

# Snapdragon Diseases Common In New York

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A full list of all diseases observed on snapdragons in New York might be a bit discouraging, but fortunately, only a few of them are common or serious. Those few, however, may spell the difference between profit and loss if not controlled. We will discuss here only those diseases commonly encountered in greenhouse production.

**DAMPING-OFF** or seedling rot, caused by any one of several fungi, usually attacks only the young seedlings and rarely affects the older plants. Under most conditions damping-off can be prevented by proper sterilization of the seed-flat soil, and steaming is still the preferred method. Other types of soil treatment have been sought because many growers are not equipped for steaming, and because recontamination of steamed soil is a problem. One of the more successful snapdragon soil treatment materials in recent years in Panodrench-4. Used at one teaspoon to three gallons as a preplanting drench of the prepared flats, Panodrench can be highly recommended for control of common types of snapdragon seedling damping-off.

Perhaps more important than sterilization or chemical treatment of the soil is proper handling of the seed flats. While the flats may be kept covered with glass or plastic until seedlings emerge, they should then be given ample light and air circulation. This enables the plant to "harden" and develop natural resistance to damping-off organisms.

**POWDERY MILDEW**, recognized by the powdery whitish growth on the leaves, may attack either seedlings or older plants. Almost invariably it gets a start on the lower leaves, but may later become severe on the upper foliage, or in extreme cases even on the blossoms. A very important effect is that of weakening the lower leaves so that other fungi, such as Botrytis, may get in and actually kill the stems.

Powdery mildew can best be controlled by making *regular preventive* applications of dusting sulfur or wettable sulfur spray to the young plants so that the lower foliage, on which the disease starts, will be protected. The sulfur may be included in other spray or dust treatments. If the grower has neglected the preventive program and mildew has already built up, it can best be eliminated by one or two thorough sprayings with Mildex or Karathane WD. These materials should be used at six oz. to 100 gallons, and enough wetting agent (Triton X100 if you have it, other good household detergent if you haven't) should be added to make the spray *thoroughly wet* the mildew growth itself. If plant growth is soft or if blooms are already present, it would be well to syringe the spray de-

posit with clear water after half an hour.

**BOTRYTIS BLIGHT** is important primarily as a killer of mature shoots—usually those about ready to cut. The fungus, Botrytis, is commonly present in greenhouses, and the spores are readily carried by air currents. Botrytis is not an aggressive pathogen, however, and usually attacks only wounded, weakened, or "soft" tissues. Thus, Botrytis often gets in through wounds left in cutting the flowers, or through leaves weakened by mildew attack or repeated severe wilting, or through tender petal tissues of the older flowers. Once in, however, it may be quite virulent and rot off the stem which it has entered.

Control of Botrytis must depend mainly on making conditions less favorable for it. First, constant sanitation, i.e., removal of all dead or dying plant parts, is important in reducing the load of spores in the air. Second, maintaining good ventilation so that the air down among the plants is fresh and dry will help greatly, since the spores require condensed moisture in order to germinate. Third, maintaining the plants in an otherwise healthy condition, i.e., treating routinely for mildew and rust control, avoiding unnecessary wounding, avoiding severe wilting, etc., will reduce the chances of Botrytis attack. Theoretically, a complete captan or zineb spray after plants have been cut back to force a second crop should help, but we have no good evidence one way or the other on this.

**RUST** is still a problem in some greenhouses, although it really should not be. Spores of the rust fungus are air-borne and trouble often is perpetuated because no attempt is made to isolate the new seedlings from the old infected plants. Thus, the new crop often has a few scattered infections—enough to keep things going—before being benched.

Fungicides which are completely effective against rust are now available. We suggest routinely spraying the young plants with a mixture of one and a half to two lbs. wettable sulfur (for mildew) and one lb. zineb fungicide (Parzate or Dithane Z78), plus enough wetting agent to get good wetting, per 100 gals. A series of about four such treatments on a 10-day schedule, applied so as to get good coverage of the lower leaf surfaces, should take care of both powdery mildew and rust. Of course, constant watch should be kept for any chance infections throughout growth, and a series of sprays should be applied immediately if any rust is noted. Both sulfur and zineb also can be applied effectively as dusts, using mixtures containing about 8 to 10 per cent zineb and the rest sulfur.

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**WILTING** may be caused by any one of several conditions. Stem girdling by *Botrytis* has been mentioned above. The fungus wilt known as *Verticillium* wilt often occurs when snaps are planted in old chrysanthemum beds without sterilization. Wilting may be due also to an excessive soluble salt concentration, which injures the roots and impedes water uptake. This can be averted by a proper soil testing program or corrected by thorough leaching.

A common, but often unrecognized, cause of repeated wilting and eventual loss of plants is lack of adequate root aeration, which in turn goes back to poor soil structure or tight benches which keep the soil flooded after watering. Lack of aeration causes root breakdown, which then permits otherwise mild fungi to invade and cause extensive rotting of the root system.

Eliminating this sort of wilting obviously involves preventive measures. If the soil has not been properly prepared before benching there is not too much which can be done. The soil should be prepared to insure good, open structure for the life of the crop. Mixtures containing about  $\frac{1}{3}$  peat moss,  $\frac{1}{3}$  sand, and  $\frac{1}{3}$  soil have proved excellent, but other mixtures may serve equally well. Obviously, the benches must be provided for drainage before being filled. Wide cracks between bench boards, which cannot swell shut when wet, are essential. To insure better drainage an inch of gravel in the bottom of raised benches or a thicker gravel layer under ground beds may be needed. Such attention to soil structure and bench construction will permit application of all the water that is needed for maximum plant growth or for leaching out excess salts without flooding and depriving the roots of necessary oxygen.