



An Important Safety and Productivity Problem for Beekeepers: Bears

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ABSTRACT

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In beekeeping, an agricultural activity nested in nature, beekeepers encounter various hazards at different stages of production. The beekeepers often encounter one of these hazards, the bears due to their shrinking habitats, leading to problems in safety and productivity. The present study that aimed to analyze the causes, damage levels of bear encounters, which became one of the most important problems of beekeepers in recent years, and methods of protection from the bears with a different perspective also scrutinized the occupational health and safety dimension and emphasized the potential risks.

Ursus arctos L., indigenous to Turkey and also known as brown bear, has adapted to different habitats since it is both herbivorous and carnivorous. Brown bears that usually prefer forested and uninhabited areas are usually found in Black Sea and Eastern Anatolian Regions in Turkey, however it was observed that their numbers increased in Central Anatolian, Mediterranean and Aegean Regions due to the recent conservation efforts that were initiated in 2003. Brown bears, which could consume a wide range of nutrients, started to live in areas closer to human settlements due to the expansion in agricultural cultivation and increase in highlands tourism activities and their encounters with beekeepers who need to set up their hives in rural areas. Besides the honeycombs they love, the smell of food that is likely to originate from lodging areas increases the frequency of bear encounters around apiaries.

Bear hunting was prohibited with the Land Hunting Law no. 4915, which also aims to preserve sustainable wildlife, and the brown bears could loot the apiaries to appease their hunger after their brumal sleep during the spring and to store energy before the brumal sleep during the autumn. In order to keep the bears away from the apiaries, several technological devices such as electric fences could be used, and also practices that would attract animals to inhabited areas should be prevented. Furthermore, in the case of physical encounter, it would be better to remain calm and move away from the site with movements that would not trigger aggressive behavior. Having knowledge about bear behavior would also assist one to prevent an attack at this stage. On the other hand, as in all production activities, the analysis and elimination of the risks present in the work environment and external risks in beekeeping should be assessed with risk analysis, which is significant for occupational health and safety.

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Arıcalar İçin Önemli Bir Güvenlik ve Verimlilik Sorunu: Ayılar

MAKALE BİLGİSİ

ÖZET

Bu çalışma, 25-27 Ekim 2018 tarihlerinde Antalya'da düzenlenen 10th International Animal Science Conference'da sunulmuştur.

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Doğa ile iç içe yürütülen bir tarımsal faaliyet olan arıcılıkta arıcalar, üretimin farklı aşamalarında çeşitli tehlikelerle karşı karşıya kalmaktadır. Bu tehlikelerden biri olan ayılar, daralan yaşam alanlarının da etkisiyle sıklıkla üreticiler ile karşı karşıya gelmekte, buna bağlı olarak da gerek güvenlik gerekse verimlilik ile ilgili sorunlar ortaya çıkmaktadır. Son yıllarda arıcaların önemli sorunları arasına giren ayı karşılaşmalarının nedenlerini, zarar seviyesini ve ayılardan korunma yollarını farklı bir bakış açısıyla değerlendirmeyi amaçlayan çalışmada, konunun iş sağlığı ve güvenliği boyutu da ele alınmış ve muhtemel risklere dikkat çekilmiştir.

Türkiye genelinde yaşayan ayı türü olan ve boz ayı olarak da bilinen *Ursus arctos* L. hem otçul hem de etçil olması sebebiyle farklı yaşam alanlarına uyum sağlamıştır. Daha çok ormanlık alanları ve insanlardan uzak bir yaşamı tercih eden boz ayıların, ana yayılma alanları Karadeniz ve Doğu Anadolu Bölgeleri olarak bilinse de 2003 yılından itibaren anlatılan koruma çalışmaları ile birlikte yakın dönemlerde Orta Anadolu, Akdeniz ve Ege Bölgelerinde de sayılarının arttığı görülmektedir. Geniş bir besin yelpazesine sahip bozayılar, genişleyen tarımsal üretim alanlarına ve yayla turizm faaliyetlerinin artmasına bağlı olarak insanlarla daha yakın yaşar olmuş ve üretim için arılıklarını kırsal alanlara kurmak zorunda olan arıcalar ile daha sık karşılaşmaya başlamışlardır. Severe tükettikleri ballı peteklerin yanı sıra konaklama alanlarından yayılması muhtemel yiyecek kokuları boz ayıların arılıkların etrafında görülme sıklıklarını artırmaktadır.

Sürdürülebilir yaban hayatın korunmasını da amaçlayan 4915 sayılı Kara Avcılığı Kanunu ile avı yasaklanan bozayılar, ilkbaharda kış uykularının ardından açlıklarını gidermek, sonbaharda ise kış uykusu öncesi enerji depolayabilmek için arı kovanlarına zarar vererek ballarını yağmalayabilmektedir. Ayıların arılıklardan uzak tutulabilmek için elektrikli çitler gibi birçok teknolojik aygıttan yararlanılabileceği gibi hayvanları yaşam alanlarına çekecek uygulamalardan da uzak durulması gerekmektedir. Bunun yanında fiziksel yaklaşımlar söz konusu olduğunda sakinliği koruyarak ayının saldırganlık davranışlarını tetiklemeyecek hareketler ile ortamdan uzaklaşmak yararlı olacaktır. Bu aşamada ayı davranışları hakkında bilgi sahibi olmak saldırganlardan korunmaya da yardımcı olacaktır. Diğer taraftan tüm üretim faaliyetlerinde olduğu gibi arıcılıkta da çalışma ortamında var olan ya da dışarıdan gelebilecek risklerin değerlendirilerek ortadan kaldırılmasını amaçlayan risk analizleri, iş sağlığı ve güvenliği açısından oldukça önemlidir.

Introduction

Honey bees inhabit almost all areas in the world except the polar regions due to their high adaptability. The bees that provide several products

such as honey, pollen, beeswax, propolis, royal jelly and bee venom increase the quality and productivity in vegetation products significantly due to their role in pollination.

One of the most common agricultural productions, beekeeping is conducted with two methods: migratory and non-migratory beekeeping. Non-migratory beekeepers conduct their production using local nectar and pollen resources. On the other hand, for migratory beekeepers, it is essential to follow the flowering periods, avoid the chemical applications in crop production areas, and winter the colonies in areas with moderate temperatures to increase the yield. Regardless of the apiculture method, the beekeepers are exposed to various hazards in different stages of production. To control the bears that are one of these hazards and affect the productivity and to provide solutions for the problems, it is necessary to acquire knowledge on the biology, feeding patterns, habitats and the reasons of the restriction of the habitats of brown bears. In order to protect producers from potential hazards, it is necessary to address the occupational health and safety dimensions with different methods.

Brown bears

The largest carnivore in Turkey, brown bears (Özkazanç, 2012) are protected under the Land Hunting Law dated 1/7/2003 (No: 4915) (Anonymous, 2003). During the last decade, the population of brown bears, frequently encountered in Northeastern and Eastern Anatolia, started to inhabit Mediterranean and Aegean regions. The current brown bear population in Turkey is estimated to be around 3400-4000, albeit the lack of current data (Ambarlı et al., 2016).

Contrary to common belief, the majority of the brown bear diet includes plants (Ambarlı, 2016). Furthermore, they could consume various resources that include insects and carcasses as

nutrients (Stenset et al., 2016). However, unlike their relatives in other continents, the limited availability of salmon and other meat sources is considered to be one of the reasons for their smaller size (Ambarlı et al., 2016). Although the presence of male individuals up to 600 kg was mentioned in Turkish brown bear population, mean weight among male individuals varies between 150-250 kg. The male height could also vary between 180 and 220 cm. The mean lifespan of brown bears is 30-40 years (Turan and Güzel, 2017), while female individuals are 8-10 % smaller when compared to males.

The brown bears, who generally avoid human contact and are shy and skittish in nature (Sağlam et al., 2010), could regulate the onset of hibernation based on seasonal differences. However, this period usually begins in December and lasts until the end of April (Ambarlı et al., 2016). Hibernation, which is a survival strategy during winter months when food is limited (Welinder et al., 2016), is not considered as a complete sleeping state for the brown bears. During this period, non-feeding brown bears use the fat stored in their bodies (Sağlam et al., 2010). However, they can sometimes wake up from hibernation due to reasons such as nutritional deficiencies, climatic conditions and human-induced environmental factors (Friebe et al., 2014). The mating season of the bears, who live a solitude life, starts in mid-May and may last until early July. Although usually they mate with a single male, in some cases, it was observed that female bears can mate with two males on the same day (Ambarlı et al., 2016). There is a long period of time between mating and blastocyst implantation periods in bears. The average gestation period, measured as 221 days in previous studies (Tumanov, 1998), may vary slightly in

few cases. Pregnancy, which is generally 60 days (Tsubota et al., 1987), can be extended up to six months until spring, when the offspring could come out of the cave and find plenty of food.

The female bears, which usually give birth to 1 or 2 puppies, keep their offspring around for about two years. After this period, the offspring slowly start to leave their mothers when they are 3 years old and immediately demonstrate a desire to mate.

The type and content of the area is highly effective on the habitats of brown bears. Although they prefer different types of habitat that include coastal areas and high elevations, bears generally prefer glades, areas covered with high grass and away from human impact as habitats that would allow them to hide and feed freely (Can and Togan, 2004).

Brown Bear-Human Conflict and Beekeeping

Conflict between bears and humans occurs under two different conditions. The bears that cause harm to the cultivated lands, animals and beehives to feed are, also, exposed to the cruelty and illegal hunting of the humans (Qashqaei et al., 2014). The main reasons for frequent bear-human encounters include hydroelectric power plants, touristic construction, road construction, urbanization and expansion towards natural areas, mining activities, building developments in preserved areas after a certain period of time, allowing investments in preservation areas (Turan and Güzel, 2017).

Brown Bear-Beekeeper Encounters and Risk Assessment

It is possible to consider the determination of the hazards that are present during production or could occur

due to the production, identification of the hazards that could occur due to these activities, determination of the damages that these hazards could cause among the employees, to the workplace and the environment and the measures that needs to be taken against these risks in general as risk assessment. The main objective of risk assessment in beekeeping is to protect the health of the beekeepers and ensure their safety. Thus, in risk assessment, the processes of collecting the information, determination of the hazards, assessment of the risks that arise due to the hazards, planning the actions to eliminate these risks and finally putting the risk assessment findings in a written form should be conducted with care.

Certain farmers, who live in rural areas and aim to protect their crops from the hazards, take precautions against bears such as night watch, fencing the cultivated areas with barbed wires, and using machines that produce noise, while beekeepers prefer applications such as placing the hives at higher locations that the bears cannot reach, utilizing guard dogs and scaring the bears away by making noises (Sağlam et al., 2010). Nevertheless, continuously narrowing bear habitats and their desire to access to food increase the possibility of bear-beekeeper encounters. The news in the local and national press reveals the significance of the issue.

There are a number of measures that could be taken against brown bears that could cause hazards which could lead to serious injury or death for the beekeepers. However, more than these measures, general practices are important for the health and safety of the beekeepers. Simple precautions such as avoiding the places where an encounter with a bear is possible, avoiding to be alone, using common communication tools such as mobile phones, and

determination of the areas where the communication tools are active are important. Furthermore, it would be adequate to make an effort to be noticed beforehand in order to prevent encounters. Similarly, the use of noise-making apparatus such as bells when walking in deserted areas or making a noise during movements are effective methods to fend off the bears, who are basically afraid of the people.

Feeding habits of the bears near human settlements are one of the factors that escalate the problem. Thus, in addition to the measures listed for the set up of the apiaries, spreading the odors of the nutrients in the food chain of the bears such as honey should be avoided. Then, one of the reasons for the visits by the bears would be removed. Furthermore, it is possible to consider placing light and sound sources around the apiary for bears who prefer to eat during nighttime.

In order to achieve a peaceful solution to the bear-beekeeper conflicts and to prevent the damages to both sides, electric fences developed during recent years have been used by several beekeepers. This apparatus that operates based on electroshock and could work with solar energy warns the bears with low voltage upon contact to the fence. Thus, the aim is to fend the bears off the apiary.

In the case of an encounter with a bear despite the precautions, it is very important to avoid the bear, whose eyesight is quite bad, to recognize the individual and to perceive the human as a threat. For this purpose, the bears may want to get up on their hind legs and expand their field of vision. A standing bear is often curious and does not constitute a threat. Talking with a lower voice is considered as an adequate behavior. However, sudden actions and reactions such as screaming should be

avoided. The bears, who generally prefer to stay alone, prefer to get away when they recognize people. Otherwise, if the bear is still, the individual can try to move slowly sideways and get away. However, it should be kept in mind that running away could result in a bear attack. Keeping in mind that the bear can run as fast as a horse, it would be better to stay still in such an event. It should be remembered that bears can climb trees. In order to prevent bear attacks, certain sprays can be used at the time of the attack rather than keeping the bears away. Furthermore, the bear puppies should be avoided in order not to be perceived as a threat by the bears and cause significant disadvantages and coming between the mother and the offspring should be avoided at any cost (NPS, 2018).

Discussion

Brown bears, who could feed on a wide range of nutrients, started to live closer to humans due to their reduced habitats and began to encounter increasing number of beekeepers, who need to set up their apiaries in rural areas for production. In addition to the honeycombs they like to consume, food odors in the settlements increase the frequency of the visits by brown bears to apiaries. Consequently, beekeepers, who try to protect themselves and their colonies from possible bear attacks, could not use the areas with rich nectar and pollen potential in many cases. In different situations, they face colony losses, health and safety problems.

Several rural producers, especially the beekeepers, take various measures such as electric fences, sound systems and night illumination in order to keep the brown bears away from production and living quarters. In case of probable

encounters despite the measures, it is obvious that taking into account the risk assessments, which may contribute significantly to the solution of health and safety problems, and the knowledge on general behavior of the bears would reduce the risk of serious injuries or death.

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