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A survey on the sawflies (Hymenoptera: Symphyta) of Gorgan County of Golestan Province in northern Iran

Roya Mohammadkhani¹, Ahmad Nadimi^{2*} and Mohammad Khayrandish³

¹ Department of Plant Protection, Baharan Institute for Higher Education, Gorgan, Iran.

² Department of Plant Protection, Faculty of Plant Production, Gorgan University of Agricultural Sciences and Natural Resources, Gorgan, Iran.

³ Department of Plant Protection, Faculty of Agriculture, Shahid Bahonar University of Kerman, Kerman, Iran.

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ABSTRACT. A survey on sawflies (Hymenoptera: Symphyta) fauna of Gorgan County, northern Iran, during 2015-2017, led to the identification of sixteen species. Six species including *Arge cingulata* (Jakowlew, 1891); *Calameuta pallipes* (Klug, 1803); *Phylloecus xanthostoma* (Eversmann, 1847); *Allantus cingulatus* (Scopoli, 1763); *Ametastegia pallipes* (Spinola, 1808) and *Nematus lucidus* (Panzer, 1801) are recorded for Golestan fauna for the first time and *C. pallipes* is a new record for the Iranian fauna.

Key words: Hymenoptera, Symphyta, Golestan, distribution, Iran

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Introduction

The order Hymenoptera, one of the most species-rich groups of insects, is divided into two suborders Symphyta and Apocrita. The first group, Symphyta, with 9 superfamilies (8 extant) and 25 families (14 extant) is smaller, geologically older and structurally more primitive than the Apocrita (Aguilar et al., 2013; Goulet & Huber, 1993). This suborder consists mainly species with numerous wing veins, a broad connection between the abdomen and the thorax, a pair of metanotal protuberances (except the Cephidae), the cenchri, and an unmodified abdomen in which the first segment is similar to the remaining segments (Quinlan & Gauld, 1981; Smith, 1988; Goulet & Huber, 1993). Sawflies (common name) are derived from the modified

ovipositor with marginal teeth, which looks and functions like a saw. The Symphyta is predominantly herbivorous, so that they are potentially pests under certain circumstances (when populations are large), and are therefore important in agricultural ecosystems.

Sawflies, which comprise 817 genera and roughly 8855 species worldwide, occur on all continents except Antarctica (Taeger et al., 2018). With 145 genera and about 1800 described species the West Palaearctic sawfly fauna is particularly diverse (Taeger et al., 2010). Among the approximately 178 sawfly species which have been reported from Iran, the family Tenthredinidae with 131 species (73.5%) is the largest (Khayrandish et al., 2017). In Iran, several

Corresponding author: Ahmad Nadimi, E-mail: nadimi@gau.ac.ir

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sawflies have been reported on agricultural plants, like *Hoplocampa flava* (Linnaeus, 1760) and *H. minuta* (Christ, 1791) on plums and prunes (Davoudi, 1995), *Arge ochropus* (Gmelin, 1790) on *Rosa* spp. (Abai, 2009) and *Cephus pygmeus* (Linnaeus, 1767) on wheats (Ghadiri, 1993), and these are potential economic pests. Gorgan County is located in the North of Iran and characterized as belonging to the Hyrcanian Zone which includes Alborz range forest steppe, Caspian-Hyrcanian mixed forest and Caspian lowland desert, with a rich flora that is supposed to

support a rich sawfly fauna. The aim of this study is to improve our knowledge on the sawfly fauna in different ecosystems in Gorgan county, Iran.

Material and methods

A faunistic study of sawflies was conducted using specimens collected in the northern part of Iran, Golestan province, Gorgan County, during 2015-2017 (Fig. 1). All adult sawflies were captured during flight, in 16 Malaise traps. The position of capture locations was determined by a Global Positioning System (GPS).



Figure 1. Geographic map of the collected species of sawflies in the North of Iran. Red points indicate the study sites of Gorgan County of Golestan Province.

Specimens from Malaise traps were preserved in 70% ethyl alcohol. The species were identified mostly using the keys of Gussakovskij (1935), Benson (1951, 1952, 1958, 1962, 1968), Quinlan & Gauld (1981), Zombori (1981, 1982, 1984) and Zhelochovtsev & Zinovjev (1993). Studied specimens are deposited in the Collection of the Department of Plant Protection, Faculty of Plant Production, Gorgan University of Agricultural Sciences and Natural Resources.

Results

Sixteen species were recognized in Gorgan County. *Arge cingulata* (Jakowlew, 1891); *Calameuta pallipes* (Klug, 1803); *Phylloecus xanthostoma* (Eversmann, 1847); *Allantus cingulatus* (Scopoli, 1763); *Ametastegia pallipes* (Spinola, 1808) and *Nematus lucidus* (Panzer, 1801) are recorded for Golestan fauna for the first time and *C. pallipes* is a new record for the Iranian fauna.

I- Family Argidae

1- *Arge cingulata* (Jakowlew, 1891)

Material examined: (1♀), Golestan Province, Gorgan County, Hezarpich, (36°49'N, 54°23'E), 310m, 01.IV.2017, 1♀; Leg.: R. Mohammadkhani.

Distribution in Iran: Alborz, Gilan and Mazandaran provinces (Khayrandish et al., 2017); Alborz, Kermanshah, Kerman and Tehran provinces (Khayrandish & Ebrahimi, 2018); Mazandaran province (Khayrandish & Farahani, in press); Golestan province (current study).

General distribution: East Palaearctic (Taeger et al., 2010), Iran, Tajikistan, Turkestan and Uzbekistan (Ushinskij, 1936; Benson, 1968).

II- Family Cephidae

2- *Calameuta pallipes* (Klug, 1803)

Synonyms: *Astutus pallipes* Klug, 1803; *Cephus phthiscus* Fabricius, 1804; *Cephus pusillus* Stephens, 1835; *Cephus immaculatus*

Stephens, 1835; *Cephus cultrarius* Hartig, 1837; *Cephus pallidipes* Dalla Torre, 1894.

Material examined: (1♂), Golestan Province, Gorgan County, Shastkalateh (36°50'44"N 54°24'56"E), 242m, 24.V.2017, 1♂; Leg.: R. Mohammadkhani.

Short description: Total body length 8.5 mm; head black; clypeus, labrum, palps, mandibles and outer margin of gena yellow; mandible with three black teeth at apex; 20 black antennal segments, segment 4 longer than 3 and 5, distal segments somewhat longer than wide; thorax black, ventral surface of thorax yellow; leg yellow; outer surface of coxae and femur black, tarsus a little darker at apex; wing hyaline, with dark veins; abdomen black, tergite 3 and 5, tergite 2 and 4 laterally, posterior margin of tergite 6, sternite 5 and 6 and half of last sternite yellow (Fig. 2).

Distribution in Iran: New record for fauna of Iran.

General distribution: West Palaearctic (Taeger et al., 2010); Austria, Belarus, Belgium, Croatia, Czech Republic, Denmark, Estonia, Finland, France, Germany, Great Britain, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Netherlands, Norway, Poland, Romania, Russia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and Ukraine (Taeger et al., 2018).

Host plants: Unknown.

3- *Phylloecus xanthostoma* (Eversmann, 1847)

Material examined: (2♀♀), Golestan Province, Gorgan County, Shastkalateh (36°50'44"N 54°24'56"E), 242m, 24.V.2017, 2♀♀; Leg.: R. Mohammadkhani.

Distribution in Iran: Alborz and Gilan provinces (Khayrandish et al., 2017); Golestan province (current study).

General distribution: West Palaearctic (Taeger et al., 2010).

Host plants: *Filipendula ulmaria* (Taeger et al., 1998).

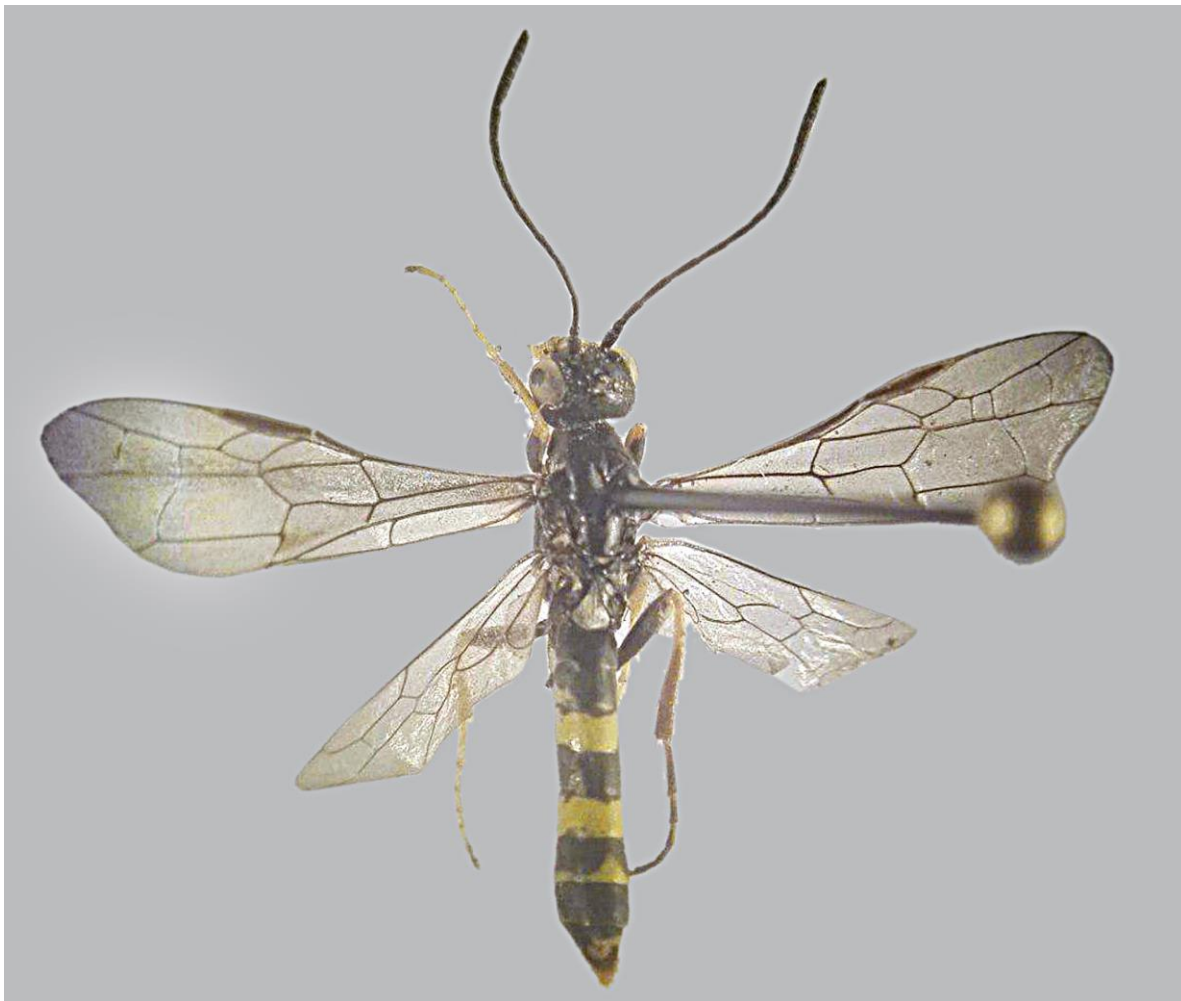


Figure 2. Dorsal view of *Calameuta pallipes* (Klug, 1803).

III- Family Tenthredinidae

Subfamily Allantinae

4- *Allantus cingulatus* (Scopoli, 1763)

Material examined: (2♂♂), Golestan Province, Gorgan County, Touskestan (36°46'54"N 54°34'57"E), 1319m, 22.V.2015, 1♂, 12.VII.2015, 1♂; Leg.: A. Nadimi.

Distribution in Iran: Gilan province (Khayrandish et al., 2017); Golestan province (current study).

General distribution: Palaearctic (Taeger et al., 2010).

5- *Allantus didymus* (Klug, 1818)

Material examined: (4♀♀, 12♂♂), Golestan Province, Gorgan County, Touskestan

(36°46'54"N 54°34'57"E), 1319m, 18.V.2015, 1♂, 15.VI.2015, 1♂, 12.VIII.2015, 1♂, 12.IX.2015, 1♂, Leg.: A. Nadimi, 11.VII.2015, 1♂, Leg.: R. Mohammadkhani; Shastkalateh (36°50'44"N 54°24'56"E), 242m, 05.VI.2015, 1♀, 27.VII.2015, 1♂, Leg.: A. Nadimi, 22.VI.2016, 1♂, 25.VII.2016, 4♂♂, 07.IX.2016, 2♀♀, 1♂, Leg.: R. Mohammadkhani; Sayedmiran, (36°47'50.47"N 54°20'19.90"E), 158m, 22.V.2015, 1♀; Leg.: A. Nadimi.

Distribution in Iran: Alborz, Gilan, Qazvin and Mazandaran provinces (Khayrandish et al., 2017); Golestan and Mazandaran provinces (Khayrandish & Farahani, in press).

General distribution: West Palaearctic (Taeger et al., 2010).

6- *Allantus (Emphytus) laticinctus* (Serville, 1823)

Material examined: (1♀, 6♂♂), Golestan Province, Gorgan County, Touskestan (36°46'54"N 54°34'57"E), 1319m, 04.VIII.2015, 1♂, Leg.: A. Nadimi; 04.VIII, 2016, 1♂, Shastkalateh (36°50'44"N 54°24'56"E), 242m, 18.V.2016, 1♂, 18.VI.2016, 1♂, 22.VI.2016, 2♂♂, 24.VII.2016, 1♀; Leg.: R. Mohammadkhani.

Distribution in Iran: Gilan, Qazvin and Mazandaran provinces (Khayrandish et al., 2017); Golestan and Mazandaran provinces (Khayrandish & Farahani, in press).

General distribution: Palaearctic (Taeger et al., 2010).

7- *Ametastegia alabastria* (Konow, 1898)

Material examined: (4♀♀, 4♂♂), Golestan Province, Gorgan County, Touskestan (36°46'54"N 54°34'57"E), 1319m, 31.V.2015, 1♂; Sayedmiran, (36°47'50.47"N 54°20'19.90"E), 158m, 02.V.2015, 1♀, 2♂♂, 14.V.2015, 1♀, 1♂, 22.V.2015, 1♀, Leg.: A. Nadimi; Sadabad, 25.V.2017, 1♀, Leg.: R. Mohammadkhani.

Distribution in Iran: Gilan and Mazandaran provinces (Khayrandish et al., 2015, 2017); Mazandaran province (Khayrandish & Ebrahimi, 2018); Golestan and Mazandaran provinces (Khayrandish & Farahani, in press).

General distribution: West Palaearctic (Taeger et al., 2010).

8- *Ametastegia pallipes* (Spinola, 1808)

Material examined: (1♂), Golestan Province, Gorgan County, Touskestan (36°46'54"N 54°34'57"E), 1319m, 18.V.2015, 1♂; Leg.: A. Nadimi.

Distribution in Iran: Iran without locality details (Benson, 1968; Lacourt, 1999), Gilan province (Khayrandish et al., 2015, 2017); Golestan province (current study).

General distribution: Palaearctic, Nearctic (Taeger et al., 2010).

9- *Ametastegia persica* Khayrandish, Talebi & Blank, 2015

Material examined: (2♀♀, 4♂♂), Golestan Province, Gorgan County, Touskestan (36°46'54"N 54°34'57"E), 1319m, 14.V.2015, 1♀, 18.V.2015, 3♂♂, 15.VI.2015, 1♀, 1♂; Leg.: A. Nadimi.

Distribution in Iran: Gilan and Mazandaran provinces (Khayrandish et al., 2015, 2017; Khayrandish & Ebrahimi, 2018); Golestan and Mazandaran provinces (Khayrandish & Farahani, in press).

General distribution: Iran (Khayrandish et al., 2015).

10- *Athalia cordata* Serville, 1823

Material examined: (2♀♀), Golestan Province, Gorgan County, Touskestan (36°46'54"N 54°34'57"E), 1319m, 12.IX.2015, 2♀♀; Leg.: A. Nadimi.

Distribution in Iran: East Azerbaijan, Gilan and Mazandaran provinces (Khayrandish et al., 2017); East Azerbaijan, Kerman, Mazandaran and West Azerbaijan provinces (Khayrandish & Ebrahimi, 2018); Golestan and Mazandaran provinces (Khayrandish & Farahani, in press).

General distribution: West Palaearctic (Taeger et al., 2010).

Subfamily Nematinae**11- *Cladius pectinicornis* (Geoffroy, 1785)**

Material examined: (3♂♂), Golestan Province, Gorgan County, Touskestan (36°46'54"N 54°34'57"E), 1319m, 30.VI.2015, 2♂♂, 01.IX.2015, 1♂; Leg.: A. Nadimi.

Distribution in Iran: Northern Iran (Benson, 1968); Alborz, Qazvin, Gilan and Mazandaran provinces (Khayrandish et al., 2017); Gilan and Golestan provinces (Khayrandish & Ebrahimi, 2018); Golestan and Mazandaran provinces (Khayrandish & Farahani, in press).

General distribution: Palaearctic, Nearctic, Oriental (Taeger et al., 2010).

12- *Nematus lucidus* (Panzer, 1801)

Material examined: (1♀), Golestan Province, Gorgan County, Shastkalateh (36°50'44"N 54°24'56"E), 242m, 07.VI.2015, 1♀; Leg.: A. Nadimi.

Distribution in Iran: Mazandaran province (Khayrandish et al., 2017); Golestan province (current study).

General distribution: Palaearctic (Taeger et al., 2010).

13- *Stauronematus platycerus* (Hartig, 1840)

Material examined: (1♀), Golestan Province, Gorgan County, Shastkalateh (36°50'44"N 54°24'56"E), 242m, 27.VII.2015, 1♀; Leg.: A. Nadimi.

Distribution in Iran: Alborz, Gilan, Golestan, Isfahan, Markazi, Mazandaran and Tehran provinces (Khayrandish et al., 2017); Mazandaran province (Khayrandish & Ebrahimi, 2018); Golestan and Mazandaran provinces (Khayrandish & Farahani, in press).

General distribution: Palaearctic (Taeger et al., 2010).

Subfamily Tenthredininae**14- *Macrophya blanda* (Fabricius, 1775)**

Material examined: (4♀♀), Golestan Province, Gorgan County, Shastkalateh (36°50'44"N 54°24'56"E), 242m, 05.V.2015, 1♀, Leg.: A. Nadimi, 24.V.2016, 1♀, Leg.: R. Mohammadkhani; Sayedmiran, (36°47'50.47"N 54°20'19.90"E), 158m, 22.V.2015, 1♀, 21.VI.2015, 1♀, Leg.: A. Nadimi.

Distribution in Iran: Northern Iran (Lacourt, 1999); Alborz, Gilan, Mazandaran and Qazvin provinces (Khayrandish et al., 2017); Khuzestan and Mazandaran provinces (Khayrandish & Ebrahimi, 2018); Golestan and Mazandaran provinces (Khayrandish & Farahani, in press).

General distribution: Palaearctic (Taeger et al., 2010).

Host plants: *Potentilla reptans* (Chevin, 2002); *Rubus caesius*, *R. fruticosus* agg. (Macek 2012).

15- *Tenthredo distinguenda* (Stein, 1885)

Material examined: (5♀♀), Golestan Province, Gorgan County, Shastkalateh (36°50'44"N 54°24'56"E), 242m, 27.IV.2015, 1♀, Leg.: R. Mohammadkhani; Sayedmiran, (36°47'50.47"N 54°20'19.90"E), 158m, 14.V.2015, 4♀♀; Leg.: A. Nadimi.

Distribution in Iran: Northern Iran (Lacourt, 1999) and Gilan province (Khayrandish et al., 2017); East Azerbaijan province (Khayrandish & Ebrahimi, 2018); Golestan and Mazandaran provinces (Khayrandish & Farahani, in press).

General distribution: West Palaearctic (Taeger et al., 2010).

16- *Tenthredopsis ornata* (Serville, 1823)

Material examined: (2♀♀, 10♂♂), Golestan Province, Gorgan County, Touskestan (36°46'54"N 54°34'57"E), 1319m, 14.V.2015, 1♂, 18.V.2015, 1♂, 22.V.2015, 1♂, Leg.: A. Nadimi, 14.V.2016, 2♂♂, Leg.: R. Mohammadkhani; Chaharbagh, (36°35'59" N 54°30'00"E), 1322m, 24.IV.2015, 3♂♂, 14.V.2015, 1♂, 28.V.2015, 1♂, 07.VI.2015, 2♀♀, Leg.: A. Nadimi.

Distribution in Iran: Iran without locality details (Lacourt, 1999); Alborz, Gilan, Golestan and Mazandaran provinces (Khayrandish et al., 2017); East Azerbaijan and Golestan provinces (Khayrandish & Ebrahimi, 2018); Golestan and Mazandaran provinces (Khayrandish & Farahani, in press).

General distribution: West Palaearctic (Taeger et al., 2010).

Discussion

According to previous studies 44 species of Symphyta (4 species of Argidae, 4 species of Cephidae, 1 species of Siricidae and 35 species of Tenthredinidae) have been

reported from Golestan province to now (Khayrandish et al., 2017, Khayrandish & Ebrahimi, 2018, Khayrandish & Farahani, in press). At the moment with the 6 new records, Golestan province has the highest species richness with 50 species after Mazandaran and Gilan provinces with 80 and 79 species respectively. The present study also increased the total number of Symphyta species in Iran to 189 (Khayrandish et al., 2017, Khayrandish & Ebrahimi, 2018, Khayrandish & Nadimi, 2018; Khayrandish & Farahani, in press).

Tenthredinidae are the most abundant in Golestan province with 38 species number (76.92%), and Cephidae, Argidae and Siricidae with 6 (11.54%), 5 (9.61%) and 1 (1.93%) species respectively.

Faunal composition of Iranian Symphyta show that Gilan, Mazandaran and Alborz provinces with 39, 36, 21 similar species, respectively, have high similarity with Golestan province (Khayrandish et al., 2017, Khayrandish & Ebrahimi, 2018, Khayrandish & Farahani, in press). Also, an overview of Symphyta fauna of neighboring countries showed that Russia and Turkey, with 37 and 26 similar species respectively, have most similar species compositions with Golestan province (Taeger et al., 2018).

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Conflict of Interests

The authors declare that there is no conflict of interest regarding the publication of this paper.

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بررسی زنبورهای تخم‌ریز آره‌ای (Hymenoptera: Symphyta) شهرستان گرگان استان گلستان در شمال ایران

رویا محمدخانی^۱، احمد ندیمی^{۲*} و محمد خیراندیش^۳

۱ گروه گیاهپزشکی، مؤسسه آموزش عالی بهاران، گرگان، ایران.

۲ گروه گیاهپزشکی، دانشکده تولید گیاهی، دانشگاه علوم کشاورزی و منابع طبیعی گرگان، گرگان، ایران.

۳ گروه گیاهپزشکی، دانشکده کشاورزی، دانشگاه شهید باهنر کرمان، کرمان، ایران.

* پست الکترونیکی نویسنده مسئول مکاتبه: nadimi@gau.ac.ir

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چکیده: بررسی فون زنبورهای تخم‌ریز آره‌ای (Hymenoptera: Symphyta) شهرستان گرگان، شمال ایران، طی سال‌های ۱۳۹۴-۱۳۹۶ منجر به شناسایی ۱۶ گونه شد. شش گونه شامل (*Calameuta pallipes* Arge cingulata (Jakowlew, 1891) (Klug, 1803)، (*Allantus Phylloecus xanthostoma* (Eversmann, 1847) و (*Ametastegia pallipes* (Spinola, 1808) cingulatus (Scopoli, 1763) و (*Nematus lucidus* (Panzer, 1801) برای اولین بار از استان گلستان گزارش شدند و گونه (*Calameuta pallipes* (Klug, 1803) گزارش جدیدی برای فون ایران است.

واژگان کلیدی: بال‌غشاییان، زنبورهای تخم‌ریز آره‌ای، گلستان، پراکنش، ایران