

## **Glomalin: The Real Soil Builder**

**by Don Comis, Agricultural Research Service, USDA**

An Agricultural Research Service scientist now has more proof that she has found a key ingredient responsible for the well-known benefits of soil organic matter.

Sara F. Wright, a soil scientist with the ARS Sustainable Agricultural Systems Laboratory in Beltsville, MD, discovered glomalin in 1996 and named the substance after Glomales, the taxonomic order of the fungi that produce the sticky protein. Recently, she used a nuclear magnetic resonance imager to show that glomalin is structurally different from any other organic matter component, proving it is a distinct entity.

The fungi live on most plant roots and use the plants' carbon to produce glomalin. Glomalin is thought to seal and solidify the outside of the fungi's pipelike filaments that transport water and nutrients to plants.

As the roots grow, glomalin sloughs off into the soil where it acts as a "super glue," helping sand, silt and clay particles stick to each other and to the organic matter that brings soil to life. It is glomalin that helps give good soil its feel, as smooth clumps of the glued-together particles and organic matter flow through an experienced gardener's or farmers hands.

Glomalin was long lost in humus, the organic matter that is often called "black gold." When it did turn up in humus measurements, it was thought to be a contaminant.

Glomalin is not just the glue that holds humus to soil particles, it actually does much of what humus has been credited with. Because there is so much more glomalin in the soil than humic acid, an extractable fraction of humus, glomalin stores 27 percent of total soil carbon, compared to humic acid's eight percent. It also provides nitrogen to soil and gives it the structure needed to hold water and for proper aeration, movement of plant roots and stability to resist erosion.

**Source: Agricultural Research Service, USDA (02/05/03)**