

# Drench Resistance in Hume

- 2012/2013
- Hume LHPA and Zoeitis
- 25 farms volunteered



**X** denotes farms that participated in the trials



# What is a Drench Resistance Trial?

- Aka faecal or worm egg count reduction test
- It's a test that you do on-farm
- Tells you which drenches are working and which are not
- Once every 2-3 years



# How did we run our Drench Resistance Trials?

- Used undrenched weaners
- Average of >200 epg
- Preliminary faecal sample  
of 10 animals
- Most farms a total of  
around 90 head were used



Source: Sheep 201



# How did we run our Drench Resistance Trials?

- Sheep were randomly put into small groups of 12- 15 head
  - Each group was assigned a different drench
  - Plus a control
- Identified
- Weigh
- Drench with calculated dose rate



# What is a Drench Resistance Trial?

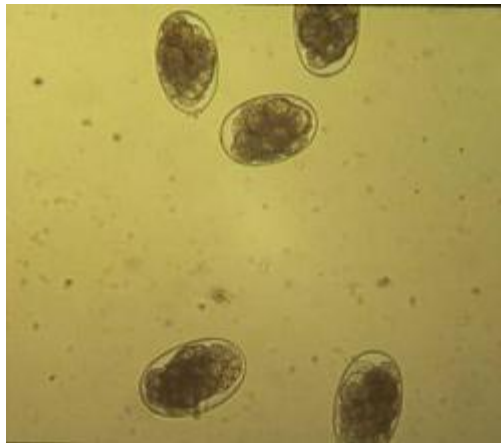
- Repeat faecal samples at 10-14 days directly from rectum
- Collect from 10 animals per group



Stewart Hinze (unfortunately it was Movember)

# At the Lab

- Veterinary Health Research Laboratory  
Armidale
- Faecal egg count for all groups
- Larval culture to identify species



Worm eggs

Source: Sheep 201



Worm larvae

Source: [wool.com/Rob Woodgate](http://wool.com/Rob%20Woodgate)

## At the Lab cont...

- Treatment and control groups are compared
- For each worm species calculate the percentage killed by a particular drench
- Percentage reduction = drench efficacy
- Drench resistance is defined as  $< 95\%$  drench efficacy ie  $> 5\%$  survive



Source: CSIRO



# Drenches Tested in Hume

| Drench  | Number of Farms |
|---|-----------------|
| Ivermectin (Ivomec®)  | 25              |
| Derquantel/abamectin (Startect®)                              | 25              |
| Moxidectin (Cydectin®)  | 24              |
| Naphthalophos/benzimidazole/levamisole (Rametin® Combination) | 22              |
| Abamectin/benzimidazole/levamisole (Triguard®)                | 14              |
| Benzimidazole/levamisole (Scanda®)                            | 12              |
| Closantel   | 2               |
| Levamisole (Nilverm®, clear drench)                           | 1               |
| Ivermectin/benzimidazole/levamisole (ivermectin 'triple')     | 1               |
| Monepantel (Zolvix®)  | 1               |

# Worms Present

| Worms  | Number of Farms |
|--|-----------------|
| <i>Teladorsagia</i> (Small Brown Stomach Worm) | 25              |
| <i>Trichostrongylus</i> (Black Scour Worm)     | 24              |
| <i>Haemonchus</i> (Barber's Pole Worm)         | 15              |



**Small Brown Stomach Worm**

Source: Royal Veterinary College



**Black  
Scour  
Worm**

Source:  
Wormboss/Nick  
Sangster



**Barber's Pole Worm**

Source: Sheep 201

# Drench Resistance

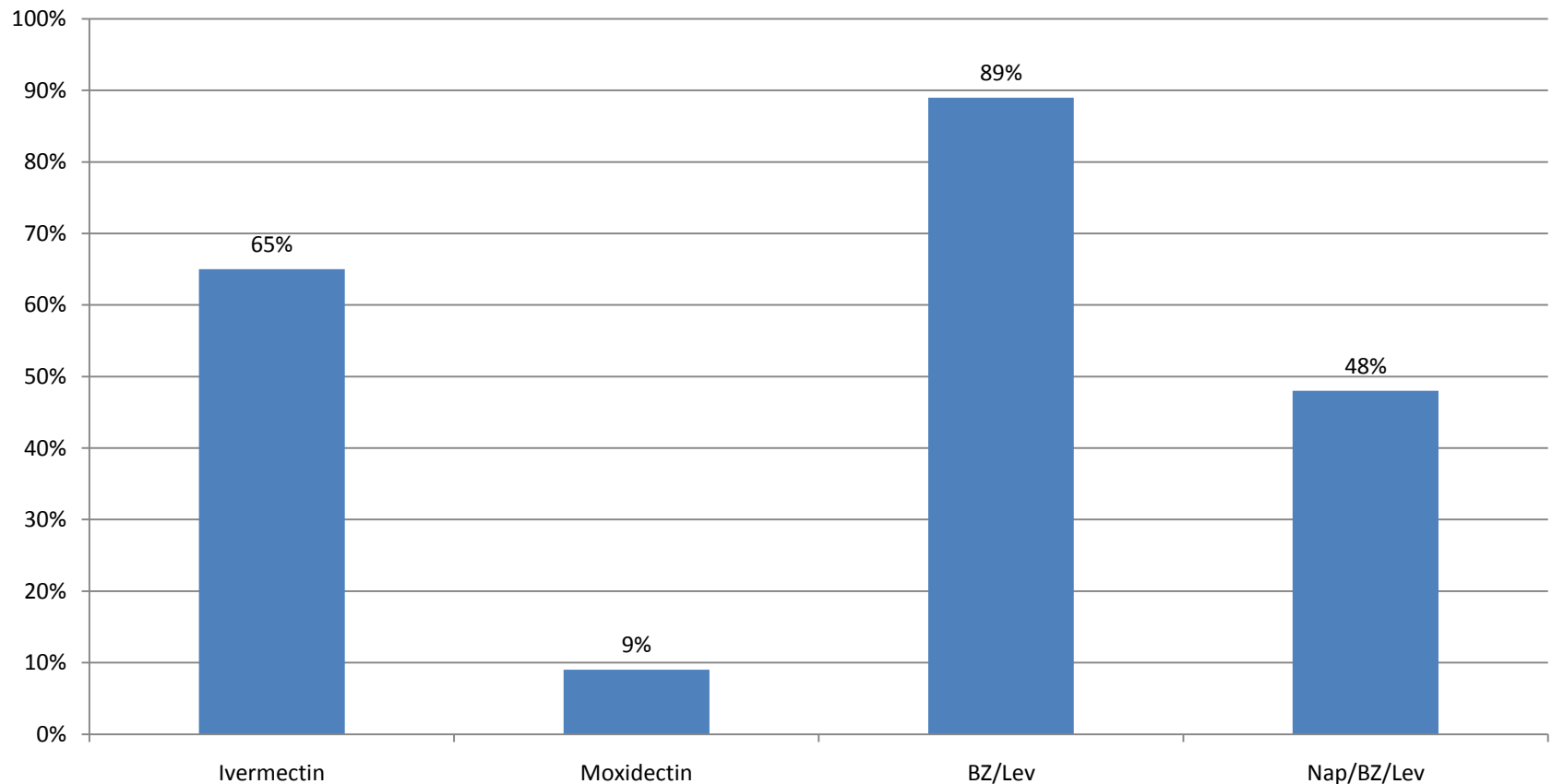


Source: Zazzle



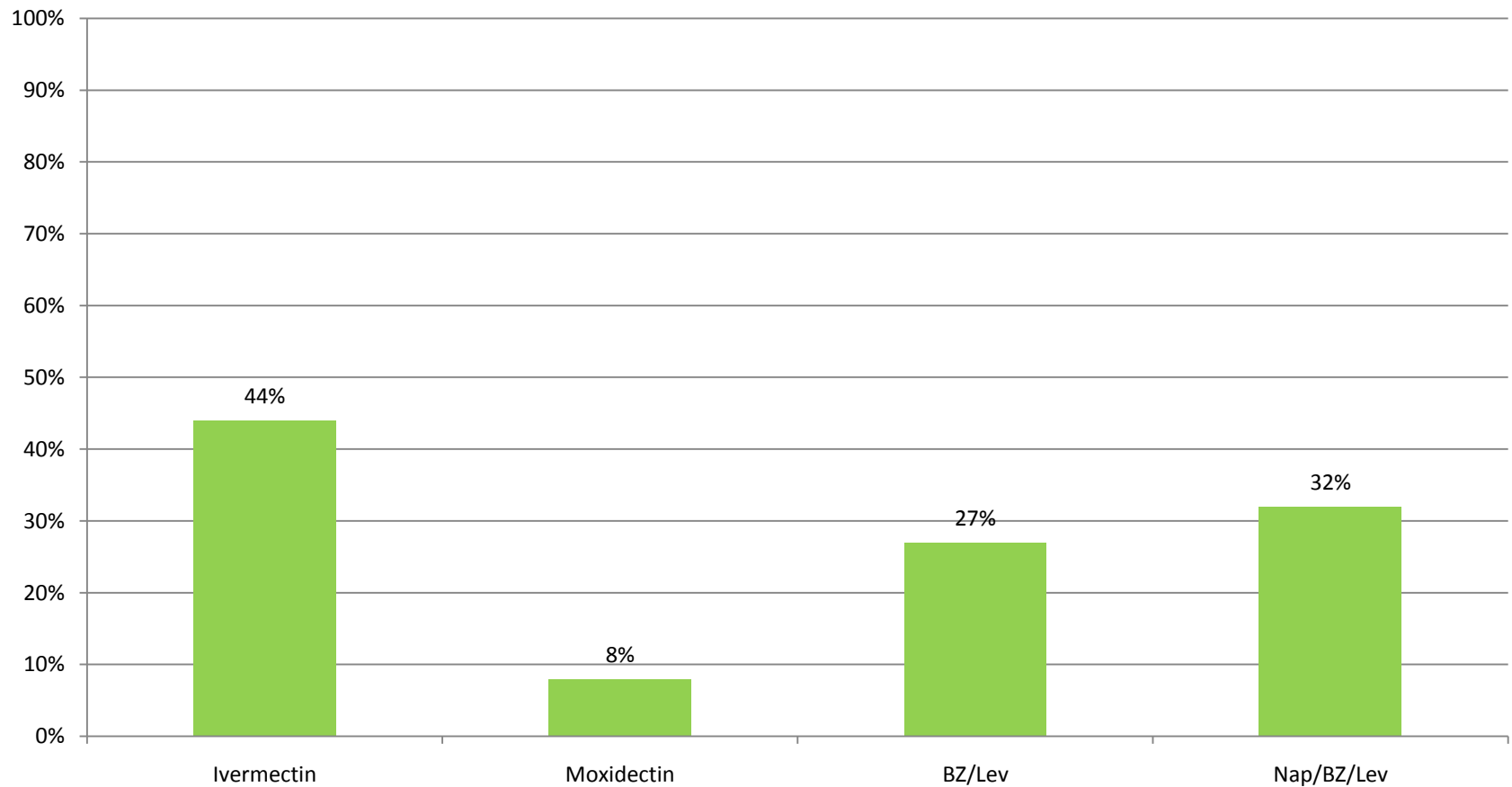
# Small Brown Stomach Worm

Percentage of Properties with *Teladorsagia* Resistance



# Black Scour Worm

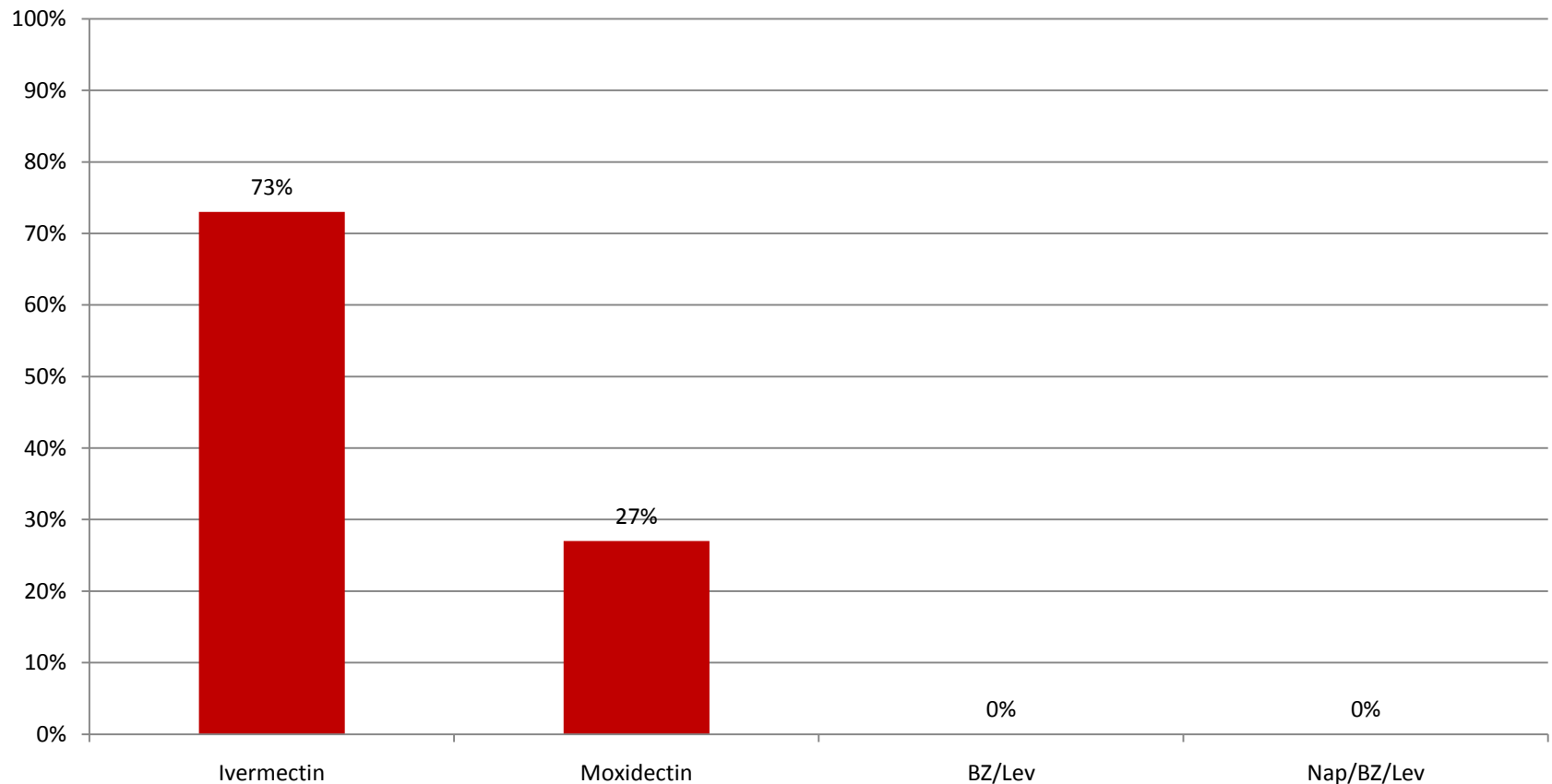
Percentage of Properties with *Trichostrongylus* Resistance





# Barber's Pole Worm

Percentage of Properties with *Haemonchus* Resistance



# Farm 1

- Merino weaners
- Ill-thrifty and scouring, weren't growing well
- Given Cydectin at weaning
- 90 weaners left undrenched for the trial



Source: Novartis

# Faecal Egg Counts

|      | Control | IVM  | NAP/BZ/LEV | BZ/LEV | MOX | Derq/ABA |
|------|---------|------|------------|--------|-----|----------|
| Min  | •240    | 160  | 0          | 0      | 0   | 0        |
| Max  | 3440    | 2280 | 640        | 600    | 200 | 40       |
| Mean | 1848    | 752  | 100        | 228    | 32  | 4        |

# Drench Efficacy

## Percentage of worms killed

|                    | Control | IVM  | NAP/BZ/LEV | BZ/LEV | MOX  | Derq/ABA |
|--------------------|---------|------|------------|--------|------|----------|
| Overall Efficacy % |         | 59.3 | 94.6       | 87.7   | 98.3 | 99.8     |
| Black Scour        |         | 86   | 96         | 98     | 100  | 100      |
| Small Brown        |         | 63   | 92         | 75     | 97   | 100      |
| Barber's Pole      |         | 0    | 100        | 100    | 97   | 100      |

- 1<sup>st</sup> summer drench
  - Zolvix



Source: futuresmag

- Between-drench rotation
  - Novel molecules – Zolvix and Startect (once registered)
  - Abamectin triples or Q-drench
  - Naphthalophos combination drenches
  - Moxidectin
  - Do not use ivermectin including ivermectin triples
- Monitor – DrenchCheck 10 days



## Farm 2

- Merino weaners
- Appeared healthy
- Commonly uses Weanerguard<sup>®</sup> and Cydectin<sup>®</sup>
- 90 weaners used in trial



# Faecal Egg Counts

|      | Control | IVM | NAP/BZ/LEV | BZ/LEV | MOX | Derq/ABA |
|------|---------|-----|------------|--------|-----|----------|
| Min  | 40      | 160 | 0          | 0      | 0   | 0        |
| Max  | 640     | 560 | 80         | 80     | 280 | -        |
| Mean | 400     | 340 | 12         | 8      | 124 | -        |

# Drench Efficacy

|                    | Control | IVM | NAP/BZ/LEV | BZ/LEV | MOX | Derq/ABA |
|--------------------|---------|-----|------------|--------|-----|----------|
| Overall Efficacy % |         | 15  | 97         | 98     | 69  | 92*      |
| Black Scour        |         | 0   | 79         | 100    | 0   | 100      |
| Small Brown        |         | 40  | 100        | 94     | 71  | 76*      |
| Barber's Pole      |         | 100 | 100        | 100    | 100 | 100      |

Interesting to have completely susceptible Barber's Pole – unpredictable

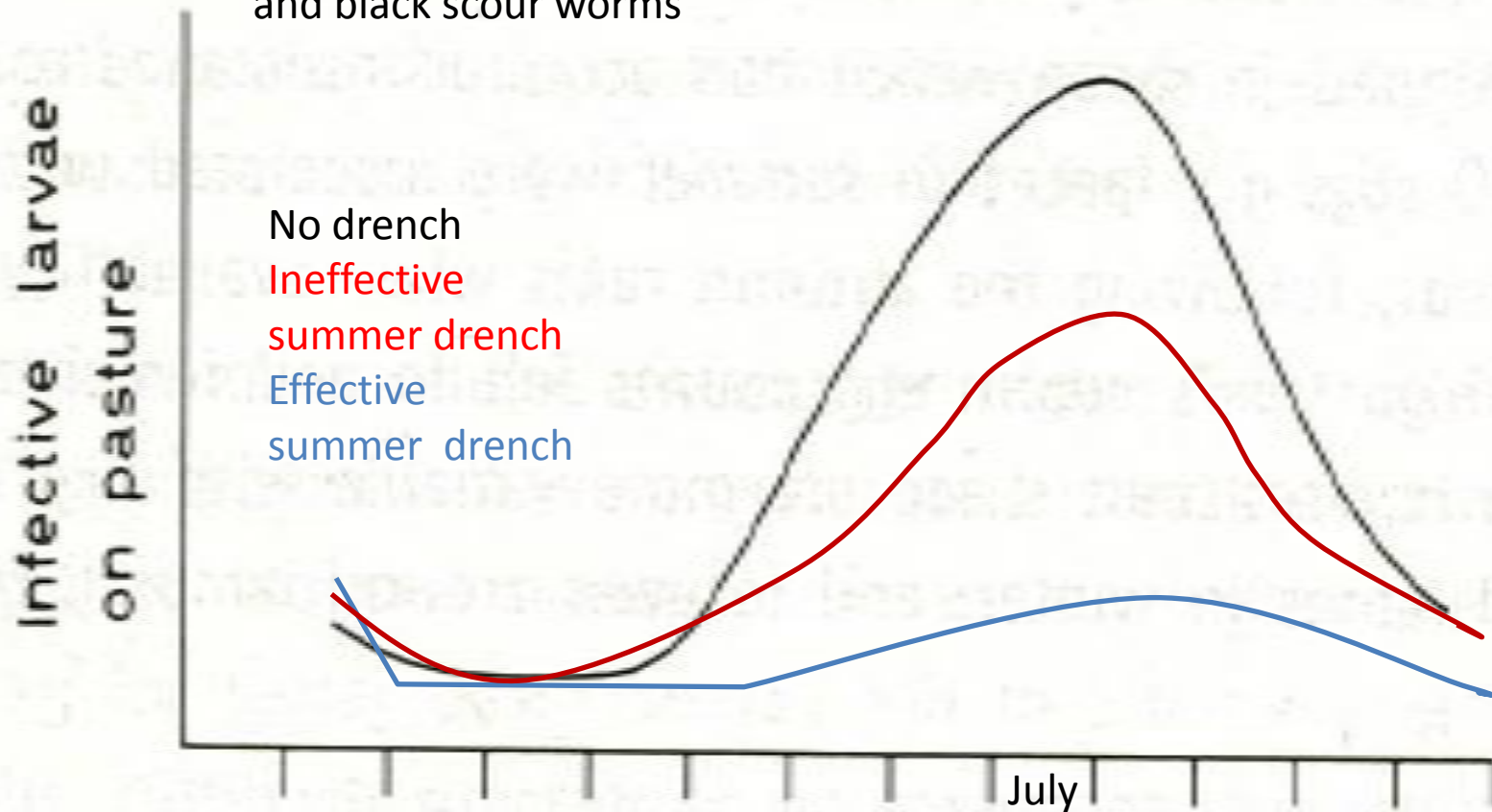


Source: University of  
Westminster

- Stay away from ivermectin and moxidectin
- Rotate between triples, Q drench, naphthalophos combinations and novel molecules
- Monitor with DrenchChecks
- Farmer very surprised by moxidectin resistance
- Causing production loss rather than disease
- Would also be causing pasture contamination with resistant larvae

# Pasture Contamination

Small brown stomach  
and black scour worms





# Resistance Summary

- **Whites/clears** have reached the end of the line
- **Naphthalophos combination** drenches are still useful on some properties and are a valuable rotation option
- **Abamectin triples** working well based on our trials
- **Novel molecules** are also effective and should be introduced now

# More Summary

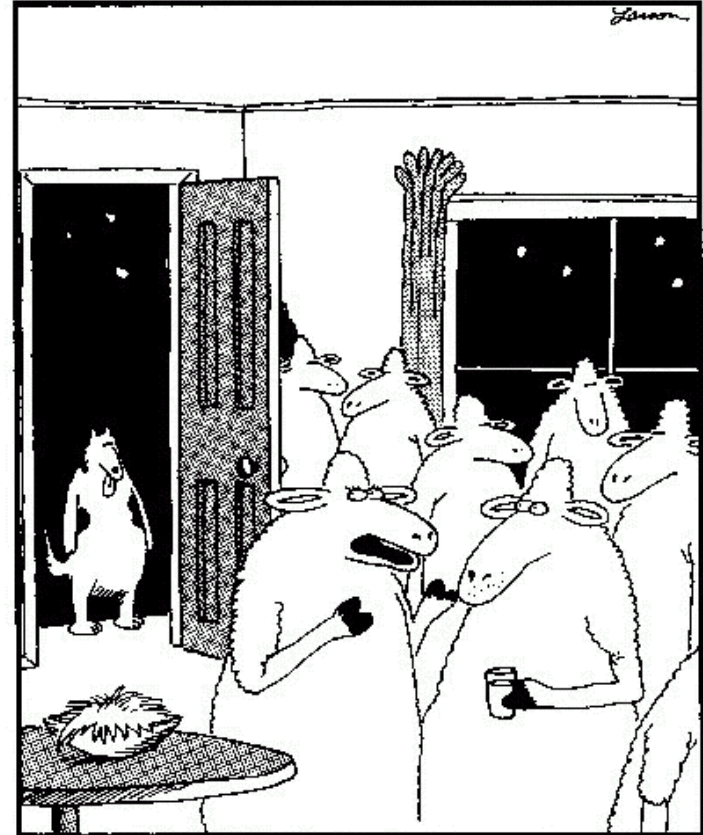
- **Ivermectin** resistance is widespread in Hume in all three main species of sheep worm
- Further research is needed for ivermectin resistance in the small brown stomach worm
- **Moxidectin** resistance is increasing

# Final Thoughts

- Drench resistance may cause disease
- May go undetected but cause production and economic loss
- Regular monitoring with DrenchChecks at 10 days
- Results of a drench resistance trial are unique for each farm and not always predictable
- Do your own drench resistance trial every 2-3 years – totally worth it

# Acknowledgements

- Jock Muroe and Neil Charman at Zoetis Animal Health
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“Henry! Our party’s total chaos! No one knows when to eat, where to stand, what to ...  
Oh, thank God! Here comes a border collie!”