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STRAW AND STUBBLE ARE FERTILIZERS - USE THEM

by

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The farm is never any better than the soil - and the soil is never any better than its ability to furnish plant food in available form for the growing crop. A productive soil must have a store of mineral plant food and, also, a supply of decaying organic matter to convert the minerals to an available form that can be used by growing plants.

Crop production year after year is a drain on the mineral supply of the soil; the sale of each crop represents a share sold from the store of minerals. Each year's farming operations also consume a part of the soil's supply of organic matter. To maintain good yields, it is necessary to add additional organic matter each year, and it should be obvious that any minerals in such added matter will not only increase yields but also lengthen the productive life of the soil.

Six hundred thousand acres of land in Oregon are producing various types of legume seed crops. The straw and stubble from these crops is of unusually high value as a source of both mineral plant foods and a high-quality organic material. Most of these seeds are sold to produce cover crops as a direct aid to soil fertility in other sections. If the straw is utilized, the crop can be of equal aid to the production from Oregon farms.

The value of returning straw and stubble to the soil is not questioned. It adds both plant food and organic matter. There are some problems in the utilization of this material, however, that too often tempt the farmer to use a match as the easiest way out. The problems are both mechanical and chemical.

Before the crop residue can be of any value either as plant food or organic material, it must rot. This process requires moisture, heat, and air; furthermore, it is accomplished by action of bacteria and other micro-organisms which temporarily tie up any readily available supply of plant food, chiefly nitrogen. This demand unfortunately coincides with the demand of a growing crop.

With legume straw having 20 pounds of nitrogen or more to the ton, there is an ample supply of plant food to supply the needs of both the bacteria and any growing crop. The utilization of legume straw then becomes a mechanical problem of either mixing the material with the soil or letting it remain on the surface until such time as it becomes thoroughly moist so the decomposition can proceed. Legume straw will rot readily on top of the ground if it is kept moist.

In the utilization of grain straw, the decomposition organisms require an additional supply of nitrogen. They will take this supply of nitrogen from the soil and use it, temporarily, at the expense of any growing crop, until the decomposition process has reached the point where plant foods are again released. For the satisfactory utilization of this material, it may be necessary to add an extra supply of nitrogen to avoid the decrease in yield from the succeeding crop or to avoid trouble in farming operations through mechanical difficulties caused by delay in rotting of the straw and trash on the surface.

Straw of all types has been satisfactorily handled from the mechanical standpoint by a number of methods. It may require more time and consequently more expense. Plows of the disk type, either the conventional disk plow or the newer one-way disk, do the best job. They have an advantage in that they mix the material with the soil, a condition that leads to more rapid decay. Plows of the mold-board type may cause some difficulty from clogging. Plows with high clearance beams work better than the standard type. Large diameter coulters, particularly of the cut-away type help. With a clean job of mold-board plowing, the straw is left in one layer with only the top and bottom in contact with the soil, and where there is little air and heat this delays decomposition. For best results the straw must be mixed with the top layer of soil. Disking before plowing is often justified.

Straw and stubble from grain crops will decompose almost as rapidly as legume straw, if extra nitrogen is added. The nitrogen may be supplied as commercial nitrogen, barnyard manure, or legume straw of high nitrogen content. Ladino clover, hairy vetch, crimson clover, red clover, alsike clover, and common vetch would be suitable in the order mentioned. For the legume straws, it would take, roughly, a ton of legume straw for every ton of grain straw. Barnyard manure of good quality would take, roughly, 3 tons for every ton of grain straw. Commercial nitrates should be used so as to supply approximately 15 pounds of nitrogen per ton of grain straw. In using any of these materials the applications should be followed by disking to bring nitrogenous material in contact with the straw and mix both with the soil. Decomposition of grain straw with nitrogen added would be somewhat slower than legume straw because of the generally tougher fiber. This difference would probably not be noticed in the course of a season's farming operations.

Grain straw can be utilized without the use of nitrogen at the expense of a little time. Heavy straw cover disked early in the fall will ordinarily decompose enough during the fall and winter to permit plowing and seeding to a spring crop without reduction in yield. Exceptionally dry or exceptionally cool fall weather may prevent this from happening. The straw will decompose more readily on a fertile soil than on a poor one. By this method the stage of decomposition requiring the most nitrate is accomplished ahead of the time when it is needed by a growing crop. With this method there need be little concern about loss by either erosion or leaching during the winter months. The decomposition process is as effective in holding available plant food as a growing cover crop.

FERTILIZER VALUES

Crop	Nitrogen		Phosphoric Acid		Potash		Fertilizer Value*
	N	Ammonium Sulfate	P_2O_5	Triple Super	K_2O	Muriate	
	Lbs/Ton	Lbs/Ton	Lbs/Ton	Lbs/Ton	Lbs/Ton	Lbs/Ton	$/Ton
STRAW RESIDUES							
Crimson clover	32	152	6	13	23	37	$ 5.99
Ladino clover	52	248	8	18	34	57	9.46
Red clover	31	148	7	15	27	45	6.11
Sweet clover	25	119	5	11	20	33	4.80
White clover	42	200	8	18	28	47	7.21
Alsike clover	31	148	7	15	22	37	5.86
Hairy vetch	39	186	10	22	27	45	7.41
Common vetch (Will.)	28	133	7	15	21	35	5.39
Austrian peas	24	114	6	13	24	40	4.92
Barley	12	57	4	9	22	37	3.02
Oats	12	57	4	9	25	42	2.92
Wheat	10	48	3	7	12	20	2.18
Rye	10	48	6	13	17	28	2.61
Flax	16	76	4	9	19	32	3.43
Grass straw (aver.)	13	62	6	13	15	25	2.93
CANNERY RESIDUES							
Bean vines	60	285	13	28	40	66	11.18
Pea vines	49	233	10	22	24	70	9.56
BARNYARD MANURE	10	48	5	11	10	18	2.30
COVER CROPS - ALSO HAY							
Vetch & Oats (Common)	40	190	12	26	25	42	7.57
Rye	20	95	8	18	25	42	4.53
Sweet clover	50	238	10	22	24	40	8.80
Crimson clover	42	200	9	20	30	50	7.92
Common vetch	44	210	13	28	44	73	9.14
Hairy vetch	56	267	15	33	46	77	11.04
Alfalfa	49	233	10	22	42	70	9.56
Ladino clover	69	329	12	26	49	82	12.83
Alsike clover	42	200	10	22	25	42	7.73
Red clover	45	215	11	24	37	62	8.81
Timothy & clover	28	133	8	18	35	58	6.05
PLANT FOODS REMOVED BY TYPICAL CROPS							
Potatoes	7	33	3	6	10	16	1.66
Barley	35	167	15	33	10	16	6.30
Sugar beets	4	19	2	4	9	15	1.13
Flax	17	81	4	9	20	33	3.62
Clover seeds	60	281	30	67	28	47	11.60
Corn silage	6	28	2.5	5	7	12	1.34

* Nitrogen valued at $0.14/lb; phosphoric acid at $0.06/lb; potash at $0.05/lb.