

**REPEATED POULTRY LITTER APPLICATION BUILDS COTTON SOIL PRODUCTIVITY****Haile Tewolde****Ardeshir Adeli****Dennis Rowe****Mississippi State University****Mississippi State, MS****Abstract**

Poultry litter is a bulky mix of mainly chicken manure and bedding materials. It is generated in large amounts on a continuous basis in the Mid South and southeastern US. This necessitates yearly application to crops as a way of managing the constant supply. Manures including poultry litter applied in one season are known to have residual impact in subsequent crop seasons. Although expected, it is not known if and when the rate of application can be reduced after several yearly applications. A six-year research (2002-2007) was conducted at two private farms to determine if several yearly applications of broiler litter at rates initially considered inadequate for optimum cotton production build soil productivity and lead to reduced subsequent application rates. Cotton was fertilized with 0, 2.2, 4.5, 6.7 Mg/ha (0, 1, 2, 3 ton/ac) broiler litter yearly for six years and compared to a farm standard fertilization (Std) which received commercial inorganic fertilizers and to another treatment which received 4.5 Mg/ha (2 ton/ac) litter plus 67 kg/ha (60 lbs N/ac) as urea ammonium nitrate (UAN). The results showed that as much as 6.7 Mg/ha (3 ton/ac) litter at one of the farms that uses conventional tillage was not adequate for optimum lint yield during the first 3 years (2002-2004) of consecutive applications. In the subsequent 3 years (2005-2007), 6.7 Mg/ha (3 ton/ac) litter produced equal lint yield as the Std, a finding which suggests that repeated litter application under conventional till system builds soil fertility gradually and that litter rates for optimum lint yield may be reduced in subsequent years. Lint yield at the other location which used no-tillage was maximum when the cotton was fertilized with 4.5 Mg/ha (2 ton/ac) litter plus 67 kg/ha (60 lbs/ac) UAN-N in 2002-2005. Lint yield of the 6.7 Mg/ha (3 ton/ac) litter treatment equaled that of the Std in nearly all years but was less than that of the treatment which received 4.5 Mg/ha (2 ton/ac) litter plus 67 kg/ha (60 lbs/ac) UAN-N. There were some indications of soil productivity improvements as a result of repeated applications of 6.7 Mg/ha (3 ton/ac) litter at the no-till location but these improvements were weak and much less than the increases at the conventional-till location.