

Virus Resistance – A Possible Solution To Snap Bean Losses



W. R. Stevenson and C. R. Grau
Department of Plant Pathology
UW-Madison

Snap Bean Viruses – A Recurring Problem Since 2000

- 2000 - Fields near Oostburg, Belgium and Cambria
 - High incidence of plants with virus-like symptoms
 - Many fields exhibiting these symptoms were destroyed prior to harvest – losses represented several hundred acres
- 2001 – Primary incidence along Lake Michigan near Manitowoc; scattered incidence elsewhere; losses less than 2000

Observations During 2002

- Outbreaks of soybean aphids delayed and lighter than in 2000 and 2001
- Virus outbreaks on snap beans observed only on late planted snap bean fields
- Symptoms most visible on late plantings in eastern WI along Lake Michigan
- Losses to virus diseases on snap beans were minimal in 2002

Snap Bean Diseases – Virus Diseases

Overall Key Points

- **Pathogen: Several viruses detected**
 - ◆ **May involve: CMV (Cucumber mosaic virus), AMV (alfalfa mosaic virus) and other viruses**
 - ◆ **All are stylet borne aphid transmitted**
- **Symptoms :**
 - ◆ **Leaf and pod mosaic**
 - ◆ **Plant stunting, pod blemishes, internal pod discoloration**
 - ◆ **Blossom abortion, pod drop, low yields, low quality**
- **Timing of symptoms consistent with soybean aphid buildup**
- **Control of aphid vectors and transmission of viruses difficult with conventional approaches**
- **Some cultivars express field tolerance to CMV and possibly other viruses**

Snap Bean Germplasm Virus Evaluation- 2002

- Three trials:
 - West Madison Agricultural Research Station –
 - two planting dates
 - Commercial snap bean field near Manitowoc, WI
 - 120 plot entries representing majority of snap bean breeding programs in U.S.
- Each entry - 20' long - 2-row plots
- 3 replicates

Snap Bean Germplasm Virus Evaluation- 2002

	Manitowoc	W Madison early	W Madison late
Planted	7/9	6/21	7/24
Leaf sample 1			
• collected	8/22	8/14	9/9
• assayed	8/28	8/20	9/12
Leaf sample 2			
• collected	9/11		9/20
• assayed			9/27
Visual rating	8/22, 9/11	8/14-8/15	8/30, 9/6, 9/28

Snap Bean Germplasm Virus Evaluation- 2002

Lines included:

Agora	Dandy (+/-Gaucho)	Honker
ALBERTA	Del Monte IDVA1001, IDVB1002, IDVB1003, IDVD1004	Hystyle (+/- Gaucho)
Ambassador		Igloo (+/- Gaucho)
Arena	Dorint	Indy Gold
Avalon	Endurance	Jersey
BBL-156	Envy	Keeper 85 (+/- Gaucho)
Benchmark	Evergreen (+/- Gaucho)	Kylian
Benton	FESTINA	Landmark
Brotherton: #883, VW 535, VW 738	Formost	Lexus
Carson	Green Arrow	Masai
Casino	Harris-Moran HMX 00065, HMX 0103, HMX 0104, HMX 0944, HMX 1947, MV-185	Mayon
Castano		Minidor
Castel		Montano
Celtic	Hercules (+/- Gaucho)	Nelson
		Newton

Snap Bean Germplasm Virus Evaluation- 2002

Lines included:

Odessa	Scuba	True Blue
Opera	Scylla	Tyro
Orion	Seminis 08190504, 08190505, 08190509, 08780412, 08790467, BBL 47, BBL 94, RS 1394, RWG 1045, 08190506	WISC.MDR-214
Pension	Shade	Yukon
PIPER	Sirio	
PIX	Summit (+/- Gaucho)	
PLS (each +/- Gaucho) 118, 442, 72, 75, 83, 86, 87, 88, 99	Syngenta/Rogers HB 1745-3-1-5-4, IDMV19, IDMV20, IDMV40, SB4243	
Polder	TAPIA	
Probe	Topps (+/- Gaucho)	
Rambo		
Roma II (+/- Gaucho)		
Saurus		
Savannah		

















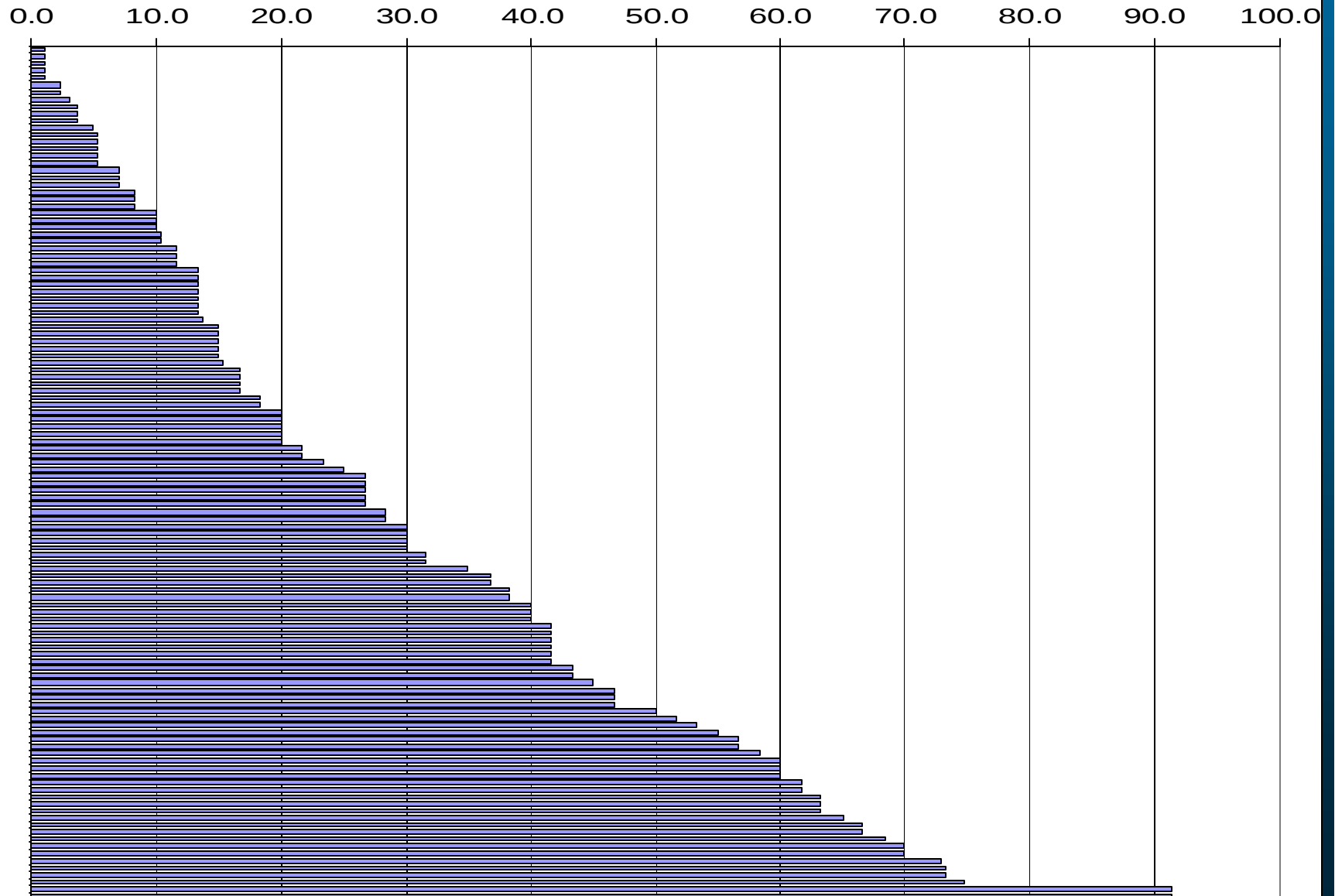






Snap Bean Germplasm Virus Evaluation- 2002

W. Madison, Late Planting Visual Rating 9/6 – VARIABILITY



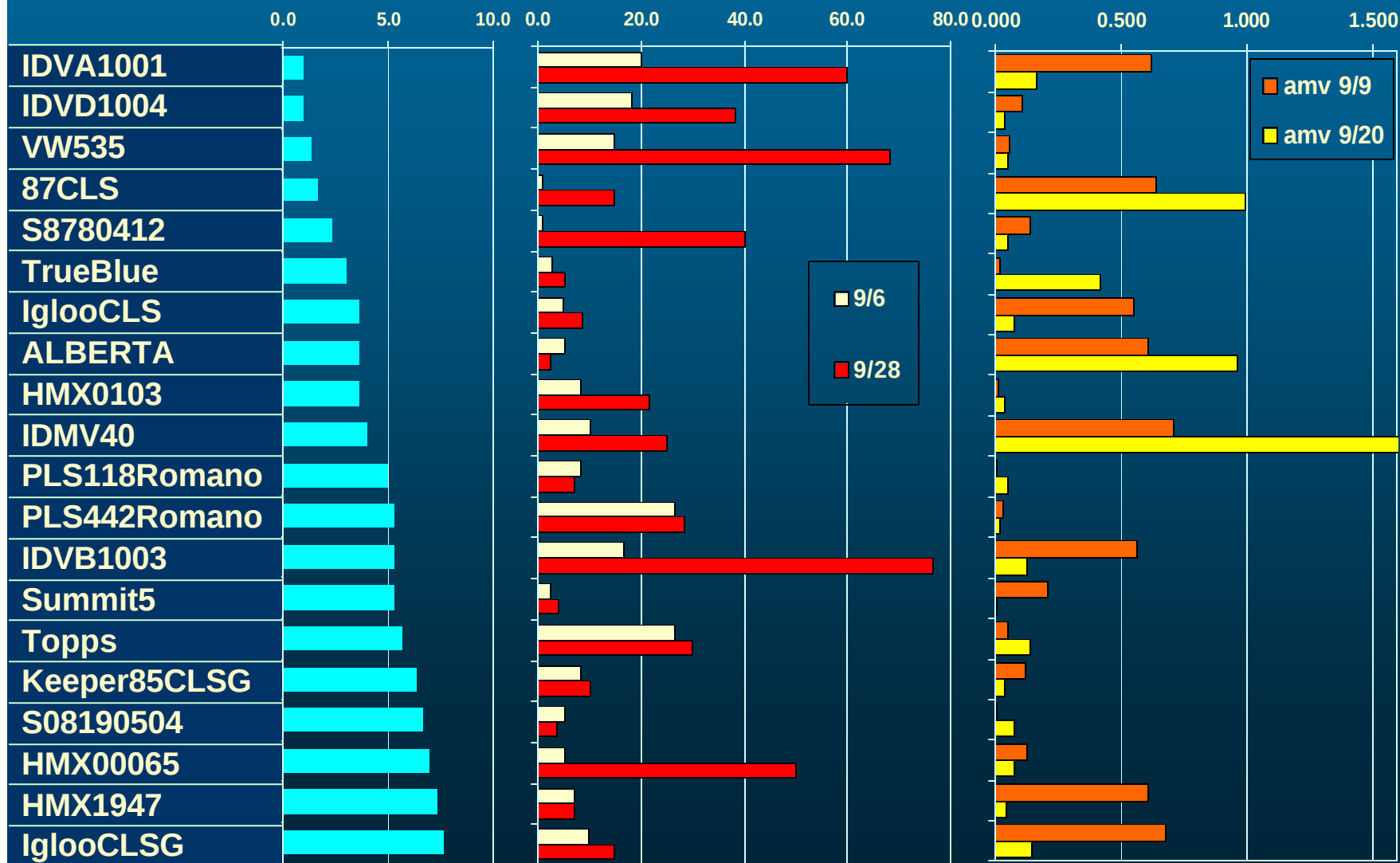
Snap Bean Germplasm Virus Evaluation- 2002

W. Madison, Late Planting – VARIABILITY

Visual rating 8/30 (20 lowest)

Visual rating 9/6 and 9/28

AMV (ELISA)



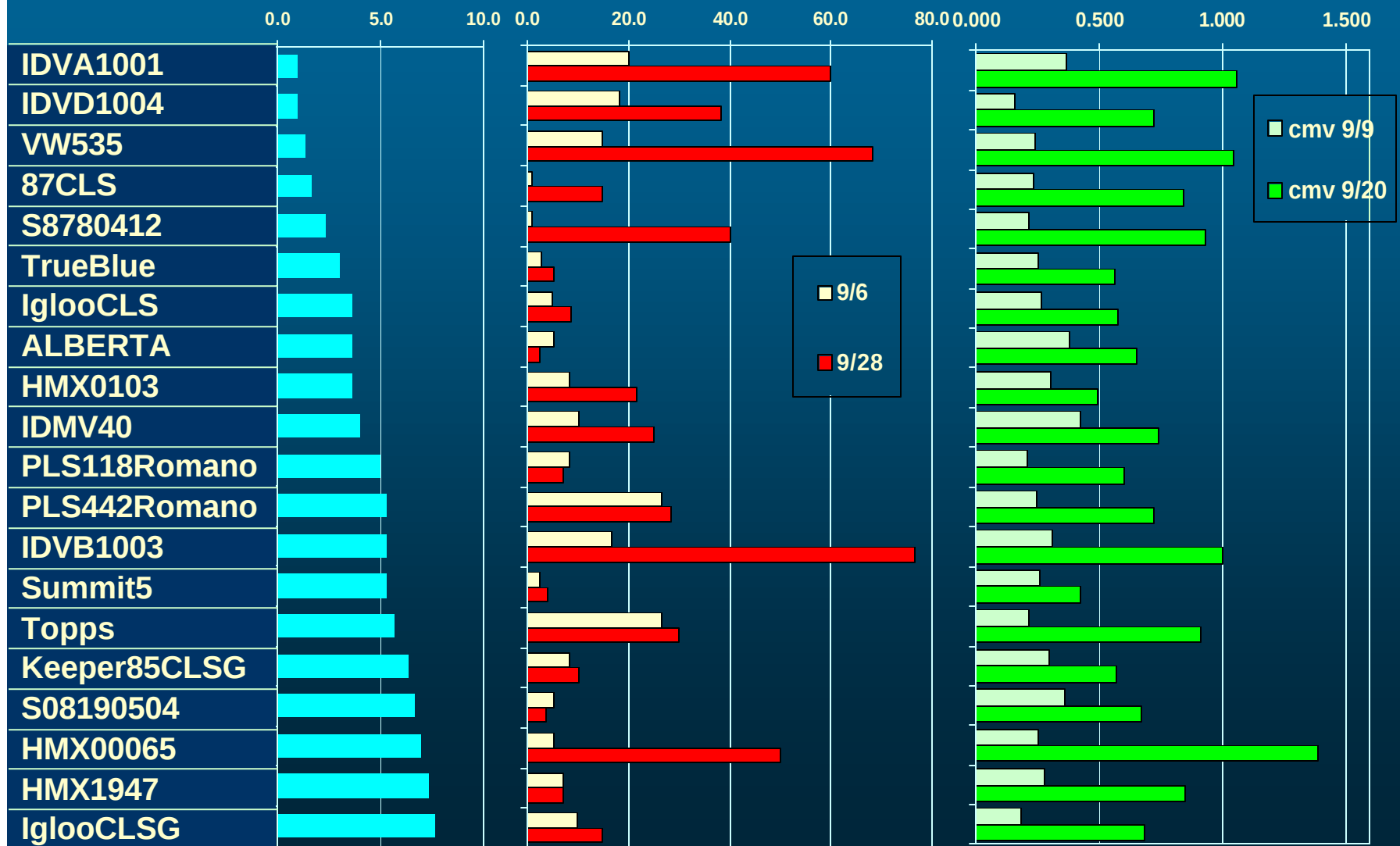
Snap Bean Germplasm Virus Evaluation- 2002

W. Madison, Late Planting – VARIABILITY

Visual rating 8/30 (20 lowest)

Visual rating 9/6 and 9/28

CMV (ELISA)



Snap Bean Germplasm Virus Evaluation- 2002

W. Madison, Late Planting – Effect of Gaucho

Visual rating 8/30

Visual rating 9/6 and 9/28

AMV (ELISA)

0

50

100

0

50

100

0.000

0.500

1.000

Dandy + G

Dandy

Evergreen + G

Evergreen

Hercules + G

HERCULES

Hystyle + G

Hystyle

Igloo + G

Igloo

Keeper85 + G

Keeper85

PLS75 + G

PLS75

PLS87 + G

PLS87

PLS88 + G

PLS88

Roma II + G

Roma II

Summit + G

Summit

Topps + G

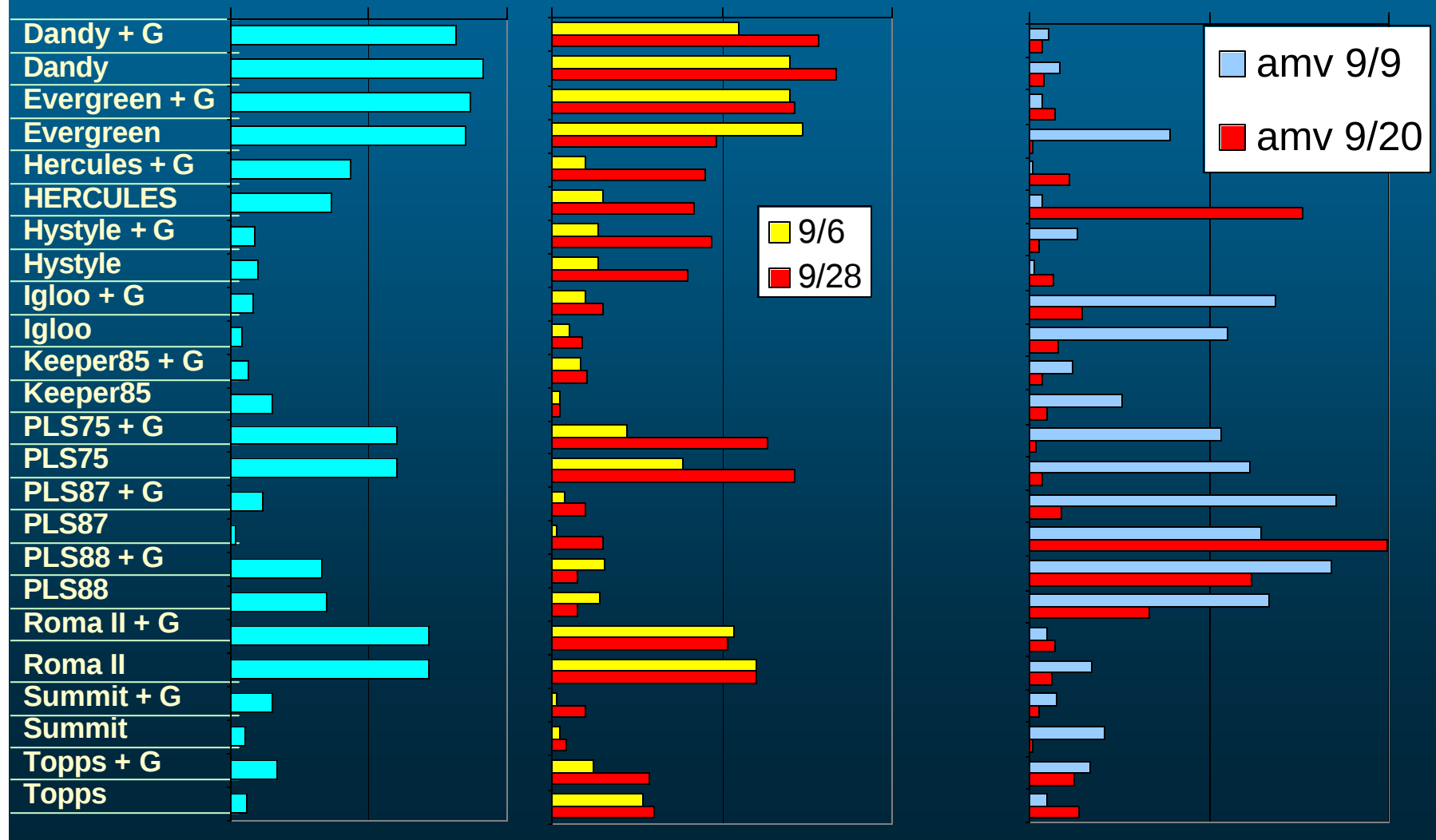
Topps

9/6

9/28

amv 9/9

amv 9/20



Snap Bean Germplasm Virus Evaluation- 2002

W. Madison, Late Planting – Effect of Gaucho

Visual rating 8/30

Visual rating 9/6 and 9/28

CMV (ELISA)

0

50

100

0

50

100

0.000

0.500

1.000

Dandy + G

Dandy

Evergreen + G

Evergreen

Hercules + G

HERCULES

Hystyle + G

Hystyle

Igloo + G

Igloo

Keeper85 + G

Keeper85

PLS75 + G

PLS75

PLS87 + G

PLS87

PLS88 + G

PLS88

Roma II + G

Roma II

Summit + G

Summit

Topps + G

Topps

9/6

9/28

cmv
9/9

cmv
9/20















