

Winter Wheat Survival in Adverse Conditions

Winter wheat is seeded in early September into a shallow seedbed; ideally the plant accesses enough water to germinate quickly and grows for 4 to 5 weeks. The next 4 to 8 weeks (October and November) allow the plant to vernalize (giving the plant the signal to flower next spring) and acclimate to the cold (harden off for the winter). This plant would be 3 to 4 leaf, have a tiller or two with developed crown tissue and would be ready to achieve winter wheat's maximum yield potential next spring.

The fall of 2001 in many areas was far from this ideal picture of winter wheat establishment. The results of fall's seeding efforts are variable but disappointing in many cases. Most producers have crop that emerged and grew to 1 to 3-leaf in wet areas around sloughs or in low spots. However in a high percentage of each field, seeds are anywhere from lying in dry dirt not germinated, to sprouted and not quite through the ground. Even though conditions are not ideal, the crop should not be given up on yet. The following some tips to keep in mind about how your crop will react given its stage at the end of this fall.

With many different stages of crop in the field growers are wondering what this will mean for next spring. The graph below gives the best idea of what to expect from different stages of crop.

Stage	Date of Germination	Yield	Competition	Winter	Rust Risk	Maturity
		Factor 1=Low 10=High	Factor 1=Low 5=High	Survival FSI (514=best)	NonR Vars. (% Risk)	(Days Later)
Not Germinated (Just imbibed)	15-Oct	6 to 10	1	499	5%	0-10
Sprouted (Not yet through ground)	1-Oct	8 to 10	2	476	4%	0-8
1-2 Leaf	15-Sep	9 to 10	4	510	2%	0-4
3 Leaf + Tiller	5-Sep	10	5	514	1%	0

*From the Winter Wheat Production Manual

The ideal plant with 3 leaves and a tiller will have all winter wheat's yield potential intact, be highly competitive with weeds next spring and have the best chance of winter survival due to the crown tissue laid down this fall. The maturity will be optimal and given this rust risk should be low. This has full potential to be a successful winter wheat crop.

The 1 to 2-leaf plant will have much of its yield potential and will lose only a small amount of its winter hardiness, as long a snow catch is adequate. Competition with early spring annuals will be slightly less so more attention should be paid to early

germinating weeds. The maturity will be slightly longer and the crop will be susceptible to rust for a longer period as a result (assuming the crop has no varietal resistance).

The seeds that have sprouted and not yet emerged have lost slightly more yield potential and will be much less competitive with early weeds. Wild oats and early broadleaves will have to be eliminated early to avoid further yield losses. Maturity will be extended further and rust will be given a larger window as a result. The biggest problem with this stage is it will have the lowest winter hardiness. The plant has exhausted most of the seed reserves and has not laid down any new reserves from photosynthesis. This plant will need an adequate snow catch to help it survive prolonged cold in January and February.

The seeds that have not sprouted will have lost the most yield potential and will be the most susceptible to early weed competition. Their winter hardiness is better than sprouted seeds due to energy reserves still in the seed. This plant's maturity will be very long, probably only a week earlier than spring cereals. Again, rust will be more of a concern due to the extended window due to longer maturity.

For all stages of winter wheat, winter survival is important but as long as adequate amounts of snow are trapped for January and February cold spells, the crop should be able to survive.

Three important things to keep in mind for your winter wheat crop next spring –

1. Do not be too quick to give up on a winter wheat stand. The crop may look ragged but it will usually produce more than a re-planted crop. Twenty plants per foot squared is ideal however half of those numbers will produce an adequate crop. Crops with large bare spots may be in need of re-planting. Delaying the decision until mid May, the crop will have time to recover and you will still have time to re-plant if necessary.
2. Next spring weeds should be taken care of early (2,4-D spray to kill broadleaves then likely an in crop wild oat spray) to preserve the yield potential of the crop. Crops that have less competitiveness can turn out very well but they need help from herbicides.
3. Fertilizer should be applied as planned as soon as possible in the spring. This should be done by the first week in May. Early fertilizer gives the winter wheat plant the nutrition it needs to produce a healthy stand. If the worst-case scenario occurs and the crop is winterkilled, you will still need the fertilizer for the crop you re-plant.

The crops in the field that don't have perfect emergence and ideal staging are at a disadvantage, but with proper, timely management and moist, cool spring weather an excellent winter wheat crop is still a good possibility.

For more information on winter survival, spring management or winter wheat programs, call Winter Cereals Canada at 306-848-1252 cell 306-861-9247
Find the winter cereals production manual at www.usask.ca/agriculture/plantsci/winter or contact Winter Cereals Canada regarding a hard copy of the manual