

Many kinds of drags or floats are used, but they do not do the work that the plank drag does. They are merely smoothers, create a dust and follow the lay of the ground to a great extent. The plank drag as outlined above, is in a place by itself, and is very useful. It does excellent work in bringing about uniformity of the seed bed, because it holds itself down to the work and shaves the surface, thus moving everything in its way and levelling the soil.

After the land is plank dragged, the seeder should deposit the seed at a uniform depth.

Depth of Seeding

This is really important; more so than many realize. Not many farmers get down on their knees and find out how deep the seed is going in the soil. Many seed deeply to offset a possible drought, with the idea that if sown deep it will withstand a drought. This will have an opposite effect. In most cases nothing is gained and much may be lost by deep seeding. Bear in mind, I am writing just now of a prepared summer-fallow with the moisture at the surface.

If we seed deeply, say, three inches or more, the seed is down in the cold soil and away from the heat, light and air. It takes a long time to come above the ground, and if the seed is of weak vitality a weak plant is the result. When the plant gets above the ground it begins to strike out a fresh root system near the surface and will not be the strong and healthy plant as that from seed sown at the right depth of one and a half to two inches. I make it a rule if the moisture is there, to seed not more than one and a half inches deep on well prepared fallow.

If we want to harvest a bumper crop, we must do all in our power to bring about a rapid, strong, vigorous growth, without any check. Any plant that receives a check in its growth will in most cases suffer, and not be the strong plant it should be.

By carefully stripping the stem of grain when it is about ten or twelve inches high we may find the head already formed. These are very small, but still they are discernible. The heads being formed early cannot by any means of our own or conditions of the seasons, favorable or otherwise, be increased in the number of spikelets. They are already formed, let it be small or large, four-rowed, or eight-rowed or ten-rowed. But at the time of fertilization later in the season, the number of grains in the spikelet may be increased or decreased according to climatic and soil conditions. Now, having this in mind, it is necessary that we do all we can to bring about a rapid and vigorous growth in the early stages of the plant. This may be done by looking after the important details from the time we prepare the seed bed to the sowing of the seed, and again late in the season.

The seed should be sown as nearly as possible to not more than two inches deep. At this depth germination is strong. The plant does not develop a second root system as in the deeper seeding. It strikes out a strong set of roots that reach out on every side for the necessary plant food in the proper temperature. It comes above ground sooner, and after being in the soil for about three weeks has developed a healthy root system. Later, when above the ground, it will develop a strong, healthy top system, larger heads will form and if we should have unfavorable weather conditions, it will hold its own better than a thin, weakling plant will do, such as often results from deep seeding.

A Practical Illustration

I had no better illustration of this fact than in June, 1914, during the hot, dry spell we experienced. I took the occasion to go into three different fields on the farm of two different varieties of wheat, and found by investigation that the plants from the seed that I knew had gone too deeply in a certain part of the field, when pulled, showed the double rooting system. The roots that first struck out at germination were there and a fresh set had just formed with about three small, short roots. The plants showed signs of suffering, were weak and spindly with only a single stool. In pulling the plants that

were sown at one and a half inches deep close by, it was found that these had a solid bunch of long, healthy roots, a single rooting system and a top growth of four to six healthy stools large and strong. The difference in the height of these two plants was remarkable. The deeply seeded was less than half as long as the other plant and showed signs of suffering. This was not confined to a single plant, but to a great number, and in different parts of three different fields. I am convinced that if all my field had been sown deeply my yield would have been light, but fortunately, I had already learned the lesson of seeding grain at the proper depth. I may add that these three fields were sown under different condi-



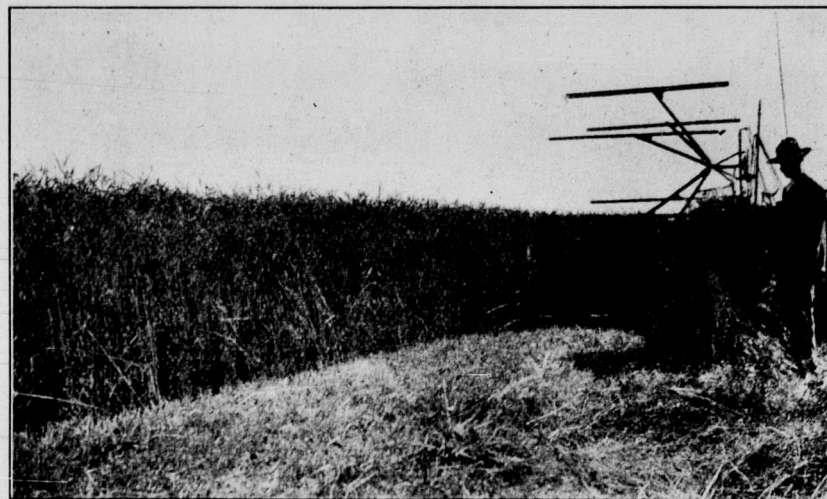
Hand selected seed plot of Preston wheat, grown on Brome sod, 1911. Note uniformity of plot. Yield fifty-three bushels per acre.

tions. One was on summer-fallow, one on spring plowing, the other on fall plowing, so that this was not an isolated case.

Now the lesson to be applied is that the deeper seeded grain was longer in the time coming above ground. After showing above ground they had to strike out a fresh root system and conditions then were not as favorable as in the early stages of growth. The hot, dry weather interfered and prevented this and the plant, as it were, was in the air, with conditions getting worse. The other plant, seeded at the proper depth, quickly developed a good root system, the top growth was rapid and being deeply rooted, better withstood the hot, dry spell.

The Soil Packer

The surface packer should follow the



Field of Marquis wheat, 1914. The sweepstakes wheat at Wichita, Kansas, came from this field.

seeder immediately—not two or three days later—or its good effect is lost. The object in using the packer after the seeder is to bring the warm, moist soil in contact with the seed. This will result in more even germination, will germinate the seed and bring it above the ground three to four days sooner than if unpacked or only harrowed. Packing brings about the rapid growth I mentioned, and generally all thru the growing season the effect will be seen. It also usually ripens one week earlier at harvest time. I am a firm advocate of the land packer when used in its proper place and at the proper

time. There are different styles of packers and each has its place on the farm. The sub-surface packer for the plowing, the surface packer for the seed. As few farmers can purchase both kinds, I consider the surface packer the most convenient to have. It is not my intention to discuss the merits or demerits of the packer, but I would say that, if possible, use one, and if used intelligently and in its right place, it will pay for itself in a very short time. Many farmers today have one laying around on the farm and never use it. They do not use it because they never saw the good effect. Many use them in the wrong place and at the wrong time. A packer is useful in packing down the furrow slice after plow-

smothering at this time when the plant is weak, but when it has developed two or more stools it may be harrowed without harm. If any farmer intends to harrow growing grain it is necessary first of all to have the soil in condition to do so. The seed bed should be firm and free of rubbish. A loose seed bed filled with stubble needs some judgment before going on with the harrow, and unless the weeds are so thick that it is a case of kill or cure, I would not advise harrowing.

At the stage I mentioned, when the plants are just peeping thru the ground, it may be harrowed if the seed bed is firm and even if there is rubbish in the field, but not after the grain is up as the rubbish gathers on the teeth of the harrow and does not do the work intended and smothers the grain. In summing up the operations as outlined in seeding prepared summer-fallow:—First, harrow, plank drag, seed, pack immediately and harrow as the grain comes through the ground.

Fall Plowing

Fall plowing as a rule in many districts does not give as good results as spring plowing. There are several reasons for this; one of these is that it is generally done too late in the season, after the harvest operations. The earlier it is done the better the results. It is too often the case that a lot of plowing is done and no attempt is made to harrow or pack it down, as soon as plowed. The object in general is to get as much plowing done as soon as possible, before the frost stops all plowing operations. The land is left as plowed with the object of holding the snow. This is not a good practice, as plowing that is harrowed and packed immediately will have more moisture in the spring than land left up rough. After harvest last fall, considerable plowing was done, and heavy rain fell over most of the province. On one side of the road was to be seen plowing that was worked down, on the other hand, there was plowing left up rough. After two or three days' heavy rain I examined some of this plowing. The land that was rough, untouched by the harrow or packer, was found to be dry. A few days' of sunshine and wind having evaporated a great deal of the moisture. On the other hand, the land that was worked down, was in a condition to absorb all the rain that fell and penetrated deeply, because it was in a receptive condition. The moisture is thus stored up for next season's crop. The weight of the winter's snow also helps to pack the land, and when the snow leaves in the spring it will penetrate well into the rootbed and the land will be in better condition to grow a crop. On the other hand, the land that was left up rough, when the snow has left it in the spring will, between the freezing and thawing process, have had evaporated from it considerable moisture, and in all probability the rains that fell in the fall did not go beyond the furrow slice, thus were lost, when every ounce of moisture was certainly needed.

In all probability the land will be pulled down with the harrows in the spring, and the dry dust will be incorporated with what moist soil there is, and if we do not have more snow than we have at present the probabilities are that there will be no excess of moisture there, and in the spring it is not an easy matter to firm this plowing as there is very little rain fall at that time to help to compact the soil. As the time is now past to remedy this matter, it remains to be seen which is the best method to follow in the spring when seeding time arrives. I would here express a few words of caution in this respect.

Seed Fall Plowing Late

Fall plowing is usually sown early in the spring without any regard to the conditions of the soil, or whether it is weedy or not. If the ground has been in cultivation some years the probability is that there are many weed seeds in the soil. These weed seeds are waiting to start growing early in the spring, as at that time of the year conditions are more favorable to their growth than later in the season. If seed is sown in the spring without any attempt to destroy these weeds, the probabilities

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