Phosphorus Mobilization by Buckwheat

Results:
Soil conditions were extremely wet in 2001 which delayed planting and reduced the buckwheat biomass at the Olsgaard location. The buckwheat stand was excellent at the Thomas location.

The soil P concentration increased significantly from 2001 to 2002 on both the buckwheat and fallow treatments. Buckwheat did not significantly increase the measurable soil P concentration at either location. One thousand pounds/acre of “Cluck” (4-4-2) was applied at both locations for the crop year 2000 and may explain the precipitous increase in P concentration between years.

In 2002, the P concentration in soybean biomass increased following buckwheat despite no measurable differences in soil P concentration at the Olsgaard location. At the Thomas location, buckwheat reduced the plant K concentration but caused an increase in Na and Zn concentrations. These differences had no effect on grain yield at either location.

In 2003, the soil P concentration at the Thomas location was significantly greater (p<.01) where buckwheat was planted two years previously. The trend was similar at the Olsgaard location, but the increase was not statistically significant (<.14). This difference may be explained by the difference in buckwheat biomass production, which was significantly greater at the Thomas location.

Buckwheat is very competitive and effectively eliminates weed competition if an adequate stand is established (data not shown). This was clearly the case at both locations.

Buckwheat attracts many types of beneficial insects. Although several groups of beneficial insects were present in the buckwheat in 2001, the average number of individuals trapped within a species was relatively low and did not vary across location. The Tachinid fly was the predominant beneficial insect across locations. The green lacewing and hover fly also occurred in greater numbers compared to most of the other beneficial insects (data not shown).

Purpose of study:
Buckwheat is often claimed to “sequester” soil P for availability to a subsequent crop. The objective was to determine buckwheat’s ability to 1) sequester soil P and other nutrients, 2) suppress weeds, and 3) provide habitat to beneficial insects.

Buckwheat was established in 2001 as a green manure crop in two locations and incorporated after flowering, but before seed set. Soil samples were taken prior to buckwheat establishment in 2001 and from the same sites (within 1 meter) in 2002 in the following soybean crop, and in the 2003 wheat crop. Soybean (2002) and wheat (2003) plant samples were collected, at the same locations, and analyzed for P and several other common elements from the two treatment areas. In the fall of 2002, grain yield was also measured, but not in 2003. No other soil amendments were added during the trial.