

## **Powdery Mildew: An Ounce of Prevention. . .**

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### **What is Powdery Mildew?**

Powdery Mildew looks like white fuzzy powder that accumulates on leaves and stems predominantly in spring, and again to a lesser degree in fall. It is actually a fungus that is spread by millions of microscopic spores. It imbeds itself into tender new growth and feeds on the sap of the plant. By the time the naked eye can see the white 'powder,' it has already invaded the plant tissue and is feeding and reproducing at a rapid pace. As it spreads itself on the surface, it eventually kills the cells of the plant leaf, leaving the leaf rippled and curled.

Mildew spores are everywhere in the garden - in the air, the soil, on debris and on plant surfaces - ready to sprout when the environment is just right. Warm days (50°-80°F) and cool nights with elevated humidity and resultant dew provide ideal conditions. Though humidity promotes fungal growth, it grows on DRY plant surfaces, unlike blackspot which requires immersion in water for about seven hours in order for infection to take place.

Tender new growth needs a chance to 'harden' and develop its waxy coating that provides somewhat of a barrier to fungal growth. Therefore, the rosarian must provide protection for new spring growth on a weekly basis.

### **CONTROLLING POWDERY MILDEW**

Controlling mildew doesn't have to mean spraying the planet into oblivion. It includes plant genetics, cultural practices and something as simple as WATER.

**GENETICS:** While rose hybridizers are chastised for breeding OUT fragrance, what they are trying to accomplish is breeding IN disease resistance. For scientific reasons beyond explanation here, rose genes don't contain both features - it's one or the other. Hence, you can expect either fragrant roses with little disease resistance, or clean plants with little fragrance. Plants with glossy or waxy leaves are less susceptible to mildew, as the leaf surface is harder for spores to penetrate. Rugosas naturally possess a high degree of disease and pest resistance. Where mildew is a constant problem, the choice in plantings can help prevent the need for extensive maintenance.

**CULTURAL PRACTICE:** Planting bushes with sufficient space between them and away from walls and fences will provide good air circulation which reduces the chances for mildew.

The annual pruning event plays a major role in disease prevention. Stripping leaves from the bush at pruning time, and cleaning up debris in the garden contribute to a cleaner environment. Dormant spraying will at least wipe out last year's spores, leaving only this year's to contend with. Keeping the centers of the bush open during the growing season will aid air circulation.

Avoid the use of other plant materials with high mildew susceptibility, such as euonymus and tuberous begonias. Apply a thick layer of mulch in early spring to cover spores in the soil that may have wintered over. WATER is perhaps the most misconceived element surrounding powdery mildew. Many gardeners still subscribe to the belief that you should NEVER get rose foliage wet. On the contrary, a high-pressure spray of water will remove mildew spores that haven't imbedded themselves yet, and prevent them from germinating. Higher incidence of mildew during periods of rain is caused by the moisture in the air and soil - increasing the humidity that promotes mildew - not by water on the leaves. Similarly, watering early in the day will allow the soil surface to dry out a bit before the cool night temperatures arrive, reducing humidity from moist soil.

### **PREVENTION IS THE ONLY CURE**

Once powdery mildew is apparent to the eye, it can't be eradicated. It simply must be prevented. Prevention is achieved by coating the plant tissue with something that provides a barrier to prevent fungus from gaining a foothold and invading the plant tissue. Growth is so rapid in spring that the leaves unfolding THIS week won't be protected by what you sprayed LAST week. This is the reason you find application schedules of every 7-10 days on most fungicides, and the reason you must follow that schedule.

The choice of what the SOMETHING is that you choose to spray is widening. Fungicides are the most widely used because they are chemically formulated to specifically combat fungus diseases. Recent reports of non-toxic, environmentally-friendly products such as baking soda and anti-transpirants are proving very encouraging also.

**FUNGICIDES** are any of a number of chemicals labeled to combat powdery mildew, and do so by interfering with its metabolic life process, rendering it unable to grow and spread. Although they must be in place on the plant before the spores arrive, they do have systemic action - meaning they move into the plant tissue - providing a residual effect for a short period.

Fungicides are available in many forms - liquids (mix readily with water), emulsifiable concentrates (a thicker, usually milky substance), wettable powders (require thorough mixing prior to application). Each has its own properties, all are effective. Most, however, have a medium-to-high degree of toxicity to humans. Extreme caution should be used to cover eyes, skin and hair, and use a painter's mask or respirator during application. They are mixed at various rates, usually 1 tablespoon per gallon of water, and require application every 7-10 days.

**BAKING SODA:** "New research shows that simple baking soda is a powerful weapon against fungus-caused rose diseases", wrote Kristi Clark in her September 1992 American Rose Magazine article.

In a world that is becoming increasingly aware of environmental concerns, more attention is being paid to finding alternative measures to widespread chemical use. Sodium bicarbonate (grocery-variety baking soda) was tested originally to determine its effectiveness in preventing blackspot.

During the experiments, it was noticed that no powdery mildew was found on any of the test roses.

Controlled experiments were conducted for some three years, using sodium bicarbonate or potassium bicarbonate in various combinations with insecticidal soap, Sunspray® ultra-fine spray oil, or only water. The result: both diseases were subdued by a weekly spraying of either sodium or potassium bicarbonate at 3 teaspoons per gallon of water, combined with Sunspray at 2 tablespoons per gallon of water. The bicarbonates eliminated the fungi, but addition of the Sunspray provided a spreader-sticker action that increased its performance.

Sunspray is available commercially as Safer® Sunspray. As Clark cautioned, do not attempt higher concentrations of the solutions, as leaf burn may result. Rain or overhead watering may wash the solution off, reducing its effect.

**ANTI-TRANSPIRANTS** are another group of substances that hold promise as a non-toxic method of controlling powdery mildew (as well as pests). Anti-transpirants are emulsions and acrylic polymers that were developed to form an impermeable film on plant surfaces to substantially reduce moisture loss. Several brands are available; look for a white liquid, about the consistency of milk.

They are widely used on cut Christmas trees to retard drying and needle drop, and on plants to provide protection from drought, heat, wind and transplant shock. Since the thin film prevents transpiration of moisture - both in and out of the leaf - it makes sense that it would also prevent fungus spores from permeating the leaf surface.

Some rosarians have used anti-transpirants in combination with fungicides, and feel the combination works better than fungicide alone. Others have used it entirely alone, and find that it works very well all by itself. Packaging directs us to water plants well and allow them time to take up the water before spraying. Since anti-transpirants are NOT yet labeled for disease protection, there is no accepted formula for application. They come in various concentrations that would require more or less dilution - anywhere from 1 tablespoon to 1/2 cup per gallon of water. Again, frequency is not addressed ... once a week ... once a month? At this stage it's sort of experimental. If a residue is left on the foliage (objectionable to you as an exhibitor) then reduce the ratio.

Whether we choose the fungicide method or the non-toxic approach to controlling powdery mildew probably depends upon the degree of severity we encounter on a regular basis. Regardless of the product selected, it must be used on a regular basis in the proper dilution to prevent fungal growth without damaging plant tissue.