Lead (Pb) Version 1.1 8 December 2011

Introduction

Lead (Pb) is not required for soils, plants, animals or people. Avoid access to any Pb products because animals seem to be attracted to Pb and die soon after consuming too much. Feeding a correctly formulated soluble mineral mix such as DeLaval Feedtech can supply the nine essential minerals needed to remove a craving for toxic elements. Mixes of only a few minerals or ones with toxins such as manganese, can be negative

Animal & Human Excesses

Pb poisoning is not as common now that most fuels have none and no fully lead based paints are used and because it is well known that Pb can kill. Soil levels above 20 parts per million (ppm) can be the result of lead contamination. Feed which has more than 30 can be toxic.

Lead toxicity symptoms include anaemia, anorexia, fatigue, depression, constipation or diarrhoea, abdominal pain (kicking at stomach), abortion, loss of weight and difficulty in swallowing.

Soil & Plant Excesses

Be careful of “black” grasses on roadsides in high-traffic areas as occurs in Europe, however, some of the black can be from tyre rubber. Vehicle fuel now has less lead, but more cadmium than in the past.

Sources

Lead batteries, grease, old engine oil, exhaust fumes (on pasture on roadsides especially when lead is in fuels) solder, putty, golf balls, lead shot, weights, some pipe jointers, thread compounds, roof tiles and linoleums. Even some “lead-free” paints in some countries contain up to 1% Pb.

Lead can be very high in soils that have been used as a shooting range. See - http://www.princeton.edu/~rmizzo/firingrange.htm

Precautions for Plants growing in Soils

To reduce absorption of lead by plants maintain soil pH levels above 6.5 based on calcium at 0.8% in ryegrass tissue - not on excess potassium, sodium, or the nature of the soil. Organic soils such as peat can have a low pH with the optimum amount of calcium, while some volcanic soils can have a higher pH and lack calcium. Lead uptake by plants is lower when calcium is at 0.8%. If needed, add lime according to pasture test recommendations using the Lime Nutrient Planner software from www.farmingsuccesses.info

Lead is also less available when soil phosphorus levels are optimum at about 0.4% in ryegrass tissue.

Increasing organic matter by one third in soils with high lead levels, will significantly reduce lead availability. Organic compounds bind lead and make it less available to the plant. Good sources of organic matter include composted leaves, neutral (non-acid) peat, and well-rotted manure. Avoid leaf mulch obtained along highways or city streets as it may contain higher than normal lead levels.

Locate your vegetable garden as far away as possible from busy streets or highways and older buildings that could have lead paints.

Solutions

The main Lead shot from shooting ranges should be removed to a dump site. If this is too costly, use a motor scraper to lift it and dump it in a suitable place on the property and plant trees of other suitable plants over it. Don’t do this in an area that floods. Grow crops like Indian mustard and maize both of which take up lead, and then dispose of them, or apply four tonnes or more of agricultural lime per hectare with the lime synergisms and chisel plough them in to increase the soil’s organic matter content. See Elements > Calcium in www.farmingsuccesses.info

Regulations

Local body staff fear making a mistake that affects their employment, so avoid something that can backfire, or not identifying something that develops, so are over-cautious, sometimes to the extreme. Despite this, few know about the information quoted here and in www.farmingsuccesses.info under Elements > Calcium. Leaching of all pollutants, is a problem few know how to reduce. See Pollution.

Bureaucrats may only approve soil levels close to zero. They are measured in ppm, so one needs to know the figures they use, because soil concentrations of lead occur **naturally** in the surface of

agricultural soils. USA figures average 10 ppm in a range of 7 to 20 ppm.

Some of the following is from the writings of Carl J. Rosen, University of Minnesota.

The most dangerous source of soil lead is through ingestion (eating) of contaminated soil or dust because in general, plants do not absorb lead, but can have their levels increased by dust or mud from grazing animals or machinery. However, in soils testing high in lead, it is possible for some lead to be taken up.

Studies have shown that lead does not readily accumulate in the fruiting parts of vegetable and fruit crops such as corn, beans, squash, tomatoes, strawberries, apples. Higher concentrations are more likely to be found in leafy vegetables such as lettuce, and on the surface of root crops such as carrots.

Since plants do not take up large quantities of soil lead, the lead levels in soil considered safe for plants will be much higher than soil lead levels where eating of soil is a concern. Generally, it has been considered safe to use garden produce grown in soils with total lead levels less than 300 ppm. The risk of lead poisoning through the food chain increases as the soil lead level rises above this concentration. Even at soil levels above 300 ppm, most of the risk is from lead contaminated soil or dust deposits on the plants, rather than from uptake of lead by the plant.

There is more concern about lead contamination from external lead on unwashed produce than from actual uptake by the plant itself. If your garden is close to busy streets or highways, remove outer leaves of leafy crops, peel all root crops, and thoroughly wash the remaining produce in water containing vinegar (1 percent) or soap (0.5 percent).

Children

Lead in soil clings to fingers, toys and other objects that children normally put in their mouths. This is the most common way that lead in soil gets into a child. It does not pass through unbroken skin. When soil is covered with lawn grass, plants, rocks or other ground cover, children have less contact with the dirt and the lead in it.