

Animal deterrent spray to prevent wildlife attacks

Human–wildlife conflicts have caused serious injuries to both animals and human beings. Killing of animals is not a solution and under the Wildlife (Protection) Act, 1972, killing is a punishable offense. It is likely that some of fatalities can be avoided by non-lethal deterrents. It has been reported that capsaicin based repellents alter behaviour of bears, ungulates, dogs and humans^{1–3}. The resin contains capsaicin found in the fruits of *Capsicum* spp., which is the agent that gives them the spicy taste by stimulating nociceptors of the trigeminal system^{4,5}. The irritating quality of this stimulation produces a burning sensation that animals find unpleasant. Development of red pepper spray-based repellents for bear defence has been advocated⁶. Spraying is an effective alternative to lethal force and should be considered as a personal safety option for those working in national parks, zoos and wildlife sanctuaries. Forest staff rely on a variety of deterrents for protection from wildlife like firearms, red-pepper sprays, signal flares, etc.

A comprehensive study, where bear spray was used during close-range encounters in Alaska, USA, from 1985 to 2006, showed that red-pepper sprays prevented undesirable behaviour 92% of the time when used on brown bears, 90% for black bears and 100% for polar bears. Among all persons carrying sprays, 98% were not injured by bears in close-range encounters⁷. The success of atomized capsaicin oleoresin with bears prompted exploration of its possible use as an elephant and other carnivores repellent. A capsaicin aerosol spray has been found to effectively repel crop-raiding elephants in Zimbabwe⁸. Pepper sprays have been used to successfully thwart attacking tigers in Russia⁹.

The above-mentioned studies show that capsaicin-based sprays are globally accepted for self defence against animal attacks. They have been tried and tested for decades around the world on a variety of animals. Capsaicin-based aerosol spray has been recommended by the US Fish and Wildlife Service, and leading wildlife experts. According to the United States Environmental Protection Agency (EPA), following are the conditions for spray usage: (1) Spray concentration should contain at least 1% and not more than 2% capsaicin and related capsaicinoids. (2) It should be at least

225 g or 7.9 ounces in net weight. (3) Spray should be derived from oleoresin of capsaicin. (4) Spray should be in a cloud pattern. (5) It should be delivered from a minimum range of 25 ft. (6) Spray should last at least 7 sec.

Here we report a capsaicin-based animal deterrent spray (ADS) developed by an NGO EFFECT in Dehradun, India. ADS spray is easy to use with practice; it does not make the animals aggressive nor does it kill or injure animals or people. The product has a leakage-proof, single-piece aluminum can (Figure 1). Each can is filled with 350 g of Government-approved, laboratory-certified 2% capsaicin formula, which is according to the globally accepted maximum strength recommended by EPA for ADS.

While undertaking eco-tourism activities inside national parks, wildlife sanctuaries, etc. ADS can help in the prevention of any mishap and provide protection as it diffuses potentially dangerous situations in the short term by providing the user time to move out of an encounter situation. Insights about ADS spray efficacy may contribute to more informed decisions regarding its use and reduce human injury. It is an innovative approach for the safety of frontline staff and wildlife. Some Forest Divisions from Uttarakhand, Maharashtra and Bihar Forest Departments and the Wildlife Institute of India, Dehradun have already started distributing ADS among frontline staff on a pilot basis. It has also been successfully



Figure 1. Animal deterrent spray developed by the NGO EFFECT, Dehradun, India.

used by frontline staff for self-protection in two different incidents – one with an elephants in Haridwar Forest Division and another with the Asiatic black bear in Joshimath Forest Division. Persons working in the tiger, bear, elephant and lion habitats should feel safe if they carry ADS. Thus, the widespread use of this spray will help promote human safety and wildlife conservation.

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