Gardening in the City and Beyond

By Lisa Alexander, MassDEP/BWSC

When I was a little girl, I found a half-dead potted geranium on the sidewalk. Someone had put it out with the trash at our triple-decker in Cambridge. With two green thumbs inherited from both sides of the family, I brought it up to our porch and put it beside my Dad's container-grown tomatoes. I started watering it, and soon, it 'miraculously' (to me) recovered and grew new flowers. At the time, I had no idea how hardy geraniums were, or that 20 years later I'd have a whole hedge of them in California from someone else's clippings. No matter, it was a bit of green and color on our porch in house with a dirt yard too shady to even grow grass.

At least, that was what I thought at the time.

The only things that grew in our back yard in Cambridge were a few random tufts of grass, a three story yellow cherry tree (no one knew *what* it was but it sure was pretty in the spring) and a mulberry tree (my mom warned me not to eat those berries that might be "poisonous"). We also had night crawlers which we used to go out and collect for fishing after it rained. Did that mean we didn't play in the yard? No way! We had a sandbox and a swing set and a slide. For five years we were out there digging, building forts, making mud balls wrapped in newspaper to throw over the fence and riding bikes and tricycles. Gardening wasn't even an option in that backyard but it was still a fun place to play. But was it *safe*? That idea never even entered our minds.

And why wouldn't it be safe?

Well, we were just yards away from a well-used main street during the heyday of leaded gasoline and lead paint. The building was over 100 years old and may have used coal for heating at one time. There were three above-ground fuel storage tanks in the cellar and three fill pipes on the sides of the house. Everyone in the area had flat roofs and nearly every summer someone was getting new tar added. There was some kind of composite siding on the house. So there were many possible contaminants that might have been in the mix. Asbestos was a possibility and maybe coal ash once upon a time. Who knew what used as fill in that flat location? But there could have been quite a few things in that urban soil. And, when we moved to the suburbs a few years later, to a location that was formerly the edge of an apple orchard, no doubt there was a possibility of arsenic and other pesticides, plus wood or coal ash from the original stove that was once in the house. But the yard was a hill covered in grass and buttercups and flowering shrubs so who would even think about toxins?

But times have changed. Nearly everyone is aware that many soils are not suitable for grubbing around to grow food crops (let alone make mud balls). And in this last decade or so, with the increased interest in food security, fresh, locally grown produce and the many benefits of growing one's own vegetables, we know it is important to do those things safely, whether your condo is on a former site (industrial or otherwise) or an old orchard, or your yard just happens to be in an urban area with "typical" atmospheric deposition of leaded gas emissions, paint and mystery "fill." A quick internet search will produce dozens if not hundreds of articles and studies. A review of some of these reveals that typical contamination in urban soils may include lead, arsenic, petroleum and PAHs, with the possibility of PCBs or solvents as well.

In one of the articles, about a project in Dorchester, the author quoted different experts on the lead concentrations. One made reference to a "strictly risk-based lead concentration of 2-50 ppm with consideration for what gardeners can realistically achieve," gave suggestions to take precautions even below 100 ppm and an admonition against gardening directly in soils with greater than 200 ppm lead (the Massachusetts S-1 clean up concentration, revised in 2014). In contrast, another expert quoted in the same article argued that the EPA standard of 400 ppm was protective since "only 5-10%" of the lead would be bioavailable, compared to 30% bioavailability used in some other models. This broad range of suspect soil concentrations can be confusing for someone who just wants to grow a few tomatoes!

Planning an urban garden becomes even more complicated if you consider the regulations that do – or do *not* – apply. While lead is clearly a hazardous material, there are several exemptions in the law (M.G.L. Chapter 21E) and regulations (310 CMR 40.0000) that may muddle the questions of whether there is a legal obligation to clean up the soil and whether it is safe to garden.

MassDEP/BWSC revised the Massachusetts Contingency Plan in June, 2014 and released guidance last December in an effort to bring some transparency and consistency to the way the gardening exposure pathway is handled in the program. After reviewing many other articles, it's clear that the MassDEP/BWSC guidance covered the most typical suggestions found in the range of articles reviewed ahead of this article. I'll recap the essence of the most common guidance given to potential urban gardeners by garden advocacy groups, local governments and university researchers. This is becoming the standard approach nationwide. (While MassDEP/BWSC's guidance is generally consistent with what follows, it is specific to sites being assessed under the MCP.)

COMMON APPROACHES

1. *Assume if you are in urban area that there is likely to be some level of contamination.*
   Garden in raised beds constructed with appropriate material and filled with soil and compost known (not just assumed) to be safe for gardening. If you do not build raised beds, you may wish to test the native soil (assuming it is not otherwise required), but each additional contaminant costs additional money and won't necessarily cover all the contingencies in these heterogeneous soils (e.g., the kids that found a mercury clock to take apart in the yard…). If you do decide to get it tested and you have high levels of "something" worth removing from the garden, consider excavating, putting in a barrier layer below clean soil. Again, if adding new soil or compost – make sure the new soil or compost is clean and not just adding something else undesirable to the mix.
2. *Consider covering any the walkways in the garden with marble chips, wood chips, pavers or other materials to prevent excess walking and disturbance of the soils.*
   Similarly, cover other areas of the yard with bushes, grass, etc. to reduce exposures.
3. *Minimize contact: wear gloves, don't over-till or "double dig" when turning soils, wear shoes in the garden, don't wear them into the house.*
   In fact, permaculture fans would skip turning the soil anyway since it only releases carbon to the atmosphere and breaks up and destroys the soil structure.
4. *Minimize the possibility of ingestion: wash all leafy vegetables and even throw away or compost the lower leaves, wash and peel all root vegetables, and definitely don't eat with dirty hands.*

A few additional internet references (linking to several other references) are listed at the end of this article.

ADDITIONAL SOURCES:

http://search.usa.gov/search?utf8=%E2%9C%93&affiliate=afsic.nal.usda.gov&query=urban+soils&btnG.x=6&btnG.y=16 A general link to USDA with many articles on urban agriculture.

http://www.jhsph.edu/research/centers-and-institutes/johns-hopkins-center-for-a-livable-future/projects/Urban-Soil-Safety/ A good link from John Hopkins with several additional resource links embedded.

http://ehp.niehs.nih.gov/121-A326/ This is the story about the garden in Dorchester, written by a woman who was in the process of converting a parking lot into a community garden.

http://www.mass.gov/eea/docs/dep/cleanup/laws/14-910.pdf MassDEP/BWSC Best Management Practices for Non-Commercial Gardening at Disposal Sites.