

Carefully to Carry

SEPTEMBER 2006

Table grapes

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Table grapes are expensive and may be carried on pallets either in containers or in break bulk refrigerated vessels.

As grapes do not continue to ripen once they have been cut from the vine, they must be harvested in fully mature condition. Harvesting itself is a critical operation. Grapes can easily be physically damaged, and poor handling can result in a variety of physiological defects such as 'wet shatter' and 'dry shatter'. The grape berries are attached to single stem called pedicles. The pedicles in turn are attached to larger stems known as laterals. The term 'wet shatter' means that individual grapes have broken from the bunch either by a clean break between the berry and the pedicle, or as a result of the pedicle itself breaking along its length up to and including breaking directly from the lateral. When berries have become physically damaged, they are more susceptible to microbiological invasion.

When the grapes have been cut from the vine, they should be chilled as soon as possible. Even comparatively short periods of exposure at normal temperatures, say six hours at 20°C, can result in dehydration and browning of the stems which then often results in bunch 'shattering' during handling. It is therefore normal practice to cool grapes as soon as practicable after they have been harvested. Vinifera fruit (destined for winemaking) is treated with sulphur dioxide at this stage to minimise the risk of deterioration of the fruit due to fungal growth. Later and particularly during storage, sulphur dioxide treatments are repeated at regular intervals.

Weather conditions, particularly rain, prior to and during the harvest period, can have a significant effect on the storage life of grapes, because wetted grapes are more susceptible to fungal invasion than grapes which have been harvested after a period of dry weather. If rain falls during harvesting, it is advisable that cutting should be suspended for three days so that any fungal attack can be noted. Excessive heat during the growing season can result in the berries becoming shrivelled.

Various species of micro-organisms will invade grapes. The most common found in transportation is *botrytis cinerea*, which produces typical grey



"The carrier shall properly and carefully load, handle, stow, carry, keep, care for and discharge the goods carried."

Hague Rules, Articles iii, Rule 2

Carefully to Carry Advisory Committee

This report was produced by the Carefully to Carry Committee – the UK P&I Club's advisory committee on cargo matters. The aim of the Carefully to Carry Committee is to reduce claims through contemporaneous advice to the Club's Members through the most efficient means available.

The committee was established in 1961 and has produced many articles on cargoes that cause claims and other cargo related issues such as hold washing, cargo securing, and ventilation.

The quality of advice given has established Carefully to Carry as a key source of guidance for shipowners and ships' officers. In addition, the articles have frequently been the source of expertise in negotiations over the settlement of claims and have also been relied on in court hearings.

In 2002 all articles were revised and published in book form as well as on disk. All articles are also available to Members on the Club website. Visit the Carefully to Carry section in the Loss Prevention area of the Club website www.ukpandi.com for more information, or contact the Loss Prevention Department.

mould, white mould, or some forms of berry rot frequently seen on bunches of grapes. This organism can grow at a temperature as low as -4°C. Fungal infection is more likely to arise if, during the growth period of the berries, the weather has been wet, but *botrytis* mould can develop on grapes which have not been exposed to wet conditions before harvesting. It is impossible to completely control or arrest the spread of fungal infection by this mould, as it will tolerate high levels of sulphur dioxide treatment. Other species of micro-organisms which cause deterioration include *cladosporium herbarum*, *alternaria*, *penicillium* and *aspergillus niger*. Confirmation of the type of microorganism causing rotting, can only be determined by laboratory examination of specimens of the grapes concerned.

Grapes are stowed in refrigerated containers in pre-cooled conditions. At the normal temperatures for loading, the rate of metabolic heat production is low so there should be no 'heat load' problems. The carrying temperature, i.e., the air delivery temperature, must be as low as possible and container units are normally set to 0°C. Although grape berries will not freeze at temperatures above approximately -2°C, the stalks will freeze at -1.5°C to -2°C. On thawing, the stalks blacken, shrivel and become brittle, so that there can be substantial shatter (i.e. individual grapes becoming detached from bunches) with over-cooled fruit, even if the berries themselves are unaffected.

The lugs in which the grapes are packed must be carefully stowed, this is normally the responsibility of the shipper. The key responsibility of the ship is to ensure the carrying temperature (0°C) is maintained and that there is a legible record to confirm it. From what has been said above, it necessarily follows that grapes infected with *botrytis cinerea* will continue to

deteriorate, even at 0°C, but the rate of deterioration falls as the temperature is lowered, which is why carriers are advised to keep the grapes at the lowest practical temperature, always ensuring it is above 1°C.

There is another potentially serious problem which can cause damage to grapes and that is as a result of sulphur dioxide bleaching; there are also occasions when deterioration can be due to ageing. Very old grapes are soft and flaccid, with dull skins.

There are many types of physiological disorders which can result in commercial losses of grapes and as can be seen from this brief article some of the causes arise during the growing, harvesting and handling rather than during ocean voyage. If therefore, damage to grapes is reported, the master should ensure that a surveyor is called in to carry out a very careful survey.

Surveyors should be able to recognise the various conditions of infection or deterioration and take adequate samples to enable specialists to assess the nature of such damage. It is important in cases of fungal infection, that samples are drawn which illustrate each particular type of fungal deterioration so that the causative organisms be identified. This is important as the types of infection involved can give an indication of the underlying cause. Experience has shown that claims for damage to cargoes of grapes frequently concern shipments made from the same source at about the same time. This could mean there were problems with a particular harvest. It is clearly important that owners should advise the Association as soon as any allegations of damage are received so that the information can be collated and an investigation be commenced to determine whether there is any particular pattern involved.