By Martha Mintz

An old tool with some new tricks

Gypsum is proving to be the multi-purpose tool of soil inputs.

It should surprise exactly zero farmers to know that a 2006 study identified heat and drought stress and flooding to be the top two causes of agricultural economic loss between 1980 and 2004. A $180 billion hit.

"Air-water balance is the single most important factor limiting agricultural production in the United States," said research soil scientist Darrell Norton at the Midwest Soil Improvement Symposium. Too little water and yields wither away, too much water and plants die in the field.

Building strong soil structure that creates pore space for air and water helps maintain the delicate balance and mitigate water-related losses.

The input that can help farmers achieve aggregated, strong soils isn't complicated or new. Ben Franklin used it. It was just forgotten. But now, gypsum is making a grand comeback.

Now that it's more available as a byproduct of emissions scrubbing, researchers and farmers have turned a fresh eye to long-ignored gypsum.

Cost sharing. Norton notes even the Natural Resources Conservation Service is working to develop a national standard for its use and looks to add it as a best management practice, making it available for cost-sharing.

As we approach a decade of renewed interest and use of the soil amendment, it's proving to be one of the most diverse tools available to farmers. It provides calcium and plant available sulfate sulfur, prevents soil crusting, builds soil structure, reduces phosphorus runoff (by 55 percent according to an Ohio State University study), stabilizes nitrogen in manure applications, and the list goes on.

The benefits to roots are significant. In a greenhouse study, Norton observed gypsum-treated soil produced double the root mass and 10 times the root surface area than the control in just 6 weeks, likely due to the highly soluble calcium gypsum provides.

"Nutrient and water uptake is really controlled by the surface area of roots," he says. "The drought resistance we see with gypsum is purely due to a bigger root." He also observed roots growing through ar-

►**Above left:** Good soil structure helps producers be more efficient managers of water, a resource under increasing strain. ►**Top:** Gypsum helps plants build massive root systems to support the plants and their yields through stressful conditions. ►**Above:** The fine consistency of FGD gypsum means it has a huge surface area, making it very reactive and fast-acting in the soil.

tificially waterlogged soil, something that would kill a crop in the field.

"In hydroponics you can grow roots in 100 percent water and nutrients if there is air in the system," he says. He theorizes gypsum precipitates out the carbon dioxide that contributes to plant death in standing water, allowing roots to continue growing.

Rising demand. As research continues to come out and gypsum media coverage increases, farmer interest and demand has risen, too.

Doyle Pearl, general manager of JB Pearl Sales and Service in St. Marys, Kansas knew the potential of gypsum, and the ag retailer was happy to make it a part of his product offering. He started custom spreading gypsum for his ag customers in 2013.

"Many of our customers had heard about gypsum and were ready to try it once we had it," says Pearl, who had a local flue gas desulfurization (FGD) gypsum source that was unavailable to him until he was able to use Gypsoil to act as a distributor.

Pearl initially used his lime spreading equipment to apply gypsum. It worked, but the lighter, higher moisture gypsum would bridge in the spreader and force them to reduce fill. They invested in a new spreader with steeper (50 degree) sides and a wider belt and openings to fix the problem.

Pearl spread gypsum on almost 1,000 acres in his initial season, including dryland and irrigated, high production soils and marginal land. His customers are focusing on heavy clay soils first, hoping to build soil structure to increase water infiltration which prevents ponding, minimizes erosion, and captures more water.

"We don't have an abundance of water here, so if gypsum can help us utilize moisture better, the crop is going to benefit," Pearl says. ■