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Seed Academy

40F Cold Test for Early Planted Corn

INTRODUCTION

Version 7.20.22

This test was developed by SoDak Labs, Inc. in 2021 to emulate planting into 40–42F soils in an aerobic soil environment. This test is an evolution of the tray cold test (aerobic, 50F regime) to match the practice of growers planting earlier when soils are "fit" but temperatures are less than 50F. The 40F cold test regime is aerobic, so growers planting immediately before a major rain fall event may want to delay. If planting prior to major rainfall events, growers may want to also consider the use of the 50F Saturated cold test. The 50F Saturated cold emulates germination in an oxygen deprived soil regime.

Since the 40F is a new corn vigor test, we conducted over 700 farmer submitted sample comparsions with routine vigor tests which are presented in Table 1, below. Individual seedlot relationship to vigor test methods are presented in Figures 1–5.

Based on the data in Table 1, it appears a 40F cold is practical to use as a tool to evaluate seed corn lot early emergence. Based on data collected, it seems probable that a result of 80% might be a standard threshold to use in the farmer's decision to plant into cold soils.

Reasoning for the 80% standard threshold for 40F cold is it is a stressful emergence environment similar to the 50F saturated cold. The 40F is different from 50F saturated cold in that colder water is imbibed into seed and an aerobic soil regime, whereas 50F saturated cold has an anaerobic regime. Both the 40F cold and 50F saturated cold are good "tools" for farmers and seed companies to use when assessing early planting and seed vigor, respectively.

TABLE 1. Germination and vigor responses from 713 corn seed lots sorted based on saturated cold quality range. Samples were received in 2022.

50°F Saturated Cold Normal Seedling Quality Range (%)	# Tests per Quality Range	Percent of Total Samples	50°F Saturated Cold			40°F Cold		50°F Cold		77°F Sand Germination
			%							
			Strong Normal	Slow Normal	Dead seeds	Strong Normal	Slow Normal	Strong Normal	Slow Normal	Normal
90–100	237	33	94	3	2	93	1	96	1	98
80–89	194	27	85	8	5	90	2	95	1	97
70–79	127	18	74	14	9	86	2	94	0	97
60–69	71	10	64	19	14	83	2	92	1	97
<60	84	12	48	25	23	76	3	89	0	96

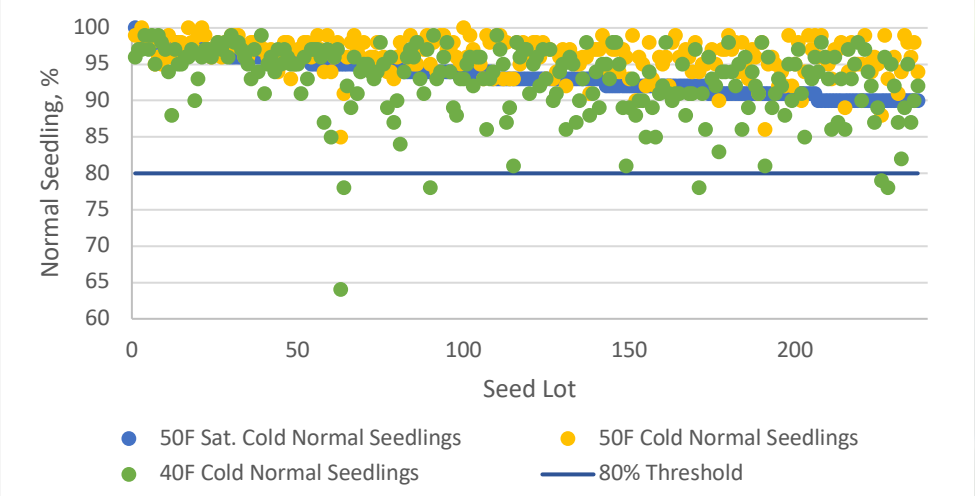

FIGURE 1. Comparison of 50F Sat Cold, 50F and 40F Cold percent normal seedlings for 237 seed lots that had a 50F Sat Cold Quality Range 90–100%.

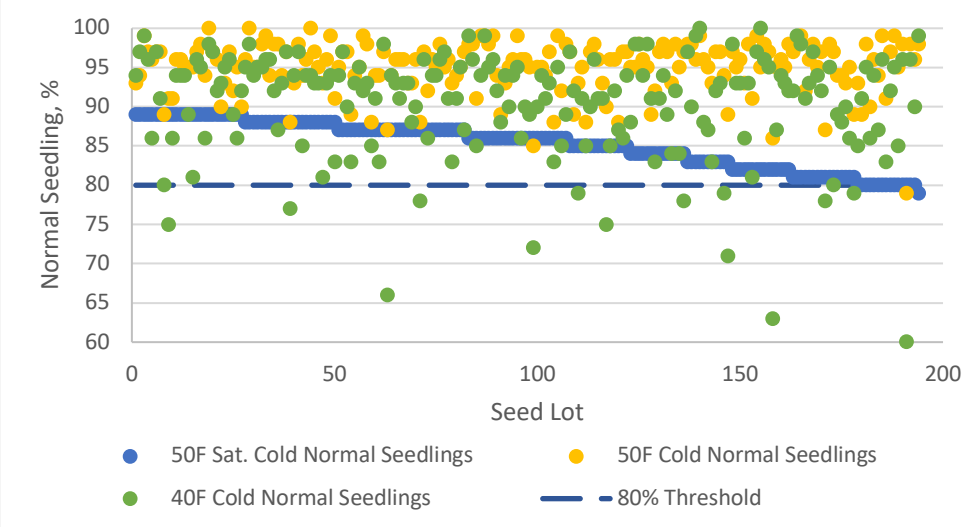

FIGURE 2. Comparison of Sat Cold, 50F and 40F Cold percent normal seedlings for 194 seed lots that had a Sat Cold Quality Range 80–89%.

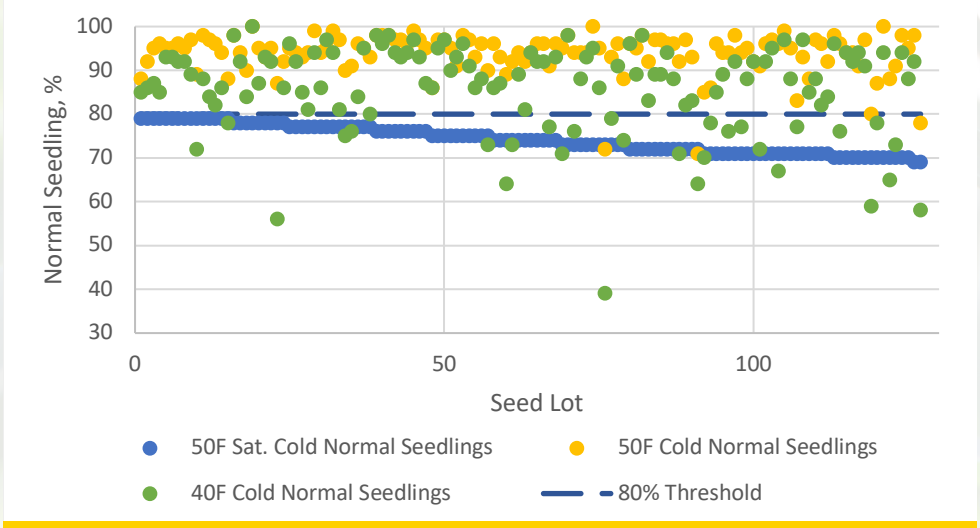

FIGURE 3. Comparison of Sat Cold, 50F and 40F Cold percent normal seedlings for 127 seed lots that had a Sat Cold Quality Range 70–79%.

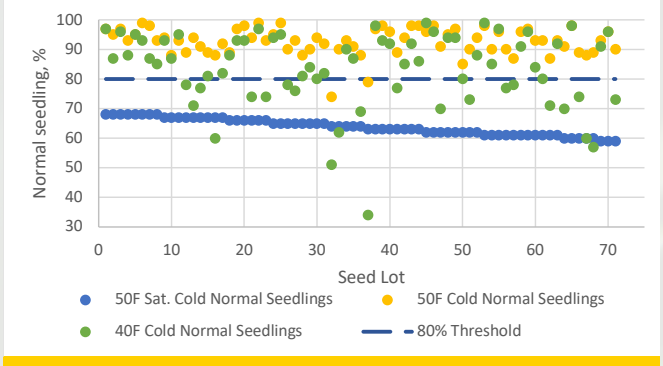

FIGURE 4. Comparison of Sat Cold, 50F and 40F Cold percent normal seedlings for 71 seed lots that had a Sat Cold Quality Range 60–69%.

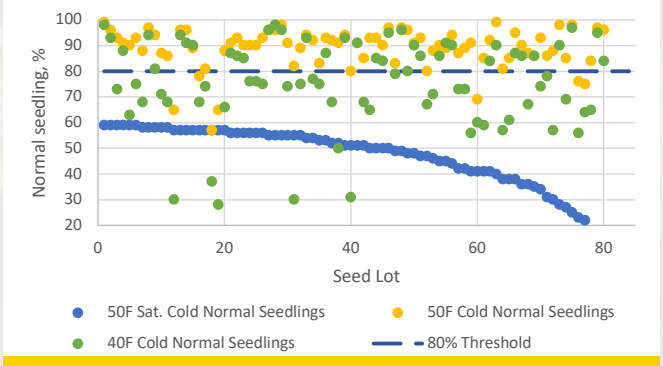

FIGURE 5. Comparison of Sat Cold, 50F and 40F Cold percent normal seedlings for 84 seed lots that had a Sat Cold Quality Range less than 60%.

LITERATURE CITED:

Association of Official Seed Analysts. 2009. Seed Vigor Testing Handbook. Contri. No. 32. | Association of Official Seed Analysts. 2018. Volume 4. Seedling Evaluation Handbook. | Goodsell, S.F., G. Huey, and R. Royce. 1955. The effect of moisture and temperature during storage on cold test reaction of *Zea mays* seed stored in air, carbon dioxide, or nitrogen. Agron J. 47:61-64. | TeKrony, D.M. and J. Woltz. 1997. Standardization of the cold test for corn seed. Proceedings American Seed Trade Corn and Soybean Research Conf. 52:206-227.