When ordinary people visit Poland’s forests, they are most afraid of encountering a big mammal – a wolf, boar, or bear. But the greatest dangers are actually posed by more inconspicuous animals: ticks and snakes.

Anna Wierzbicka
Poznań University of Life Sciences

Are people in Poland are actually reluctant to go into the forest because of the potential risk of tick-bites? To find out, the Polish Institute for Patients’ Rights and Health Education (IPPEZ) commissioned a nationwide survey in 2018. Three-quarters of those surveyed indicated that they had indeed, at least once, opted out of going for a stroll in the woods or park out of a fear of being bitten by a tick, while one in three respondents (37 percent) reported that they were “definitely” afraid of ticks. Moreover, the most prevalent reason the survey participants cited for fearing ticks was the disease risk associated with getting bitten – indicated by 94 percent of respondents. Lyme disease was named by 87 percent of survey participants as the main disease transmitted by ticks, while tick-borne encephalitis (TBE) was indicated by not quite half as many (42 percent). Lyme disease is indeed the most frequently diagnosed and registered disease (17,338 cases in 2022) and as such it provokes considerable anxiety. However, it is worth bearing in mind that Lyme disease is a curable disease that responds well to antibiotics, and so from a public health perspective it is not as dangerous as TBE, which can lead to death or permanent disability. There is no known cure for TBE, the number

Anna Wierzbicka, PhD, ME is an Assistant Professor at the Department of Game Management and Forest Protection, Poznań University of Life Sciences. She studies mites living in the forest and people’s attitudes towards forest and game management. A promoter of greater public awareness of science, head of the Polish Association of Forestry Educators. anna.wierzbicka@puls.edu.pl
of diagnosed cases of the disease doubled last year, and a very robust upward trend has been recorded since 2020 in countries neighboring on Poland. So it turns out it is actually TBE that we should fear more. We should also take steps to protect ourselves from the latter disease – preferably by getting vaccinated. Unfortunately, only foresters and soldiers in Poland receive mandatory TBE vaccinations, whereas only 2 percent of the general population is currently vaccinated.

### Ticks lying in wait

For more than 10 years now, the Department of Game Management and Forest Protection at the Poznań University of Life Sciences has been conducting research into tick biology and ecology. One interesting experiment sought to identify when people spending time in the forest are most likely to become tick hosts. An equal number of men and women of different ages (students and faculty members) performed various activities typical for forest visitors in Poland (e.g. walking, sitting by a tree trunk, sitting on undergrowth, collecting firewood, sitting on a fallen log). The activity “gathering firewood” was included even though Poles do not currently gather brushwood or do so occasionally, because it was intended to mimic mushroom-gathering (i.e., slowly wandering in different directions, frequently stopping to bend over) as the experiment was conducted in the spring, when mushrooms are not present in the forest. The participants wore white beekeeping suits, white gloves and socks, sports shoes or below-the-ankle hiking boots. Their sleeves and pant legs were further secured with silver adhesive tape. We repeated the experiment in May and September (traditionally considered to be the months of highest tick activity in the forest) in coniferous (boreal) and mixed forest at the experimental forestry sites of the university’s Faculty of Forestry and Wood Technology. The forests differed primarily in terms of the undergrowth vegetation – there were not many plants on the forest floor in the boreal forest, whereas berry bushes, grasses, and shrubs made up the undergrowth in the mixed forest. After the activities, all ticks present on the suits were collected and then analyzed for tick-borne diseases.

Forest visitors were found to be at greater risk of tick infestation in the more fertile mixed-forest habitats, with lush undergrowth, as compared to the boreal habitats, with relatively impoverished undergrowth. Nymphs (1.5 mm in size, akin to a pinhead or single poppy seed) are the most common form of tick that attacks human. They lurk on low vegetation (the aforementioned grasses and berry bushes) and when we brush against these plants as we walk, the ticks get onto our clothing or skin. They then begin searching for a warm place with thin skin and significant blood vessels: most often the armpits, groin, elbow-bends, knee-bends and spots behind the ears. The experiment found that ticks landed most predominantly on the calves (more than 56 percent of all ticks), followed next by the thighs. Therefore, an important way to protect against tick-borne diseases is to wear appropriate ankle-length shoes and tuck your pant legs into your shoes or socks. That way, any ticks that do get on your clothes will not be able to reach your skin.

The ticks collected during the experiment and also from various parks in the city of Poznań were tested for the presence of protozoa of the genus Babesia, which causes a disease that affects animals and humans, sometimes known as the “malaria of the north.” We found that ticks in forests are much more likely to carry the protozoan than those collected in city parks (11% and 2.6% of the animals examined, respectively). The reverse is true for ticks carrying Lyme disease bacteria, which are more common in cities than in forests. However, it should be borne in mind that we are much less likely to encounter a tick in urban parks than in forests (up to 18 times less likely), but if we do, we are more likely to end up infected with Lyme disease.

May is traditionally considered the month of peak tick activity (it is warm and humid, and tick host animals are also highly active). However, as a result of climate change, ticks are now also active in the winter months in large parts of Poland. If the temperature is above freezing, we can find ticks in the Greater Poland

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**Nymph of the common tick (Ixodes ricinus)**

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**ANNA WIERZBICKA**

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**INSIGHT Entomology**
For people who often spend time in Polish forests, another noteworthy danger is posed by snakes. However, people are generally not aware of this risk, considering snakes to be present only in the mountain regions. There is only one venomous snake species in Poland, the adder, but it can be found throughout the country and is under strict protection. It is particularly numerous in the areas of Białystok, Pomerania, and the Bieszczady Mountains. It is active during the day and at dusk, especially on warm days and after prolonged cold spells. In October it goes into hibernation, which last until late April or early May. The adder does not attack without reason and only bites when it feels directly threatened – this often happens when someone is trying to catch it, or steps on it accidentally. In Europe, the frequency of snakebites, mainly from the Viperidae family, is estimated at 15,000–25,000 per year, and the number of deaths caused by bites is estimated at about 30 per year. Bites are most dangerous for children, the elderly, and people with cardiovascular disease. Bites most often affect an upper limb (51–60 percent) or lower limb (38–40 percent). Most bites occur during the spring and summer months. When mild winters and warm summers lead to an increase in the snake population, this is correlated with a higher incidence of bites. Bite victims are predominantly children and adult males.

Viper venom can cause a wide range of clinical symptoms. Poisoning depends on the dose of venom per kilogram of body weight, the site of the bite, physical activity after the bite (exertion, movement, alcohol consumption accelerate the absorption of venom), the particular person’s sensitivity age and body weight, the type of bite (whether it was a dry bite, how deep it was, whether it was through clothing/footwear, and how long the snake remained adhered to the victim), secondary infections and treatment (nature of first aid given, time between bite and hospital admission, time elapsed before antitoxin administration). The most common symptoms are swelling and subcutaneous hemorrhaging, vomiting, abdominal pain, diarrhea, decreased blood pressure, sweating, cardiac disturbances, and fever. Others, such as losing consciousness, occur rarely, in about 5 percent of cases. The primary local symptom of poisoning is swelling, which can appear within minutes or after a longer delay. It most often occurs within the first two hours of the bite. The skin exhibits a reddish-blue color and a bite mark – two symmetrical holes spaced 1 cm apart. What should we do if someone is bitten by an adder? Never suck out the venom – the methods shown in Wild West movies are long outdated by an adder? Never suck out the venom – the methods shown in Wild West movies are long outdated! The person needs to get to a hospital as soon as possible. The bitten limb should be immobilized and placed below the level of the heart for transport to the hospital, as this reduces the speed and degree of venom absorption. But above all, we can protect ourselves from getting bitten in the first place, by wearing high boots and long pants and showing caution when walking in the woods.

In the forest environment, people are exposed to many dangers. In Poland’s forests, the main ones are associated with certain animals, although they turn out to be smaller animals than we might imagine. But regardless of the season, the best protection against these dangers is provided by the same very simple measures: long pants and high boots.

Adders also await

Tick-Borne Diseases

Tick-borne diseases are one of the most common health problems in Poland. People are particularly at risk when they are in the woods, where ticks are abundant. The most common tick-borne diseases in Poland are those caused by the bacterium Borrelia burgdorferi, which can cause Lyme disease, and the virus Borreliosis. The disease is spread by ticks, which are found in forests, meadows, and gardens. The tick-borne disease is transmitted by the bite of the tick, which can remain attached for several days. It is estimated that there are over 100,000 cases of tick-borne disease in Poland each year.

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