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Distributed 10/28/05

Jefferson, Orleans Soil Contamination May Not Be As Serious As Feared

LSU AgCenter experts say soil contamination in Jefferson and Orleans parishes from flooding after this summer's hurricanes may not be as serious as originally feared.

Those experts say initial results of tests conducted in October indicate no need for special preparations to the soils prior to planting and that there should be no danger for individuals digging or planting in the soil.

The LSU AgCenter scientists and extension educators, who were concerned about damage to landscape, fruit and vegetable plants from massive flooding that followed Hurricane Katrina and more flooding that accompanied Hurricane Rita, collected soil and sediment samples from five areas in the two parishes on Oct. 4.

"Soil samples were taken in Kenner, Lake View, City Park, Mid-City and Old Metairie to provide information on the effects the floodwaters had on soil in various locations," said LSU AgCenter horticulturist Dr. Jeff Kuehny, who led the team. "We were mainly concerned about the salinity levels in the soil and how that might affect plants over the short term and long term.

"Preliminary findings indicate that the soil salinity in all areas is at or below levels acceptable for even low-tolerance plants," Kuehny said.

Soil salinity typically is expressed as electrical conductivity of a solution extracted from the soil at water saturation and is usually reported in millimhos per centimeter (mmhos/cm) or decisiemens per meter (dS/m), according to the experts.

Using the decisiemens per meter as the measurement, LSU AgCenter tests of the soil samples taken in October showed most of the areas came in at less than 2 dS/m. Soil salinity values were slightly higher in the Mid-City and Lake View areas, but, at 2 dS/m to 4 dS/m those generally still should not cause problems, the AgCenter experts said.

The LSU AgCenter team also looked at levels of heavy metals, such as lead, arsenic, cadmium, nickel, zinc and mercury, in the samples. The test results also found the levels of those materials in the soil samples were within normal soil levels.

In addition, the team tested sediments that were deposited on top of the existing soil in areas covered by the brackish floodwaters from Lake Pontchartrain. In the Lake View area, these sediments were found to be high in salinity – up to 16 dS/m. But heavy metal concentrations were found to be at or below average for most soils.

According to water samples analyzed by environmental engineering professor Dr. John Pardue and others at LSU to determine heavy metal levels in floodwater, lead, arsenic and, in some cases, chromium levels in floodwater exceeded drinking water standards.

"But with the exception of somewhat elevated lead concentrations in some areas, the levels found were comparable to what would be found in typical storm water runoff," Pardue explained, adding, "So what was exceptional about the floodwaters was not their level of pollutants but that they covered such a large area and that there was more extensive human exposure to the water.

"On the other hand, the incredible amount of water that flowed into the New Orleans area greatly diluted the pollutants it picked up," he continued.

That dilution also plays a role in sediment contamination, according to the LSU AgCenter experts.

"Our team believes that explains why heavy metal levels in the sediment are not greatly elevated," LSU AgCenter horticulturist Dan Gill explained.

LSU AgCenter experts say these initial tests indicate soil salinity, and heavy metals should not be considered a problem in the areas tested.

"That means that there should be no problem with individuals digging or planting in the soil," Gill explained. "Growing vegetables for consumption should not be affected by salinity or heavy metals in the areas tested, and there is no need for special treatment of the soil before beginning to replant landscapes in areas that were flooded."

Of course, to anyone viewing the city, it is obvious plants in the flooded areas were severely damaged or killed.

In addition to studying soil samples, LSU AgCenter faculty examined landscape plants to answer the question of what happened to the plants that now appear partially or totally brown. They concluded plants that appear damaged probably succumbed to problems caused by the floodwater itself, not pollutants in it.

"The roots of typical landscape plants must have oxygen available to them," Kuehny explained. "They get the oxygen they need from air spaces in the soil. When these spaces are filled with water, as during floods, roots are deprived of the oxygen they need.

"Roots will not function properly if they do not get oxygen. So the roots, which are solely responsible for absorbing the water a plant needs, quit absorbing water – causing the

plants to die," he said, noting it's ironic that flooded plants, in essence, died of thirst. "In such a case, the longer the soil stays saturated, the more damage occurs."

Along the same lines, the LSU AgCenter experts note that low-growing plants were completely covered by the floodwater and that taller shrubs, such as Japanese yews, may have been only partially covered. Some of these plants may appear brown where the floodwater covered them but green above that level.

"The extended period of time that the floodwaters persisted, combined with low oxygen and carbon dioxide availability in the floodwaters and low light reaching leaves submerged in the turbid water, would have killed the foliage that was below the water," Gill explained. "So low-growing plants that died and larger shrubs that appear to have partial foliage death from the ground level to the highest water level were not affected by pollutants or salt in the water, but more likely suffered from lack of light reaching the leaves through murky floodwater and/or from a lack of oxygen available to their roots."

Shrubs that are brown only where the floodwater covered them will likely survive and recover, the experts advise.

"The brown areas may send out new foliage and, if that happens, the shrubs will look like they did before," LSU AgCenter horticulturist Dr. Ed Bush said. "If not, dead lower portions can be pruned away later once the homeowner can determine which portions of the plant are alive and which are not."

Trees that are totally brown or have leaves that appear to be turning brown probably suffered from low oxygen to their root systems, as well, according to the LSU AgCenter horticulturists.

"Magnolias seem to be especially hard hit," LSU AgCenter forester Dr. Hallie Dozier said. "Only time will tell if these trees will recover from the extended flooded conditions. If there is any doubt, wait to remove these trees until next spring to be sure they are dead."

In areas where floodwaters several feet deep covered lower growing plants for one or more weeks, it is likely that virtually all turf, herbaceous plants and most shrubs were killed due to reduced light reaching the foliage and root death resulting from saturated soil, the LSU AgCenter experts say.

"The good news, however, is any shrubs that are still green will likely survive," Gill said, advising, "Carefully assess shrubs that may appear dead. Scrape the bark in several areas. Green tissue under the bark indicates the shrubs are still alive and may recover. Some shrubs that appear dead and leafless may begin to send out new growth a few weeks after the water recedes."

Shrubs that show no green tissue below the bark when scratched and produce no signs of growth a few weeks after the waters recede, however, are likely dead, the experts say.

"Just keep a watchful eye on these plants for any evidence of new growth in the meantime," Gill advised.

Some sediments deposited by lake waters were found to have high salt levels, Kuehny points out, advising that residents in areas with a heavy accumulation of sediment should carefully remove the sediment from lawns and beds.

The Environmental Protection Agency (EPA) has published analysis from sediment testing in most all areas that were flooded in New Orleans. It can be found at www.epa.gov/katrina/index.html.

"Although levels of pollutants in the sediment do not appear to pose any serious health risk, the EPA recommends wearing proper protective equipment, such as gloves and safety glasses, when handling this sediment," Kuehny said. "They also recommended washing with soap and water following exposure just to be sure."

The LSU AgCenter experts say extensive soil testing doesn't appear to be necessary as people return to their homes and try to reestablish their landscapes.

"Based on these findings, there is not an overwhelming need for residents in flooded areas to have their soil tested," Kuehny said.

Individuals who would like to have their soil tested, however, may contact the LSU AgCenter Extension office in their parish for instructions on how to collect and submit samples for analysis – as well as information on the types of tests that are performed.

For more details on the variety of issues covered by the research and educational programs of the LSU AgCenter, including extensive information on lawns and gardens, visit www.lsuagcenter.com.

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