

# National Fire Plan

## Study Fuels for Compost & Mushroom Production

### ARKANSAS -- 2003



In August 2002, the Shirley Community Service & Development Corp. (SCDC) Shiitake Mushroom Center received a National Fire Plan grant to study possible uses of dead and hazardous timber infested by the Red Oak Borer (ROB) insect. The initial objective was to analyze the chemical make-up of chipped timber for possible use as green chip bedding, Shiitake mushroom substrate, compost for fertilizer and disease suppression, and other uses in the poultry industry.



In May 2003, two passive aerated static piles of high carbon chips were established. The piles progressed through a thermophillic stage from May 5 to August 29, and into a mesophillic stage from September 5 to December 1. The Agricultural Research Service (ARS) at Booneville did a total chemical analysis while fungal and bacterial activities were analyzed by Soil FoodWeb, Inc. (SFI) of Corvallis, Oregon.

The broiler house bedding most commonly used throughout Arkansas consists of rice hulls, which are plentiful and light but dust-causative and non-biodegradable. Un-composted hardwood chips are plentiful, but excessively heavy, while pine shavings are plentiful and more biodegradable, but very flammable. SCDC elected to compare composted ROB chips to rice hulls. Because fungal organisms are known to cause respiratory problems in poultry houses, a bedding of compost that is bacterially dominant may prove preferable.



Passive aerated static piles of chips used in the tests

The composted material did digest enough carbon in the allotted time of seven months to produce usable compost with a Carbon:Nitrogen ratio of 25:1. The addition of extra nitrogen made the finished compost bacterially dominant and more beneficial as poultry bedding than fungal dominant compost. Rice hulls excelled at water absorption and also surpassed compost for its ammonium retention capacity when compared on a dry weight basis (less than 10% moisture). A small number of sawdust blocks were supplemented with grains and sucrose and inoculated with Shiitake mushroom spawn. After three fruitings, the blocks averaged one pound of Shiitake caps per block.

At 55 percent moisture, ROB compost consumes nitrogen in the form of ammonium and could provide a healthier environment in the poultry house. It would not be cost effective for ROB compost, either wet or dry, to be hauled to the birdhouse environment as bedding; however, green ROB chips could be brought in, starter microbes added, then watered to approximately 50 percent moisture with the chickens doing the turning through their normal scratching process. This could produce bedding that digests nitrogen, limits pathogens, and provides a quality end product (compost). A test is needed in a poultry setting before exact conclusions could be drawn and more substrate blocks inoculated with Shiitake spawn for a broader quality analysis.