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## **Are Soybeans a Menace to Soil Improvement**

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ARE SOYBEANS A MENACE TO SOIL IMPROVEMENT?

Since the introduction of the soybean crop into Indiana it has been championed by enthusiasts as a wonderful soil improvement crop and has been condemned by its critics as one of the worst of the soil depleting crops. Obviously such extreme points of view, along with intermediate appraisals have left farmers much confused.

The following material has been drawn from the best experiment station sources in order to help clear up the confusion that seems to exist in comparing soybeans with other farm crops from the standpoint of soil improvement:

1. The problem of erosion with soybeans is much the same as with corn. On rolling lands, soybeans should be planted on the contour, preferably drilled solid, and should be followed by a winter grain or cover crop.
2. On acid soils, limestone or marl is the first need for soybeans. Without lime on such soils, fertilizers have little effect. On these soils after liming, soy beans usually show marked responses to fertilizer (P & K), when plowed under for beans. Highest yields of beans result when the PH is about 6.5.
3. All crops when grown and removed from the land, deplete the soil minerals (PK etc.) On an equivalent yield basis, soybeans are no more soil depleting in minerals (P.K. etc.) than corn, alfalfa and some other crops.
4. Following is shown the removal of minerals (P. & K.) by the four crops in a rotation of corn, soybeans, wheat and clover, in which all grain has been removed, but all crop residues returned. Fertilizer was applied as follows: 300 lbs. 2-16-8 on wheat, 200 lbs. 0-16-8 on corn before planting and 100 lbs. 2-16-8 in the hill. Even with this treatment the crops showed a potash deficiency.

RELATIVE MINERAL REMOVAL BY GRAIN, SOYBEANS AND HAY

Based on yields and analyses from Purdue Agr. Expt. Station Bulletin #468  
 Soils and Crops Farm - 1938 - 1940

Crop	Average Acre Yield		Average Annual Mineral Removal, lbs. per acre					
	Grain Bu.	Stover, Straw or Hay lbs.	Grain			Stover, Straw or Hay		Total in Crop
			Phos. Acid (P <sub>2</sub> O <sub>5</sub> )	Potash (K <sub>2</sub> O)	Total Mineral	Phos. Acid (P <sub>2</sub> O <sub>5</sub> )	Potash (K <sub>2</sub> O)	
Corn	101	4410	41	27	68	9	30	107
Soys	31	2630	28	31	59	8	12	79
Wheat	42	4520	24	13	37	11	33	81
Clover	-	3300				19	44	63

Data above show about the same phosphate removal by crops as reported by Henry and Morrison but considerably less potash removal.

A more nearly normal yield ratio than the above would be 70 bu. corn, 25 bu. soybeans and 30 bu. of wheat per acre. Compared on this basis the removal of minerals (PK) in the grain for corn and beans is about the same. The mineral removal by wheat (grain) is only about 55 percent that of corn or beans.

5. Purdue data show that 60 lbs. of nitrogen are required to produce the grain in a 70 bushel corn crop. Soybeans, according to the Illinois Experiment Station Bulletin 456, "can obtain about two thirds of their nitrogen from the air" when well inoculated. When a 20 bushel crop of beans is combined, the seed removed and the straw left on the land,

the Illinois station estimates that 16 pounds of nitrogen are returned per acre above that removed from the soil. Considering the total of nitrogen, phosphorus and potash removed in the grain, as when sold from the farm, soybeans are less soil depleting than corn.

6. The steady increase in soybean acreage and production in the United States reflect the need for soybeans. When processed, they furnish oil for a variety of uses and protein supplement second to none. Soybeans fit naturally in the rotation following corn and in this way aid in corn borer control, and increase small grain yields.

In any soil improvement program, deep rooted legumes, clovers, alfalfa etc. should always be grown where soybeans are included in the rotation to replenish the plant food removed when beans and other grains are sold as a cash crop. For further information on soybeans read Purdue Ext. Bulletin 231, "Soybeans in Indiana."

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