Epidemiologic Report

Accidents by venomous animals

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BRIEF HISTORY

Accidents by venomous animals victimize around 260 thousand people per year in Brazil, of which 45 thousand (17.3%) are in the state of São Paulo (SSP), including deaths and reduction in life expectancy due to permanent sequelae.[1]

This condition became compulsory notification throughout the national territory in 2010 (PTR GM/MS nº 2.472, 2010), showing, from that year on, increasing annual incidences.[2]

Accidents caused by venomous animals of medical importance in São Paulo are caused by spiders, scorpions, bees, snakes and caterpillars.[3]

VENOMOUS ANIMALS OF MEDICAL IMPORTANCE IN THE STATE OF SÃO PAULO

Bees that cause accidents (characterized by the inoculation of the venom by the stinger) in São Paulo and in Brazil are the Africanized bees, resulting from the accidental hybridization between African bees (*Apis mellifera scutellata*) and European bees (*Apis mellifera*) in the interior of the state (Americana region), in 1956. These bees escaped captivity and, despite being very productive, caused a significant impact at the beginning of their dispersal, due to their high degree of aggressiveness. Thus, the first accidents and deaths in humans began to occur and spread across the country.[4]

Spiders belong to the arachnid class and are distributed throughout the country. In the SSP there are several species of spiders that may or may not pose a risk to humans and small animals. Among those that do not represent a risk, the garden spider (*genus Lycosa*) stands out, whose bite causes intermediate pain and has no risk to life, being important for the differentiation of some species of wandering spiders (*genus Phoneutria*) and a species of tarantula spider (*Lasiodora parahibana*), whose bites, in addition to being painful, can lead to intoxication (also not life-threatening) due to their stinging hairs.[5]

The **spiders** that can lead to death by poisoning are the wandering spiders (*Phoneutria spp*., with the species *P*. *nigriventer* being the most important representativ of this genus in SSP), the brown spider (*Loxoceles spp*., with the species *L*. *gaucho* and L. *laeta* those with the highest occurrences in the SSP) and the black widow (*Latrodectus curacaviensis*).[5] The brown widow (*Latrodectus geometricus*) in the territory of São Paulo, in comparison with the black widow. But confirmation of this envenomation with a systemic clinical picture is not well established.

Scorpions, like spiders, belong to the arachnid class and are distributed throughout the state. It is the biggest public health problem related to accidents by venomous animals due to the high

incidence and the relative increase in the number of deaths in recent years. The species involved are the yellow scorpion (*Tityus serrulatus*), the main cause of accidents, the brown scorpion (*Tityus bahiensis*) and the yellow scorpion of the Northeast (*Tityus stigmurus*).[5]

The larvae of lepidopteran **caterpillars** of the families *Megalopygidae* and the *Saturniidae* are responsible for the main accidents in humans.[6] *Megalopygidae* is characterized by "hairy" caterpillars, which normally cause skin burns (short, pointed bristles with venom glands). *Saturniidae* caterpillars are "spiny", and the main species causing accidents are *Lonomia*, which have pointed bristles and branched like spines.[6] In São Paulo, the species causing accidents is the *Lonomia obliqua,*[5] whose venom can produce systemic manifestations characterized by hemorrhagics.[7]

Snakes are reptiles that have an elongated body, covered with scales, without limbs and without eyelids, being ectothermic animals (they need external sources of heat to regulate their body temperature). In São Paulo, the main snakes causing accidents are the pit viper (*Bothrops spp.*), rattlesnake (*Crotalus durissus*) and true coral (*Micrurus frontalis* and *M. corallinus*), which have fangs capable of inoculating the venom when they bite.[5]

EPIDEMIOLOGICAL SITUATION

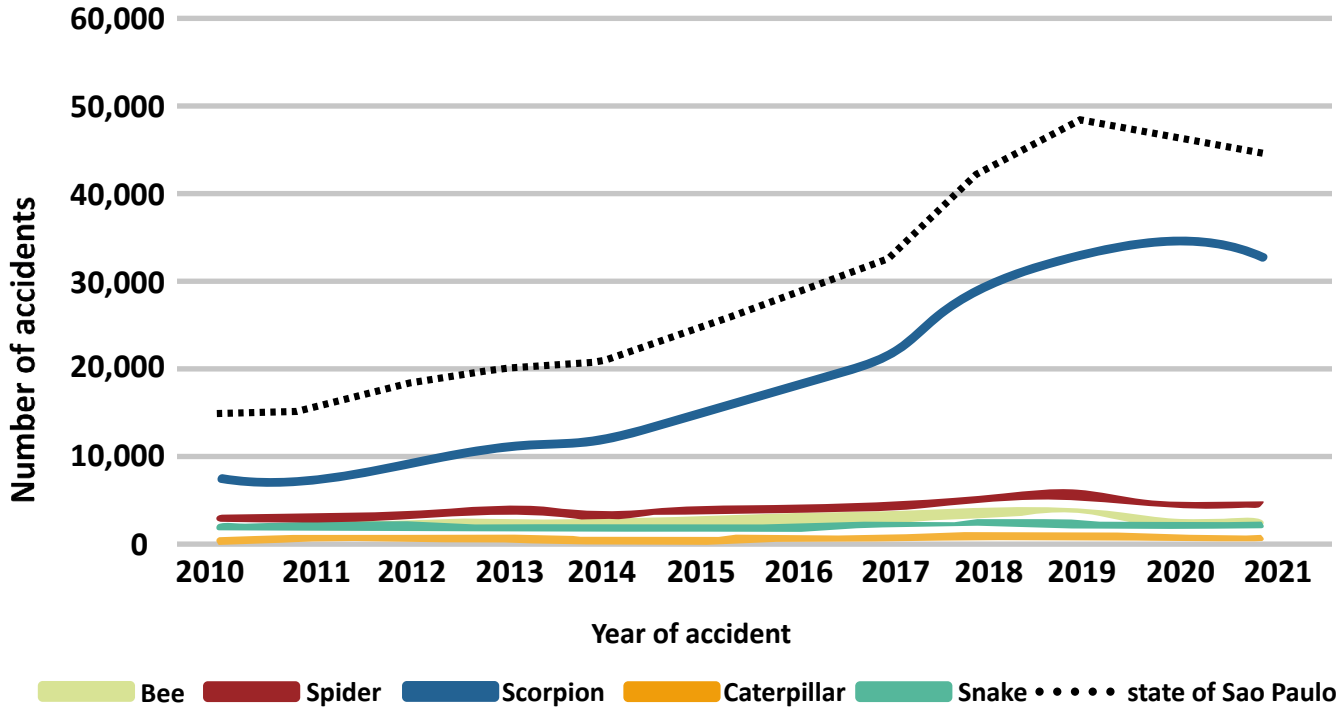
Accidents by venomous animals reached their peak in 2020, with about 48,000 accidents, with scorpion stings being responsible for most of the records – more than 36,000. Next, the most common accidents in the SSP are, in order, caused by spiders, bees, snakes and caterpillars (Graph 1).

The data presented in Graph 1 and Table 1 demonstrate that, in recent years, the incidence of scorpionism (scorpion sting poisoning in humans) reached 78/100 thousand inhabitants, the highest among venomous animals of medical importance in Sao Paulo.

Its lethality, however, is much lower (0.03, ranging from 0.01 to 0.05) when compared to accidents by bees (0.19, ranging from 0.11 to 0.33) and snakes (0.26, ranging from 0.09 to 0.50) and similar to accidents caused by spiders (0.01, ranging from 0.02 to 0.06). Regarding accidents by caterpillars, no deaths were ever recorded.

Accidents by contact with caterpillars had the lowest incidence, not reaching 2/100 thousand inhab. After scorpionism (incidence equal to 44.9 in the period from 2010 to 2021, ranging from 17.4 to 78), the highest incidences were respectively araneism (spider bite poisoning) 10.1 in the period ranging from 7.7 to 14/100 thousand inhab., bee stings 6.5 in the period ranging from 4.5 to 9.5/100 thousand inhab. and snakebite (snake-bite poisoning) 5 in the period ranging from 4.3 to 5.4/100 thousand inhab., as shown in Table 1.

Graph 1. Number of accidents by venomous animals, SSP, 2010 to 2021.*



*Data update date: June 29, 2022. Source: Notifiable Diseases Information System – Sinan.

Table 1. Number of accidents, incidence, number of deaths and lethality of accidents by venomous animals in the SSP from 2010 to 2022.*

Animal	Year	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	Total
Snake	Accidents	1,855	2,000	2,040	1,888	1,992	1,991	1,977	2,434	2,316	2,323	2,127	2,234	1,103	**26,280**
	Incidence	4.50	4.81	4.87	4.32	4.52	4.48	4.42	5.40	5.09	5.06	4.60	4.79	2.36	**5**
	Deaths	1	10	5	2	5	8	8	7	5	7	2	6	1	**67**
	Lethality	0.05	0.50	0.25	0.11	0.25	0.40	0.40	0.29	0.22	0.30	0.09	0.27	0.09	**0.25**
Bee	Accidents	1,876	2,080	2,398	2,499	2,651	2,707	2,730	3,384	3,995	4,379	2,995	2,891	1,629	**36,214**
	Incidence	4.55	5.00	5.72	5.72	6.02	6.10	6.10	7.50	8.77	9.54	6.47	6.20	3.48	**6.3**
	Deaths	4	3	5	7	4	3	4	4	5	10	10	6	0	**65**
	Lethality	0.21	0.14	0.21	0.28	0.15	0.11	0.15	0.12	0.13	0.23	0.33	0.21	0	**0.18**
Spider	Accidents	3,192	3,342	3,628	4,502	3,568	4,355	4,582	5,117	5,363	6,472	4,763	4,641	2,270	**55,795**
	Incidence	7.74	8.04	8.66	10.31	8.10	9.81	10.24	11.35	11.78	14.09	10.29	9.96	4.85	**9.7**
	Deaths	1	0	0	0	0	1	1	0	3	1	0	0	1	**8**
	Lethality	0.03	0.00	0.00	0.00	0.00	0.02	0.02	0.00	0.06	0.02	0.00	0.00	0.04	**0.01**
Scorpion	Accidents	7,211	7,493	9,518	11,428	12,447	15,340	18,658	21,535	30,476	34,224	36,109	33,750	15,361	**253,550**
	Incidence	17.48	18.02	22.72	26.17	28.27	34.55	41.69	47.75	66.92	74.53	78.01	72.42	32.82	**43.9**
	Deaths	1	0	2	3	2	7	7	7	13	9	7	7	3	**68**
	Lethality	0.01	0.00	0.02	0.03	0.02	0.05	0.04	0.03	0.04	0.03	0.02	0.02	0.02	**0.03**
Caterpillar	Accidents	518	574	686	623	381	418	668	698	891	885	837	609	651	**8,439**
	Incidence	1.26	1.38	1.64	1.43	0.87	0.94	1.49	1.55	1.96	1.93	1.81	1.31	1.39	**1.5**
	Deaths	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
	Lethality	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**

*Data update date: June 29, 2022. Incidence: per 100,000 inhabitants. Source: Sinan.

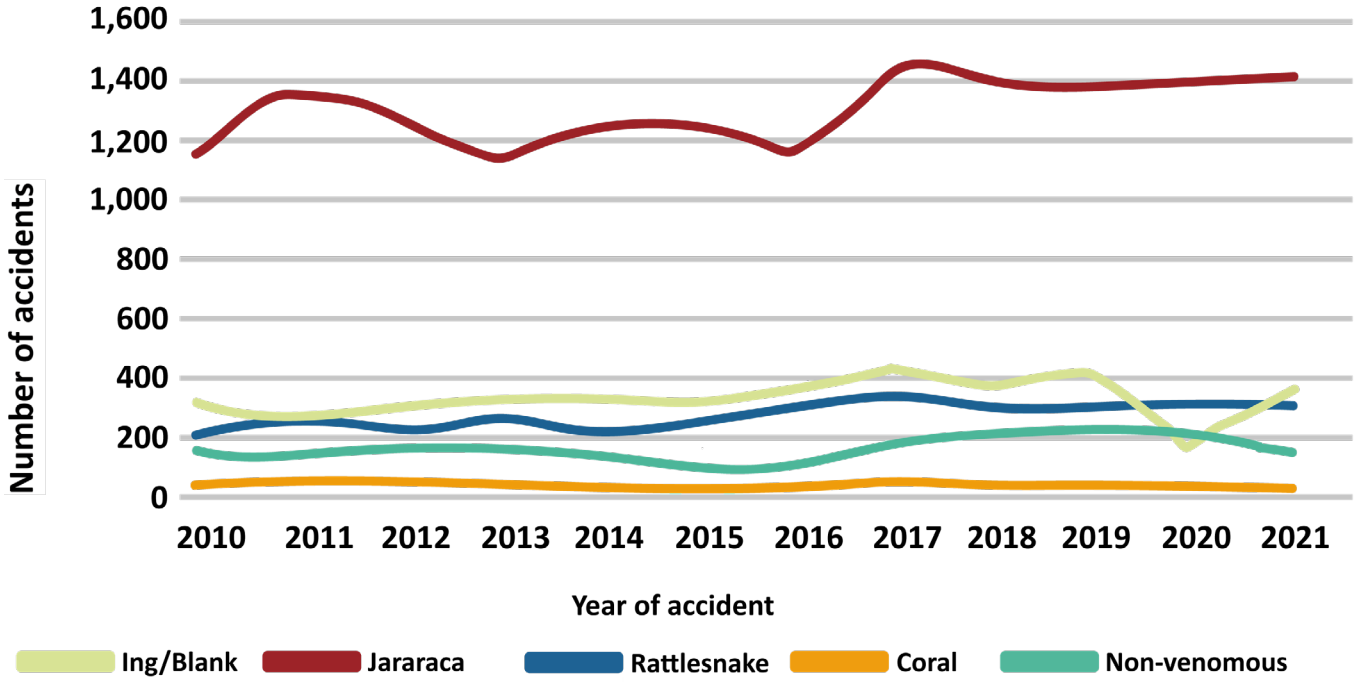
Between 2010 and 2021, accidents by venomous animals in the territory of São Paulo totaled almost 360 thousand, with 203 deaths, of which 66 were by snakes (32.5%), 65 by scorpions (32%), 65 by bees (32%) and 7 by spiders (3.4%). The decrease over time in deaths caused by snakes and the increase in deaths caused by bees and scorpions stood out (Table 1).

Regarding snakes (Graph 2), Bothrops jararaca were the main causes of accidents, with an average variation of 1,200 to 1,400/year. This amount corresponded to about 63% of the total records involving snake accidents, with more than 15 thousand notifications in the period from 2010 to 2021. Rattlesnake accidents ranged from 200 to 370/year, corresponding to about 12% (about 3,000 notifications in the period).

The notifications involving non-venomous snakes were between 180 and 220/year, which corresponded to about 8% (about 2 thousand in the period). Accidents with coral corresponded to less than 1% of the total records involving identified snakes, an average of 25 annual events.

It is worth noting the high number of notifications in which the snake causing the accident was not identified (ign./Blank), ranging between 200 and 400/year. This corresponds to about 15% of the total notifications with snakes reported annually in São Paulo (Graph 2). During this period, 28 notifications were recorded as an accident by surucucu (*Laquesis muta*), being disregarded in the total count, as this snake is not present in the territory of Sao Paulo.

Graph 2. Number of snakebites in the SSP, 2010 to 2021.*



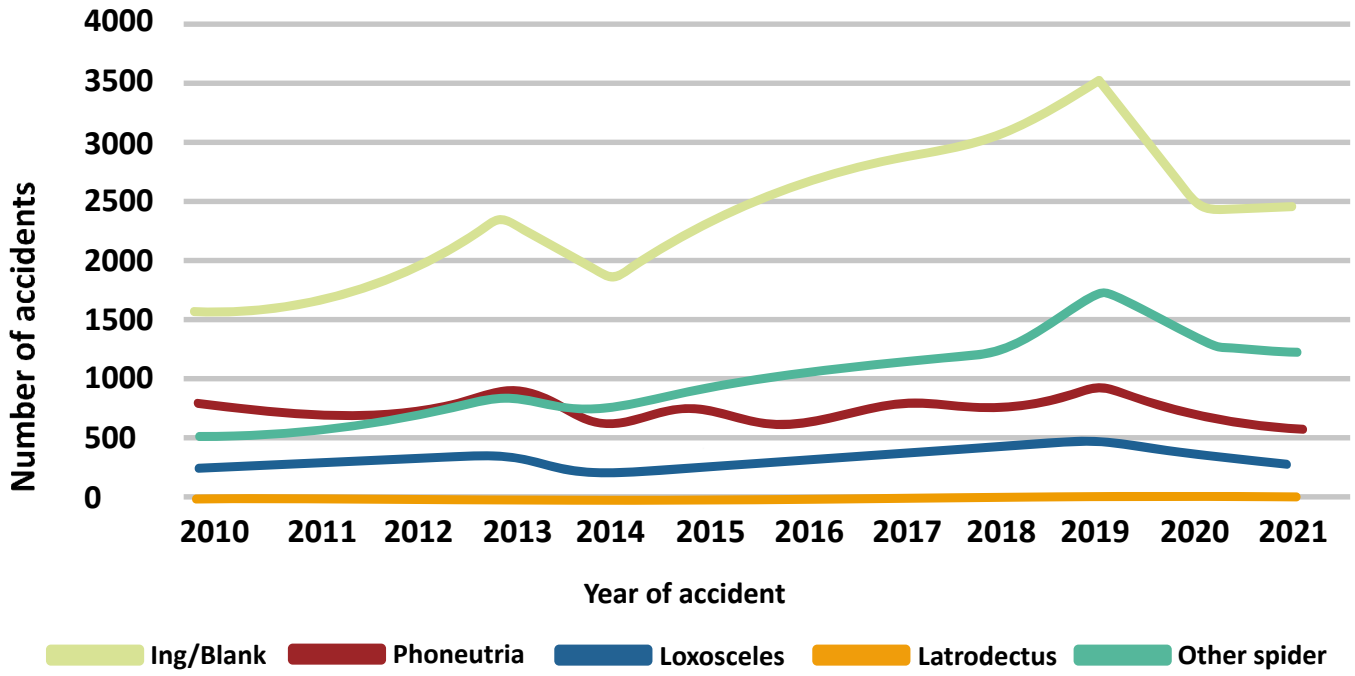
*Data update date: June 29, 2022. Source: Sinan.

Among the notifications of accidents caused by spiders, which totaled more than 53 thousand between 2010 and 2021, the wandering spider (*Phoneutria*) stood out. The species was responsible for about 17% of the records (with more than 9 thousand in the period), sometimes reaching a thousand accidents/year.

The brown spider (*Loxoceles*) caused 500 accidents/year, which corresponded to about 8% of the total (approximately 4,500 records in the period). Notifications by *Latrodectus sp* (brown and black widow) corresponded to 0.5% of spider bites, not exceeding 35 records/year. Other spiders were responsible for about 21% of the notifications (with more than 11 thousand in the period), reaching more than 1,200 accidents/year (Graph 3).

It is also worth mentioning the high number of notifications in which the spider type variable was ignored or left blank (ign./blank), which may have corresponded in some years to more than 50% of the accidents caused by spiders reported in São Paulo, with an absolute variation from 1,500 to 3,300 records/year and totaling more than 28 thousand accidents in the period (Graph 3).

Graph 3. Number of spider accidents in the SSP, 2010 to 2021.*

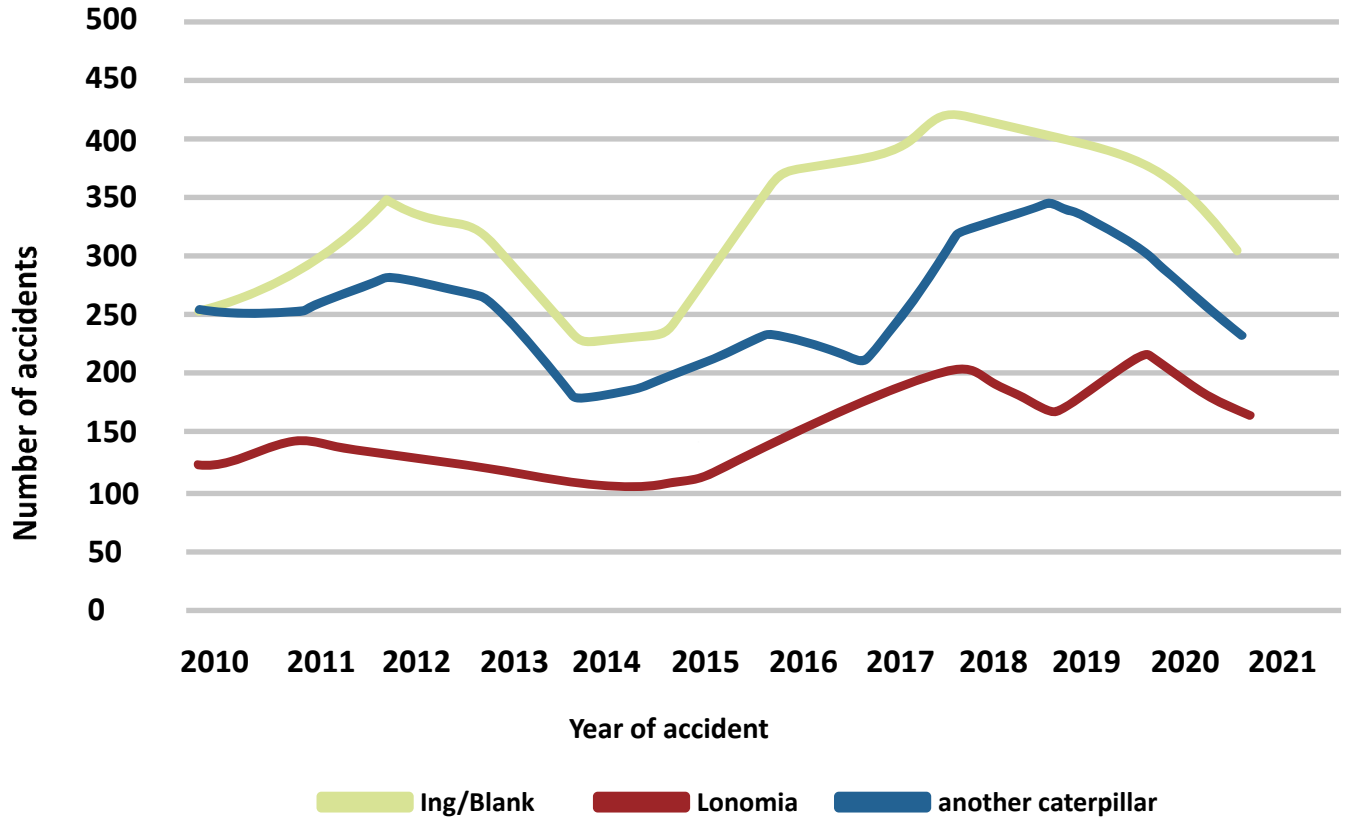


*Data update date: June 29, 2022. Source: Sinan.

Regarding accidents caused by caterpillars (almost 7,800 in the period from 2010 to 2021), the high number of Ign./Blank notifications stood out, exceeding in some years 50% (ranging from 190 to 430 accidents/year) of the total number of accidents by caterpillars, around 3,800 notifications in the period.

Accidents recorded in "Other caterpillars", other than those of the *Lonomia* genus, accounted for about 40% of the notifications (corresponding to more than 2,700 accidents in the period, ranging from 130 to 290 accidents/year), while accidents with *Lonomia* totaled just over 1,200 from 2010 to 2021 (ranging from 55 to 160 accidents/year), which corresponded to just over 15% of the total number of accidents by caterpillars (Graph 4).

Graph 4. Number of accidents by caterpillar in the SSP, 2010 to 2021.*



*Data update date: June 29, 2022. Source: Sinan.

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