

the husbandman made his appearance. The sowing of cereals has altered matters so that when the grasses fail to produce stems the saw-flies were able to continue their increase by attacking wheat and rye, with the result that they are now a serious pest.

Yet another insect which is checked by lack of moisture is the Hessian Fly. Dry seasons are generally recognized as anti-fly years and in Manitoba the partial second brood is frequently destroyed outright by a premature ripening of the grain, due to dry, hot weather conditions in late July. A knowledge of this fact is often of the greatest importance in forecasting as to the probabilities of a Hessian-Fly outbreak. It also comforts us in the thought that weather conditions will seldom remain favourable to the insect for any length of time, though we have the unpleasant knowledge that good crop years are frequently best adapted to Hessian-Fly increase. Moisture is probably still more important over northern latitudes in the form of snow when it provides a thick covering to the objects beneath, protecting them from both frost and sun. It is really astonishing how a blanket of snow will afford protection even to the tender plants. For instance, potatoes have more than once survived the winter, even in our invigorating Manitoba climate where the temperature, at times, attains a minimum of fifty below zero. Yet expose these same potatoes directly to four or five degrees of frost and they will present a sorry spectacle next morning.

Snow is unquestionably a very important factor in preserving insect life in winter time, and there is no doubt that it is largely responsible for the preservation of many forms which would perish without its covering. Perhaps there is no better example of its preserving influence than was shown by the Colorado Potato Beetle. This beetle invaded Manitoba a number of years ago, but did not become a serious pest until comparatively recent times. It had, however, gradually extended its range northward. In 1913 its ravages were severely felt in Southern Manitoba as far north as latitude 50° and to a lesser degree for some distance farther north. In the winter following, that is 1914-15, there was a great scarcity of snow in portions of the province so that some places used wheels throughout the winter. The result of this lack of snow was that the frost penetrated considerably deeper into the ground than