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## SOME THOUGHTS ON SEED DRYING

by

A. H. Boyd, Ph.D., G. B. Welch, Ph.D. and C. C. Baskin, Ph.D. <sup>1/</sup>

Mechanical drying of seed (and grain) is accomplished by forcing air to flow through a layer of seed or grain. The air flow through the seed must perform three functions: (1) it must provide a source of heat for evaporating moisture from the seed, (2) it must absorb moisture evaporated from the seed and (3) it must transport the absorbed moisture from the seed being dried. When drying cannot be accomplished with natural air, heat is added to the air going into the seed mass to raise the temperature so that evaporation will take place and lower the relative humidity of the air so that the evaporating water can be absorbed. The velocity of the air should be fast enough so that it will not become saturated before leaving the seed mass.

The density and depth of the seed mass must allow sufficient air flow through the mass to accomplish drying. Increasing the seed depth decreases air flow and reduces drying time or may completely eliminate the possibility of drying. Doubling the seed depth increases drying time fourfold.

Deep bed (bin) drying systems have a high heat (energy) efficiency. They operate at air flow rates of 3 to 12 cubic feet/min. /bushel and in the temperature range of 90 to 110 degrees F. Batch or continuous flow driers have a lower heat efficiency, operate at an air flow rate of 75 to 125 cubic feet/min. /bushel and with temperature range of 90 to 130 degrees F. for seed and 180 to 220 degrees F. for grain. Drying is generally slower with deep bed systems. To do the best job of managing a drying system it is necessary to understand the relationships among air flow, drying fronts, equilibrium moisture and static pressure.

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Seed drying is necessary when seed moisture contents are too high for safe storage. The seed moisture range for safe storage is 12 to 14 percent or less depending on the seed kind and storage conditions.

Care must be taken to dry seed properly. Overdrying or drying too rapidly causes physical damage such as cracked seed coats and stress cracks. Overdried seed are more susceptible to mechanical damage when handled. Underdrying may result in heading, molding and loss in germination.

Even when seed are dried properly or stored dry enough for safe storage, "hot spots" may develop and "stack burn" may occur if seed are not properly aerated. Moisture migration takes place when there is a large temperature differential (15<sup>o</sup>F or more) between the outside conditions and seed mass temperatures. Air movement within the bin causes moisture accumulation in certain areas. This problem can be easily eliminated by timely and adequate aeration.