3. ORGANIC MATTER PROBLEMS UNDER DRY-FARMING CONDITIONS

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Agronomists representative of every dry-land section of the United States and Canada have stated at one time or another, that aside from water, organic matter is the most important soil problem of their section. In many cases this statement has been based on first-hand experience, the counterpart of which is rare in humid sections in this generation. Virgin land has been seen brought under the plow. The gradual disappearance of fibre and degranulation of structure have been observed. An increasing tendency toward erosion by wind and water has become apparent. The ease and satisfaction of implement performance in many cases has been seen impaired and the labor requirement in tillage increased. And, in spite of remarkable strides in agricultural efficiency since the virgin sod was turned, there are scores of cases with which dry-land agronomists are personally familiar, where the yielding capacity of the soil has been considerably reduced.

Analysis of soils from fields that have been cropped for extended periods has shown extensive losses in the organic matter portion. Considering the theoretical functions of organic matter, coupled with such first-hand observations as those just mentioned, what is more logical than the conclusion that the depletion of organic matter is serious?

There is no question but what organic matter has been depleted in dry-land sections under some cropping systems. State-wide studies of organic matter depletion have been under way in Nebraska for several years. The following is a digest of the data obtained to date on 67 fields from all sections of the state. These are fields which have been cropped mainly to grain without addition of manure or growth of legumes or without obvious water or wind erosion.

Nine fields under cultivation for three to seven years have lost 6.5% of their original organic matter content. Nine fields under cultivation for 8 to 15 years have lost 12.4%. Twelve fields under cultivation 17 to 30 years have lost 26.8%. Twenty-five fields under cultivation 32 to 44 years have lost 26.2%. Twelve fields under cultivation 45 to 60 years have lost 28.0%. Loss of organic matter in all these cases is based on a comparison of the analysis of the top foot of the cultivated soil with adjacent and comparable virgin land. Fifteen of these fields that have been under cultivation from 30 to 60 years show in portions which have been subjected to water erosion an average loss of 56.6% of organic matter as compared with 27.1% loss on level uneroded portions of the same fields.

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