

Green Manure Crops Worth Considering

By W. D. Pew

The need for maintaining good soil fertility and proper soil structure is a critical and ever-present problem with Arizona soils. One of the important reasons for this is their characteristically low level of organic matter. As is typical of soils where adequate soil moisture and temperature, proper amounts of calcium, and appropriate pH exist, the organic matter is rapidly burned up.

Under such ideal conditions, the decomposition of organic materials in these semi-arid area soils is very rapid, and they quickly revert to the low levels considered typical of them, especially since bacterial activity is high and chemical changes are favorable.

Much has been written and many tests have been conducted in the study of soil organic matter, what is required, how long it lasts, where it goes, and its importance in maintaining proper soil conditions for crop production.

Has Many Purposes

It should be pointed out that organic matter in soils is not only important for the obvious reasons in production, but also for less apparent ones. It has been said and repeated often that a function of organic matter "is to serve as a cushion against the shock of tillage."

Seemingly most farmers and growers do not think of it in this subtle way, but even this is a factor of serious concern because poor soil structure often results from tillage methods. This is becoming a more and more difficult problem. Yet, as far as the farmer is concerned, most of these tests and evaluations point to one very obvious conclusion.

Namely, it is nearly always considered prohibitive costwise — compared to benefits received — to develop and/or restore organic matter in the quantity required to improve its level in Arizona soils regardless of the method used. Therefore, only soils used for high income crops, such as vegetables, commonly receive such treatment.

Two Ways to Supply It

Several ways are available to improve, temporarily at least, the organic matter level, but the two most common are application of animal manures and the growing of green manure crops. One basic difference exists between these two methods, along with several indirect and lesser differences. Basically, the use of animal manures brings about salt accumulation, but they do contain and supply rather easily used plant nutrients. These materials are in larger quantities than for green manure crops.

Conversely, green manure crops tend to reduce the salt concentration of the soil, largely through the leaching action of the irrigation water. Likewise, the crop residues returned to the soil from such crops release nutrients, as they decompose, at a much slower rate and in smaller amounts than for animal manures.

As we turn our attention to green manure crops, the grower — if he selects to grow such a crop — has a large number from which to choose. However, in

reality only a few, because of their relative effectiveness, are ever employed in the lower elevation areas of Arizona. These are guar, papago peas, sesbania, and, as a secondary purpose, alfalfa. Those that are sometimes used include barley, sudan, and sorghum crops that are plowed under while yet in the young, succulent stage. At elevations between 3000 and 4000 feet, cowpeas is the usual crop.

Owner Often Reluctant

With Arizona agriculture being a year-round activity, and since labor costs are high and water, land, and similar production items are expensive, the average farmer generally feels he is not interested in growing green manure crops. It would appear, however, that in some instances such a decision is hasty and is not in the best interest of the farmer, since he may not be aware of all the facts.

He may be missing an excellent opportunity effectively and economically to improve his soil and its productivity. Hence, he should more carefully study his soil problems, requirements and possible benefits before making a decision. Perhaps he should design a cropping program that would provide for growing such crops rather than considering them independently, and thus use them only on an infrequent basis. Certainly it is his decision, but to acquaint himself with some of the basic knowledge of such a program would seem of prime importance in achieving success in crop farming. Some of the considerations he should make and questions to ask are:

Answer Four Questions

1. Do I have a problem with harmful salt, and would growing green manure crops provide an opportunity to correct it?
2. Would the growth of these crops improve my soil by selecting one with a different type of root system than my usual crops, and thus more effectively utilize the natural fertility of my soil?
3. Will a cover crop help in "opening" my soil and provide for better water movement and subsequent crop root development?
4. Will it provide a means by which my soil may be replenished with organic matter for a temporary period, at least, by plowing these crops back into the soil to maintain structure and improve tilth?

Careful consideration of each of these should be made, as well as for any special consideration the farmer may have. He could thus determine the benefits that could be derived and to what extent. Unfortunately most growers approach a cover crop program with a tongue-in-cheek skepticism and permit only a very superficial, often biased, evaluation before making a decision.

It is common reasoning that if its use cannot be justified on the income from the first crop following the cover crop, it is branded an impractical and undesirable practice. Yet, a deeper study would likely reveal longer-lasting benefits that could make it a highly desirable program. In this manner its values could and should be extended over a longer period of time and be measured by the increases from several crops and seasons rather than for only one.

Specifically, what might be expected from a green

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Border Bug Battle

Few Land-Grant colleges of agriculture are as near the border of a foreign country as is this college, at The University of Arizona. Likewise, probably all readers of **PROGRESSIVE AGRICULTURE IN ARIZONA** have been stopped at the Nogales border and asked "Bringing any fruits or vegetables?"

But of the thousands who are stopped daily, few realize the importance of that question, or the hazard to our agriculture, our livelihood and food supply, in the possible invasion of insects and diseases from which our crops, trees, soil, and ornamental plants and flowers are now protected. The USDA Plant Quarantine inspectors are doing an important job and deserve the good will and support of all of us.



At a California port of entry there were 80 persons on the bus which had come all the way from El Salvador. Plant quarantine inspectors confiscated fruit from persons, bus seats and handbags, putting it all outside on one side of the bus, while they searched the other side.

"When we returned," said an in-

spector, "all the fruit had been eaten, and we found only scattered peelings, cores, etc. So, in the interest of international good will, and since the disposal job would seem to have eliminated any chance of pest dispersal, we accepted it all in good graces and bid the travelers to be on their way."

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manure crop when compared with a heavy application of feedlot manure or the continued use of organic fertilizer is shown in this table. Cost conscious growers might reduce these figures to dollar and cents values and thus be able to compare costs with benefits. This would represent the usual terms of evaluation in determining the value of such crops.

Yet, this is not all of the benefits received. To these should be added improvement in soil tilth, influence on water efficiency, ease in tillage, disease and insect con-

California Leader In Tuber Production

What state receives the largest income in the nation from potato production? Maybe you'll be surprised, as we were, to learn it is California. In California the 1965 income from those edible tubers was \$126,964,000. Only other state anywhere in that range was Idaho with \$102,737,000.

From there the descending scale includes, in third place, that old standby, Maine, with \$49 million, and another old timer, New York state, with \$46 million. Wisconsin follows with \$30½ million, and then a winter potato state, Florida, comes along with \$28½ million.

In the \$20 million area is a group of important "potato" states, including Colorado, Pennsylvania, Minnesota, Michigan, North Dakota, Washington and Oregon. In the group which counts on potatoes for approximately \$14 million each per year are some of the winter producing areas — Virginia, North Carolina, Alabama and Texas.

Arizona, which in 1965 realized \$9,656,000 from potatoes, is considered an important producing area, ahead of 29 other states in the continental United States.

These figures, and many more dealing with area, season of production, markets, variety, total yields, cultural practices, yield per acre, portion of the crop used in various ways, research information available, legislation and grading, and many other topics, are found in the "American Potato Yearbook," published annually at Westfield, N.J.

Los coccidiostatos quimicos han hecho posible el uso de mantecas animales y grasas en las raciones. Las mantecas son ricas en energía y, cuando se usan correctamente, mejoran la eficacia del alimento. Los antioxidantes tienden a estabilizar ciertas vitaminas, particularmente las vitaminas A y E.

trol, and similar changes associated with this kind of program, if the total value is to be determined, understood, and applied.

Table 1. Effects of Guar and Steer Manure on Production of Head Lettuce.

Treatment	Harvests		
	1st 2-dozen size	2nd size—	Total cartons/acre
Guar*	83.0	364.0	447.0
Steer manure (20 tons/acre)	192.0	348.0	540.0
Check	32.0	212.0	244.0

*Equivalent to approximately 20 tons material on a fresh weight basis.