

Tetanus -Some Things You Should Know

By: G. R. Barse

The following statement in Ritchie and Corola's book on biology is pertinent:

Another foe of respiration is tetanus poisoning, or "lockjaw." The tetanus bacterium, *Clostridium tetani*, can exist only when oxygen is absent. **It exudes a toxin 50 times as poisonous as cobra venom and 150 times stronger than ... strychnine.** Buried rusty nails are common dwelling places for such anaerobes, so that anyone stepping on a nail and driving it through the skin causes self-inoculation, by introducing the bacteria into an airless environment where they can thrive. Immunization consists of injecting a small amount of weakened toxin into the body to stimulate it to build up its own antitoxin. **Anti-tetanus shots are a practical necessity for farmers, soldiers, children and any others who have frequent skin breaks and are likely to be in contact with soil.**

The last statement above includes rose growers almost by definition. We are always in contact with soil, or so it seems, and if I had the cliché nickel for each thorn prick, I'd have quite a pile of nickels by now. In fact, I had a nasty bout with "lockjaw" when young and probably am lucky to be alive.

A further point may be of interest. The following quote is from the book by Tortura et al on Microbiology:

"The causative agent of tetanus ... is especially common in soil contaminated with animal fecal wastes."

This latter statement should be of particular interest to those who use manure for fertilizer or organic amendments, particularly fresh material, in contrast with well-composted material.

It has been reported that a significant portion of the serious cases of tetanus each year arise from injuries considered too minor to consult a physician. The following information is distilled mostly from an National Institutes of Health background paper on tetanus, but includes also information from several other sources.

Some quotes from NIH:

- This ancient and dreaded disease develops as the result of an infected wound, usually a puncture or laceration. However, even a superficial scratch is susceptible to infection by tetanus bacteria. When tetanus infection does occur, it is highly lethal ... an amount of tetanus-produced purified toxin weighing no more than the ink in the period at the end of this sentence would be enough to kill 30 grown men.
- And yet, though these bacteria produce one of the most deadly poisons known to man, a tetanus immunization infection given every 10 years will prevent its lethal effects.
- The organism ... is an ever-present bacillus found in soil, dust, manure, clothing, and in the digestive tracts of man and many animals ... A paper cut can sometimes be as lethal as a knife wound.

- If a wounded person has not been immunized for tetanus, and infection develops, the prognosis is grim. Case fatality rates run from 45 to 55 percent, even with the best hospital care. In underdeveloped nations, tetanus is a major cause of death; it has been estimated ... that tetanus causes approximately 423,000 deaths every year.

The cause of tetanus is not the clostridium tetani bacterium itself, but the toxin which it produces as a result of its metabolic activity. Since it is an anaerobe (meaning that it can thrive only in locations where there is no oxygen), it is not normally apt to cause trouble unless introduced into a wound where it is cut off from an air supply. That's one of the reasons why there's no problem even if they are found in one's digestive tract.

But that's also why puncture wounds are such a potential problem. Their very nature is such that they close up and keep out the air. Although the bacteria usually begin to multiply right away after finding the right environment (airless, first of all), they are spore producing, and the spores are very resistant and can remain dormant for a very long time. There is one documented case, with a war wound, where the infection did not develop until 14 years after the initial injury.

Most deaths occur within 10 days after the infection process begins.

Statistics in the United States show that about two-thirds of the yearly cases, which are generally low due to a high degree of immunization, occur in those 50 and older. This apparently is because this age group is more apt to have allowed the booster immunization to lapse, thereby becoming prone to infection. In fact, some surveys have revealed that at least 50 percent of the population does not have adequate protection.

Although it is not clear exactly how the toxin causes the effects it does, it is clear that it is a protein substance which attacks the nervous system and, in NIH's words, "short circuits" it. For example, when the jaw opens normally, one muscle group acts while the muscles which close the jaw are inhibited. Conversely, when the jaw closes, the opening muscles are inhibited. This neat arrangement is so that one muscle group is not fighting another, with one trying to open at the same time another is trying to close.

By some means, the tetanus toxin apparently is able to inhibit the inhibition, so that opposing muscle groups are both triggered at the same time, with the result being severe muscle spasms and locking up.

By no means does this article pose as a medical one. But the widespread, essentially ubiquitous, nature of the bacterium, particularly in soil, apparently is not well recognized among most gardeners. For the non-immunized person, simply trying to grow some roses, a relatively minor-seeming puncture such as from a thorn, if done in the presence of bacterial contamination on the thorn (from soil, say) can result in major and serious consequences. Since they are so potentially lethal, and the prevention so simple, a word to the wise seems appropriate.

A simple immunization once every 10 years is all that's recommended. So check with your physician and get up to date if you're not already.

This article is an Award of Merit Winner.

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