

# Study on Rose Diseases: Identification, Detection and Cure

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**Abstract**—Roses are liked by one and all, irrespective of the age group. A bouquet is incomplete until roses are not present in it. The reason why all of us love roses is the pleasant smell that it possesses. They are not only famous for their fragrance but also for the diversity in their colors. Plants that are grown today need utmost care so that they are made free from any sort of diseases. These diseases cause severe damage to the plants and their growth is affected. The rose plant is also no exception. It also suffers from a numerous disease that can cause it a stunned and a hampered growth.

**IndexTerms**—Stem canker; powdery mildew; *Botrytis cinerea*; Aphids; Blackspots;RRV

## I. INTRODUCTION

The different types of roses vary on the grounds of their ability to resist any disease and the maintenance they require. For the successful growth of roses, we should be able to differentiate among the species that are in need of care that can be provided. The shrub type roses bloom beautifully with the very less amount of chemical control measures. On the other hand, the hybrid type of roses requires an effective spraying before the season begins [1]. The diseases in rose plants are caused either by the pathogens or insects and thus its beauty is affected to a great extent.

## II. DISEASES CAUSED BY PATHOGENS

Some of the diseases that the rose plant suffers from are enlisted below-

- i. **Black Spot:** Black spot is a one of the common diseases that's present in the in the roses. It is also considered as one of the most serious diseases that are caused by the fungus named *Diplocarpon rosae*. The severity of the disease is at its peak post the warm springs.

The symptoms that can be seen in the rose plant include circular, black spots that are surrounded by a yellow area. The leaves that are infected by this disease often fall off the plants. This infection is so harsh, that continues throughout the summer season. As a result of this infection, the plants suffer from stunted growth, producing fewer and paler leaves. By the midst of the summer, the most severely affected plants, might have shed half of their leaves.

### Prevention and Treatment:

The spread of black spot in roses can be reduced and in near future the minimization of infections can be done by the following methods-

- **Maintaining good sanitation:** The practice of good sanitation is must in order to reduce the future infections and disease development. In fall or winters, the old leaves are to be removed on the ground along with any of mulch that's contaminated with the infected leaves. The fresh layer of mulch is to be replaced before there's a growth of new roses
- **Removal and Destruction of Infected Canes:** The canes that are affected by the black spot infection are to be removed and are dark and identified by reddish patches also known as the lesions. The most severely affected plants are to be pruned back in the winter season. During the growing season, the infected leaves should be removed and disposed as soon as they are spotted [1].
- **Keeping the leaves dry:** Syringing of plants with water and the usage of an overhead irrigation methods in the later afternoon or early evening should be avoided. Promoting rapid drying of leaves should be done by planting the roses in full sun. The new plants should be placed far enough for allowing the good circulation of air.



Fig1: Blackspot

- ii. **Powdery Mildew:** The powdery mildew is caused in roses due to *Peronosporasparsa*, which is also responsible for its growth in other plants also such as raspberry [2]. The powdery mildew causes a grayish-white powdery substance on the surface of young leaves, shoots and buds. There are also chances of distortion in some of the leaves and some amount of leaves might also drop. There's also a possibility that the flower buds may fail to blossom and the fortunate ones that open up, might be producing the poorer quality of flowers. This infection has no fixed time for its spread as it can occur at any point of time during the growing season, when the temperature is warm and the humidity is high at night and low during the day time [1]. The severity of this disease can be seen in the shady areas and when the nights are cooler.

**Prevention and Treatment:**

- There is a diversity in the roses and they differ in their susceptibility to this particular disease. The resistant varieties of roses prove to be the best measure against this disease. A thin film of water is responsible for the inhibition of infection and in the years where there is enough of rainfall especially during the spring and summer. The destruction and removal of all the diseased leaves along with the canes should take place during the growing season of the plant. Raking up and destroyed leaves should be placed under the plant in the fall season.
- In case the severity of the disease is too high, and can't be controlled by certain chemical controls, an appropriate fungicide should be chosen, that is responsible for stopping both blackspot and powdery mildew. Some of the common fungicides being used in home garden include- propiconazole, thiophanate-methyl, sulfur or neem oil or even baking soda that's mixed with horticultural oil [1].



Fig 2: Powdery Mildew

- iii. **Stem Canker & Dieback:** Cankers mostly appear as dead or even discolored areas present at the rose canes and can vary in color ranging from light tan to dark purplish brown. This type of disease caused by different fungi including *Botryosphaeria*, *Leptosphaeria*. All these type of fungi enter the canes through the wounds that are usually caused by winter injury, improper pruning, hail or even flower cutting [1]. The cankers can also enlarge the damage until and unless they are surrounded by the cane or if they reach the base of the plant and thereby spreading to other canes or even killing of the entire plant. Their occurring is common in those roses that are weakened by the blackspot along with poor nutrition or even winter injury.

**Prevention and Treatment:**

- As such there are no fungicides available that can control and eradicate stem cankers in roses. Care can be taken by controlling the spread of other diseases such as the black spot, powdery mildew.
- **Avoiding injury to the plant:** Wounds formed because of various ways such as cultivating, pruning, transplanting of flowers act as a gateway for the fungus to the plant. Thus, injury should be avoided so as to stop the spreading of fungus in the plants.
- **Pruning properly:** Pruning should be done properly and to an outwards facing bud. Due to this too many branches wouldn't grow at the center of plant that might cross and rub against each other.
- **Removal and destruction of all dead & infected portions of the cane:** The removal and destruction of all dead as well as infected portions of the canes should be done immediately, as they might lead to further damage in the plants. Making all pruning cuts below the diseased and infected areas and also pruning about one-fourth inch above an outward facing bud node, but without cutting of the nodal tissues at an angle of 45 [1].



Fig 3: Stem Canker

- iv. **Rust:** Another disease that a rose plant suffers from is the rose rust, which is caused by the fungi *Phragmidium* species. This species of fungi cause an orange colored appearance on the stems as well as the leaves. When the rust is at its peak of severity, an orange dust-like substance can be seen on the plant surface as well as on the ground that lies below the plant. The rust attacks all the parts of the plants other than the roots and petals. The most infected and diseased leaves turn either yellowish or brownish and finally they drop.

**Prevention and Treatment:**

- The utmost care that should be taken is that the plants should be provided with good air circulation. Also, the roses should not be planted in crowded areas and pruning of plants at regular intervals should be done in order to keep the centers of the plant open
- The plants should be watered before noon and also the wetting of leaves should also be avoided
- Diseased leaves should be removed and destroyed, so that the infection doesn't spread



Fig 4: Patches of Rust

- v. **Botrytis Blight:** The buds and flowers of the rose plant are often infected with a grey-brownish fuzzy growth of a gray mold called *Botrytis cinerea*. This fungus is most active at temperature ranges from 62 to 72 F along with the conditions being moist. The infected canes of the plant become discolored in the cankers and dieback can stretch to the stem. The diseased and infected flower petals have a small, light-colored spots that are surrounded by reddish halos, which with time can quickly expand to large irregular blotches. This disease can cause the bud's inability to

fail and often droop. Thrips can also cause a similar damage to the semi-opened buds, therefore the plants need to be inspected carefully.

#### Prevention and Treatment:

- The most important factor for prevention of the disease is to keep the area clean. All the faded flower blossoms and leaves are collected and discarded. Good air circulation should be provided and wetting of the leaves should be avoided when it's being watered
- This particular disease can easily develop on the canes that have been damaged. It might also spread on the canes that are kept too wet due to the use of manure mulch.
- For necessary chemical controls, fungicides that contain thiophanate methyl or neem oil should be used. The neem oil is to be used on a trial basis, especially on the open blooms and during the hot weather [1].



Fig 5: Botrytis Blight

- vi. **Rose Rosette Disease:** This disease is considered to be an untreatable disease and is caused because of the Rose rosette virus (RRV). It is spread and introduced in the rose plant during the feeding that takes place by the rose leaf curl mite also known as *Phyllocoptesfructiplilus*. The extremely small eriophyid mite feed on the cell sap of the tender stems and leaf petioles [1]. The leaf curl mite causes a very less damage but if it's a carrier of the RRV virus, the symptoms of infection can be seen within one to three months.

Some of the symptoms that can be seen on the roses include the reddened terminal growth taking place on the infected leaves, with the stems becoming thicker. Stems of the plant exhibit an abnormal high number of pliable thorns, present in either green or red colors. The leaves that are developed on the infected branches are smaller than the usual leaves. Lateral branches might grow excessively from the main stems and thereby creating a witch's broom. The flowering capability of the plant is reduced, and thereby the petals may be distorted and fewer in number.

The symptoms are evident during the late spring to early summer and the progress during the growing season. Once the plant is infected, RRV moves throughout the plant and the entire plant is under infection. The RRV spreads to the neighboring plants after affecting the host plants and the infected plants die within a couple of years.

#### Prevention and Treatment

- The wild multiflora roses are very susceptible to this disease. Any wild plants planted nearby should be removed and also promptly removed.
- The infected, cultivated roses should be immediately removed and burned. No roots should be left behind so that there are any chances of sprouting of the disease again.
- No part of the uprooted and infected plant should be left behind in the garden, as the mites might leave the rose plants for other plants
- Spacing should be done between the rose plants and they should not touch each other





Fig 6: Rose Rosette Virus


- vii. **Crown Gall:** This disease is caused due to soil inhabiting bacteria named, *Agrobacterium tumefaciens*. The symptoms of this disease include the swollen galls or swellings that can occur take place at or below the soil surface on stems and roots. The swollen galls are light green in color and at a tender age they are nearly white. With the increase in size, the galls darken in color and also become woody, ranging upto several inches in size. The galls are responsible for disruption of water flow and nutrients that travel upto the roots and plants, thereby making weakening and stunting the growth of the plant top.


**Prevention and Treatment:**

- For prevention of galls, disease-free roses should be chosen. Once a plant is infected, there are no countermeasures to stop the infection.
- Injury should be avoided to the roots and crown of the plant during the process of plantation and cultivation, as the bacteria can enter the plant through the fresh wounds
- The infected plants should be removed as early as the galls are spotted
- If possible, then soil should be removed and discarded immediately from the area where the infected plant was located



Fig 7: Swollen Gall at Root Level

S. No:	Name of the Disease	Causing Fungi	Fungicide(s) Used	Image of the Disease
1.	Black Spot	<i>Diplocarpon rosae</i>	chlorothalonil, mancozeb	
2.	Powdery Mildew	<i>Sphaerotheca pannosa</i>	Propiconazole	
3.	Stem Canker	<i>Botryosphaeria, Leptosphaeria</i>	No particular fungi used for stem cankers, but fungicides used for controlling black spot and mildew need to be deployed	
4.	Rust	<i>Phragmidium</i>	Fungicides that contain the portions of myclobutanil, mancozeb or propiconazole	
5.	Botrytis Blight	<i>Botrytis cinerea</i>	Fungicides containing thiophanate methyl, chlorothalonil	
6.	Rose Rosette Disease	Rose rosette virus and <i>Phyllocoptes fructiplilus</i>	Bifenthrin sprays	

7.	Crown Gall	<i>Agrobacterium tumefaciens</i>	Disinfecting the plants in a solution of 0.5% sodium hypochlorite for several minutes	
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**Table 1:** Summary of All the Diseases Caused In Rose Plant

### III. DISEASES CAUSED BY INSECTS

Some of the insects that cause harm to the rose plant are enlisted below-

- i. **Yellow Rose Aphid:** A widespread rose pest whose sighting is common and occurs during cooler season of fall, though it can also be spotted the whole year [4]. Different species of the aphids can cause infections to the plant. It feeds on the leaves leading to leaf drop. The honeydew that's secreted by the aphids can serve as a major food source to the sooty mold breed, which in turn can cause the leaves to turn black and unsightly. Aphids can attract its enemies which feed on the aphids themselves or the honeydew secreted by them, which are rich in sugar content. Natural enemies of the aphids include lady beetles, lacewings, syrphid flies, predatory mites and thirps [4].



Fig 8: Rose Aphid

- ii. **Large Leaf Footed Bug:** The nymphs and the adult large leaf footed bugs are commonly found feeding on the rosebuds [4] and the blossoms that are expanding. Their eggs are shiny and golden in color which is commonly found in clumps lying on the underside of the leaves. These are often found in roses during the mid to late summer and their damage is limited to some of the flowers that are malformed with a few blossoms not opening up properly [4]. They can easily be removed from roses by bare hands, provided they are present in large numbers.



Fig 9: Large Leaf Footed Bug

- iii. **Fuller Rose Beetle:** The fuller rose beetle of the *Pantomoruscervinus* species are introduced weevil that usually feeds on the edge of the leaves and then notches them in an irregular fashion. The whitefingered beetle complex, feeds on the leaves and also notches them irregularly. The adult species of the beetle are mostly active at night and can be found hiding on the secluded plants during the daytime. A flower beetle, *Euphoria sepulcralis* a beetle pest [4] that's found in the roses.



Fig 10: Fuller Rose Beetle

- iv. **Leafcutting Bees:** A large number of bee species also known as the “leafcutting bees”, the reason being their habit of cutting out the circular sections of rose leaves for replenishing the food cells for their larvae. The damage caused by the bees is obvious, as circular pieces of 0.5 inch are removed from the leaflets. There are chances when more than one circle is cut from each of the leaflet.



Fig 11: Leafcutter Bee

- v. **Leafhoppers:** These are tiny insects which have piercing sucking mouth parts which can suck plant juices from the undersides of the leaves. The immature species of this insect are usually found in large numbers, and are found in colors ranging from pale white to yellow to green and move quickly from side to side, if they are disturbed. The damage caused from them is shown up as a “hopperburn”, wherein the leaves appear to be splotched, bronzed or even off colored. The damage that is caused by leafhoppers, thrips and mites are very similar in appearances.



Fig 12: Leafhopper



- vi. **Thirps:** These are tiny, fast moving, rasping and sucking insect. Several species of thirps feed on various rose parts such as leaves, buds and the flowers [4]. During the feeding stage, the thirps often leave the fecal matter on the leaves as dark spots that appear on the plant matter. These flower thirps can be a nuisance if the cut roses are brought indoors.



Fig 11: Rose Thirp

- vii. **Two-spotted Spider Mite:** These are very common rose pest that are found throughout the year can build up in large numbers very quickly. It feeds primarily on the underside of the leaves and protects itself by spinning thick webs around themselves. These pests suck chlorophyll and the juices from the outer cell of the leaves. This in turn causes the leaves to appear bleached or even stippled and at last they drop. Hot, dry weather plays a major role in the reproduction of the mites and enhances their buildup.



Fig 12: Two-spotted Spider Mite

#### IV. CONCLUSION

The number of diseases in rose is large. To keep its beauty intact, utmost care should be taken. The flower is liked by all and insects & pathogens are also no exception. By carrying out appropriate steps and safety measures the beauty can be easily sealed and made free from the impurities that try to damage it.

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