

## **Study of Mildew and Algae on Exterior Surfaces**

Painted or repainted exterior wood and foundation surfaces can sometimes become grey, black or green in colour, specifically on the north side as well as areas that are continuously exposed to moisture.

This study is to shed light on mildew spores and algae of various kinds. Sometimes it can be hard to distinguish mildew and algae from dirt in the environment. To some extent, mildew can be controlled with chlorine which will bleach the mildew and algae but will not alter the colour of the dirt. The problems with various types of growth have increased in the last few years.

In some places, mild winters have caused an increase in mildew growth. For example, the warm autumn of 2000 in Northern Europe followed by a mild winter, has caused mildew to appear on surfaces that would normally be unaffected under more normal seasonable temperatures.

We will in this study attempt to explain why various mildew and algae growth can develop on exterior facades, doors and windows as well as offer techniques to avoid the conditions that make these unwanted blooms occur.

In very high humidity, wood material can be attacked by a mildew that causes internal decay and destroys the wood from the inside. We will not highlight these types of mildew spores in this study.

There are many types of fungi. A common type is the black fungi. These types of fungi are clearly visible especially when growing on light coloured backgrounds. Although unattractive, leaving black spots on the surface, this fungi does not destroy the wood. The dark spots are what make mildew visible but the threads, or roots, that branch out from these spots are colourless.

These types of mildew spores can be found on new unpainted wood. It flourishes in the timber grain but does not affect the integrity of the wood.

## **Algae**

These organisms are not related to mildew. Algae, like all vegetation, contain chloroform and are made up from carbon dioxide present in the air. Algae are not dependent on the nutrition found in the wood grain and are not destructive. The green coatings you often find at the bottom edge of exterior siding consist of algae.

## **Criteria for flourishing mildew**

For mildew and algae to flourish and develop, there must be the perfect environment for the organism. First the spores must cause an infection; then there must be nourishment, moisture and the perfect temperature.

## **Spores**

The spores that spread mildew can travel in the air during most of the year in various concentrations. This means an exterior surface can always be attacked by various spores if the conditions are right. Paint that cures slowly (oil and alkyd paint) can become more susceptible to mildew growth after the paint is applied. On smoother and harder surfaces, the spores and algae will have a harder time attaching.

Spores can also lay dormant in new timber before it is installed and then develop when the temperature and humidity become favourable. The storage and treatment of the timber is of great importance, because already infected timber runs a significantly higher risk of developing mildew after it is painted or varnished.

## **Nourishment**

The mildew takes nourishment from the substrate it grows on, from various types of sugars in the wood or from organic material found in paint and other materials. Organic material in dirt (pollen etc.) that attaches itself on the surface supplies excellent food for mildew spores and algae. Algae receive much of its nutrients from the air. The combustion of fossil fuel as well as other airborne pollutants can contribute to feeding algae and mildew.

Important sources of sustenance for mildew in wood are different types of sugars and other substances that exist naturally in the wood. When timber is milled, the nutrients will migrate toward the surface. The faster the timber is dried, the more porous the wood becomes, forcing the nutrients to collect near the surface of the timber creating a higher risk of future mildew attack. Heart timber is less susceptible to mildew growth than the surface fibres in the timber. If wood is left in the weather without protection mildew will have a better chance to develop.

## **Moisture and Temperature**

Mildew spores and algae need water to live and flourish. The more moisture, the greater is the mildew growth. A porous surface can absorb significantly more moisture and therefore will become more susceptible to mildew growth.

Cracks where moisture and dirt can accumulate can often become fertile ground for mildew growth that will spread. (Dark surfaces exposed to the sun that dry quickly and becomes warm and dry will rarely accumulate mildew.)

Climate and the weather have an enormous effect on mildew and algae growth. At approximately 40°F (about 5°C), mildew and algae become active and start reproducing and spreading. Higher temperatures, ideally around 80°F (26.6°C), but not above 95°F (35°C), together with high humidity are extremely favourable conditions for growth.

Wet summers, a warm autumn and a mild winter will significantly increase the chance of mildew and algae.

### **Building design and the surrounding areas**

How a building is constructed and sited is very important in order to keep water and moisture away from building material. A good drainage system around your building is imperative. A sufficient overhang, wide soffits and proper flashing are essential building elements that will keep surfaces dry. Wood that is situated too close to the ground or exposed to leaking gutters will always result in excessive surface moisture and will result in increased mildew and algae growth. Bushes, ivy and other types of vegetation close to a building will also increase mildew and algae growth on exterior siding and foundations because shading and lack of air flow retain dirt and moisture.

### **Paint and varnishes**

Timber that is painted or varnished will have less chance of mildew and algae growth but will also come under attack if the conditions are right.

In general, it is hard to determine what types of paint are more susceptible to mildew and algae. Smooth and dense surfaces are less prone to mildew and algae growth. *Paints that create a textured surface are more apt to have spores attaching, resulting in mildew growth.* But, if the surface is able to dry quickly because it is exposed to the sun or is well ventilated, then there is less chance of discolouration from mildew or algae growth.

Concrete, stucco, lime based paint and silica based paint tend to have significantly less chance of mildew and algae growth, but it does happen. Paint with an organic binder is somewhat more sensitive. The surface preparation can reduce the mildew risk if the surface is smooth and more water repelling.

### **Mildecide – anti mildew chemicals**

Paints for exterior use that are based on organic binders like linseed oil, alkyd or latex, usually contain some substance that will prevent growth on the surface. The addition of Mildecide and fungicides will initially prevent mildew and algae growth. But with time, these will evaporate and leave the surface susceptible again.

Due to environmental reasons, new regulations have made many of these chemical substances illegal to use. The timber milling industry has also been forced to change many practices. This means that *you cannot completely protect yourself from mildew under certain conditions.* It is often not a matter of any defect in the paint products when a surface develops mould and mildew. Instead, it is a result of needed compromises between environmental considerations and mildew resistance.

### **Suggestion when discolouring mildew and algae growth**

- ✚ Evaluate to determine if any building construction or immediate surroundings can be improved.
- ✚ Attempt to wash the surface with an environmentally safe soap. Do not use a dry brush because spores can cause allergy symptoms. Use gloves. Power washing should be avoided due to the great chance of introducing large amounts of water into areas that have never previously seen moisture.
- ✚ If washing is not solving the problem, stronger disinfection can be used. Using chlorine will bleach and disinfect but it will not have any long term effect. If chlorine is used, it must be completely neutralized before painting.
- ✚ On porous and absorbent surfaces, a borax solution can be used. This will not bleach the mildew but will act as a disinfectant and also has the added benefit of having a long term effect on preventing mould when left on the surface when absorbed into the substrate. Borax is used prior to painting.

### **Repainting**

Sometimes, you have to repaint a surface after the mould is removed. There is always a risk of the mildew reappearing especially after a severe mildew outbreak. In these situations, the surface needs to be carefully cleaned before repainting.

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