Combating Rose Rosette Disease: Monitoring Extent and Diversity of the Disease

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Abstract

Roses are grown worldwide for their beauty and fragrance. The flower from this woody perennial serves as the national flower to several countries, including the United States of America. In recent years, rose rosette disease (RRD) has become a problem that threatens the US rose industry and is having a detrimental impact on the use of these plants in home and commercial landscapes. Only as recently as 2011, a virus (rose rosette virus) was identified as the causal agent of this disease. Prior to 2011, diagnosis of RRD was based on visual symptoms which are not consistent between cultivars or plantings. Recent funding from the Specialty Crops Research Initiative program will allow for the development of a monitoring/survey program for rose rosette disease. One of the aims of the monitoring effort is to catalog symptoms and cultivar information so that potential tolerant and resistant plant materials might be discovered. The proposed collected information would also provide a better view into how this disease develops and may shed light on the nature of the pathogen's interaction with the rose. To accomplish this goal, there must be a concerted effort to increase awareness and knowledge of the public and participating volunteers to RRD and the symptoms that it can produce. Then tools, such as a reporting app, must be developed to enable volunteers to report on the roses that they are monitoring. The success of finding a solution to rose rosette disease can begin with the participation of an educated volunteer base and a system to be able to receive and analyze submitted information.

The goal of the monitoring effort is to gain additional information of the extent of the spread of this disease in the USA and to identify potential resistant or tolerant germplasm which can contribute to development of new resistant cultivars. Deliberate steps are taken to develop a robust monitoring program starts with awareness and education.

Awareness

- Association of symptoms and rose rosette disease
- Basic understanding of disease impact to landscape aesthetics
- Feels the urgency in finding a solution to disease problem

EXAMPLES: (see Poster #046)
News or magazine articles
Extension educational programs
    Public talks or outreach programs
General outreach to Garden Clubs

Education

- Understanding basic biology of pathogen and vector
- Basic diagnostic skills – recognizing symptoms
- Understand basic strategies for disease mitigation
- Knowing where and how to report incidences

EXAMPLES:
Master Gardener and Rose enthusiast disease management trainings
Professional continuing education trainings for landscape professionals and rose growers.

Figure 1. Pictorial Guide to RRD to help public in symptoms recognition (Poster #327)

Active/Ongoing Collaborations

- Active monitoring by public and private gardens on their rose plantings
- Direct access to Extension specialist with consultation on disease issues
- Assistance with developing landscape plans and experimental monitoring designs

EXAMPLES:
Assisting Public Park & Rec Department in developing, collecting and analyzing RRD data.
Training Public and Private Gardens (APGA) partners in recognizing and reporting RRD incidence (e.g. NPDN and Sentinel Plant Network)

Public Participation

- Encouraging interested individuals to participate in monitoring effort
- Provide value-added activities for citizen scientists.

Figure 2. Examples of factsheets by various State Extension agencies on RRD.

How can the monitoring data be utilized?

All observations received will need to be confirmed
    • By photo and by laboratory analysis

- Example: When individual reports a RRD observation, there will be asked what other cultivars are planted adjacent and if symptoms are observed on those.

- Data will be tabulated to provide a quick view of cultivar and location where RRD is reported.

- Site/location information of confirmed observation will help to provide a more reliable map of disease range.

- Cultivar-RRD incidence information will help to identify potential resistant and/or tolerant materials.

Reported Date	Location	Cultivar	Resistance	Confirmed?
XXX	XXX	Red X	+	Yes
XXX	XXX	Yellow X	-	Yes
XXX	XXX	XXX	+++	No

Figure 5. Example of how data would be tabulated and visualized on a table where cultivar, location of plant and resistance to RRD is noted.

Reporting Tools

Reporting APP for smart devices and web-based reporting. Simple and novel methods where individuals can report RRD observations
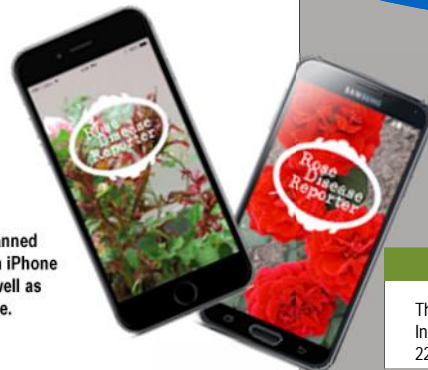

Figure 4. Mock-up of the planned app to be made available on iPhone and Android platforms, as well as planned web-based interface.
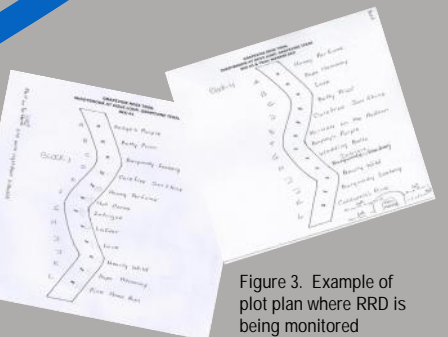

Figure 3. Example of plot plan where RRD is being monitored

Acknowledgements