Project Title: Evaluation of post harvest seed dormancy of cereal cultivars and advanced lines.

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Objective:
To determine which cultivars and development lines tend to have post harvest seed dormancy and thus as increased chance of producing volunteer plants.

Results:

Seed of grain harvested from three off-station barley cultivar performance trials and a spring cereal forage variety trial were evaluated of post harvest dormancy. In late October, two reps of 50 seeds each were placed in germination boxes with wet blotters, then placed in an incubator set at 50^{o}F. The seed was inspected at 24 h intervals starting at 72 hrs. A seed is scored as germinated when the coleoptiles extends the length of the seed. The germinated seed is removed from the box at each counting. While it is desirable to conduct these studies immediately after harvest, August –September work load for staff available does not permit such a time table.

Off-station barley trial entries: Conrad, Champion, Gallatin, Goldeneye, MT96101 (tentatively Geraldine), and Bz596117 had post 96h seed germination levels, from one or more nurseries, that suggest they have the potential to produce higher levels of volunteer barley plants in subsequent crops in a continuous crop system. For cereal forage trial entries, Horsford exhibited a high degree of post harvest dormant seed and Hockett exhibited higher than expected level. Because Hockett may be widely used for malt production, it should be given more scrutiny.

Summary:
Post harvest seed dormancy is trait that is integral to the potential of annual crop to produce volunteer plants (weeds) in subsequent crops. Post harvest dormancy became a significant issue in the Judith Basing with increased frequency of continuous cropping that occurred in1970s through the 1990s. Hector barley gained a notorious reputation for causing volunteer barley in spring and winter wheat stands and cultivars Clark and Harrington were noted for causing little to no volunteer plants. Fall germination evaluations found that 97 to 100% of current year Clark and Harrington seed would generally germinate within the first 96 hours of incubation at 50^{o}F where as only 75 to 85% of the Hector typically germinated in that first 96 hours. Craft and Stark are two more recent cultivars higher levels of post harvest seed dormancy. Just in the past 2.0 years, a Colorado microbrew company which settled on Craft malt variety had the misfortune of learning the significance post harvest seed dormancy. They wanted to malt Craft soon after harvest, but the dormant seed would not initiate sprouting.

Funding Summary:
Expenditure information to be provided by OSP.
No other grant support was provided for this project.

MWBC FY2011 Grant Submission Plans:
It is planned to submit this project for funding consideration in the next fiscal year.

Table 1 2010 Post harvest seed dormancy of barley varieties grown at three locations.
Duration, hours, of 50 seeds in 50F growth chamber till germination.
Exp. DRM3600 Central Agricultural Research Center. Moccasin, Montana.

			NTRC Moccasin		NTRC Denton		NTRC2 Moccasin		3 loc.combined	
ID	PEDIGREE	Entry	96h	96h to 168h	96h	96h to 168h	96h	96h to 168h	96h	96h to 168h
		#	#	#	#	#	#	#	#	#
Goldeneye	PI639193	1	23.5	22.5	46.5	3.0	28.0	13.0	**32.7**	**12.8**
Harrington	SK 76333	2	44.5	5.0	46.0	4.0	31.0	8.5	40.5	5.8
Haxby	MT950186	3	39.0	10.5	43.5	6.0	39.0	9.5	40.5	8.7
Metcalfe	TR232	4	34.5	11.0	48.5	1.0	37.5	8.5	40.2	6.8
Hockett	MT910189	5	38.5	12.5	45.0	5.0	37.5	4.5	40.3	7.3
Geraldine	MT960101	6	28.0	16.0	39.0	11.0	15.0	17.0	**27.3**	**14.7**
Conrad	2B965057	7	26.0	16.5	39.0	10.5	23.5	12.0	**29.5**	**13.0**
Champion	YU501385	8	37.5	12.0	47.0	2.0	44.0	4.5	42.8	6.2
Pinnacle	PI643354	9	39.0	9.0	44.0	6.0	37.5	7.5	40.2	7.5
MT010158	MT920041/Harrington	10	31.0	11.0	47.0	2.5	19.0	8.0	**32.3**	**7.2**
MT030042	MT910189/MT960099	11	39.5	6.0	41.0	7.5	15.0	9.5	**31.8**	**7.7**
MT020155	MT960225/H1851195	12	40.0	7.0	44.5	5.0	28.0	7.5	**37.5**	**6.5**
MT050030	GS 1750/Bearpaw	13	44.0	5.5	43.0	7.0	34.5	8.0	40.5	6.8
BZ596117	WPB BZ596-117	14	42.5	7.0	42.0	8.0	35.0	12.0	39.8	9.0
Gallatin	PI491534	15	39.0	10.5	45.5	4.0	33.0	14.5	**39.2**	**9.7**
MT010160	MT920041/Harrington	16	44.5	4.0	48.0	2.0	28.0	8.5	40.2	4.8
Mean			36.94	10.38	44.3	5.281	30.34	9.563	37.2	8.41
P-Value			0.00	0.04	0.59	0.53	0.00	0.05	0.00	0.00
CV 1			11.1	41.8	10.0	80.9	12.3	32.7	15.6	49.9
LSD(0.05)			8.7	9.2	9.4	9.1	8.0	6.7	6.7	4.8
COUNT PER			2	2	2	2	2	2	6	6

h = hours Germinator Temperature: 50° F Trial Date: Rep 1 Oct 25 and Rep 2 Nov 1

Table 2 2010 Evaluation of post harvest seed dormancy of hooded (hay) barley.
Duration, in hours, of 50 seeds in 50°F growth chamber till germination.
Exp. DRM2307: Central Agricultural Research Center. Moccasin, Montana.

		Fallow Site		Recrop Site		Two Locations	
ID	Entry	96h	96h to >168h	96h	96h to >168h	96h	96h to >168h
		#	#	#	#	#	#
Horsford	10SCF1	10.0	37.5	13.5	36.5	11.8	37.0
Stockford	10SCF2	47.0	2.5	41.0	9.0	44.0	5.8
Hays	10SCF3	46.5	3.5	45.0	5.0	45.8	4.3
Haybet	10SCF4	43.5	5.5	43.0	7.0	43.3	6.3
Haxby	10SCF5	38.0	9.5	41.5	8.5	39.8	9.0
Hockett	10SCF6	39.5	10.5	38.0	12.0	38.8	11.3
Lavina	10SCF7	45.0	4.5	41.5	8.5	43.3	6.5
HB62-2	10SCF8	42.0	6.0	44.5	5.5	43.3	5.8
Mean		39.06	9.938	38.50	11.50	38.78	10.72
P-value		0.00	0.00	0.00	0.00	0.00	0.00
CV1		8.2	33.6	5.6	18.6	7.7	25.6
LSD(0.05)		7.6	7.9	5.06	5.06	4.40	4.03
count per mean		2	2	2	2	4	4

h = hours Germinator Temp.: 50° F Trial Date: Rep 1 Oct 25 and Rep 2 Nov 1