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Medical Importnace of Fire Ant *Pachycondyla sennaarensis* (Hymenoptera: Formicidae) in Iranshahr and Sarbaz Counties, Southeastern of Iran

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The newest public health problem in Iran is biting and stinging of newly reported fire ant *Pachycondyla sennaarensis* (Hymenoptera: Formicidae) in south and southeast of the country. They annoy the residents by invasion into home and human premises. This study was conducted to determine the incidences of their biting and their effects on routine life of people in Iranshahr and Sarbaz counties. The questionnaire, prepared for this reason, was completed in random cluster manner. Effects of biting was surveyed and also photographed in a healthy volunteer. The results revealed that biting of the ant is mild and none of bitten individuals had systematic reactions. At least 92.5% of questioned individuals had bitten at least one time with this ant. Incidence of biting had no differ between men and women (50.9 and 49.1%) ($p>0.05$). The majority of people (69.2%) were bitten on limbs (hands and legs) ($p<0.01$). The sore of biting was tolerable for majority of individuals (89.2%) while 38% of them was suffered pain for a few hours ($p<0.01$). Its ecological requirements such as temperature range and humidity of soil can be found in other parts of Iran therefore it is the subject of spreading to other parts of the country.

Key words: *Pachycondyla sennaarensis*, fire ant, medical importance, Iran

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INTRODUCTION

Ants are probably the most successful of all the insect groups (Borror *et al*., 1981). They are present almost in all countries and all places (Sarosh *et al*., 1999). A few of them can bite, sting and squirt their venom (Bolton, 1994), which are named as fire ants. The red imported fire ant is becoming a global ecological problem, having invaded the United States, Puerto Rico, New Zealand and, most recently, Australia (Mediabadi *et al*., 2002; Mc Cubin *et al*., 2002). It detrimentally impacts human health, livestock, wildlife, crops, machinery and electrical equipment (Morrison *et al*., 2004).

Fire ants are potentially aggressive insects that attack in defense when anything disturbs them. For people with disabilities or reduced feeling in their feet and legs and for young children, the risk of serious stinging incidents and resulting medical problems may be even greater (Sutherland *et al*., 1999).

The fire ant is known to grip the skin with its mandibles and then insert its sting. It may pivot and sting many times in a circular pattern (Sarosh *et al*., 1999).

Anyone stung immediately experiences a combination of severe burning (hence the term "fire ant") and itching at the sting site (DeShazo *et al*., 1999).

The red imported fire ant injects venom along with an alkaloid, Solenopsin A. This oily fluid is toxic to skin cells and causes the pustule to form by killing cells at the sting site. These dead cells then attract the body's defensive white blood cells, which accumulate at the wound, forming pus. If the skin is broken by scratching, bacteria may enter. This can cause a secondary infection to develop, delaying healing and potentially causing other medical problems, including scarring. The venom also contains a small amount of protein (typically less than 10%) that has little effect on most people other than creating the itchy welt. However, some people can be quite sensitive to these proteins. For them, even a single sting can lead to a potentially serious condition called anaphylactic shock (Sutherland *et al*., 1999).

The world famous fire ants, *Solenopsis invicta* and *S. richteri*, have not entered in Iran (Akbarzadeh *et al*., 2006). Only a few ant species are medically important in Iran. *Formica rufibarbis* and a few the others are secondary hosts of *Dicrocelium dentriticum* in north and northwest of Iran (Sahba *et al*., 1995). But the newest public health problem in relation to hymenopterous origin is biting and stinging of fire ant *Pachycondyla sennaarensis* (Hym.: Formicidae; Ponerinae) that has been found in Iranshahr County (southeast of Iran) where it is much infected. Its local name in Baluchestan region is "Sochok" that means as an animal can induce inflammation.

This study was conducted to determine the incidences of their biting and their effects on routine life of people in Iranshahr and Sarbaz counties.

MATERIALS AND METHODS

Iranshahr and Sarbaz Counties, expansion about 30230 and 11500 km^2 respectively, located in Sistan and Baluchestan Province, southeastern of Iran. Majority of residents of these counties are Baluch Tribes. They have a high level of socialization with Pakistan. They have been adapted with sting of fire ants. This may be resulted in *IgE* antibody specific for its venom but we didn't survey it in individuals. Stinging of these ants is not important in comparison with stinging of scorpions and snakes that are very prevalent in this district. They don't refer to any health center for ant biting therefore there is not any record of ant biting in health centers. Thus we prepared a questionnaire for determining the incidence of

Fig. 1: Small vesicles caused by venom of fire ant *Pachycondyla sennaarensis* (Hym.: Formicidae), 1 min after stinging, Iranshahr Station of Public Health Research, Original, May 2003

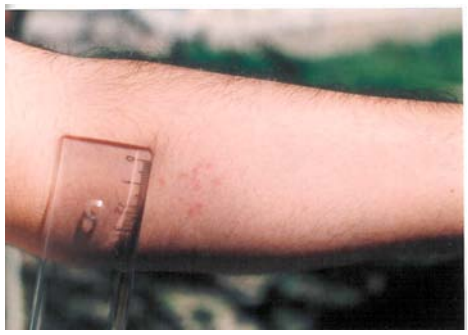

Fig. 2: Small blisters caused by venom of fire ant *Pachycondyla sennaarensis* (Hym.: Formicidae), 30 min after stinging, Iranshahr Station of Public Health Research, Original, May 2003

Fig. 3: Fine nodules with expand inflammation caused by venom of fire ant *Pachycondyla sennaarensis* (Hym.: Formicidae), 60 min after stinging, Iranshahr Station of Public Health Research, Original, May 2003

ant biting and their impact on routine life of residents in Iranshahr and Sarbaz counties during 2003-2004. The questionnaire was completed in random cluster manner.

Effects of stinging of the ant *Pachycondyla sennaarensis* were observed on hand of a healthy volunteer in Medical Entomology Lab of Iranshahr Station of Public Health Research 2003. His forearm was exposed for a fire ant to biting repeatedly. All effects of its stinging photographed as shown in Fig. 1-3.

RESULTS

Results of questionnaire: According to the results of questionnaire, 95.2% of the individuals had bitted at least one time with this ant. They were complained from its painful sting. Incidence of biting has non-significantly difference between men and women (50.9% and 49.1% respectively) ($p>0.05$). About 95.7% of questioned people were known this ant. Incidence of biting of the ant in various organs of individuals has shown in Fig. 4. There is a significantly difference between biting on limbs (69.2% on hands and legs) and other organs ($p<0.01$).

Sore of biting was tolerable significantly ($p<0.01$) for majority of them (82.9%) but 12.7% of them were suffered from its painful biting. Various traditional treatment such as alcohol (21.86%), gasoline (15.57%), salt (10.05%), mud (5.02%) and so on have used for healing of its pain as shown in Fig. 5.

Results of survey of biting on volunteer: After 5- 10 sec small vesicles appeared and grew immediately (Fig. 1). Their size may reach to 0.5 cm in Diameter and can join with others and make a large vesicle.

Small blisters substituted by inflammation with fine nodules after about 60 min (Fig. 3). After a few hours all of the appearance of biting disappeared but skin itch continued for about 24 h.

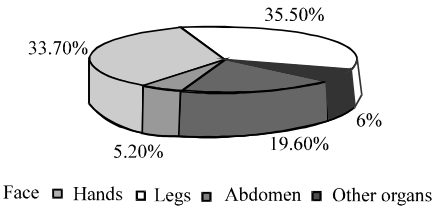

Fig. 4: Incidence of biting of fire ant *Pachycomdyla sennaarensis* in various organs of individuals, Iranshahr County, Sotheastern of Iran, 2003

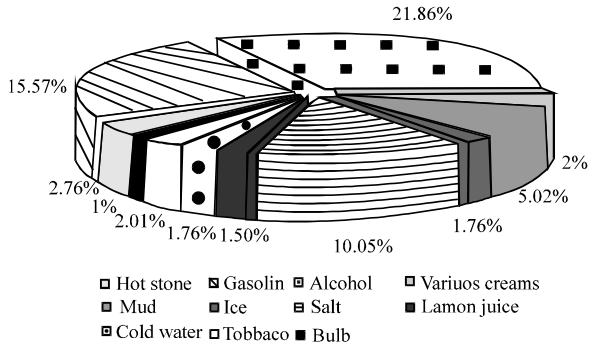

Fig. 5: Various traditional treatment of biting of fire ant *Pachycondyla sennaarensis* in questioned individuals, Iranshahr County, Sotheastern of Iran, 2003

DISCUSSION

Usually the effects of the stings of Iranian fire ant *Pachycondyla sennaarensis* (Hym.: Formicidae; Ponerinae) are mild but they are capable of multiple stinging and produce blister and skin itch. This can follow by side effects as we can see in results of biting of other fire ants (De Shazo *et al*., 1999). Some traditional attempts for healing the pain and inflammation of biting that use by victims (Fig. 5) may enhance risk of side effects.

Results of biting incidence on various organs (Fig. 4) appeared that majority of biting can be prevented easily by a few protective methods on hands and legs such as use of repellents.

The absence of background of ant biting in health centers of the area may occur some misunderstandings of occasional systemic reactions both for people and physicians. On the other hand absence of systemic reactions in biting effects of *P. sennaarensis* may be result of component of its venom. We know systematic reactions are due to protein portion of the venom (Sutherland *et al*., 1999). Component of its venom is not known. Although anaphylactic shock has not been reported among the local inhabitants, fire ant sting has caused considerable annoyance among the residences of infected areas especially in children.

It is found in some districts with range of temperature between 0 to 50°C. Therefore it is the subject of spreading more easily to southern part of the country along the Persian Gulf, in general (Akbarzadeh *et al*., 2006). Many ant species are easily transported around the globe by human commerce (McGlynn, 1999). This spread has been aided by the increase in fire ant densities and mating flights and by the movement of infested plants and other agricultural products to uninfested areas (De Shazo *et al*., 1999). Off-season vegetables such as cucumber and watermelon and some semi-dried fruits such as Mozafati dates are also exported to the other parts of the country. It may be a serious alarm for range expansion of *P. sennaarensis* to some other favorable localities of Iran.

With the increase in fire ant density and the ants' propensity to attack farm animals during times of food scarcity, reports of fire ant attacks on humans who come in direct contact with colonies came as no surprise (De Shazo *et al*., 1999).

Some educational programs need for raise knowledge and attitude of individuals for use of protective methods and treatment of biting and preventing for distribution of this pest.

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