

Problem Description

Mummy berry is caused by the fungus *Monilinia vacinii-corymbosi* that overwinters in fruit mummies on the ground. In early spring fungal fruiting cups (apothecia) grow from overwintering mummies on or near the soil surface. Ascospores from fruiting cups infect leaves shortly after buds open. A second type of spore (conidia) is produced in about 3 weeks on blighted flowers and shoots. The spores are spread to healthy flowers by wind, rain and insects. Infected flowers turn brown and wither, leaf and shoot growth expanding from newly opened leaf buds is blackened in the center and eventually wilts and dies. The death of the infected shoots is called shoot blight or primary infection. Infected berries look like healthy ones in early development stages, but as they near maturity they become a reddish buff or tan color. Mature mummied berries are gray shriveled, and hard. Usually the diseased berries fall before healthy ones are harvested.

Control of mummy berry is essential to the production of profitable blueberries. Currently no effective registered alternatives exist. If growers are forced to use only registered alternatives, probably 8 applications of Captan, it is estimated that they would have yield reductions of 21% to 30%. In localized situations, the yield loss would be greater. This yield loss estimate is what has been used in recent Section 18s and is commonly accepted by the Washington State Department of Agriculture and the Environmental Protection Agency.

Historically, Funginex (triforine) provided the most consistent and effective control of mummy berry on blueberries. Funginex is no longer available. Growers purchased the last of the remaining stock of Funginex in 1998. Efficacy of benomyl, sulfur, ziram, neem oil, certain copper compounds, potassium salts of fatty acids, and chlorothalonil, which are the registered alternatives, vary from infective to moderately effective, depending on the stage of the disease according to Pete Bristow, WSU small fruit plant pathologist. Recently, benomyl (Benlate) the most effective registered product available to growers since the loss of Funginex, was canceled by the manufacturer.

Jay Pscheidt, Oregon State University plant pathologist has conducted research that demonstrates that none of the registered chemicals provide satisfactory control of mummy berry disease. A field study conducted by Dr. Pscheidt in 2003 included Indar as a treatment along with some of the other registered pesticides used for mummy berry control. His data reveal that the Indar treatments, either alone or in rotation with other chemicals, provided excellent control (statistically similar to Funginex) of both the primary infection on shoots and secondary infection on the berries. Orbit (propiconazole), which is not currently registered for use in blueberries, also provided control comparable to Indar and Funginex. Historically, the Washington blueberry industry obtained use of Orbit via the Section 18 process; however, due to EPA concerns with the triazole group of fungicides, it rejected Washington's application for Orbit. For the previous two years the Washington blueberry industry has obtained an exemption for the use of Indar.

In 2004, EPA required the Washington and Oregon blueberry industry to generate data on a alternatives to Indar, particularly on Pristine. Washington did not generate those data. It is critical that the industry conduct a mummy berry trial in 2005. Generation of this data will be required to continue to obtain a Section 18 in 2006. This request addresses this issue.

There are about 3,500 acres of blueberries in Washington. In 2004, mummy berry pressure was unusually low, with approximately half of the acres being put on a mummy berry fungicide program that included about 5 applications. According to the 2005 Section 18 for mummy berry, the loss of

access to Indar would cost the industry between \$1,214 to \$1,677 per effective acre. The amount of impacted acres ranges to a low of 50% to a high of 100% of the state's blueberry acreage. The aggregate impact would range from \$2.12 million to a high of \$5.87 million.

Ranking and Prioritization

There are no significant environmental or human health issues associated with mummy berry pest control.

Category C: Significance to the Local or Regional Economy (I, II, III, IV, other):

Registration of a cost effective alternative will be important to the local rural economy of Western Washington. As described above, if this project is not conducted, it places continued access to a Section 18 fungicide. The potential loss could be between \$2 to nearly \$6 million.

Project Description

Due to the impending retirement of Pete Bristow, WSU will not be conducting any small fruit pathology research in 2005. Jay Pscheidt (OSU) will be conducting a parallel program with complimentary treatments in Oregon. This product will be carried out in cooperation with Dr. Pscheidt.

A site will be selected that has a recent history of mummy berry, probably in the Puyallup Valley. A plantation that has mummies under bushes will serve as an indicator. Treatments will begin when stipes appear on the mummies and or at early green tip stage. Applications will be made every 7 to 10 days. Data will be collected on % of primary infections per bush. It is estimated that we will use 6 bushes per plot. The trial will be in a randomized complete block design, with 1 bush buffers. The center bush will be used to rate efficacy. As the fruit matures, hand harvested green berries will be cut open to determine % of secondary infection. Information will be collected on efficacy against other fruit rots. Hand harvested fruit will be kept in clamshell packs and incubated at high humidity. The fruit will be examined for rots.

Since this may be the only blueberry fungicide program in Washington in 2005, care will be taken to look for other diseases, including anthracnose, Alternaria, botryis and other diseases, as well as sun burn.

It is estimated that each treatment will be applied 5 times at 7 to 10 day intervals. In the event of prolonged conditions conducive for disease development, additional applications may be necessary. Following are suggested treatments.

| Trt No. | Treatment Name | Form Conc | Form Type | Rate Rate | Rate Unit | Other Rate | Other Rate Unit | Appl Code | Spray Volume | Volume Unit |
|---------|--------------------|-----------|-----------|---------------|-----------|--------------|-----------------|-----------|--------------|-------------|
| 1 | UNTREATED CHECK | | | | | | | | | |
| 2 | BRAVO WEATHER STIK | 6 F | | 0.75 lb ai/a | | 1 pt/a | | A | 50 GAL/AC | |
| | INDAR | 75 WSP | | | | 2 oz/a | | BCD | 50 GAL/AC | |
| | ABOUND | 2.08 F | | 0.101 lb ai/a | | 6.2 fl oz/a | | E | 50 GAL/AC | |
| | LATRON B1956 | | | | | 1 fl oz/a | | BCD | 50 GAL/AC | |
| 3 | ELEVATE | 50 WDG | | 0.75 lb ai/a | | 1.5 lb/a | | ABCDE | 50 GAL/AC | |
| | | | | | | | | BCD | | |
| 4 | CAPTAN | 80 WP | | 2.52 lb ai/a | | 3.15 lb/a | | ABCDE | 50 GAL/AC | |
| 5 | CAPTEVATE | 68 WDG | | 3.2 lb ai/a | | 4.7 lb/a | | ABCDE | 50 GAL/AC | |
| 6 | CAPTEVATE | 68 WDG | | 3.57 lb ai/a | | 5.25 lb/a | | ABCDE | 50 GAL/AC | |
| 7 | PRISTINE | 38 WG | | 0.44 lb ai/a | | 18.5 oz/a | | ABCDE | 50 GAL/AC | |
| | SUPERIOR SPRAY OIL | | | | | 1 gal/a | | ABCDE | 50 GAL/AC | |
| 8 | INDAR | 75 WSP | | | | 2 oz/a | | ABCDE | 50 GAL/AC | |
| | LATRON B1956 | | | | | 1 fl oz/a | | ABCDE | 50 GAL/AC | |
| 9 | ORBIT | 3.6 EC | | | | 4 fl oz/a | | ABCDE | 50 GAL/AC | |
| 10 | ABOUND | 2.08 F | | 0.101 lb ai/a | | 6.2 fl oz/a | | ABCDE | 50 GAL/AC | |
| 11 | SWITCH | 62.5 WG | | 0.43 lb ai/a | | 11 oz/a | | ABCDE | 50 GAL/AC | |
| 12 | FUNGINEX | | | | | 24 fl oz/a | | ABCDE | 50 GAL/AC | |
| 13 | V10116 | | | | | 5.7 fl oz/a | | ABCDE | 50 GAL/AC | |
| | LATRON B1956 | | | | | 8 fl oz/a | | ABCDE | 50 GAL/AC | |
| 14 | V10116 | | | | | 7.6 fl oz/a | | ABCDE | 50 GAL/AC | |
| | LATRON B1956 | | | | | 8 fl oz/a | | ABCDE | 50 GAL/AC | |
| 15 | OMEGA | 500 F | | 40 lb ai/a | | 10.2 fl oz/a | | ABCDE | 50 GAL/AC | |
| 16 | OMEGA | 500 F | | 78.5 lb ai/a | | 20.1 fl oz/a | | ABCDE | 50 GAL/AC | |
| 17 | ECHO 720 | 6 F | | 0.75 lb ai/a | | 1 pt/a | | A | 50 GAL/AC | |
| | INDAR | 75 WSP | | | | 2 oz/a | | BCD | 50 GAL/AC | |
| | ABOUND | 2.08 F | | 0.101 lb ai/a | | 6.2 fl oz/a | | E | 50 GAL/AC | |
| | LATRON B1956 | | | | | 1 fl oz/a | | BCD | 50 GAL/AC | |

Timeline.

This project will begin as soon as disease pressure dictates. Applications may need to start as soon as the first week of March. Applications will continue into April. Samples will be collected through harvest. A final report is expected by July or August.

Project Budget

| Expenditure | WSCPR (Request) | Matching Funds | | | TOTAL COST |
|-----------------------------------|--------------------|---------------------------------------|---------------------------|--------------------------|---------------|
| | | Washington Blueberry Commission | Valent Arvesta BASF | Clover seed industry | |
| | | Amount (CASH) | Amount Cash | Amount (IN-KIND TIME) | |
| Salaries ¹ | 5000 | 5000 | | | 10,000 |
| Employee Benefits ² | 1275 | 1275 | | | 2,550 |
| Temporary or hourly workers | 1000 | 1000 | | | 2,000 |
| Travel ³ | 725 | 725 | 1000 | | 2,450 |
| Equipment | | | | | |
| Supplies | | | 2000 | | 2,500 |
| Total | 8000 | 8000 | 3000 | | 19,425 |

¹ These funds pay for a research associate to carry out the trials.

² The research associate position has benefits of 22.5% (\$1,125), the hourly workers have benefits of 15% (\$150)

³ Travel is only for direct travel to and from plots. We estimate that there will be 7 trips made to put the trial and applications. Most of these funds are for mileage (600 miles RT times 0.35 = \$1475), hotel (\$525 for 7 trips) and meals (\$450)

Inaccurate or unclear budget may result in rejection of proposal.

Has this budget been reviewed for accuracy? Yes By Whom? Jenna Watkins, bookkeeper.

Projected Expenditures (by quarter)

| Time Period | Jan-Mar 2005 | Apr-Jun 2005 | Jul-Sept 2005 | Oct-Dec 2005 |
|------------------------|-----------------|-----------------|------------------|-----------------|
| WSCPR Funds | | 5000 | 2000 | 1000 |
| Total Funds | 1000 | 11425 | 4000 | 3000 |

Has this project been funded previously by WSCPR? No

Additional Consideration:

Three registrants have been approached at the time this proposal was submitted to the WSCPR. Only Valent had time to respond. The company plans to commit approximately \$1,500 to this effort. Company supports for blueberry projects tend to be very minor due to the very limited size of the industry. The Washington Blueberry Commission has committed to fund this project. It is highly likely that by the time this proposal is heard by the WSCPR that additional information regarding the funding status of the proposal will be known.