

Keeping ahead of blackleg disease – a breeders view



Canola Breeders

canola growers' choice

Wallace Cowling

Research Director
Canola Breeders



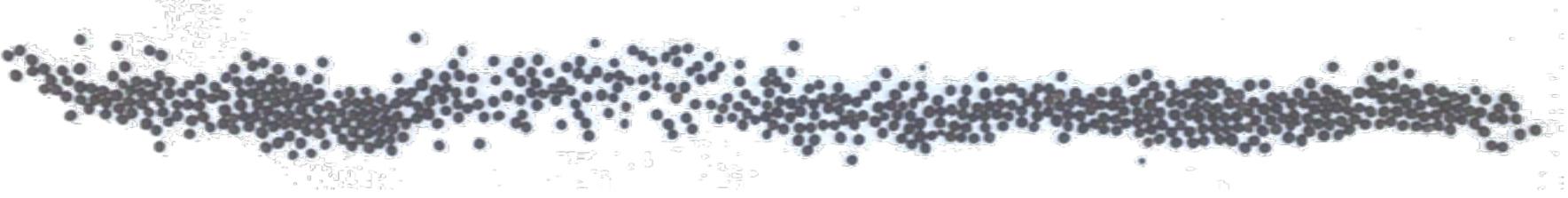
THE UNIVERSITY OF
WESTERN AUSTRALIA
A Leading University



LEMBKE®



Strategies for managing blackleg

- 
- Genetics (resistant varieties)
 - Fungicides
 - Agronomic practices



Resistant varieties



VARIETY	TYPE	BLACKLEG RESISTANCE RATING BARE SEED	BLACKLEG RESISTANCE RATING +FLUQUINCONAZOLE
CONVENTIONAL VARIETIES			
Hyola 50		R	
SARDI 515M	INDUSTRIAL MUSTARD	R	(P)
Victory 3001	HIGH STABILITY OIL	R-MR	
Monola™ NMC130	HIGH STABILITY OIL	R-MR	
Hyola 433		R-MR	
AV-Garnet		MR	(R*)
Tarcoola		MR-MS	
TRIAZINE TOLERANT VARIETIES			
Monola™ 76TT	HIGH STABILITY OIL	R-MR	
Monola™ 77TT	HIGH STABILITY OIL	R-MR	
Lightning TT		R-MR	(P)
Hurricane TT		MR	
ATR-409		MR	
CB™ Tumbo HT		MR	(P)
ATR-Marlin		MR	(R)
CB™ Mallee HT		MR	(P)
CB™ Jardee HT		MR	
Rottnest TTC		MR	
CB™ Argyle		MR	(R)
Tawriffic TT		MR	
ATR-Barra		MR	

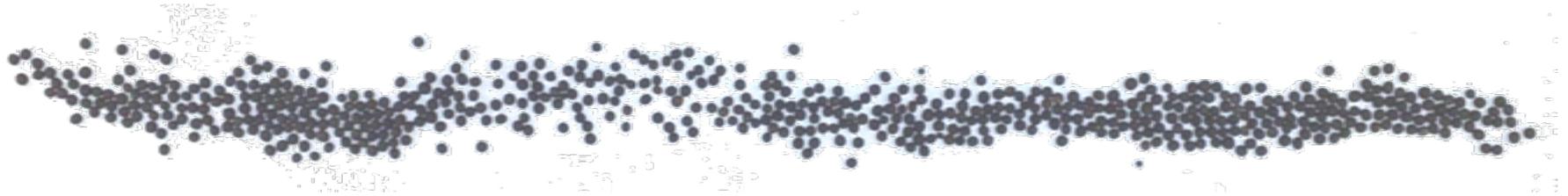


Resistant varieties

- Don't rely on “perfect resistance”
 - R can break down if not “protected”
 - The blackleg fungus adapts very quickly to new varieties
 - *Always support resistance with fungicides and best agronomic practices*
- Judge the level of resistance to your risk
 - High or low rainfall? Proximity to stubble? R, MR or MR-MS?
- Different companies have different types of resistance
 - Rotate varieties from different companies
- Be aware of different types of resistance
 - Use a range of types – R, MR, MR-MS
 - *Always support resistance to with fungicides and best agronomic practices*



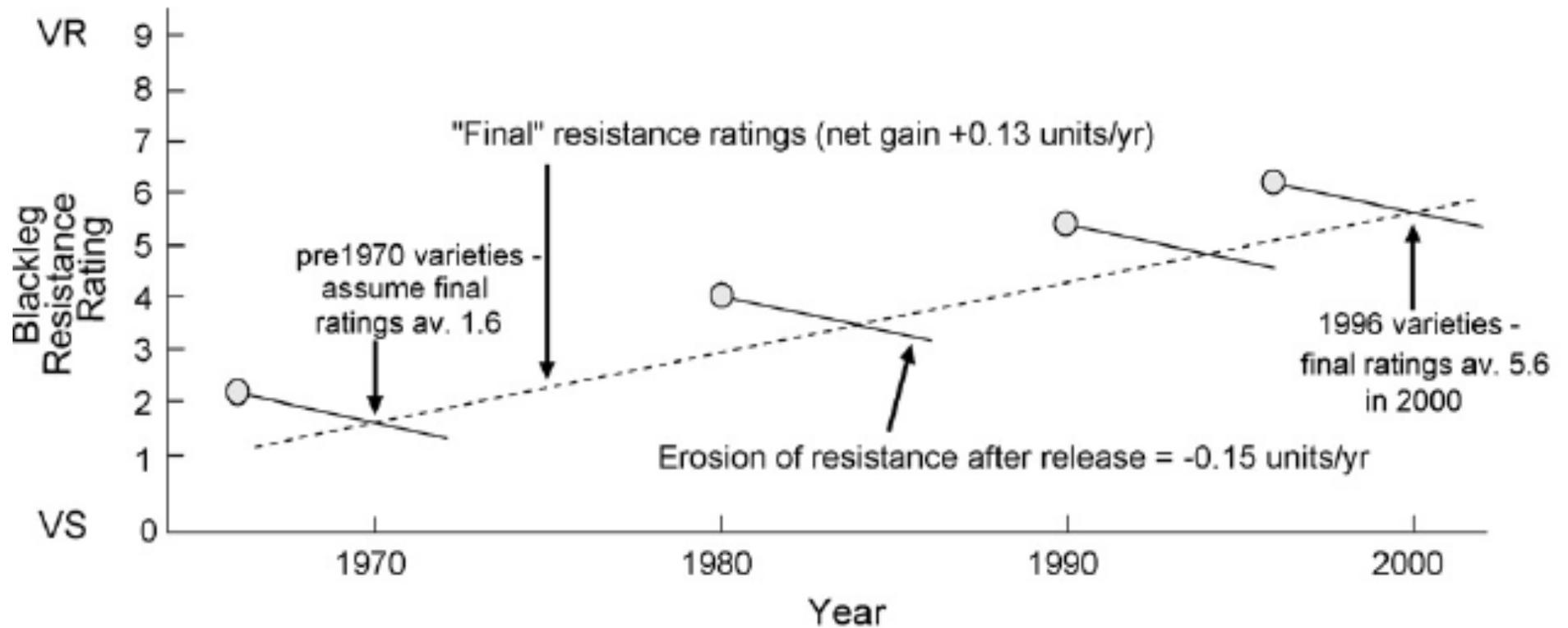
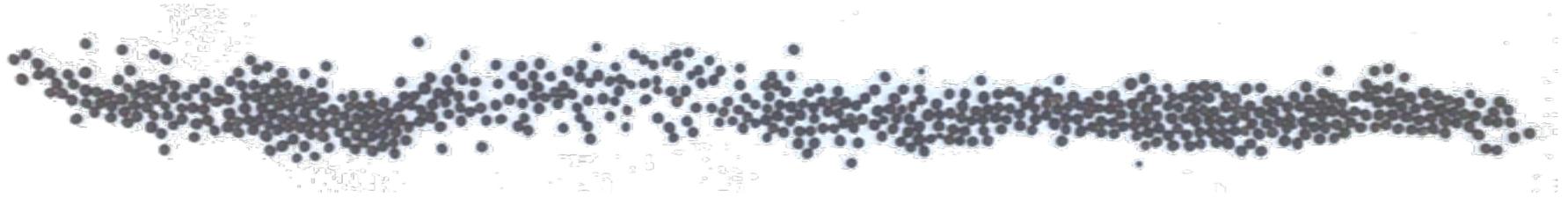
Different types of resistance



- Major gene: very resistant (“R”)
 - Effective across a wide range of environments; “look good”
 - Simple to breed with major genes, but backup with polygenic resistance to avoid “catastrophic collapse”
 - *Always support R varieties with fungicide and best agronomic practices (rotation of varieties, distance from stubble, etc)*
- Polygenic resistance = moderate resistance (“MR”)
 - Complex resistance, many minor genes, challenging to breed
 - Vary in effectiveness in different environments
 - Breeding for polygenic resistance is a continuous process
 - *Always support R varieties with fungicide and best agronomic practices (rotation of varieties, distance from stubble, etc)*



A model of “decay” in resistance





“Continuous breeding for resistance”



- New lines tested in at least two disease nurseries
 - different strains of the blackleg fungus



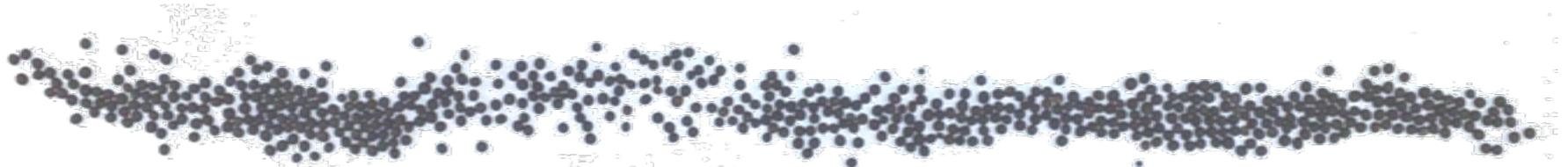


Keeping ahead of blackleg – a joint effort of farmers and breeders

- If you think there is a perfect resistance gene, you are wrong
- Always back up R and MR varieties with best practice
 - Fungicide seed dressings and in furrow
 - Rotate varieties (R and MR, different companies)
 - Distance from nearest stubble
 - Assess your risk (region, rainfall)
- Resistance breeding against blackleg disease is a continuous process
 - genetic diversity in breeding programs is the key to long term success in improving polygenic resistance



A quote from a fellow breeder



- Quantitative genes are “team players” in contrast to the relatively few “superstar” major genes, especially those prone to injury and breakdown. Reducing disease susceptibility with durable quantitative resistance is much more sustainable than masking susceptibility with short-term major gene resistance. New genetic diversity should be introgressed into elite breeding populations on a regular basis to maintain long-term viability of a breeding program. The old African proverb “If you want to go fast, go alone; if you want to go far, go with a group” applies to breeding and genes as much as it does to travel.