

# TECHNICAL BULLETIN

## DAIRY



## ENSILING IMMATURE OR FROST DAMAGED WHOLE PLANT CORN

Late corn plantings and an unusually cool summer indicate a lot of corn likely will be frosted before it reaches the recommended maturity for whole plant corn silage, unless we have a late fall. Yield will be reduced but the major consideration is that immature or early frosted plants may be too wet for proper ensiling. In addition to being high in moisture, the plants will contain high levels of soluble carbohydrates, soluble nitrogen and nitrate which make it difficult to preserve.

These components stimulate respiration and the activity of undesirable microorganisms, which reduces dry matter preservation, aerobic stability and feeding quality of the resulting silage. For high moisture crops, consider adding 100 – 200 lbs./ton of ground, shelled corn or 200 – 400 lbs./ton of wet corn gluten feed. A bacterial preservative may improve silage fermentation of wet, immature, frosted corn.

When a killing frost stops the growth of corn plants at an immature stage of development, dry matter yields are reduced primarily due to reduced corn grain yields. In commercial corn grain varieties, the grain comprises approximately 50% of the dry mature weight and most of the carbohydrate is stored in the stable form of starch in the grain. When normal translocation of synthesized carbohydrates and protein to grain is prevented, these components tend to build up in other parts of the plant. In the immature plant, the soluble carbohydrate content may be increased by 50 to 100%. The crude protein content of the cob, stems and leaves from plants with poorly filled ears is higher than that of the corresponding parts from plants with well filled ears. The average crude protein content of corn silage is from 7.5% to 8.5% on a dry matter basis, whereas, silage made from immature corn may have a crude protein content as high as 11%, depending upon the severity of immaturity, level of nitrogen fertilization and the weather prior to harvest. Test for nitrates prior to feeding.

Stressed crops resulting from unfavorable weather conditions require special management considerations. Yield and quality of frost-damaged crops are usually maximized when harvested as silage. This is also true for crops that are immature due to late planting or from poor growing conditions. Frost-damaged corn for silage can be classified two ways:

**Immature:** If the killing frost occurs before the plant is mature, it will appear drier than unfrosted corn of the same moisture content and will likely contain too much moisture for immediate ensiling. Although leaves may brown off along the edges and dry rapidly after a few sunny days, the green stalk and ears do not. If possible, the crop should be left in the field until it reaches the appropriate moisture for the storage structure. Consider ensiling this type of crop in bunkers, piles or bags. Frosted corn will cause more seepage at a given moisture than unfrosted corn because of the undeveloped plant cells. Plants will dry slowly and dry matter losses will increase as the dead plants lose leaves in the field.

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**Mature:** If the killing frost occurs after the plant has reached maturity, indicated by the black layer on the kernel, the whole-plant moisture will drop rapidly. A finer chop of ¼ inch should be considered and water added if the corn cannot be ensiled before the moisture drops below 60%. Although yield per acre is reduced, high quality silage can still be harvested from frost-damaged corn.

Immature or frost damaged corn silage containing little grain can be improved by adding QLF Silage Treat Plus with Kemin Ultra CURB® and 100 – 200 pounds of ground shelled corn to each ton of chopped forage during ensiling. If the crop is 75% of normal maturity, QLF Silage 100 can be used at normal recommendations. The time available to harvest frost damaged corn for silage and stay within the recommended moisture levels is reduced. So get the equipment in top operating condition early. The crop should be allowed to ferment completely before starting to feed.