

Evaluation of Wing Traps Baited with Disparlure for Monitoring Gypsy Moth (*Lymantria dispar* (L.)) Populations

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Abstract: Field evaluations of wing traps baited with disparlure, Z-7,8-epoxy-2-methyloctadecane, were done in 1989, in İzmit-Işıktepe, Turkey. Wing traps with used and never used sticky inserts were used. Study was conducted in a 5 ha oak (*Quercus petraea* (Matt.) Liebl. stand surrounded by 25-year-old radiata pine (*Pinus radiata* D. Don.) plantations. Traps were hung 1.5-2.0 m above the ground in host trees, and 50-60 m apart from each other. A total of 1177 male moths were captured in 18 traps from June 12 to August 14, 1989. On average, eight male moths per week were captured by the traps baited with disparlure. Most of the captures occurred in mid-July near the stems of oak trees. The captures were fewer on rainy days with low temperatures.

Sünger Örücüsü (*Lymantria dispar* (L.)) Populasyonlarının Denetlenmesinde Disparlure Destekli Wing Trap'ların Değerlendirilmesi

Özet: Disparlure (Z-7,8-epoxy-2-methyloctadecane) destekli wing trap'larının arazi değerlendirmeleri 1989 yılında İzmit-Işıktepe, Türkiye'de yapılmıştır. Çalışma etrafı 25 yaşlarında radiata çamı (*Pinus radiata* D. Don.) plantasyonları ile çevrili 5 ha'lık meşe (*Quercus petraea* (Matt.) Liebl.) meşçeresinde gerçekleştirilmiştir. Tuzaklar birbirlerinden 50-60 m mesafede olacak şekilde konukçu ağaçlar üzerine yerden 1.5-2.0 m yükseğe asılmıştır. Haziran ayının 12'sinden Ağustos ayının 14'üne kadar toplam 1177 erkek kelebek yakalanmıştır. Disparlure destekli tuzaklar tarafından iki hafta ortalaması olarak sekiz kelebek yakalanmıştır. Kelebeklerin çoğu Temmuz ortalarında, meşelerin gövdelerine yakın olan yerlerde yakalanmıştır. Yakalanan kelebek sayısı sıcaklığın düşük olduğu yağışlı günlerde daha az olmuştur.

Introduction

Gypsy moth, *Lymantria dispar* (L.) (Lepidoptera, Lymantriidae) is a serious and widely distributed defoliator of forest and fruit trees in Turkey as well as in many other countries all over the world. The natural distribution of gypsy moth is so large as to extend across the whole of Europe, including Norway and Sweden up to about 58°N and all the temperate areas of North Africa and Asia, including Japan. Despite control efforts, outbreaks occur periodically most of this range (1), and the range of infestation is increasing in North America, where gypsy moth was accidentally introduced (2).

With the importance of gypsy moth as a damaging agent in forests and orchards, several attempts have been made to minimize the damage caused by this pest. In North America, gypsy moth has been and continues to be a target for control programs in hardwood forests in the north-eastern United States and eastern Canada (3,4). The qualitative distribution of the male moth has been intensively surveyed in recent years (5). The flight activity of this pest in European forests has been studied using pheromone traps in Germany by (6) and (7), in Switzerland and Austria by (8), and (9).

Webb and others (10), in a study on the effect of

Groups of traps	I	II	III	IV	V	Total	Mean
(A)	79 (15.8)	87 (17.4)	84 (16.8)	64 (11.8)	59 (11.8)	373	15
(B)	40 (8.0)	52 (10.4)	55 (11)	55 (9.8)	48 (9.6)	250	10
(C)	70 (14.0)	99 (19.8)	111 (24.2)	121 (27)	135 (29)	536	21
(D)	10 (3.3)	5 (1.7)	3 (1)	0 0	0 0	18	2
Total	199 (10.3)	243 (12.3)	253 (13.3)	240 (12.2)	242 (12.1)	1177	

Table. The distributions of the captures by per two weeks.

traps baited with disparlure on mating success, concluded that the presence or absence of traps baited with pheromone did not significantly affect female matching success indicating that the use of pheromone traps in controlling population density of gypsy moth is limited. Thus, the the aim of trapping programs should rather be the early detection of populations in areas of danger so that the timing of insecticide applications and other preventive measures can be accurately determined.

Although the gypsy moth is considered one of the most destructive defoliator in hardwood forests in Turkey, no notable efforts have been made to investigate population dynamics of this agent through pheromone traps. Here, the result of a study to evaluate wing traps baited with disparlure, Z-7,8-epoxy-2-methyloctadecane (10, 11, 12), is presented.

Materials and Methods

The experiments were conducted in İzmit-Işıktepe, northwest Anatolia during the summer of 1989 in stands highly susceptible to gypsy moth attack. The experimental area is about 450 m above the sea level. Tree species present included *Quercus petraea* (Matuschka) Liebl. as the dominant species and *Carpinus betulus* L. (very sparse). Experimental area is surrounded by a 25-year-old radiata pine (*Pinus radiata* D. Don.) plantation. Gypsy moth has been reported to have done a substantial damage to *Q. petraea*, *Q. cer-ris* L., *Q. robur* L., *Pinus radiata* and *Pseudotsuga menziesii* (Mirb.) Franco trees in İzmit-Işıktepe district (13) where the experiments were carried out.

Traps used in the experiments were the Pherocon IC, wing traps, obtained from Sandoz Ltd., and delta traps.

The numbers and features of the traps were as follows:

Types of the traps	Quantity	Features of the traps
(A) wing traps	5	With sticky insert not-used before
(B) wing traps	5	With sticky insert used before
(C) wing traps	5	With sticky inserts (2) not-used before
(D) wing traps	3	Control traps without disparlure

The traps (except the control traps) were baited with disparlure with 500 mg attractive substance, also obtained from Sandoz-Trece, Inc., and hung 1.5-2.0 meters above the ground in host trees. This height is chosen because numerous studies have suggested that forest dwelling moths such as gypsy moth are usually trapped in highest numbers when the traps are in trees, 1.5-2.0 m above the ground (13, 14, 15). The distance between the traps was 50-60 meters. The traps were placed in the experimental area on June 12 and checked once a week on a regular basis until August 14, 1989. The moths stuck in the traps were picked up by means of a special spoon and stored after counting. Assessments were based on the number of male moths captured.

Results and Discussion

From June 12 to August 14, 1989, a total of 1177 male moths were captured. 1159 of them were captured by 15 traps baited with disparlure and only 18 males by 3 control traps. The number of moths captured in this combination decreased, in turn, from (C) type to (A), (B), and control (D) traps (Table), indicating that the number and the quality of the inserts (used/not-used) affects the capture-success of the traps. The (C) type traps captured a total of 536

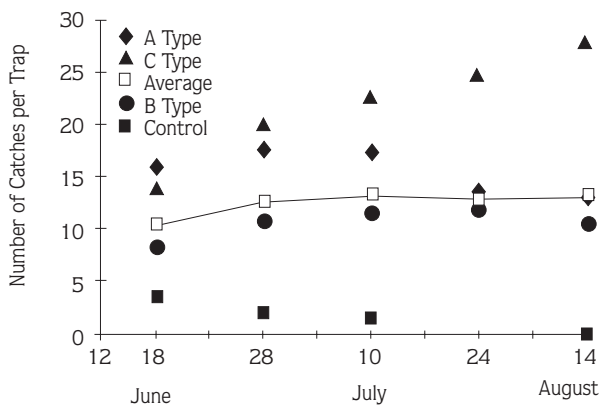


Figure 1. Distribution of the captures by months. (x axis not to scale).

male moths averaging 21 moths per trap per two weeks. (A), (B) and control (D) traps captured, on av-

erage, 15, 10 and 2 moths per trap per two weeks, respectively.

When plotted, average values indicated that the number of captures increased from the first week of June, reached its maximum in mid-July, and decreased slightly and remained relatively the same afterwards (Figure). Trap types, on the other hand, presented a different picture. The number of captures by the (C) type traps increased in a linear fashion, while the rest presented similar trends, in that an initial increase was followed by a gradual decrease (Figure). Thus, assuming that the seasonal population trend follows the average values (solid line in the figure), the use of pheromone traps for monitoring gypsy moth population (10) can be argued.

Analysis of the data with respect to the weather data obtained from a nearby weather station indicated that the number of male moths captured were fewer on rainy days with low temperatures.

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