

Proper ventilation and tuber quality

During the initial stages of potato storage management, good air circulation is critical to remove field heat, to provide adequate oxygen for the wound healing process, and to help dry out wet potatoes. Once the wound healing period is complete, air circulation is used to maintain desired temperatures in storage, continue to dry out diseased potatoes, and to remove carbon dioxide build-up.

Proper wound healing or “suberization” is vital to maintaining quality in the stored crop. And this suberization process requires oxygen and thus good air circulation. No matter how careful operators are during harvesting and handling, some damage to the tubers will still occur. Any break in the skin or “periderm” of the potato is a potential entry point for pathogens and can also increase moisture losses from the stored tubers. Recommended conditions for wound healing include temperatures between 50 and 55 F, high relative humidity and oxygen. Temperatures higher than this range will often result in rot pathogens (particularly bacterial soft rot) completely overwhelming the wound healing process. High relative humidity prevents the intact cells in the damaged areas (which are the foundation of a new protective barrier) from drying out and allows them to heal properly. All too often there are other factors – like storage rots, for instance – that require reduced relative humidity or other special storage management practices to help combat a problem.

Recent research at the University of Idaho, looked at the effects of drying time or exposure to air on the viability of four major storage pathogens. Tubers were inoculated with the pathogens that cause late blight, soft rot, silver scurf or dry rot. After just 60 minutes of exposure to air, the viability of the soft rot organism on the surface of a tuber was reduced by 90%, and after just 2 hours, pathogen viability was 0%. After 6 hours, the reduction in late blight organism viability was reduced by 88%. On the contrary, pathogen viability of silver scurf and dry rot were not affected by the exposure to air (up to 12 hours evaluated). This experiment stresses the importance of air exposure, and thus good air circulation, for reduction of some pathogen inoculum loads on the surface of a tuber. Air circulation is also needed to dry out already infected or diseased potatoes. Having adequate air circulation will help remove water from the decaying tubers.

If air circulation is restricted in the pile, low oxygen or anaerobic conditions can occur. In areas of the cellar where potatoes are deprived of oxygen, a physiological disorder blackheart can occur. This disorder is characterized by an intense black tissue discoloration in the internal center of the tuber. An obvious unacceptable situation to have occur to your otherwise marketable potatoes. Another negative impact of anaerobic conditions is that it produces a favorable environment for bacterial organisms to spread. These organisms thrive on these conditions, making the potential for a severe wet rot and decay problem.

Fresh air is needed on a daily basis to help reduce elevated levels of carbon dioxide building up in the pile. Since potatoes are respiring, they are taking in oxygen and releasing carbon dioxide. If carbon dioxide levels get too high (eg. above 1%),

detrimental affects to tuber quality can occur such as elevated reducing sugars, darker fry color, off-flavors, or even mold formation.

Proper air circulation is one of the most important factors in potato storage management. There are great benefits to having a storage with a good air circulation design and that is adequate for the volume of potatoes stored and the potential disease or wet conditions that may be present. Having minimal impediment of air circulation in the pile is necessary for maximizing the benefits of the system.

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