Leafroll Spread in Napa Valley

- Major spread of leafroll observed in recent years
- Began documenting spread in 2002

Grapevine leafroll disease effects:

- Can delay grape berry maturity
- Pigmentation of fruit often poor
- Yield reduction can be 30-40%
- Disease agents (virus) implicated in some types of graft incompatibility and young vine failures

Old assumptions about leafroll:

- Caused by a single virus
- Evenly distributed within vines
- Not field transmitted
- Only spread by grafting healthy stock with infected

Grapevine Leafroll Associated Viruses

GLRaV-1

GLRaV-2

GLRaV-3

GLRaV-4

GLRaV-5

GLRaV-6

GLRaV-7

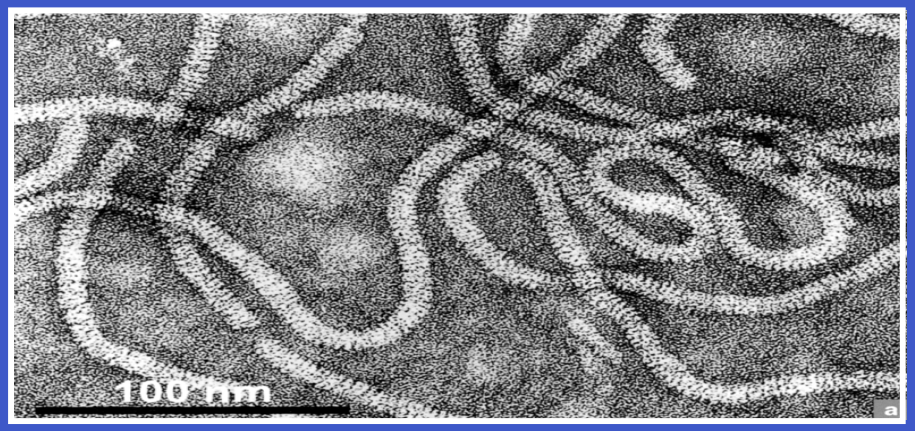
GLRaV-9

Grapevine Leafroll associated Viruses (GLRaV) Types 1 - 9:

Restricted to phloem (sap) vessels

Differ in:

- Length
- Genetic sequence
- Ability to be transmitted by mealybugs



Mealybug Transmission of Leafroll Virus

1. CLONAL LINES ESTABLISHED

2. POPULATION INCREASE

3. VIRUS ACQUISITION

4. INOCULATION PERIOD

5. INSECTICIDE SPRAY

6. VIRUS TESTING
ELISA and PCR tests
3-, 6-, and 12- months post-inoculation.

Symptoms on Cabernet Franc inoculated with LR102 using longtailed mealybugs

Transmission of different leafroll virus types by different mealybug species

	Grape	Longtail	Obscure	Citrus	Vine
GLRaV-1	**nt**	**-**	**-**	**-**	**nt**
GLRaV-2	**-**	**-**	**-**	**-**	**nt**
GLRaV-3	**+**	**+**	**+**	**+**	**+**
GLRaV-4	**-**	**-**	**-**	**-**	**nt**
GLRaV-5	**nt**	**+**	**nt**	**nt**	**nt**
GLRaV-9	**nt**	**+**	**nt**	**nt**	**nt**
GVA	**nt**	**+**	**+**	**+**	**+**
GVB	**nt**	**+**	**+**	**nt**	**+**

nt = not tested

Block 1

Cabernet Sauvignon
1989 planting

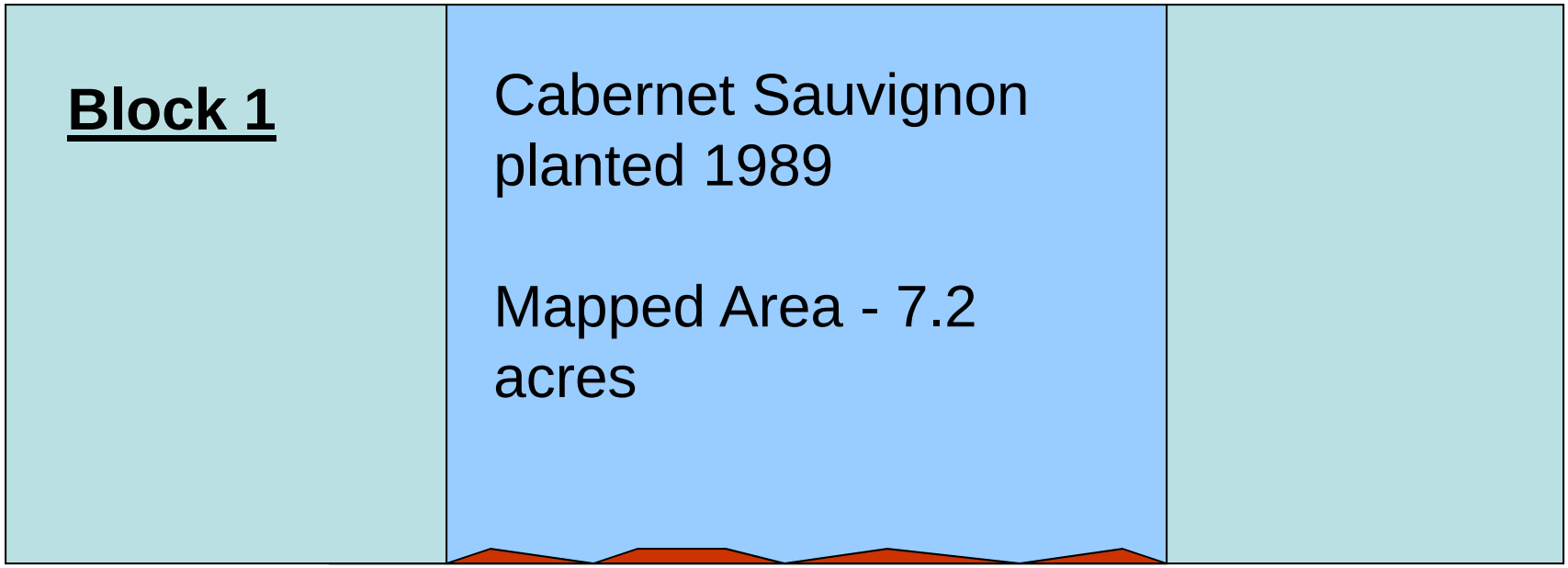
Block 2

Old Cabernet Sauvignon
1970-72
Heavy Leafroll
Pulled 1994

Block 1 **Cabernet Sauvignon**
1989 planting

Block 2 Replanted 1998


2001?

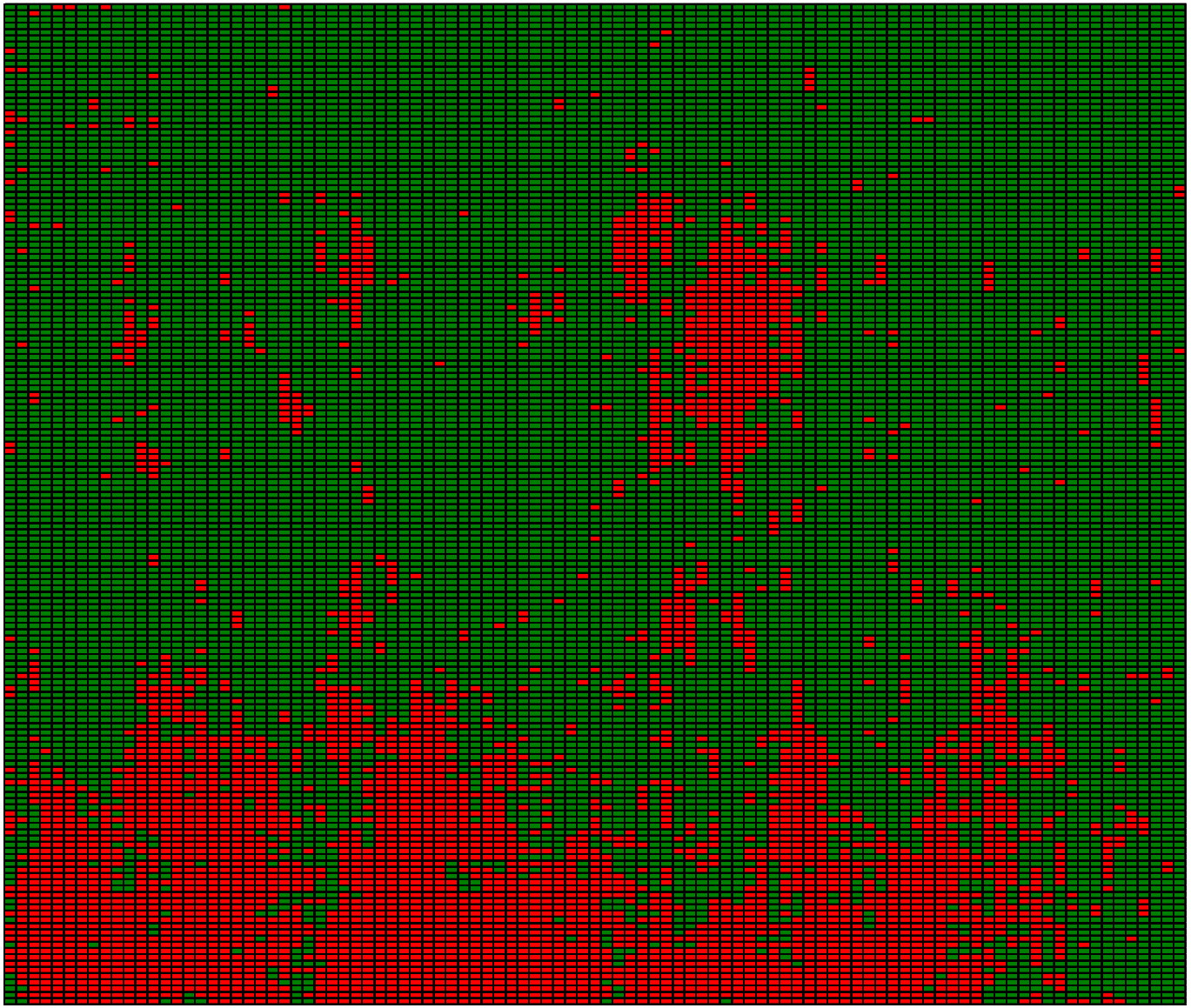


Block 2

Old Cabernet Sauvignon 1970-72
Heavy Leafroll

Pulled 1994

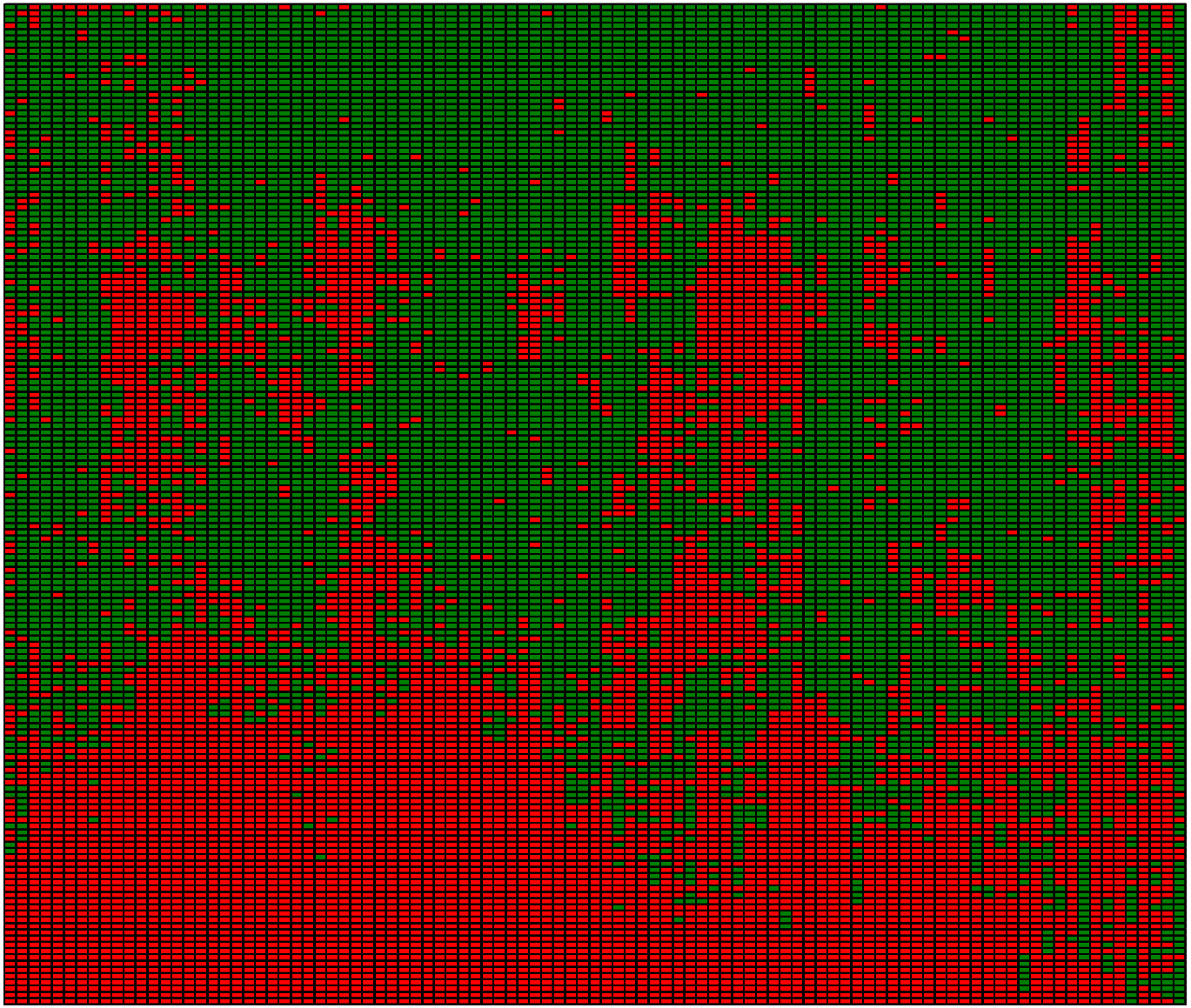
Replanted 1998



2002

Total Leafroll Rating:

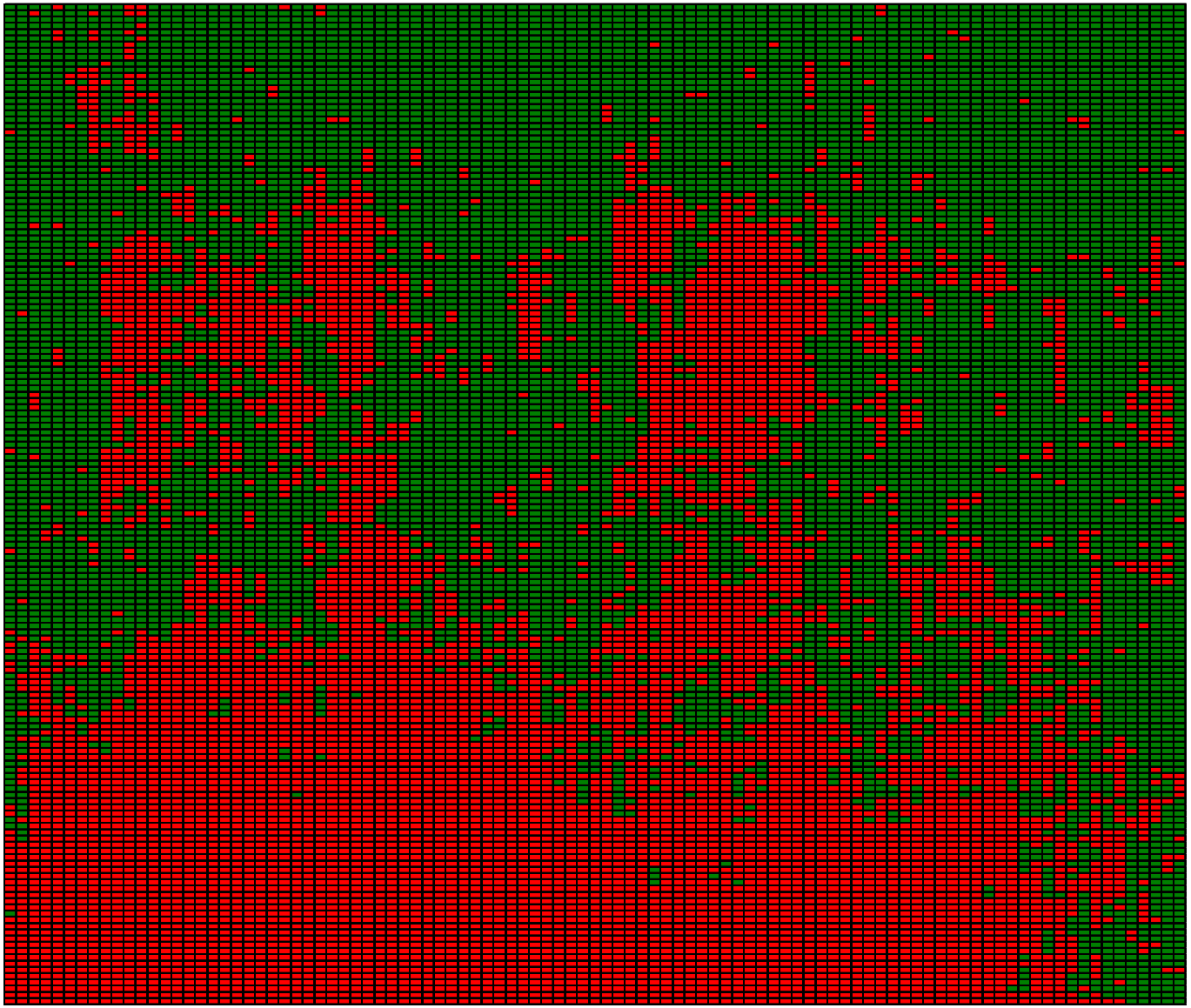
23.3%



2003

Total Leafroll Rating:

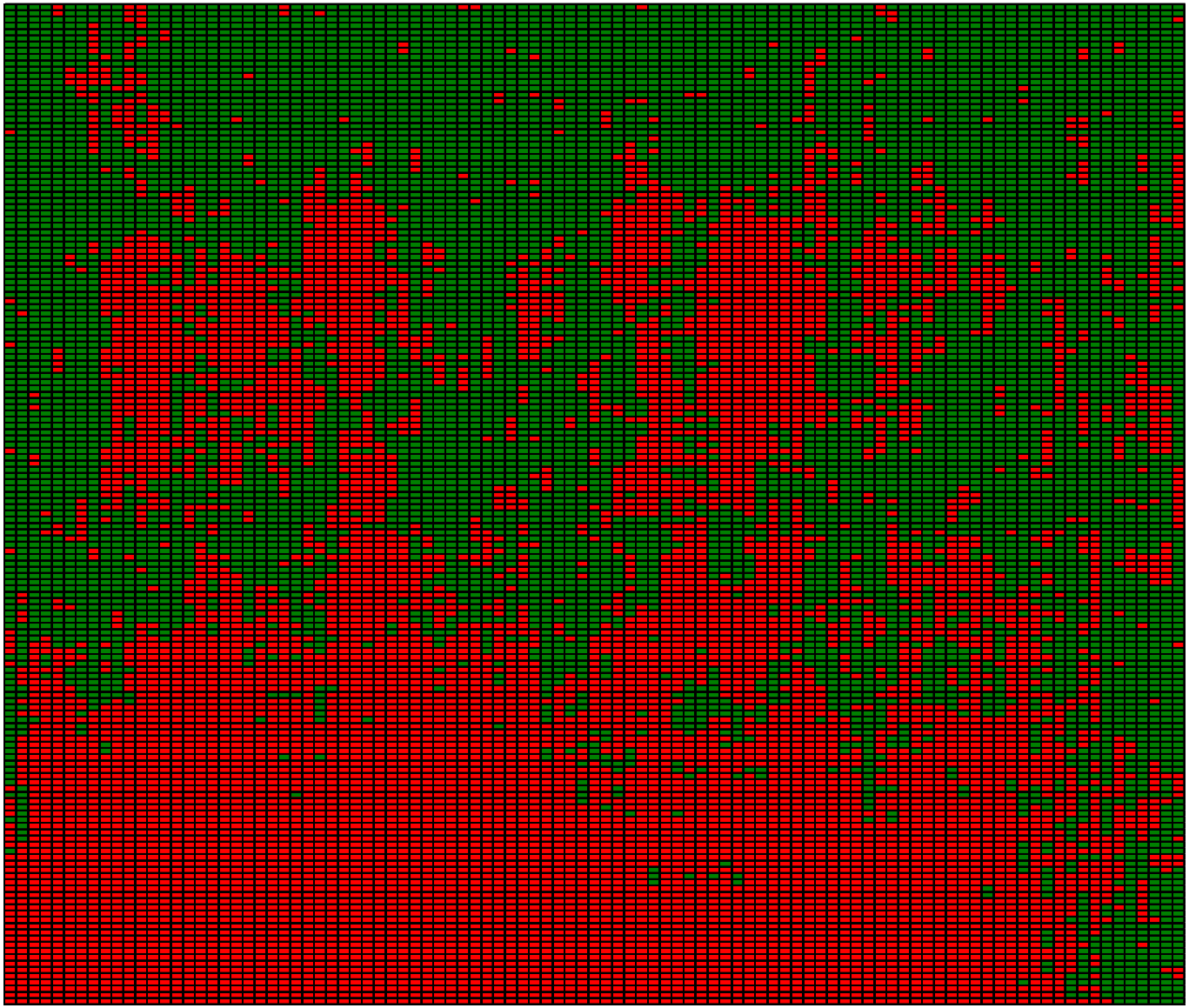
41.2%



2004

Total Leafroll Rating:

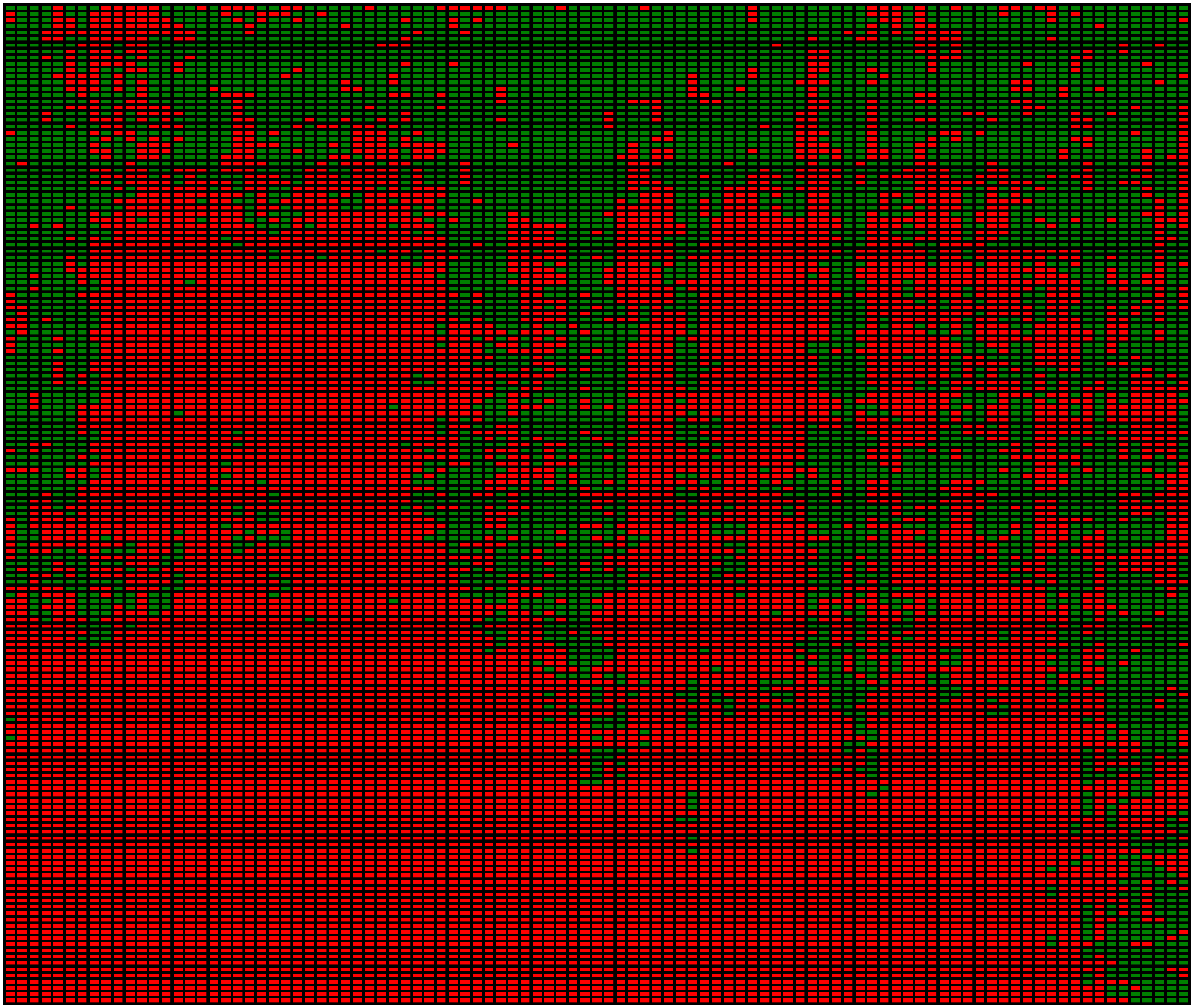
45.8%



2005

Total Leafroll Rating:

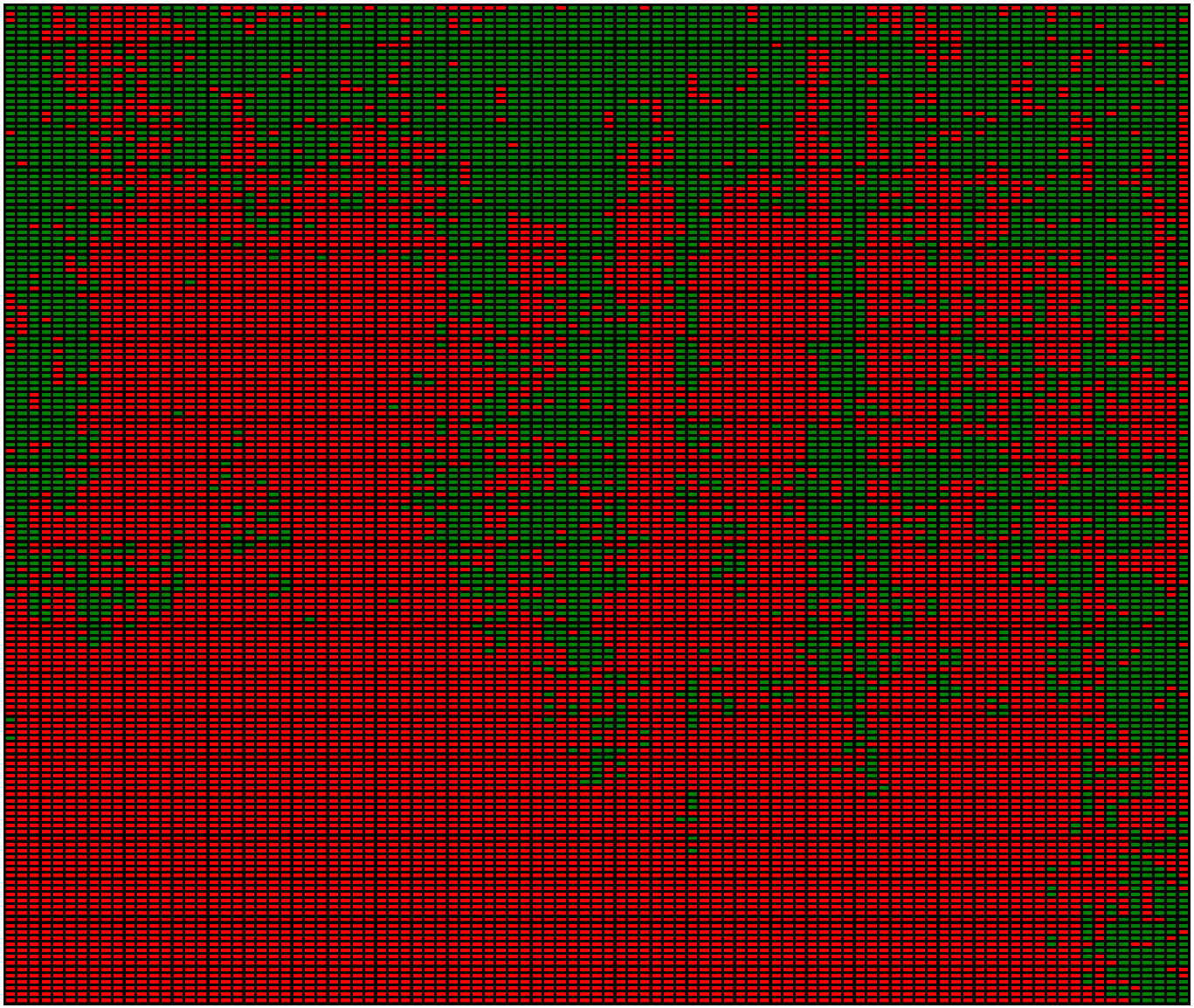
49.8%



2006

Total Leafroll Rating:

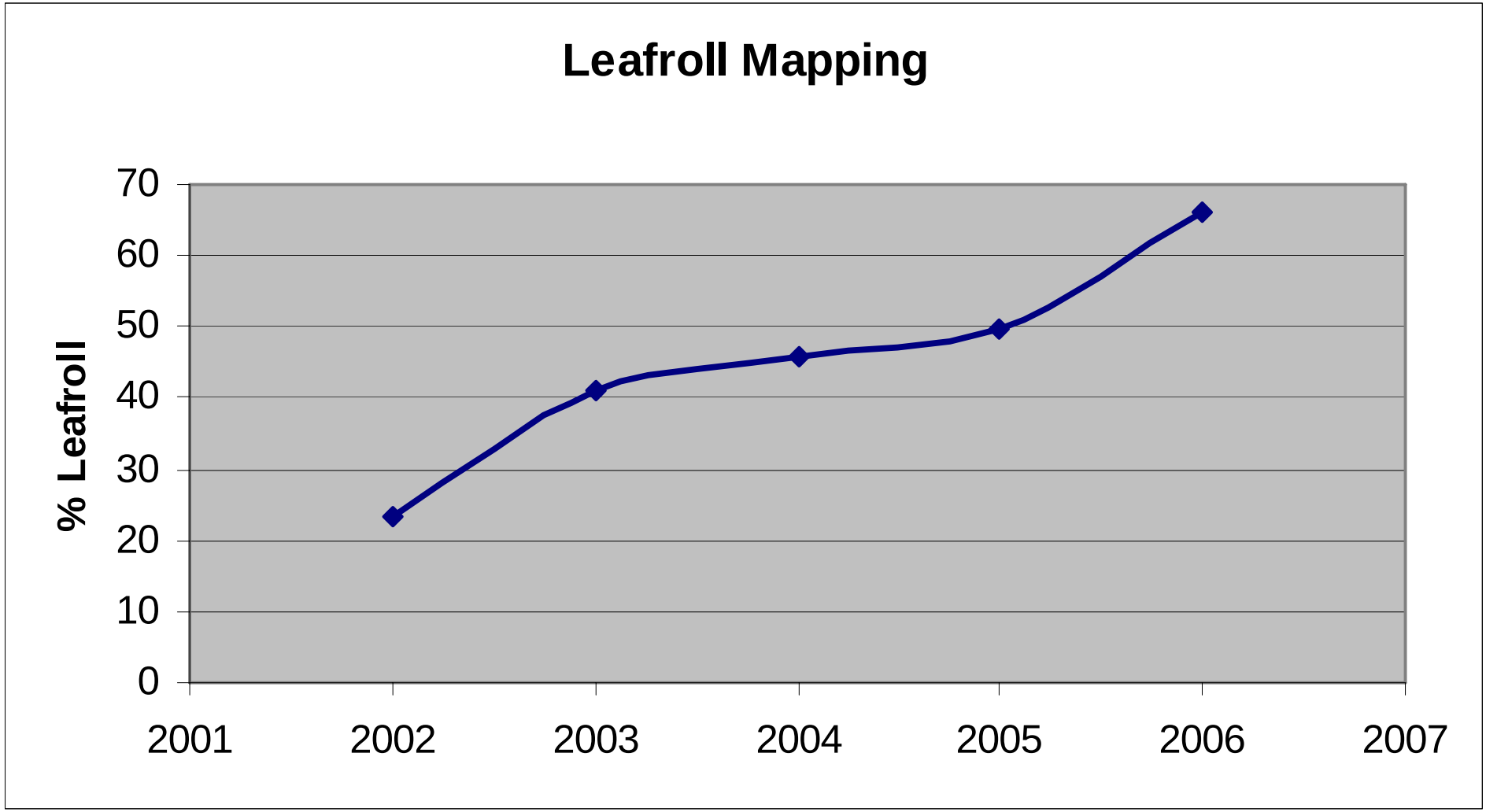
66.1%



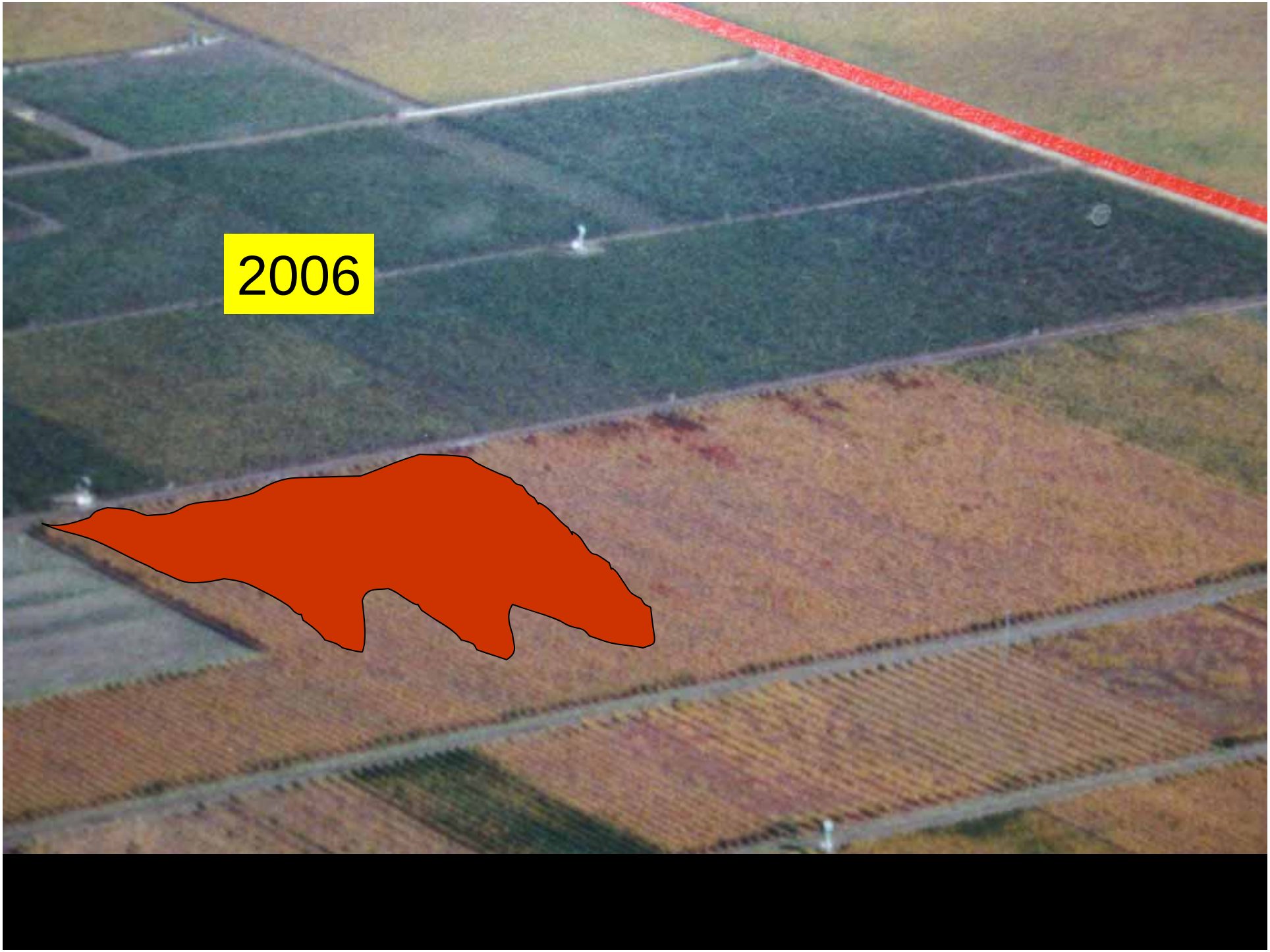
2006

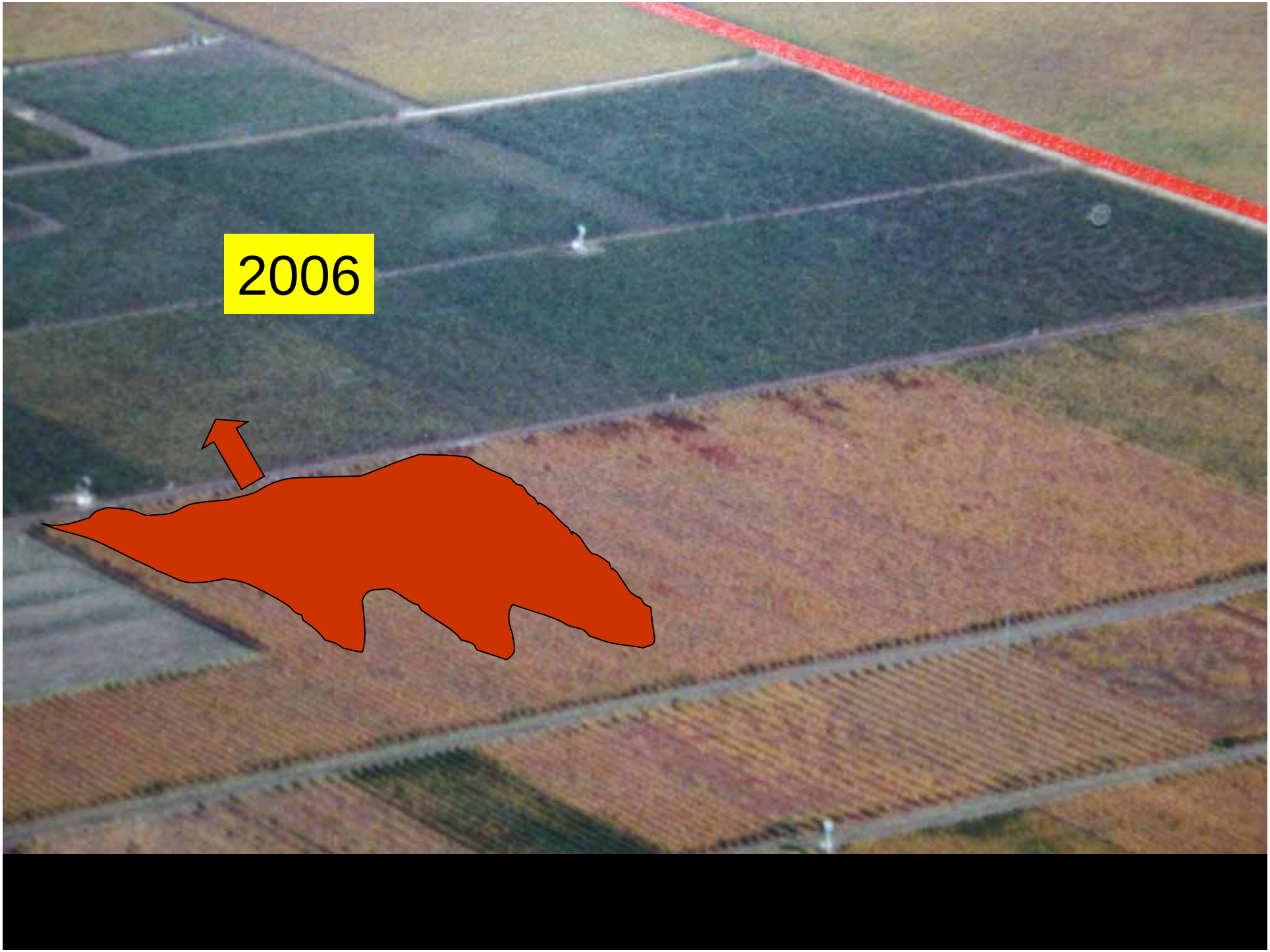
Total Leafroll Rating:

66.1%


Leafroll Mapping
% Leafroll
70
60
50
40
30
20
10
0
2001
2002
2003
2004
2005
2006
2007


2001?


2006


2006

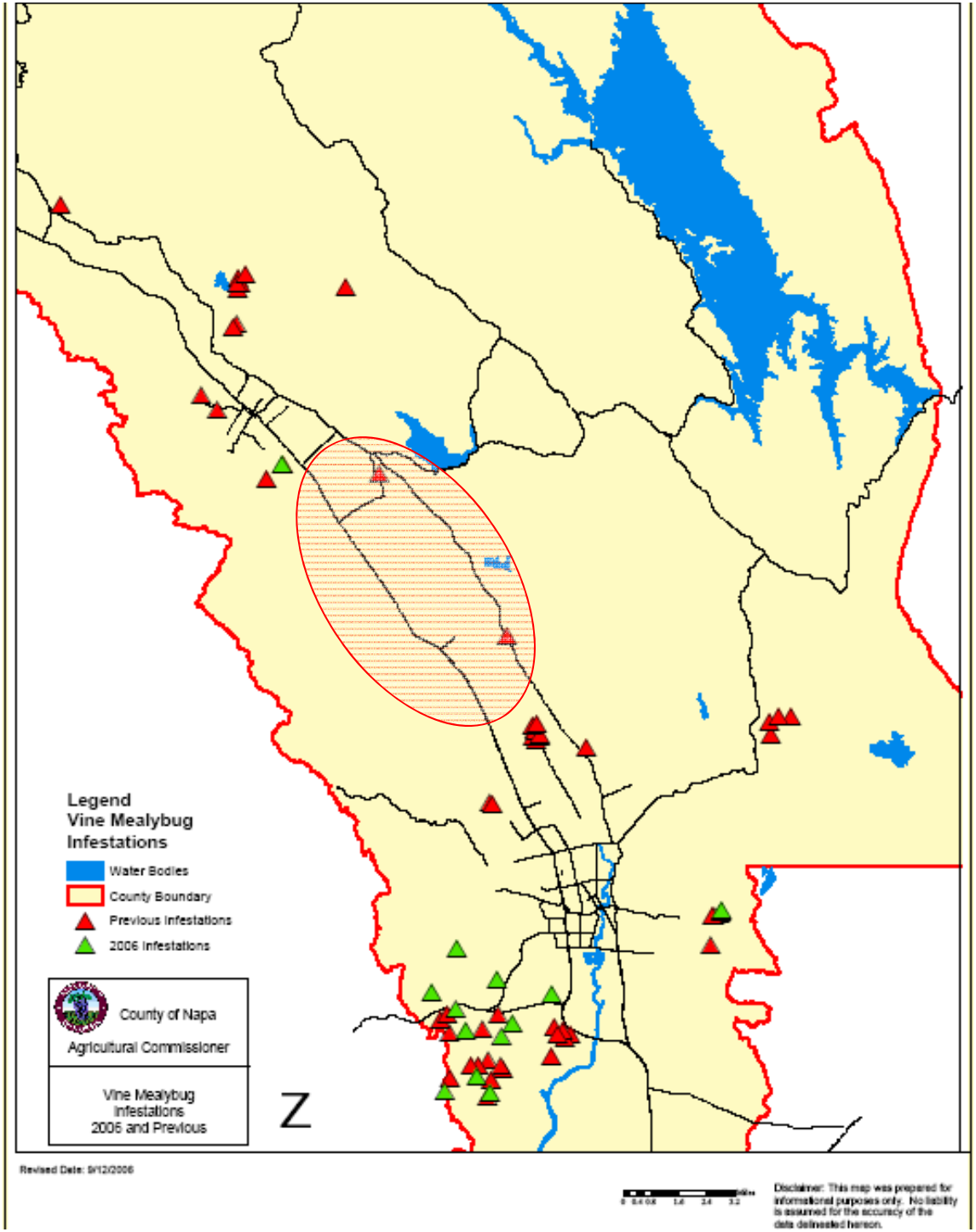
Leafroll Spread in Napa Valley

- Why is it happening now when it didn’t seem to in the past?

Why is leafroll spreading now when it didn't seem to in the past?

1) **New vectors?**

Are there new insects present that are now spreading leafroll that we didn't have before?


Legend
Vine Mealybug
Infestations
Water Bodies
County Boundary
Previous Infestations
2006 Infestations
County of Napa
Agricultural Commissioner
Vine Mealybug
Infestations
2006 and Previous
Z
Revised Date: 9/12/2006
Disclaimer: This map was prepared for informational purposes only. No liability is assumed for the accuracy of the data delineated hereon.

Why is leafroll spreading now when it didn't seem to in the past?

2) Rootstock differences?

AXR and St. George are more tolerant of some viruses than other rootstocks. Did this type of spread always occur but was less obvious before?

Why is leafroll spreading now when it didn't seem to in the past?

3) **Was Leafroll 3 recently introduced to California via "suitcase selections"?**

Other strains of leafroll are not transmitted by mealybugs.

How can we minimize the potential for spread?

Limiting Leafroll Spread

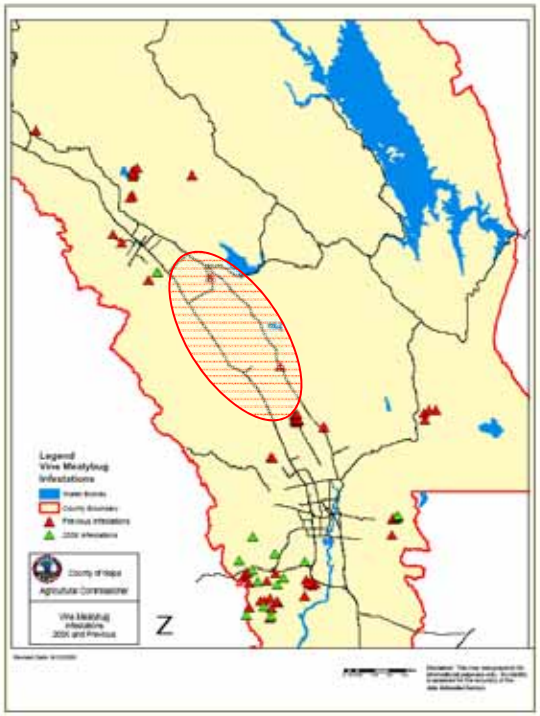
1) **Plant Certified Grapevines!**

   Most plants sold in California are uncertified. To get certified plants from your nursery, you must ask.

Limiting Leafroll Spread

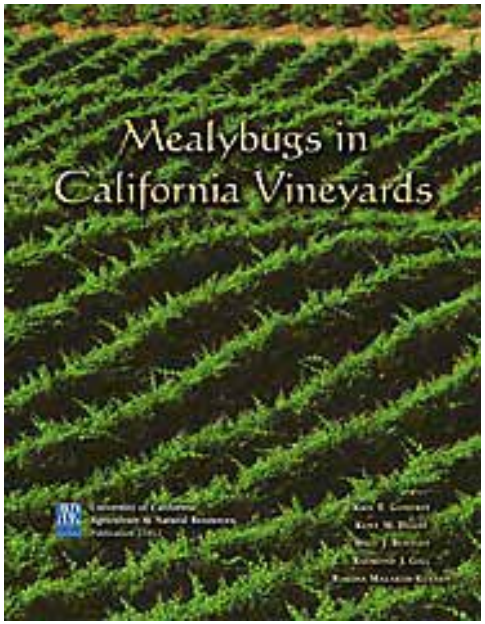
1) Plant Certified Grapevines

2) Consider implementing a mealybug control program



Mealybugs in California Vineyards

University of California Cooperative Extension



For More Information

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