DAMAGE OF HARVEST BY MILDEW

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Damage to harvest by mildew, as the result of various biological influences depend on so many things, (e.g. type and composition of the harvest, micro-organic content, nutritive content and composition) that the already mentioned schemes cannot cover all damages plus their causes. Mildew is not necessarily caused by constant entrance of air into the silage; it can be due to the already existing presence of oxygen. Irregular mildew, evenly spread throughout the bales, can be as a result of dirty (Zetten), turning over and bundling. In particular uneven ground can cause machines to dig too deeply into the ground, damaging grass roots, pulling out tufts. As these tufts, with earth attached to them, are not separated by the various agricultural machines, they enter the bales in this original form and can produce, by a damp harvest, butyric acid, by too dry conditions and the presence of air, mildew. When oxygen has been used up, mildew growth then stop.

For mildew free silage it is most important that oxygen does not continually enter the silage. Therefore it is vital that sufficient layers of film are used and that the bales are highly dense, factors leading to success.

All this demands a high quality of wrapping film. Film thickness, gas impermeability, high penetration strength, adhesive power and UV resistance are essential qualities for the film. The thickness of the outer film determines the effectiveness of the exclusion of air. Normally it is sufficient to stretch the wrapping film 70% and use minimum four layers on the bales for optimal silaging.

The more the film is stretched, the thinner it becomes. When protecting from mildew, safety is ensured by using more wrapping layers. the amount of film used is therefore not reduced by more stretching. The effectiveness of the film protection on the outer side of the bales is only given when the complete outer surfaces are sufficiently thickly and evenly wrapped.

This even distribution of the film is no problem when the round bales are well formed and densely compressed. When however, too much time elapses between compression and wrapping, then damp bales (below 30% DM) can become deformed and this leads to problems when wrapping.

The density of the bales strongly influences the volume of air and both the speed and amount of oxygen which enters them.

The higher the raw fiber content, the less dense the bales become. When the original state of material is high in raw fiber content, due to age, then the grass becomes woody and bulky. The raw fiber content should, ideally, not exceed 23 – 27% by grass with new ears and blade growth, but when the harvest is in bloom it should contain 30% of raw fiber.

When grass is very withered it also contains a high level of air volume. The highest level of dry material density in round bale compressors is reached by 50 – 60 % DM. Both the dry material and water content of the bales are replaced by air when the grass is additionally withered.

Bales from harvests of dry (above 60% DM) high raw fibre content should be wrapped in sex layers of film. Due to insufficient density there is a higher risk of air entering the bales. In addition it is easier for condense water to enter the film because of the higher volume of air which is present in the bales.

This condense water can often be observed on the "sunny side" of the bales. The air in the bales is warmed on hot, sunny days. As warm air expands, pressure builds up inside the bales. When the film is too thin, this air is pressed out of the bales. This air drops in temperature during cold nights. The air is compressed, the pressure drops and damp air is drawn into the bales. Above all, dry harvest at the upper surface of the bales absorbs this damp out of the bales. Above all, dry harvest at the upper surface of the bales absorbs thin damp out of the air. During the day, when the bales are warmed by the sun, this relatively dry air is pressed out of the bales leaving the dampness to remain. The temperature of the bales in winter drops to below the dew point and the result is condense water. This condense water dilutes the fermenting acid, the pH value rises producing ideal growing conditions

for fouling bacteria and mildew. This “pumping effect” can be reduced by high bale density (little air volume within the bales) thick layers of wrapping film and minimal temperature differences (shady storage place)

When the harvest is very damp (below 30% DM) then the bales are not very stabile. When the bales are stored on their sides they quickly become deformed and extra pressure is put on the film. A six layer wrapping of the bales is also recommended in this case to ensure sufficient mechanical stability.

There is no real difference in the possible density of the bales from various compressors. The high or low density depends on the make of the compressor and method of compressing. Deficient material must reach the outside of the pressing chamber in order to produce highly dense, stable bales. This is only possible when correspondingly wide bundles are loaded and the compressor has been equipped with a wide pick-up (at least 1,60 meters wide) When a wide pick-up (at least 1,60 meters wide) When a wide pick-up moves in a zigzag course, then less smaller bundles are lost. The round bale compressors do not differentiate in the average density of the bales, but rather in the distribution of the thickness. Bales with a denser outer surface and a more porous core, allowing for easier distribution by hand when the harvest is damp, are formed in compressors with consistent compression chambers. By gradual feeding, with longer storage times on the fodder table, this porous core can lead to increased entrance of air from the top surface, leading to possible growth of mildew. Compressors with variable compressing chambers have the advantage of producing bales with a denser core, resulting in a more stable bales due to slower entrance of air.

Round bale compressors with integrated cutters make for easier bale unraveling and higher density of the harvest containing above 40% of dry material.

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