



1  
00:00:56,670 --> 00:00:54,360  
scientists from NASA Ames Research

2  
00:00:59,640 --> 00:00:56,680  
Center have teamed with robert mondavi

3  
00:01:01,680 --> 00:00:59,650  
winery and several universities to study

4  
00:01:03,510 --> 00:01:01,690  
a privilege that may cause many of the

5  
00:01:08,340 --> 00:01:03,520  
finest wine growing regions in

6  
00:01:14,820 --> 00:01:12,240  
a tiny root parasite called phallic

7  
00:01:17,280 --> 00:01:14,830  
sarah has devastated popular varieties

8  
00:01:20,670 --> 00:01:17,290  
of grapes in the Napa Valley causing a

9  
00:01:23,550 --> 00:01:20,680  
serious decline in food production vegan

10  
00:01:26,609 --> 00:01:23,560  
sex feed on healthy plant roots exposing

11  
00:01:30,149 --> 00:01:26,619  
them to disease and stress ultimately

12  
00:01:32,490 --> 00:01:30,159  
the plants living and down for most

13  
00:01:34,649 --> 00:01:32,500

farmers early detection is nearly

14

00:01:36,990 --> 00:01:34,659

impossible because by the time the

15

00:01:39,749 --> 00:01:37,000

visual symptoms appear the vines are

16

00:01:43,290 --> 00:01:39,759

severely affected and will die in one to

17

00:01:45,450 --> 00:01:43,300

three years using airborne scanners and

18

00:01:48,990 --> 00:01:45,460

sophisticated remote sensing techniques

19

00:01:51,540 --> 00:01:49,000

NASA is developing new ways to spot the

20

00:01:53,730 --> 00:01:51,550

provider for crops decline and the

21

00:01:56,130 --> 00:01:53,740

growers can necessary to meet the

22

00:01:59,219 --> 00:01:56,140

premier's with for luxor of resistant

23

00:02:02,059 --> 00:01:59,229

rootstocks till freeze manages the

24

00:02:05,999 --> 00:02:02,069

project for robert mondavi vineyards

25

00:02:08,039 --> 00:02:06,009

remote sensing allows the detection of

26

00:02:10,559 --> 00:02:08,049

stress before we can ever see it with

27

00:02:12,600 --> 00:02:10,569

the naked eye and that gives us a

28

00:02:15,030 --> 00:02:12,610

glimpse into the future so that we can

29

00:02:39,330 --> 00:02:15,040

do a better job of planning for

30

00:02:46,260 --> 00:02:42,730

this is the Napa Valley home to

31

00:02:49,630 --> 00:02:46,270

America's most prestigious wine

32

00:02:52,180 --> 00:02:49,640

produced the fine Chardonnay Pinot Noirs

33

00:02:54,490 --> 00:02:52,190

and Cabernet Sauvignon that have helped

34

00:02:57,400 --> 00:02:54,500

with the California wine industry on the

35

00:03:00,010 --> 00:02:57,410

International lab but lurking beneath

36

00:03:02,440 --> 00:03:00,020

the surface of these green fields at

37

00:03:05,110 --> 00:03:02,450

tiny parasites called for luck Sarah

38

00:03:08,740 --> 00:03:05,120

that threatened the very roots of a six

39

00:03:11,590 --> 00:03:08,750

billion dollar industry entomologist

40

00:03:15,100 --> 00:03:11,600

Jeff brunette the place where it's

41

00:03:17,890 --> 00:03:15,110

feeding is a wounded area and fungus or

42

00:03:20,290 --> 00:03:17,900

bacteria can get into that and cause an

43

00:03:22,810 --> 00:03:20,300

infection which will eventually kill

44

00:03:24,820 --> 00:03:22,820

that portion of the route infrared

45

00:03:27,070 --> 00:03:24,830

aerial photography taken over a

46

00:03:30,190 --> 00:03:27,080

five-year period reveals forelock

47

00:03:33,640 --> 00:03:30,200

Sarah's devastating effects dead areas

48

00:03:35,710 --> 00:03:33,650

show up gray imagery like this helps

49

00:03:37,600 --> 00:03:35,720

farmers see current damage but it

50

00:03:40,570 --> 00:03:37,610

doesn't provide enough information for

51  
00:03:43,600 --> 00:03:40,580  
future planning growers need better

52  
00:03:44,970 --> 00:03:43,610  
tools so there's where comes NASA

53  
00:03:49,090 --> 00:03:44,980  
because the very sophisticated

54  
00:03:51,190 --> 00:03:49,100  
technology remote sensing allows the

55  
00:03:53,980 --> 00:03:51,200  
detection of stress before we can ever

56  
00:03:56,170 --> 00:03:53,990  
see it with the naked eye and that gives

57  
00:03:58,780 --> 00:03:56,180  
us a glimpse into the future so that we

58  
00:04:00,960 --> 00:03:58,790  
can do a better job of planning for

59  
00:04:04,090 --> 00:04:00,970  
eventualities of the loss of those bonds

60  
00:04:07,630 --> 00:04:04,100  
Phil freeze manages the Velox our

61  
00:04:10,690 --> 00:04:07,640  
project for robert mondavi winery bob

62  
00:04:13,240 --> 00:04:10,700  
mondavi has always thought to the future

63  
00:04:15,250 --> 00:04:13,250

in this case we looked up into the sky

64

00:04:18,090 --> 00:04:15,260

we look for the technology we look

65

00:04:21,220 --> 00:04:18,100

beyond the horizon they look to space

66

00:04:23,200 --> 00:04:21,230

NASA scientists at nearby Ames Research

67

00:04:25,480 --> 00:04:23,210

Center have been developing remote

68

00:04:28,060 --> 00:04:25,490

sensing technology to study the Earth's

69

00:04:30,850 --> 00:04:28,070

surface using aircraft and satellites

70

00:04:34,030 --> 00:04:30,860

for the last ten years nASA has been

71

00:04:36,370 --> 00:04:34,040

trying to get remote sensing into more

72

00:04:40,690 --> 00:04:36,380

commercial uses to develop more industry

73

00:04:44,680 --> 00:04:40,700

partnerships NASA's Jones salud heads

74

00:04:47,870 --> 00:04:44,690

the grapes 113 and boots participants

75

00:04:51,650 --> 00:04:47,880

from Ames mondavi winery in California

76  
00:04:54,320 --> 00:04:51,660  
Davis and Chicago universities we called

77  
00:04:55,880 --> 00:04:54,330  
up about four wineries last fall and met

78  
00:04:57,920 --> 00:04:55,890  
with about four different groups and

79  
00:05:00,110 --> 00:04:57,930  
explain to them what we wanted to try to

80  
00:05:02,510 --> 00:05:00,120  
do and mondavi was the one who said

81  
00:05:04,580 --> 00:05:02,520  
we're your guys we want to do that same

82  
00:05:08,510 --> 00:05:04,590  
thing this is where all the flock sir is

83  
00:05:11,570 --> 00:05:08,520  
1 1 2 & 3 have visual signs and it's in

84  
00:05:13,490 --> 00:05:11,580  
the ground four five and six have no

85  
00:05:15,290 --> 00:05:13,500  
visual signs on elites but it is in the

86  
00:05:16,520 --> 00:05:15,300  
ground and seven eight and nine are

87  
00:05:20,270 --> 00:05:16,530  
totally healthy and there's nothing in

88  
00:05:22,400 --> 00:05:20,280

the ground an 11-acre test site is

89

00:05:26,050 --> 00:05:22,410

blocked in two sections with healthy

90

00:05:28,700 --> 00:05:26,060

moderate and severely infested vines

91

00:05:30,590 --> 00:05:28,710

handheld instruments are used to measure

92

00:05:37,029 --> 00:05:30,600

chlorophyll leverage which are a

93

00:05:41,330 --> 00:05:39,529

right now if you look at a leaf for many

94

00:05:43,339 --> 00:05:41,340

of those three categories they look the

95

00:05:46,219 --> 00:05:43,349

same to our eyes but we're going to take

96

00:05:48,499 --> 00:05:46,229

them back into the lab at Ames and do

97

00:05:50,629 --> 00:05:48,509

spectral analysis and also chemical

98

00:06:03,970 --> 00:05:50,639

analysis to see how those leaves

99

00:06:10,500 --> 00:06:07,060

field and laboratory data provides a

100

00:06:12,790 --> 00:06:10,510

baseline for each level of infestation

101  
00:06:16,390 --> 00:06:12,800  
scientists estimate chlorophyll levels

102  
00:06:20,320 --> 00:06:16,400  
and use an airborne scanner together

103  
00:06:22,719 --> 00:06:20,330  
thousands of plants like infrared photos

104  
00:06:25,779 --> 00:06:22,729  
the resulting images indicate where the

105  
00:06:28,300 --> 00:06:25,789  
vines are distrustful of damages are

106  
00:06:30,520 --> 00:06:28,310  
also burner roars of with the bugs that

107  
00:06:32,770 --> 00:06:30,530  
crispy did acquire a time at the polacks

108  
00:06:35,740 --> 00:06:32,780  
for pattern seems to be going kind of in

109  
00:06:38,560 --> 00:06:35,750  
a north-south direction the resolution

110  
00:06:41,170 --> 00:06:38,570  
is so much better about the contrast the

111  
00:06:44,379 --> 00:06:41,180  
ability to see the areas that are

112  
00:06:47,379 --> 00:06:44,389  
already affected by flora it just jump

113  
00:06:49,900 --> 00:06:47,389

out at you even more so monitoring

114

00:06:53,020 --> 00:06:49,910

infestation is one thing but doing

115

00:06:55,510 --> 00:06:53,030

something about it is another we don't

116

00:06:57,370 --> 00:06:55,520

have any chemical agents that will cure

117

00:07:00,760 --> 00:06:57,380

our problem and prevent philosopher in

118

00:07:03,100 --> 00:07:00,770

Napa Valley fortunately nurseries are

119

00:07:05,740 --> 00:07:03,110

growing roots which are resistant to the

120

00:07:08,529 --> 00:07:05,750

lots are many of the popular great

121

00:07:10,540 --> 00:07:08,539

plants like Chardonnay Pinot Noir would

122

00:07:12,730 --> 00:07:10,550

easily fall prey to the underground

123

00:07:15,310 --> 00:07:12,740

pests if they were growing on their own

124

00:07:18,189 --> 00:07:15,320

rules good nurs get around this problem

125

00:07:20,529 --> 00:07:18,199

by having nurseries graft or splice

126

00:07:23,320 --> 00:07:20,539

resistant stocks to the fruit bearing

127

00:07:25,480 --> 00:07:23,330

portion of the plan what we've chosen to

128

00:07:27,820 --> 00:07:25,490

do here at Robert Mondavi vineyards is

129

00:07:30,520 --> 00:07:27,830

to remove those vines that are affected

130

00:07:33,250 --> 00:07:30,530

with filagra go back in and we plant

131

00:07:34,899 --> 00:07:33,260

these new root stocks that are tolerant

132

00:07:38,920 --> 00:07:34,909

to any philosophy that might be in the

133

00:07:42,190 --> 00:07:38,930

soil the cost of replanting at mondavi

134

00:07:45,320 --> 00:07:42,200

vineyards alone could run to 20 million

135

00:07:47,840 --> 00:07:45,330

that's why it's so critical but vintners

136

00:07:51,350 --> 00:07:47,850

know where and when philosopher will

137

00:07:52,670 --> 00:07:51,360

strike before replanting rather than

138

00:07:54,200 --> 00:07:52,680

having a feeling that it's really

139

00:07:55,520 --> 00:07:54,210

spreading will be able to say look it's

140

00:07:57,310 --> 00:07:55,530

spread thirty percent over this past

141

00:07:59,540 --> 00:07:57,320

year in this direction the NASA

142

00:08:01,790 --> 00:07:59,550

partnership with MonaVie and

143

00:08:05,000 --> 00:08:01,800

universities at Davis and Chico was

144

00:08:07,850 --> 00:08:05,010

working very well right they couldn't

145

00:08:10,430 --> 00:08:07,860

use the digital images sooner the

146

00:08:12,620 --> 00:08:10,440

mondavi team members were looking at the

147

00:08:14,750 --> 00:08:12,630

imagery so we made a decision to rip out

148

00:08:16,159 --> 00:08:14,760

half this field from looking at this

149

00:08:18,560 --> 00:08:16,169

imagery we should ripped out

150

00:08:22,219 --> 00:08:18,570

three-quarters of it because part of

151  
00:08:23,960 --> 00:08:22,229  
what we left is useless and if they had

152  
00:08:25,550 --> 00:08:23,970  
gone ahead and ripped out more of the

153  
00:08:28,740 --> 00:08:25,560  
field and replanted sooner they'd have a

154  
00:08:30,279 --> 00:08:28,750  
crop a lot sooner this new technique

155  
00:08:33,000 --> 00:08:30,289  
we'll have a long

156  
00:08:36,130 --> 00:08:33,010  
impact farm

157  
00:08:38,709 --> 00:08:36,140  
the results of this three-year NASA

158  
00:08:40,959 --> 00:08:38,719  
project will be shared with wine growers

159  
00:08:43,060 --> 00:08:40,969  
throughout the state will get this

160  
00:08:45,220 --> 00:08:43,070  
information developed and then take it

161  
00:08:47,290 --> 00:08:45,230  
out and let everyone else use it because

162  
00:08:51,160 --> 00:08:47,300  
no one survives in this industry alone

163  
00:08:53,290 --> 00:08:51,170

we all survive together umbria field

164

00:08:55,990 --> 00:08:53,300

management developed from the NASA

165

00:08:59,050 --> 00:08:56,000

research efforts may also improve wine