 765 m, 27.06.2018, 1 ♀; Samsun (Ağaçpınar Köyü), 981 m, 26.06.2018, 11 ♂♂, 2 ♀♀; Amasya (Destek Köyü), 644, 26.06.2018, 2 ♀♀; Amasya (Yeşilöz), 855 m, 26.06.2018, 1 ♂, 1 ♀; Yozgat (Sazlıdere), 1235 m, 21.06.2019, 2 ♂♂; Kayseri (Dikme), 1330 m, 28.05.2019, 4 ♂♂; Kayseri (Avlağa), 1265 m, 28.05.2019, 1 ♂; Kayseri (Şihliya 2 km), 1422 m, 28.05.2019, 1 ♂; Kayseri (Küçük Künye Yolu), 1500 m, 28.05.2019, 2 ♂♂; Kayseri (Yahyalı Dikme), 1370 m, 27.05.2019, 1 ♂; Adana (Hanyeri) 1668 m, 28.05.2019, 1 ♂, 1 ♀; Sivas (Divriği Madenli), 1160 m, 15.05.2019, 3 ♂♂, 4 ♀♀; Sivas (Zaraya 10km), 1542 m, 3.07.2018, 1 ♀; Sivas (Yıldızeli 5km), 1389 m, 3.07.2018, 1 ♀; Sivas (Nasır/ Zara), 1365 m, 22.06.2019, 4 ♂♂; Kahramanmaraş (Yalak Yolu), 1355 m, 29.05.2019, 7 ♂♂, 3 ♀♀; Kahramanmaraş (Doğankonak), 1577 m, 28.05.2019, 4 ♂♂, 1 ♀; Erzincan (Mustafabey), 1645 m, 1.07.2018, 2 ♀♀; Erzincan (Köröğlu), 1722 m, 2.07.2018, 3 ♂♂, 1 ♀; Erzincan (Altköy), 1566 m, 2.07.2018, 1 ♀; Erzincan (Gemecik), 1785 m, 25.06.2019, 2 ♂♂, 2 ♀♀; Erzincan (Aydıncık), 1789 m, 22.06.2019, 4 ♀♀; Erzincan (Refahiye), 1555 m, 22.06.2019, 2 ♂♂, 2 ♀♀; Tunceli (Çoban Yıldızı), 1393 m, 2.07.2018, 1 ♀; Tunceli (Pülümür), 1627m, 2.07.2018, 1 ♂; Tunceli (Pişi Köyü), 1162 m, 2.07.2018, 1 ♂, 3 ♀♀; Erzurum (Sarıkamış 15km), 1998 m, 28.06.2018, 1 ♂, 1 ♀; Erzurum (Nenehatun Termal), 1836 m, 30.06.2018, 4 ♂♂; Erzurum (Nenehatun), 1979 m, 30.06.2018, 1 ♀; Erzurum (Çimenli Köyü), 2145 m, 30.06.2018, 1 ♀; Erzurum (Alaca), 1873 m, 1.07.2018, 4 ♂♂, 11 ♀♀; Erzurum (Hacıhamza), 1935 m, 1.07.2018, 3 ♀♀; 1860m, 25.06.2019, 1 ♂, 1 ♀; Erzurum (Yukarı Çat), 2136 m, 1.07.2018, 2 ♀♀; Kars (Sarıkamış), 2212 m, 28.06.2018, 1 ♀; Kars (Sarıkamış 2), 2050 m, 23.06.2019, 1 ♂, 1 ♀; Kars (Yenigazi Köyü), 1830 m, 23.06.2019, 1 ♂, 1 ♀; Kars (Horasan Yolu), 2110 m, 23.06.2019, 1 ♂.

Distribution in the world: Germany, Albania, Austria, Bulgaria, France, Hungary, Poland, the European part of old Soviet Union, Turkey, Yugoslavia [1].

Distribution in Turkey: Erzincan, Cevizli, 04.08.1990, Erzurum, Merkez, 01.06.1971, Atatürk Üniversitesi, 23.07.1990, 27.08.1990, Palandöken, 17.07.1990, Oltu-Uzunoluk, 19.07.1992, Olur-Süngübayır, 13.07.1992, Pasinler, 14.08.1992, Senkaya-Turnalı, 03.07.1990, Tortum, 04.07.1991, [2]; Ankara, [8]; Eskişehir, İnönü, Uludere, 27.05.2001 [3]; Ağrı, Tutak, Suluçam, 26.06.1993, Bitlis, Tatvan, 30.06.1993, Tatvan, Karakurt, 01.07.1993; Kütahya, Sobran, Porsuk barajı, 08.07.1993, Van, Karasun Brige, 29.06.1993 [4].



Figure 1. Male of *Dismachus praemorsus*



Figure 2. Female of *Dismachus praemorsus*



Figure 3, Female ovipositor of *Dismachus praemorsus*



Figure 4. Male genitalia of *Dismachus praemorsus* a) aedeagus, b) epandrium, c) side view of gonocoxite and dystistylus, d) gonocoxite, e) hypandrium, f) dystistylus

D. praemorsus individuals were caught on the grass in grassland, forest edge or clearing areas in the forest, on the sides of the field, Perching on the stems of the grasses, and especially egg-laying behavior in the spikes of the Poacea members were observed. Table 2 shows the meadow plant species in sampling area

Table 2: Dominant plant species in sampling areas

Family	Genus	Species	Note
Asteraceae	<i>Anthemis</i>	<i>Antemis cretica</i>	
	<i>Achillea</i>	<i>Achillea millefolium</i>	
		<i>Achillea wilhelmsii</i>	
	<i>Beta</i>	<i>Beta vulgaris</i>	
	<i>Centaurea</i>	<i>Centaurea triumfettii</i>	
	<i>Daucus</i>	<i>Daucus carota</i>	
	<i>Antemis</i>	<i>Antemis sp.</i>	
Brassicaceae	<i>Sisymbrium</i>	<i>Sisymbrium loeselii</i>	
	<i>Alyssum</i>	<i>Alyssum sp.</i>	
	<i>Isatis</i>	<i>Isatis sp.</i>	perching
	<i>Neslia</i>	<i>Neslia sp.</i>	
Caryophyllaceae	<i>Silene</i>	<i>Silene sp.</i>	
Cyperaceae	<i>Scirpoides</i>	<i>Scirpoides holoschoenus</i>	Laying and perching
Fabaceae	<i>Trifolium</i>	<i>Trifolium Pratense</i>	
Hypericaceae	<i>Hypericum</i>	<i>Hypericum Perforatum</i>	
Lamiaceae	<i>Stachys</i>	<i>Stachys Lavandulifolia</i>	
	<i>Mentha</i>	<i>Mentha sp.</i>	
Plantaginaceae	<i>Plantago</i>	<i>Plantago lanceolata</i>	
Poaceae	<i>Alopecurus</i>	<i>Alopecurus arundinaceus</i>	Laying
		<i>Alopecurus aucheri</i>	Laying
	<i>Bromus</i>	<i>Bromus tectorum</i>	
		<i>Dactylis glomerata sbsp hispanica</i>	Laying and perching
	<i>Dactylis</i>	<i>Dactylis glomerata</i>	
	<i>Festuca</i>	<i>Festuca arundinacea subsp.</i>	
		<i>Festuca Rubra</i>	Laying and perching
	<i>Hordeum</i>	<i>Hordeum bulbosum</i>	Laying and perching
		<i>Hordeum murinum</i>	Laying and perching
	<i>Phleum</i>	<i>Phleum Pratense</i>	
	<i>Poa</i>	<i>Poa bulbosa</i>	
		<i>Poa trivialis</i>	
	<i>Alopecurus</i>	<i>Alopecurus sp.</i>	
	<i>Aven</i>	<i>Avena sp.</i>	
	<i>Poa</i>	<i>Poa sp.</i>	
	<i>Stipa</i>	<i>Stipa sp.</i>	
	Rubiaceae	<i>Ranunculus</i>	<i>Ranunculus sp</i>
<i>Galium</i>		<i>Galium sp.</i>	

The variation of the measured temperature and altitude values at the localities where the samples were collected is shown in the graph in Figure 5.

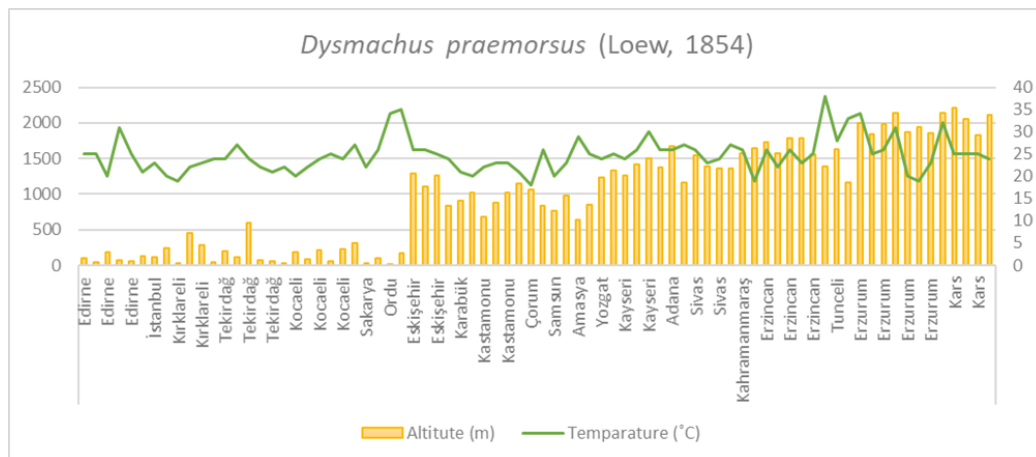


Figure 5. The relationship between altitude and air temperature values at the collecting sites

4. Conclusions and discussion

Dsymachus praemorsus had been identified in different habitats in previous studies in our country. In these studies, it was reported that adult individuals of the species showed flight activity from the end of May to the beginning of August [2], [8], [3], [4]. In our study, the specimens belonging to the species were found in the earliest in May and the latest in July, although the temperature and elevation were different in different years.

The years and months in which the species is not identified are important in terms of the species' seasonal activity limit. During the second and third weeks of April 2002, 2005, 2006, 2007, 2008, 26 individuals belonging to the species were not found in Thrace and South Marmara region (Kaz Mountains), mostly in meadow areas. Similarly, in the last week of July in 2018 and 2019, 33 different stations could not be detected in Eastern Anatolia (Erzurum, Ağrı, Bingöl, Tatvan and Süphan Mountain). Especially in this region in June and July, when the temperature in the valley exceeds 30 ° C, the meadows are dry and no species belonging to the species except the meadows under the influence of wetlands are observed. However, when the climb to the altitude of 1500-2000 meters from the valley floor to 20-25 ° C, *D. praemorsus* individuals were observed.

Figure 5 shows the temperature preferences of the species. The lowest temperature at which the species is caught is 18 ° C and the highest temperature is 36 °C. However, temperatures between 24-26 °C can be considered as the optimum temperature range of this species.

Dsymachus praemorsus females lay their eggs on the plant. Therefore, the activity of the species is also in parallel with the activity of the plants in which the eggs lay in the living environment. Adamovic [9], [5] observed in the species Obedska Bara (in Serbia) in green meadows covered with *Clematis integrifolia* and in the alluvial plains of the Sava river in May and June. The vegetation of the meadows in Obedska Bara mostly includes *Alopecurus pratensis*, *Poa pratensis*, *Poa trivialis*, *Clematis integrifolia* and other plant species.

In the present study, the plant species in the meadows where the adults were caught were *Alopecurus arundinaceus*, *Alopecurus aucheri*, *Dactylis glomerata* sbsp *hispanica*, *Festuca rubra*, *Hordeum bulbosum*, *Hordeum murinum* from the Poacea family, *Scirpoides holoschoenus* from Cyperaceae and *Isatis* sp. from Brassicaceae. It was observed that female flies laid eggs on these plants (Table 2). These plant species start to sprout and continue to grow on the soil at least 20-30 days before the onset of the seasonal activity of *D. praemorsus*. The seasonal activity of the species is in parallel with the sprouting of the plant species and the development of the spikes..

Acknowledgements

This research was partially granted by Scientific Research Projects Commission of Eskisehir Osmangazi University (Proje No: 2018-1987). The author are indebted Ümit ŞİRİN, Ceren Küçükaykay Fidan and Adem Aslan for collecting of specimens and to Dr. Dervis ÖZTÜRK for his support about information of vegetation.

References

- [1] Geller-Grimm, F., 2019, .www.geller_grimm.de. 07.11.2019.
- [2] Hayat, R., Alaoglu, Ö., 1996, Faunistic and systematics studies on the Asilidae (Diptera) species in Erzurum and neighbouring provinces III. Asilinae. Atatürk Ü. Zir. Fak. Der., 27(1): 121-138.
- [3] Çalışkan, H., 2002, Investigations on the Asilidae (Diptera) Fauna of Eskişehir Province. Anadolu University Journal of Science and Technology, 3(2):317-328.
- [4] Bosak, J., Hradsky, M., 2001, Some remarks on the distribution of robberflies (Diptera: Asilidae) in Turkey. Journal of Entomological Research Society, 3 (3): 1-28.
- [5] Adamovic. Z.R., 1973: The mating habits and egg-laying of some *Echthistus*, *Eutolmus* and *Dsymachus* species of the robber flies (Diptera, Asilidae). - Glasnik Priir. muz. Beograd, B, 28: 111-133.
- [6] Richter, V.A., 1964, Zoogeographical characteristics of the robber flies fauna (Diptera, Asilidae) of the Caucasus.
- [7] Weinberg, M. & Bachli, G., 1995, Diptera Asilidae. Insecta Helvetica. Fauna. II. 124 pp. Entomologisches Obozrenie 43 (2): 170 .
- [8] Durmuş, Y., 1999, Ankara Çevresi Asilidae (Diptera) familyasının Faunistik ve Sistemik Yönden Araştırılması. Gazi University. Institute of Science and Technology, Ankara, 135
- [9] Adamovic, Z.R., 1964, The feeding habits of some Asilid species (Diptera, Asilidae) in Yugoslavia, - Archives biol. sc. Beograd. IS (1-2): 221-227.

(Received for publication 13 December 2019; The date of publication 15 December 2019)