Growers' Guide

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Dry Farming in Western Canada

Making the Best Use of the Water in the Soil—History of Dry Farming—Summary of Dry Farming Practices.

By Prof. J. Bracken

THE practices by which the moisture stored and conserved in the soil is kept available or at least not rendered unavailable to plant roots are:—

1. By not plowing under thick layers of dense grass or other rubbish, unless time sufficient for the decay is allowed before seeding the next crop.

2. By not plowing under a heavy stubble in fall or spring unless the land is to be thoroughly compacted so that the moisture in the subsoil may rise into the furrow slice to meet the needs of the crop.

3. By seeing that in all fall or spring plowing the unturned furrow is brought firmly in contact with the subsoil, so that there may be the least possible interference with the free movement of moisture.

4. The application of manure in such a manner, at such a time and in such an amount that it will quickly decay and not interfere with the movement of soil moisture. Coarse strawy manure and stubble are often worse than useless until they have decayed, after which time they exert very beneficial effects on the moisture absorbing and moisture holding capacity of the soil.

Utilizing Soil Water

The soil moisture will be utilized most efficiently if three things are done; (1) The supply of available plant food kept up; (2) drought resistant crops grown; and (3) suitable crop management practices followed.

Keep the soil rich.—The chief function of the water stored in the soil is to dissolve plant food and carry it through the root hairs into the plant. The more plant food a given unit of water can carry into the plant the more efficient the water is. It has been found that on rich soils a given amount of water carries very much more plant food into a plant than does the same quantity of water on poor soils. Widstoe states (1) that on a naturally fertile Utah soil 908 pounds of water were required to produce each pound of dry matter in corn. (2) that when this soil was manured only 613 pounds were required and (3) that when commercial fertilizer was added only 585 pounds was necessary to produce a pound of dry matter. Similarly he found that "on a sandy loam, not cultivated, 603 pounds of water were transpired to produce one pound of dry matter of corn; on the same soil, cultivated, only 256 pounds were required. On a clay loam, not cultivated, 535 pounds of water were transpired for each pound of dry matter, whereas on the cultivated soil only 428 pounds were necessary. On a clay soil, not cultivated, 753 pounds of water were transpired for each pound of dry matter; on the cultivated soil, only 582 pounds."

The evidence of these and other investigations clearly show that the more fertile a soil is the greater yield it will produce from a given supply of moisture. This is the chief reason why dry farmers should strive to maintain the fertility of their soils. While our soils are new and rich our average rainfall will produce an average yield. As soon as they become less fertile the same amount of rain will produce a much smaller crop.

Drought Resistant Crops

Another point that the dry farmer should keep in mind is that some plants are better able to withstand drought than others. The factors that constitute resistance to drought are not all well understood but several are now quite well appreciated by dry farming investigators. For instance it is now well known (1) that different crops require different amounts of moisture to produce a unit of dry matter, (2) that certain types of crops are able to withstand more drought than others, (3) that the growth of some classes of crops so parallels the monthly distribution of moisture that they are enabled to produce more satisfactorily than other classes of crops, the growth habits of which are different, and (4) that crops which permit of intertillage may develop under smaller precipitation than those of similar type not intertilled.

Recent investigations have shown that among our commonly grown crops millet, sorghum and corn require the least moisture per unit of dry matter produced, that the legume crops, like alfalfa, peas and clovers require the most and that the grain crops—wheat, oats, barley, rye and flax are intermediate in moisture requirements.

Carefully conducted experiments have also shown that some crops will withstand drought better than others. For instance brome grass and western rye grass are both more drought resistant than any of the other commonly used grasses. Alfalfa will withstand more drought than clovers, durum wheat more than common wheat, and emmer more than oats or barley.

It is well appreciated by western farmers that annual crops yield much more than perennial ones, and that those crops which can be sown early and that reach their greatest growth during the late stages of the rainy season, and that ripen before the dry autumn months, are the most satisfactory to grow. This is why oats, an annual crop, is more generally used as hay than the grasses which are perennial. It explains why sweet clover yields more than alfalfa and it is why the grain crops are the ones best suited to our climate.

The value of intertilled crops has long been appreciated by dry farmers. The large yields after corn and potatoes, the former particularly, are well appreciated. The difficulty has been to grow either of these crops profitably in a large way under present economic conditions. As land becomes higher in price, and labor and equipment cheaper more intensive methods will pay better than extensive ones, but at present the greater profit is probably to be found in the latter in most parts of the West.

Crops That Promise Most

The crops of undetermined value that promise the most for the dry farming districts of Western Canada, and that warrant very careful trial are:—

Grain Crops—*For sale:* Durum wheat, Kubanka and Pelissier; Marquis and Red Fife (best at present); Winter rye (N.D. No. 959). *For Feed:* Spring rye (Petkus); Emmer; Two-rowed (Hannchen or Canadian Thorpe) and naked (white hulless) barley; Early and late oats (late now generally used).

Forage Crops—*For summer pasture,* sweet clover; *for fall pasture, rape; for* winter pasture, corn; *for* perennial pasture, Western rye grass, brome grass and alfalfa; *for soiling crops,* alfalfa in rows; for winter feed, corn, oats, sweet clover.

Suitable Crop Management Practices

The crop management practices the dry farmer in the Canadian west should avoid are late seeding, thick seeding, shallow seeding and late harvesting. Each of these in dry seasons and in dry areas is likely to result in lessening the yield secured.

The time to sow.—The two factors that chiefly determine the best time to sow are the temperature and moisture conditions of the soil. If crops are sown too early they may be injured by late spring frosts or the cool may die before the seedling gets above ground. Aside from this danger the seeding of our hardy cereals, wheat, rye, oats and barley should be done early. If the seeding can be done early enough the moisture from the melting snow will germinate the seed, otherwise in fall or spring plowing the germination may be seriously retarded owing to lack of rain in the early spring.

The amount to sow.—Thin seeding is a recognized dry farming practice. The drier the district the less seed need be used, while the more humid the district and the shorter the growing season the greater the quantity that should be sown. Campbell recommends as little as 18 to 20 pounds of winter wheat; 22 to 25 pounds of spring wheat; 20 to 25 pounds of oats and 35 to 40 pounds of barley per acre in the dry parts of the Western States. The United States Federal Department of Agriculture recommends the following rates for Montana: Wheat one bushel; oats one to one-and-a-quarter bushels; barley, one to one-and-a-quarter bushels; flax 15 to 20 pounds. For the dry parts of Western Canada rather heavier seedings than those recommended for Montana should be used. Of course, in the more humid sections of the west much heavier seedings are necessary.

Sow into the moisture.—In dry areas the limiting factor in germination is usually moisture. Where rains usually come in the spring season the depth of seeding is of relatively little importance but in this climate very little rain falls in the early spring and if germination is to be secured seeding into the moisture is necessary. Of course, the land should be prepared in such a way that the moisture is not at too great a depth.

Use non-shattering varieties.—Very great losses frequently occur through the shelling of overripe or easily shattered seed as a result of heavy winds at harvest time. In order to lessen this danger two practices may be followed, first, use crops that do not shatter readily and second, cut before the crop is dead ripe.

Among the wheat varieties that shatter least are the Durum types and Marquis. Durum seldom shatters even under the worst conditions while Marquis is known to be more non-shattering than any other of our commonly grown varieties.

History of Dry Farming

Most of the practices of Dry Farming are probably very old. The ancient civilizations of the Orient, the Euphrates Valley, Palestine and Egypt were developed in dry climates but chiefly in areas where artificial irrigation as

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