Evidence based parasite control for horses

Which tests to use and when to use them to target wormers

Claire Shand

Director & SQP | Westgate Laboratories

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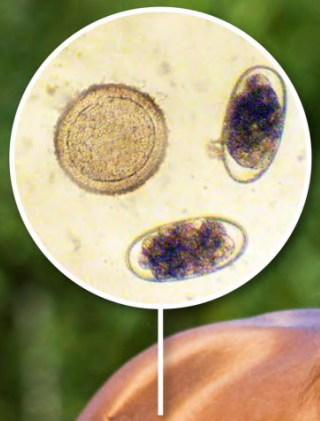
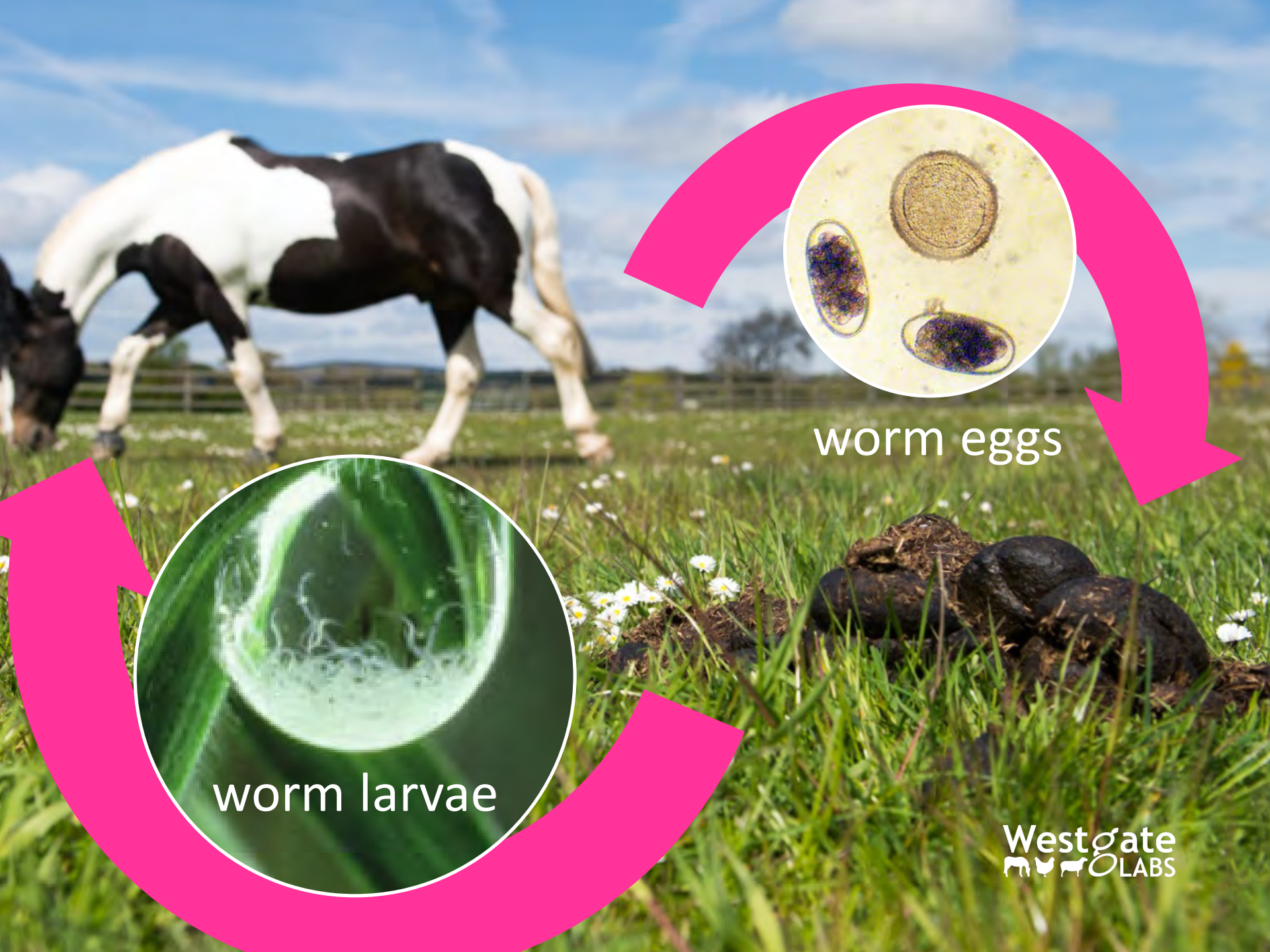


What we're going to cover:

- How horses get worms and the parasites that affect them.
- Resistance - why we need to move to test based worm control
- Testing techniques available for the different parasites affecting horses
- How to build this into a programme for a healthy horse


worm eggs
worm larvae
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eew... what's this in my horse's poo?

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Wild horses

- Non intensive
- Graze large areas
- Multi species

= LOW RISK

Domestic horses

- Intensive
- Confined grazing areas
- Single species

= HIGHER RISK

BENZIMIDAZOLES

IVERMECTIN

MOXIDECTIN

PYRANTEL

PRAZIQUANTEL

Horse wormers

Licenced in the UK

Westgate LABS

IVERMECTIN + PRAZIQUANTEL

MOXIDECTIN + PRAZIQUANTEL

Combination wormers

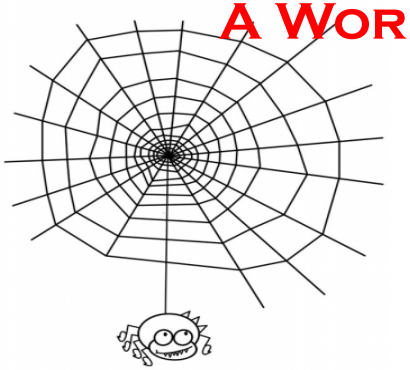
Licenced in the UK

Westgate LABS

KILL THEM !

Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Worm	Worm	Worm	Worm	Worm	Worm	Worm	Worm	Worm	Worm		

A Worming Programme From the Good Old Days



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Wormer Resistance and how it develops

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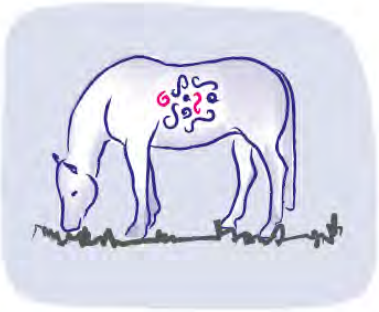
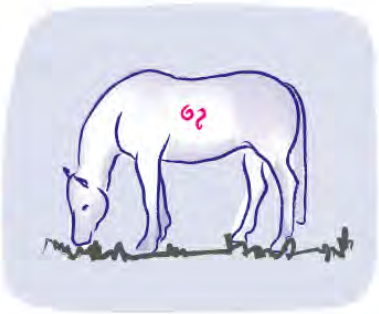
A horse naturally has a worm burden of non-resistant and some resistant worms

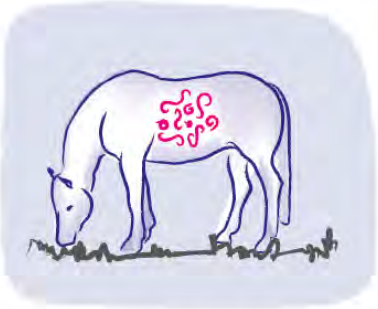


The horse is wormed

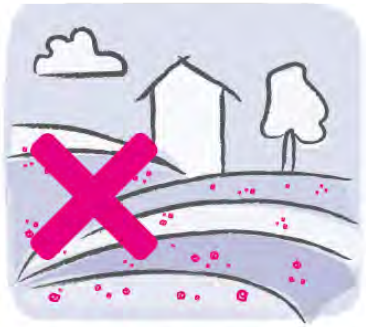


Drug exposure kills all but the small number of resistant worms

Eggs from resistant worms are shed onto the pasture to continue the lifecycle



The population of resistant worms increases as the horse is repeatedly exposed to wormer



Worms on the horse pasture are resistant to the available wormers and do not respond to treatement

Worms never regain their sensitivity to drugs once resistance develops

If this happens with all drugs then keeping horses here in the future would be difficult

Video: How does resistance develop

https://vimeo.com/408381408

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Resistance Status of the Five Main Wormers

available to treat horses in the UK

Prepared in conjunction with Professor Matthews of the Moredun Research Institute

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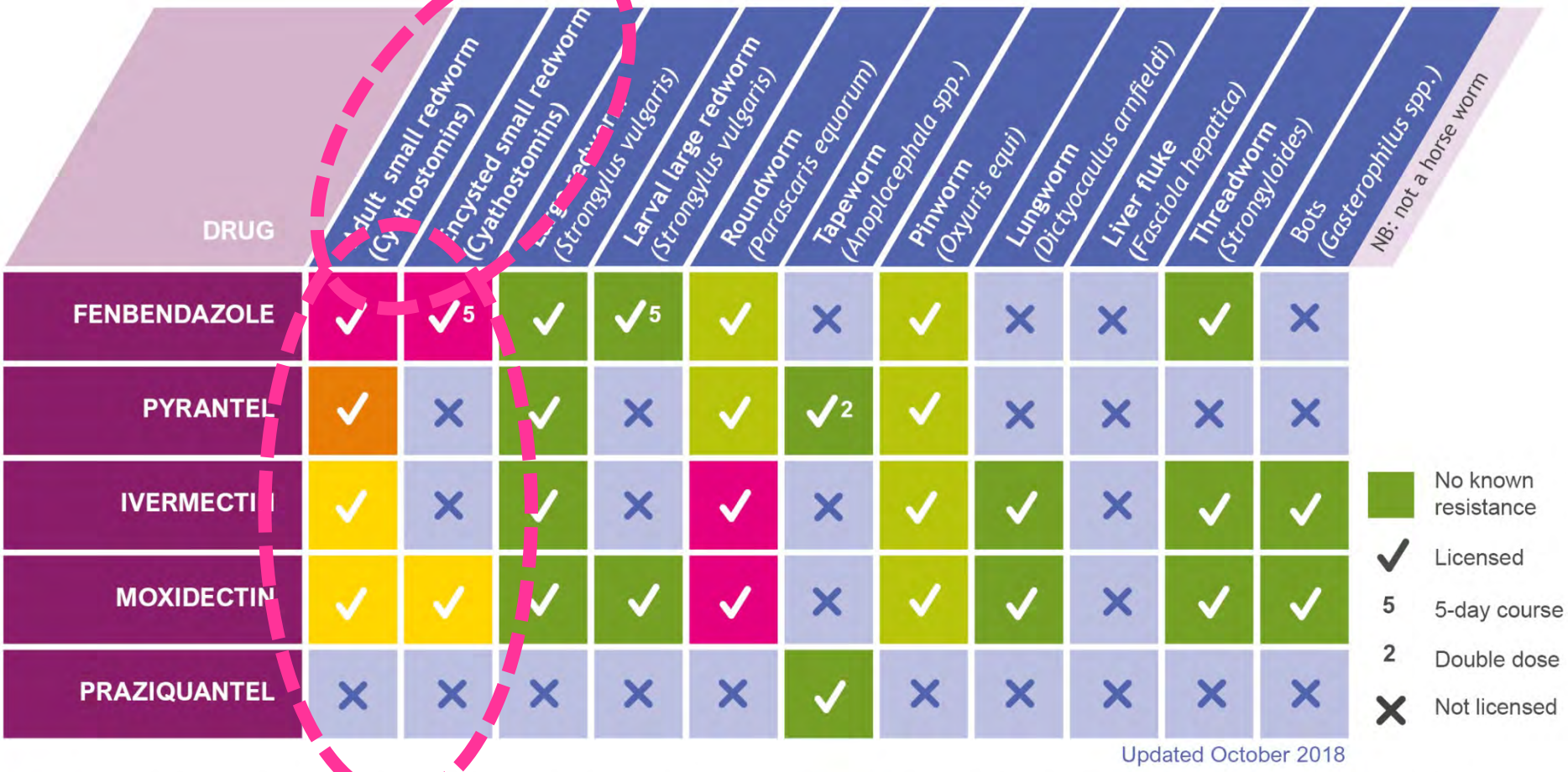
EquiSal Tapeworm



Updated October 2018

Pink - redworm or roundworm resistance commonly reported in published studies. Measured as no/low worm egg count reduction after wormer treatment

Yellow - shortened redworm egg reappearance period after treatment reported in all recent UK published studies.

Dark orange – resistance reported as measured by no/low redworm egg count reduction after treatment. Prevalence of pyrantel resistance in redworm varies between study populations in published studies.

Lime green – anecdotal reports of reduced wormer effectiveness in these species. No published efficacy studies.

what will
you do
when the
wormers
don't work
anymore?

#slowdrugresistance

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Which of these horses have worms?

Minimising Exposure to Wormers

"Faecal egg counts can be used to identify the likely 15-20% of horses that need worming and can reduce wormer use by up to **82%**".

LESTER & MATTHEWS (2013)

Fewer than **27%** of horses Equisal tested require treatment for tapeworm

AUSTIN DAVIS BIOLOGICS

Using EquiSal Tapeworm in a targeted programme reduced the use of tapeworm wormers by **86%**

LIGHTBODY *ET AL* (2017)


could you
be giving
unnecessary
wormers?
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Parasites Affecting Horses

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Test routinely; Treat if required

worm count x 3 per year plus x 1 resistance test

EquiSal test x 2 a year

Autumn/Winter

test and/or treat

Test only if necessary; Treat if required

wet grazing with sheep
test December-May

grazing with donkeys
test May-September

rubbing tail head
sellotape test

Treat if required

bot eggs on hair
1 x winter wormer

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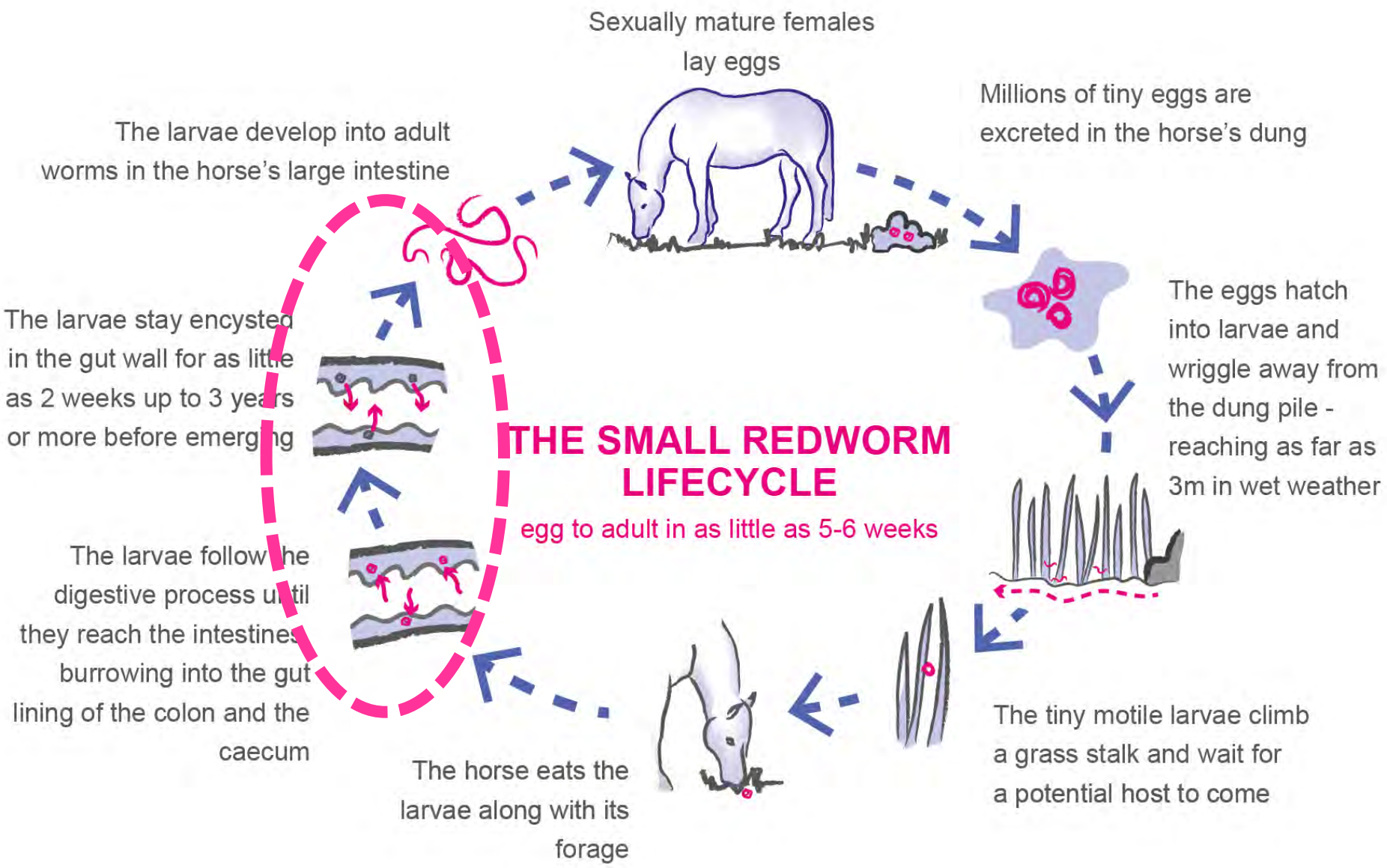
Small redworm (Small Strongyles)

cyathastomins

- 2.5cm long, thin and usually reddish in colour
- Quick lifecycle, reproduce in large numbers
- Long term infestation can seriously damage the intestinal wall, reducing the horse's ability to absorb nutrients.

Redworm lifecycle



Large redworm (Large Strongyles)

Strongylus vulgaris

- Darker red and bigger than the small redworm at up to 5cm long
- Capability to cause more damage in the horse
- Numbers vastly reduced over the last 40 years due to modern worming regimes.

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Strongylus vulgaris and a thickened cranial mesenteric artery

LIFECYCLE:

- larval stages migrate to the major arteries in the abdomen (mesenteric) and live in the artery walls. This can cause blockages, aneurisms, blood vessel rupture and sudden death.

- Infective stage during late summer/autumn period

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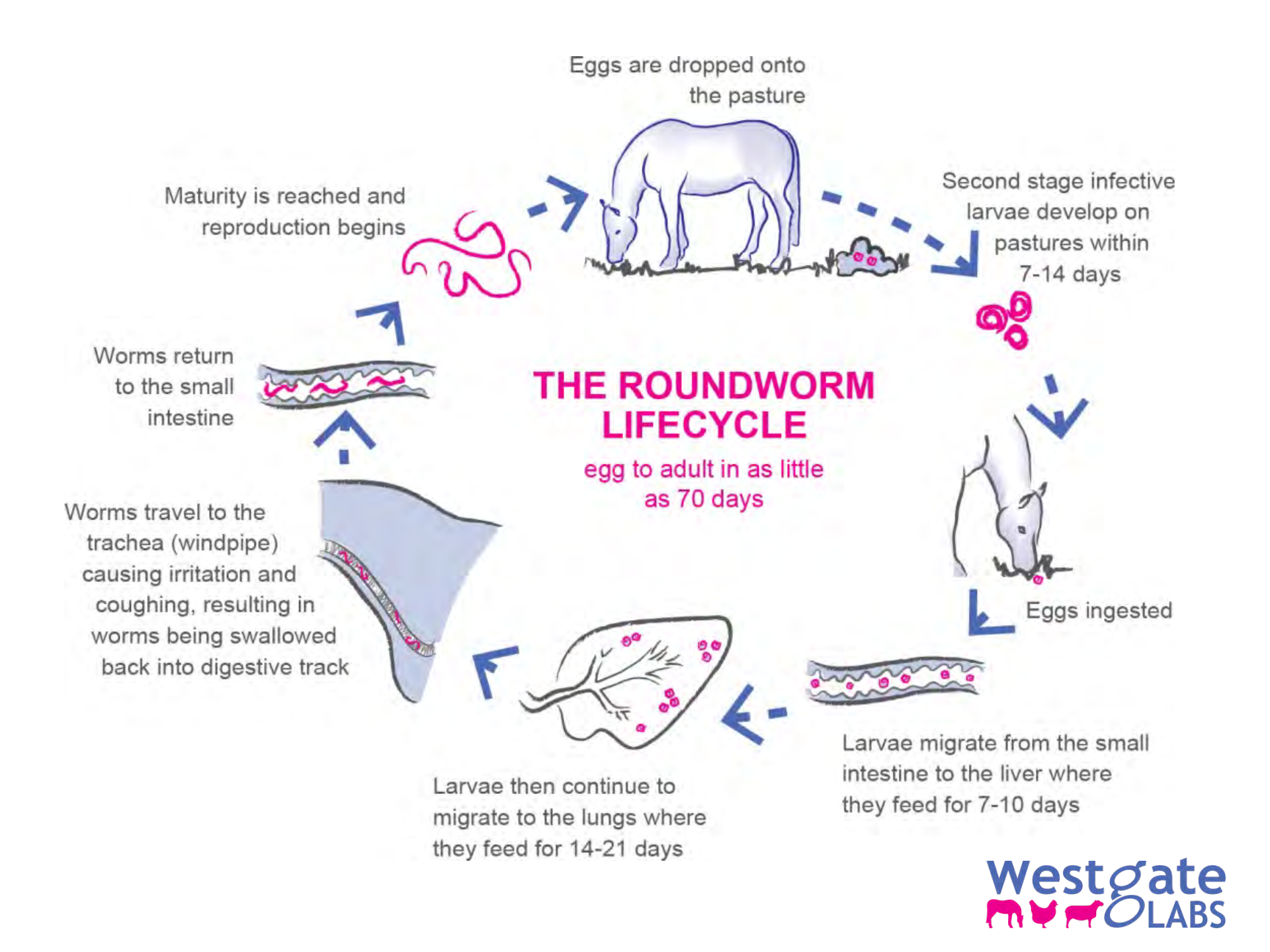
Roundworm (ascarids)

Parascaris equorum

- Large white worms up to 40cm in length
- Eggs remain in pasture for many years
- Prevalent in young horses under 4, after which they generally gain immunity
- Infection can have a devastating effect

THE ROUNDWORM LIFECYCLE

egg to adult in as little as 70 days



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Taking a sample for a worm egg count

- Take 3-4 pinches from across a fresh dropping
- Fill the pot to exclude the air gap
- Seal and label
- Enclose in the polythene bag

Video: Taking a sample for a worm egg count

https://vimeo.com/408426130

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Modified McMaster technique

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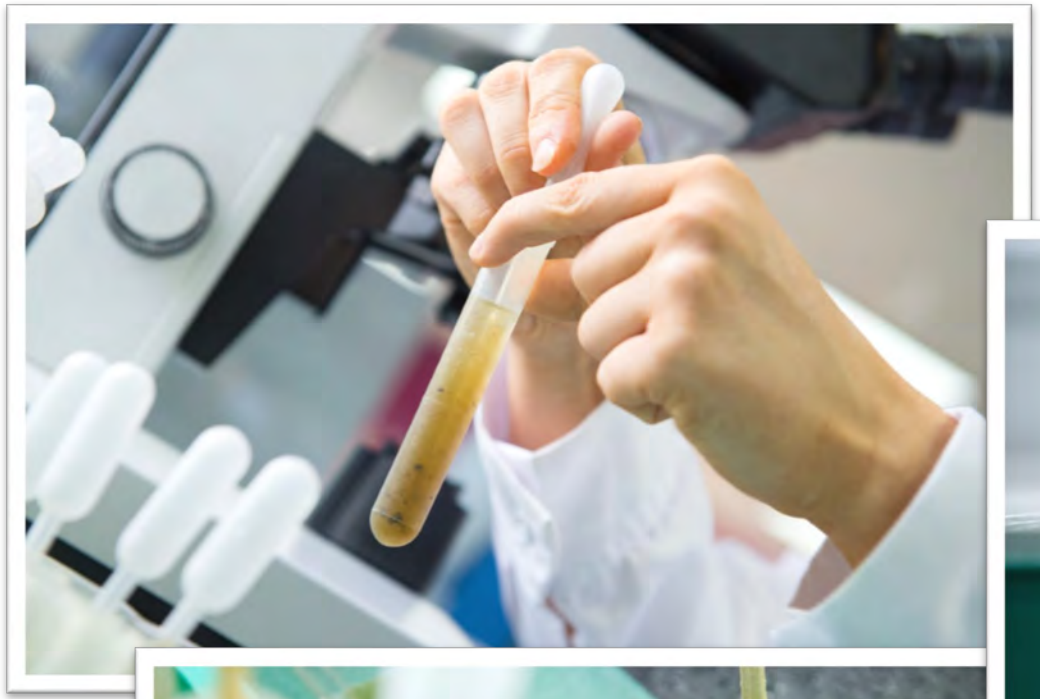

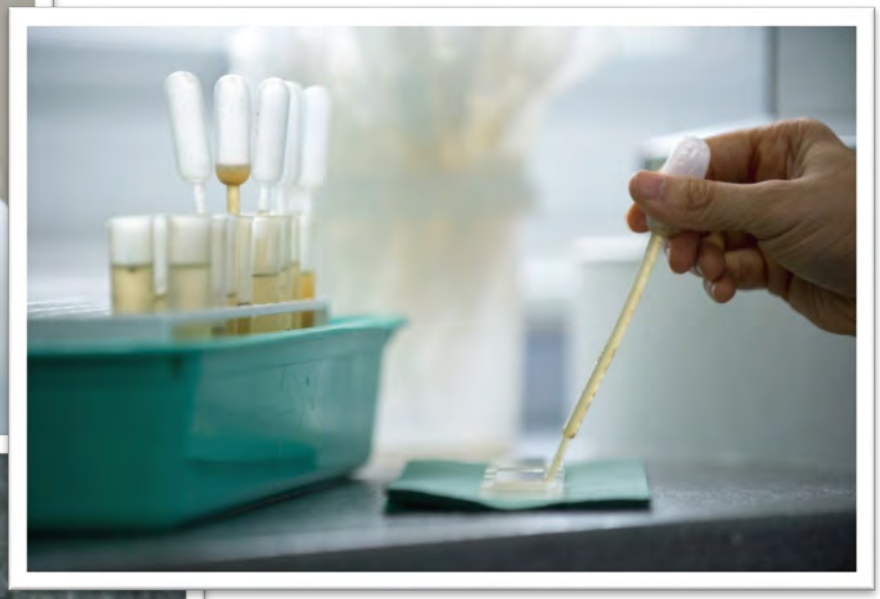

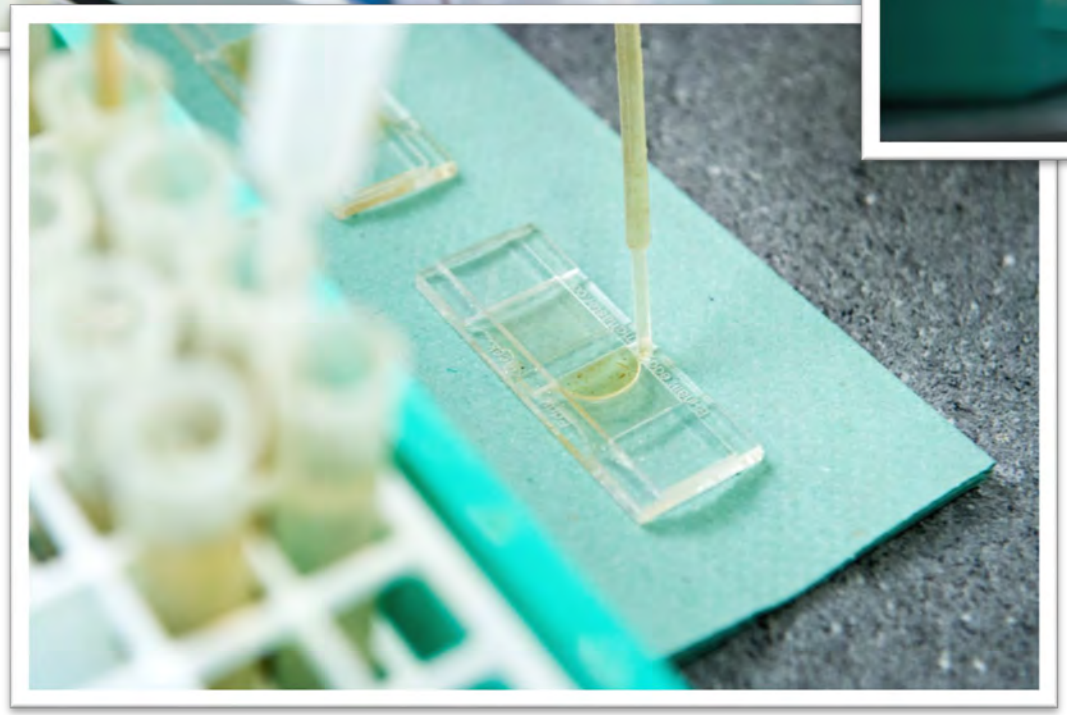

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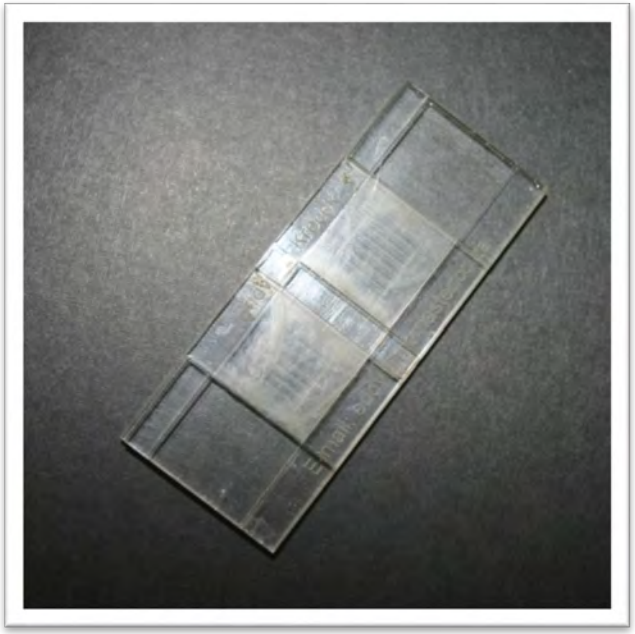

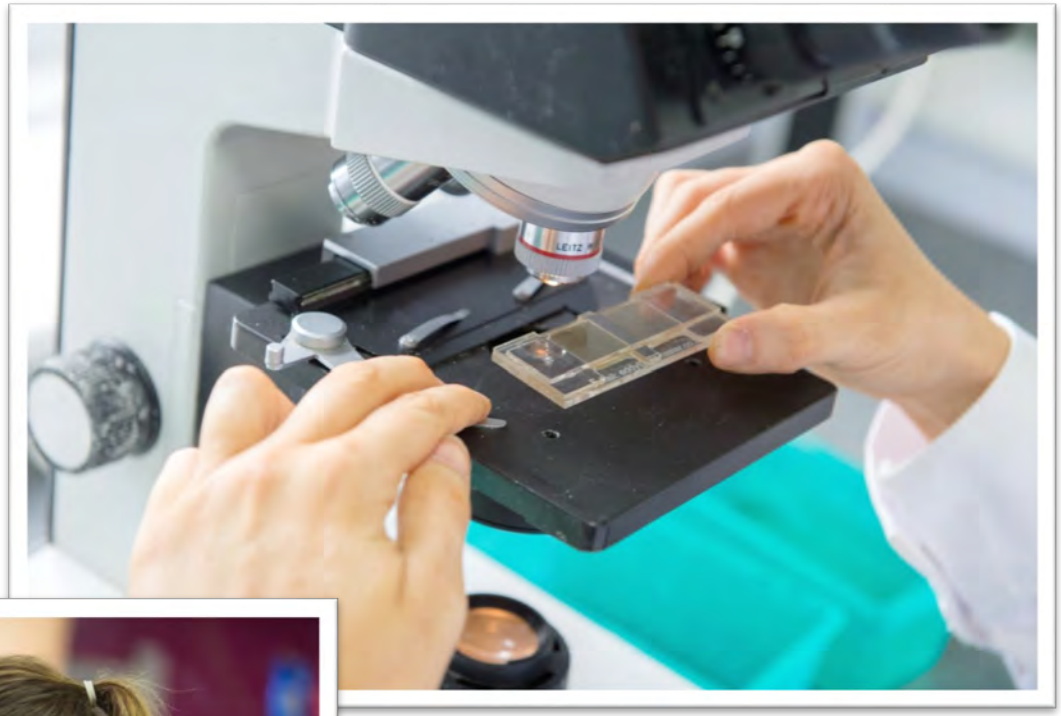

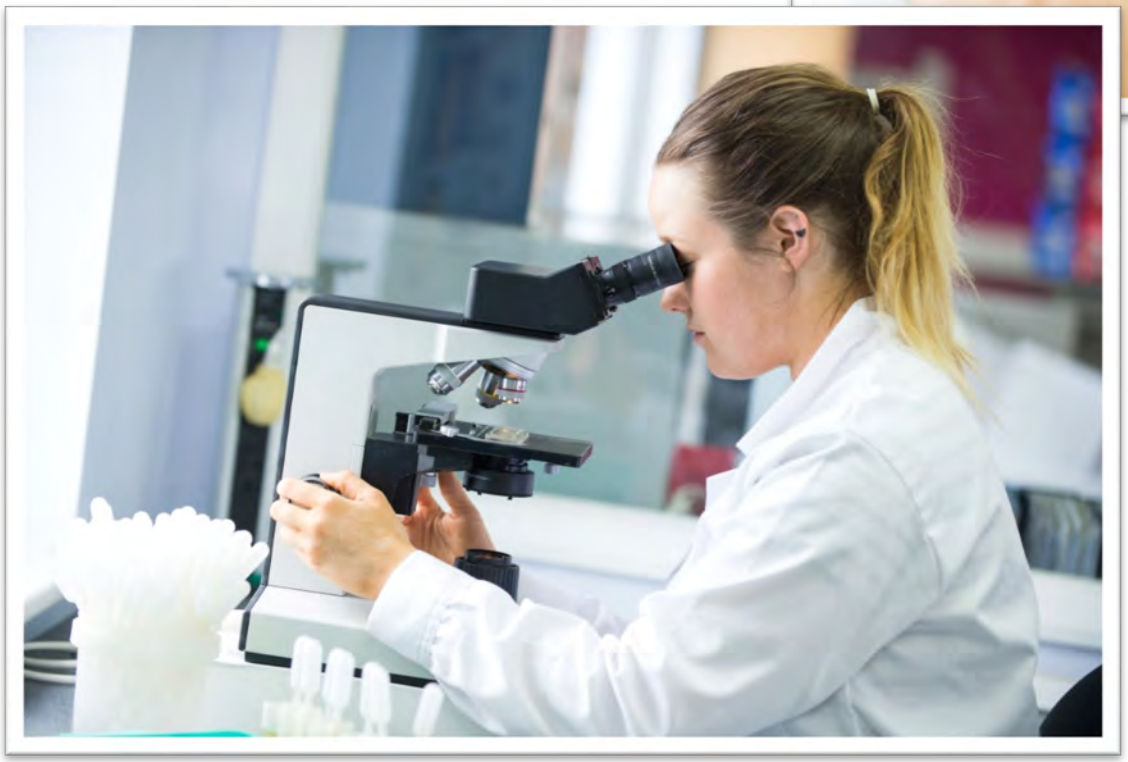

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Worm eggs seen under the microscope

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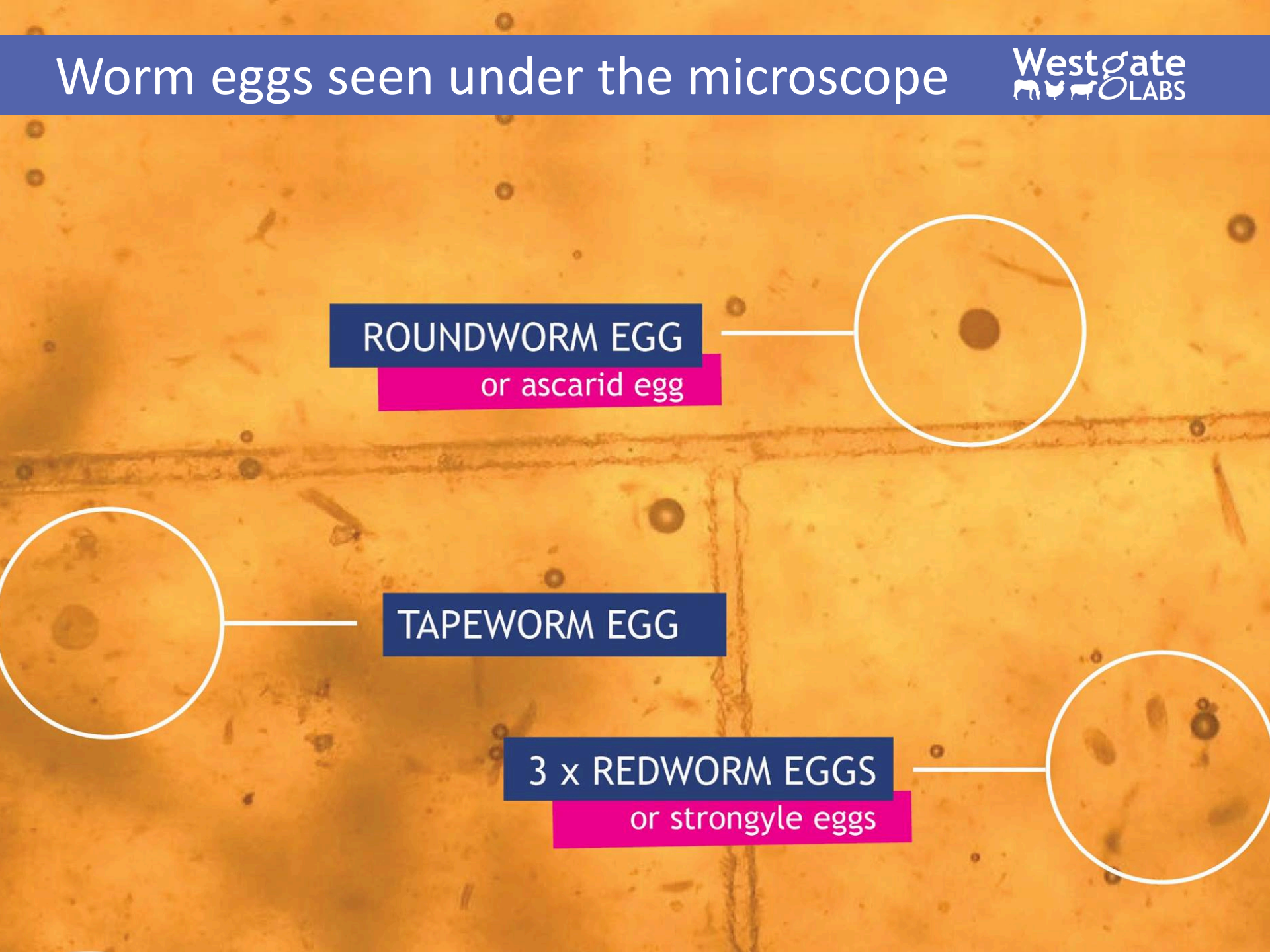

Worm egg counts

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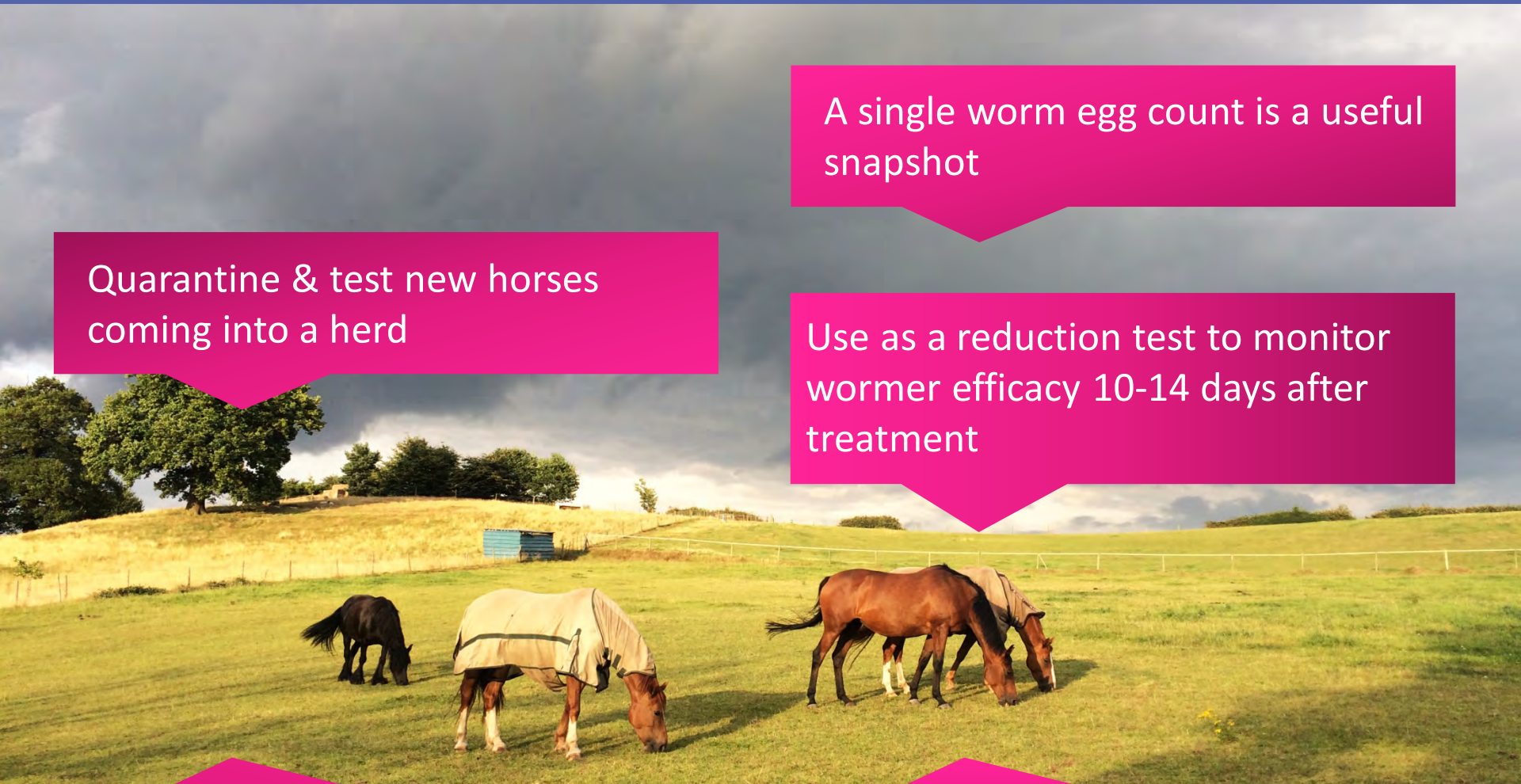
A single worm egg count is a useful snapshot

Quarantine & test new horses coming into a herd

Use as a reduction test to monitor wormer efficacy 10-14 days after treatment



As a barometer of overall immune health in the horse

Conduct every 8-12 weeks to identify high egg shedders in a herd

Worm egg count results | treatment scale

The sign < means ‘less than’ so a result of <50 e.p.g. means no eggs seen in the sample.

Up to 200 e.p.g. is a LOW count, your worming measures are working. No need to worm at this level.

Between 200 e.p.g. and 1200 e.p.g . is a MEDIUM count and the horse needs worming.

Over 1200 e.p.g. is a HIGH count, the horse need worming and the worming programme needs attention.

epg = eggs per gram

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Parasites Affecting Horses

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Test routinely; Treat if required

worm count x 3 per year plus x 1 resistance test

EquiSal test x 2 a year

Autumn/Winter

test and/or treat

Test only if necessary; Treat if required

wet grazing with sheep
test December-May

grazing with donkeys
test May-September

rubbing tail head
sellotape test

Treat if required

bot eggs on hair
1 x winter wormer

ENCYSTED SMALL REDWORM

- Millions can exist in dormant stage - inhibited encysted larvae
- Impair absorption of nutrients,
- Mass emergence can cause life-threatening colitis (larval cyathostominosis)

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Small redworm blood test

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Launched September 2019

Recommendation is to test only low and medium risk horses and to worm high risk horses proactively

ELISA test that detects all stages of small redworm including encysted

Sample needs to be taken and results interpreted by a vet

Testing suggested between September and end of December

Video: Blood testing for encysted redworm

https://vimeo.com/410973947

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Tapeworm

Anoplocephala perfolata

- Live in the ileocaecal junction (between the small intestine and large intestine where the caecum is connected)
- Sucker onto the horse's gut wall and live off food that that horse ingests.
- Saliva testing of horses in the UK has shown that approx. 25% of horses are infected with tapeworm parasites.

THE TAPEWORM LIFECYCLE

egg to adult in approx. 6 months

The tapeworm matures slowly inside the horse.

Segments of the tapeworm (called proglotids) break off and are excreted in the horse's faeces

The proglotids are gravid which they are full of eggs

These disintegrate and release their eggs

The orabatid mite ingests the egg

The mite crawls around on vegetation with the cysticercoid (the larval stage of the tapeworm) inside it.

The horse eats the infected mite on its grass, hay or other forage.

The orabatid mite

Acidic grassland

Infected Forage

EquiSal Tapeworm Testing

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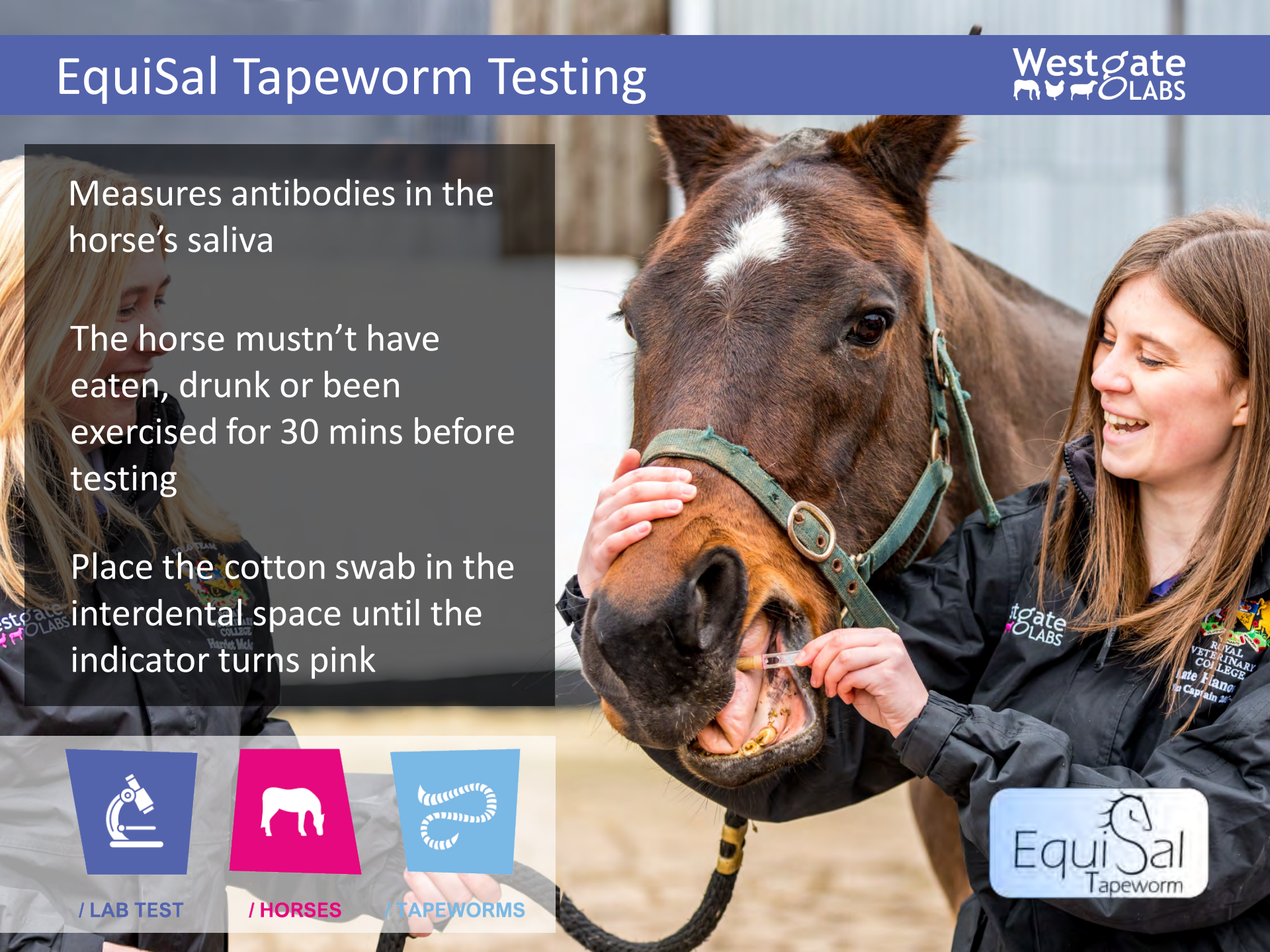
Measures antibodies in the horse's saliva

The horse mustn't have eaten, drunk or been exercised for 30 mins before testing

Place the cotton swab in the interdental space until the indicator turns pink



/ LAB TEST / HORSES / TAPEWORMS

Video: Taking an EquiSal tapeworm test

https://vimeo.com/408438263

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EquiSal Saliva Score Results

Test every **6 months**

Wait until **4 months** have elapsed since the last tape wormer or **2 months** for reduction test

	EquiSal Tapeworm Saliva Score	Tapeworm diagnosis	Tapeworm treatment recommended
	< -0.09	Low	No
	-0.09 – 0.6	Borderline	Yes
	> 0.6	Moderate/High	Yes

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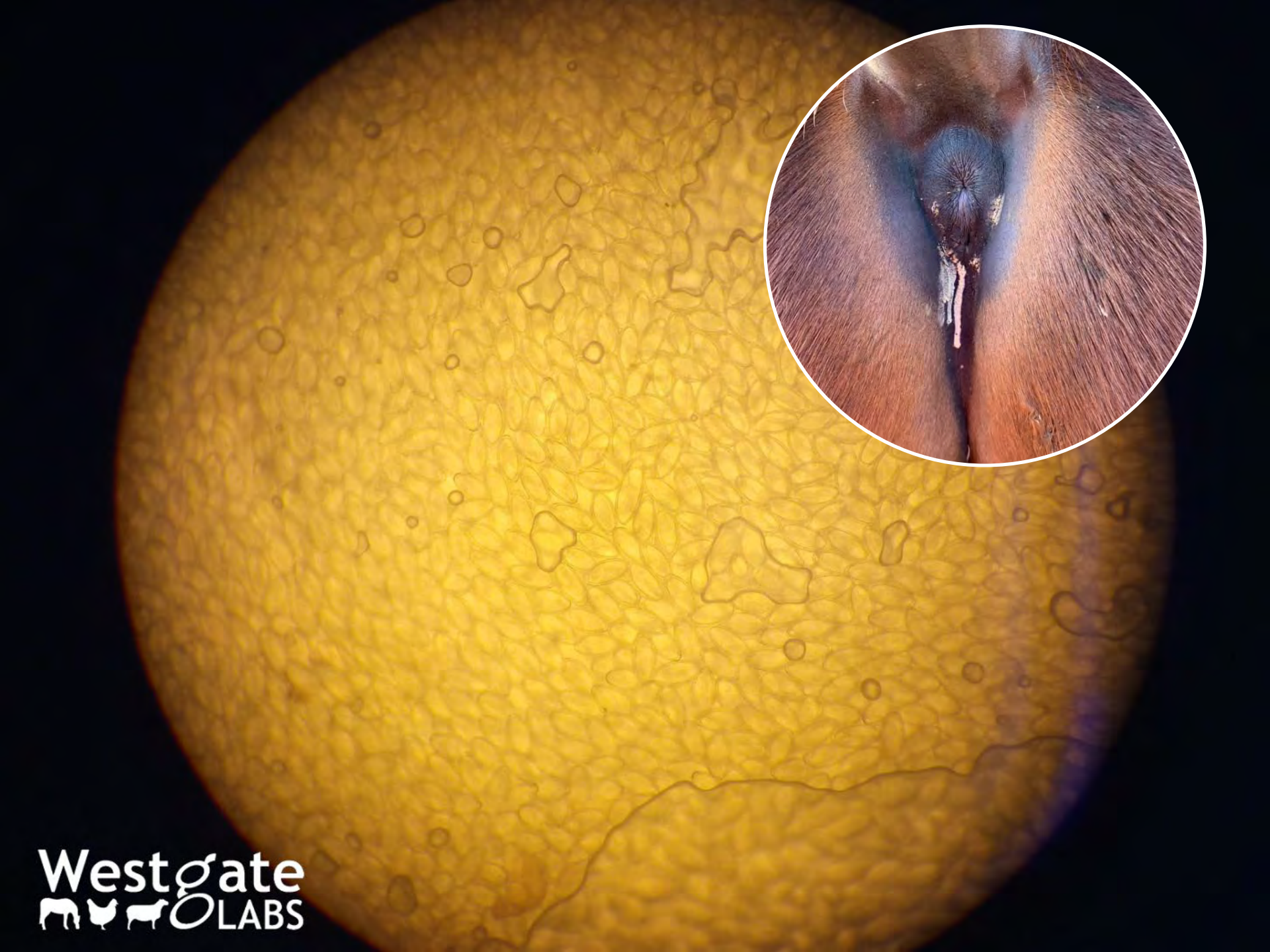
Pinworm

Oxyuris equi

- Rise in prevalence
- Not a true intestinal worm; Eggs are laid on the skin around the anus, not passed in the faeces like other worms
- Infection can cause serious irritation but is not a life threatening parasite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Adhesive Tape Testing for Pinworm

- Best taken in the morning before 9am

- Take a 4” length of clear sticky tape and press firmly onto the skin around the anus area
- Fold the tape in half, sticky side to sticky side.
- Pop the folded piece of tape into the sample bag

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Worm Egg Counting For Liver Fluke

- Take 3 samples from the horse over a 3 day period
- A worm egg count is performed with a different solution to float the worm eggs off
- No licenced flukeicide for horses

/ LAB TEST / HORSES / LIVER FLUKE

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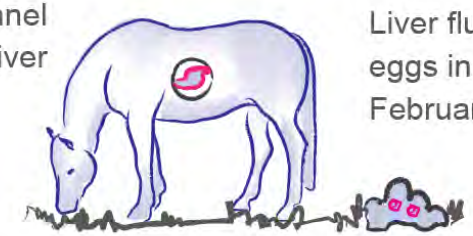
THE LIVER FLUKE LIFECYCLE

Metacercarie ingested by the horse which tunnel into the liver



Liver fluke mature to lay eggs in the gall bladder February - May

Eggs passed in faeces (8-12 weeks after infection)

Miricidium released (10-12 days)

Mud snail infected by fluke during summer months

Cercaria leave snail (5-7 weeks)

Cercaria encyst on grass forming metacercariae in the autumn

- most common in sheep and cattle, but can also infect horses
- animals in wetter, warm locations with reedy grass more at risk

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1 x winter wormer

Baermann's Sedimentation Test For Lungworm

- Test the donkey as well as any horses that might be showing symptoms
- This test requires 2-3 times the amount of faecal matter than a worm egg count
- Takes a number of days to complete.

/ LAB TEST / HORSES / LUNGWORM

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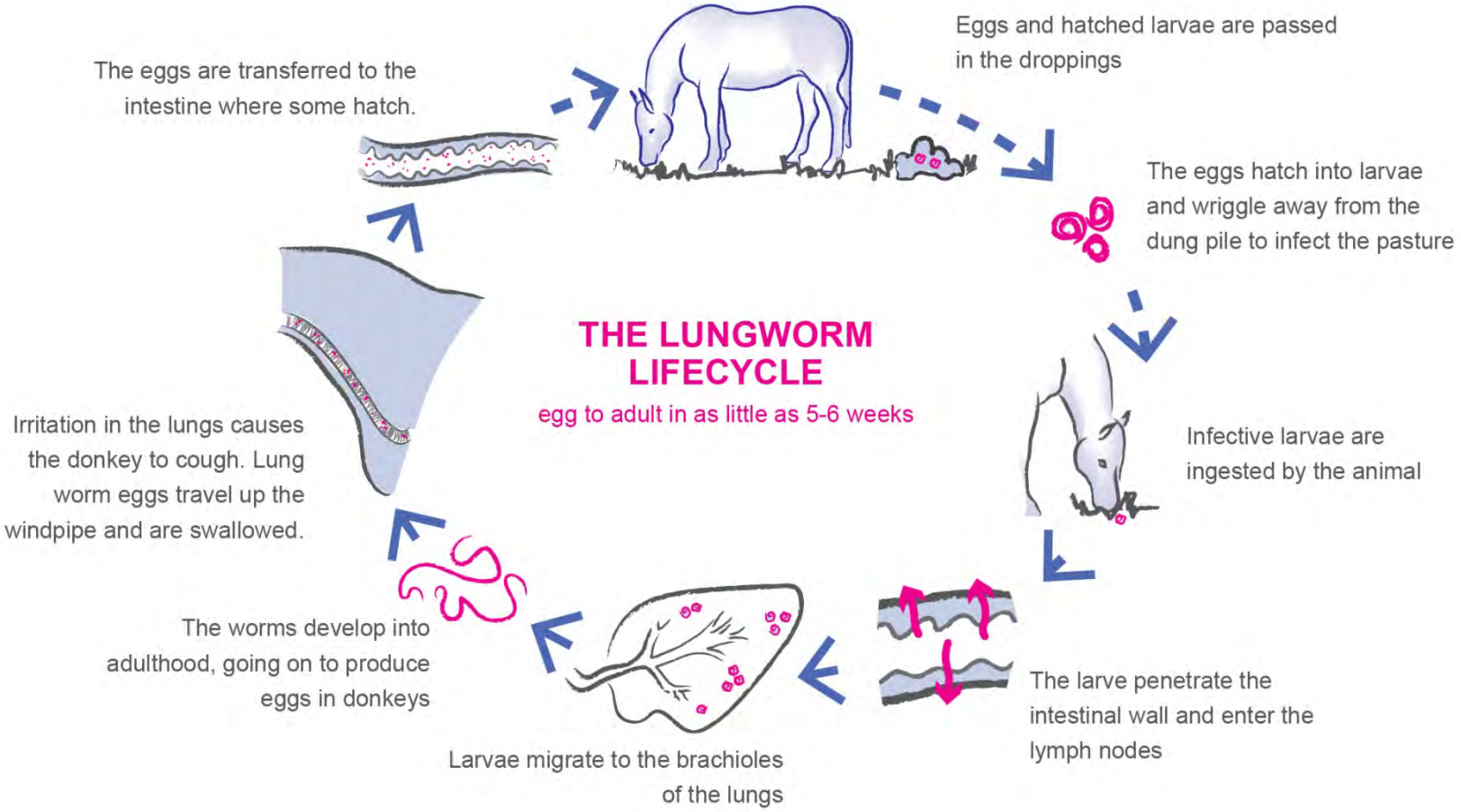

- Quite uncommon – Donkey Sanctuary quote only 4% donkeys infected
- Horses much more sensitive to the effects of a lungworm infection and show signs very similar to Recurrent Airway Obstruction; a chronic cough, nasal discharge and shortness of breath.

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Donkeys & Mules

- EquiSal test not scientifically validated on donkeys at post mortem level but used with good effect.
- Panacur 5 day Guard, Eqvalan & Strongid P are the only licensed wormers for donkeys.
- Vets at the Donkey Sanctuary successfully prescribe EquiMax and Equest Pramox.
- Treat MULES in line with donkeys.

In line with all equines the British Equine Veterinary Association advocate a targeted worming approach.

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Bots

- No means of testing for bots
- Look out for eggs laid on the horse’s coat through summer and autumn
- Scrape with a bot knife
- Ingested larvae not treatable until they're in the stomach of the horse. Target with a single treatment after the first frost of the winter which will kill bot flies and ensure no more reinfection.

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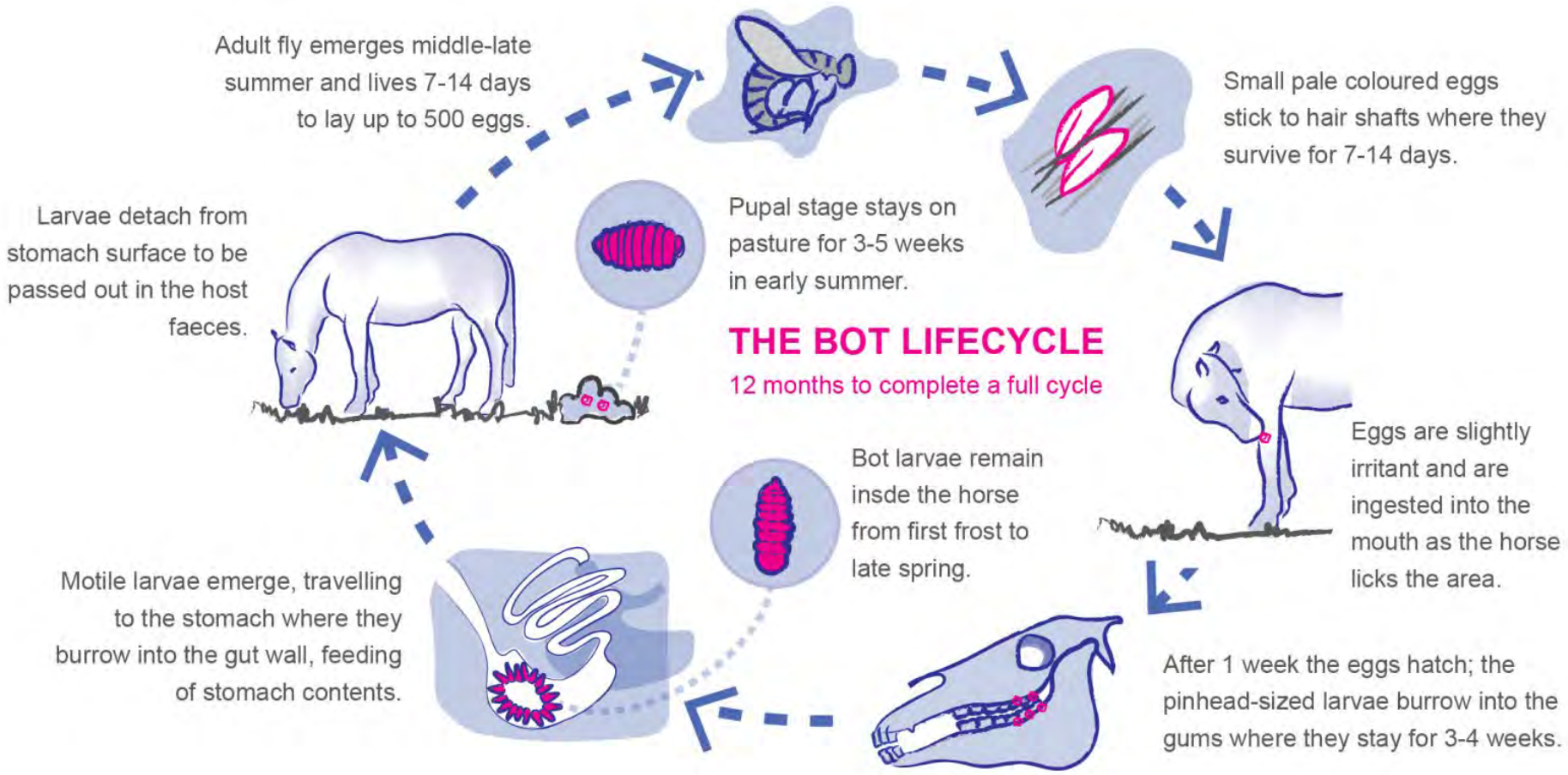

Rarely bot infections cause:

- Larval migration through the mouth - ulceration of tongue and cheeks.
- Attachment of larvae to the stomach epithelium causes ulceration and resulting loss of submucosal glands
- High burdens of *G. haemorrhoidalis* may cause rectal prolapse

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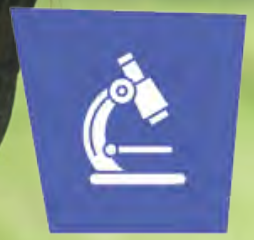
A Veterinary Approved Programme For Healthy Horses

SPRING	Worm egg count for redworm & ascarids	Saliva test for tapeworm
SUMMER	Worm egg count for redworm & ascarids	
AUTUMN	Worm egg count for redworm & ascarids	Saliva test for tapeworm
LATE AUTUMN/ WINTER	Blood test with your vet and/or treat for possible encysted redworm, depending on risk.	

Worm egg count reduction tests should be 'performed at least annually'* to monitor drug resistance.

(Equine de-worming; a consensus of current best practice. In: UK-Vet Equine. 2019.)



/ LAB TEST

/ HORSES

/ WORM EGG COUNT

/ TAPEWORMS

/ RESISTANCE TEST

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Mares & Foals

Threadworm

Strongyloides westeri

Can be passed through the mare's milk to infect the foal and also via skin transmission. Around 30% of young horses get infected.

WEC of foals show highest infection rates at 2 weeks of age, most gaining full immunity around 4 months.

In large numbers can cause scouring and dehydration in a young foal.

To treat or not?

Treat the mare with moxidectin (Equest) four weeks before the foaling due date or an ivermectin based wormer around foaling time.

Mares & Foals

- Youngsters are especially vulnerable to parasites especially ascarids
- Treat proactively every 4-6 weeks alternating between pyrantel and fenbendazole until the foal is six months old
- Tapeworm test at 6 months old
- Worm for the possibility of encysted redworm in winter

Moxidectin is not a suitable drug for young foals until they have a sufficient covering of body fat.

Equest: 4 months Equest Pramox: 6.5 months

Ivermectin is not the best choice of product for routine dosing of young horses as there is some known resistance to ascarids.

What influences parasites?

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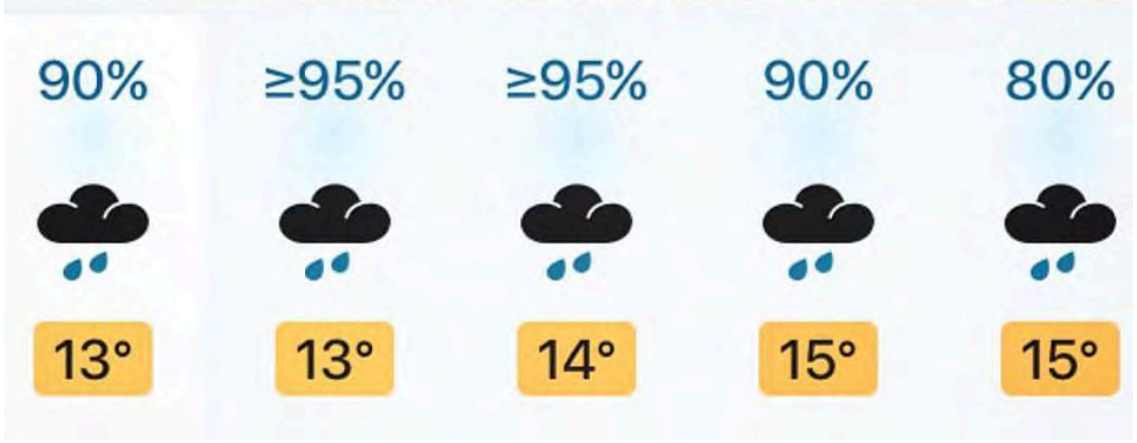
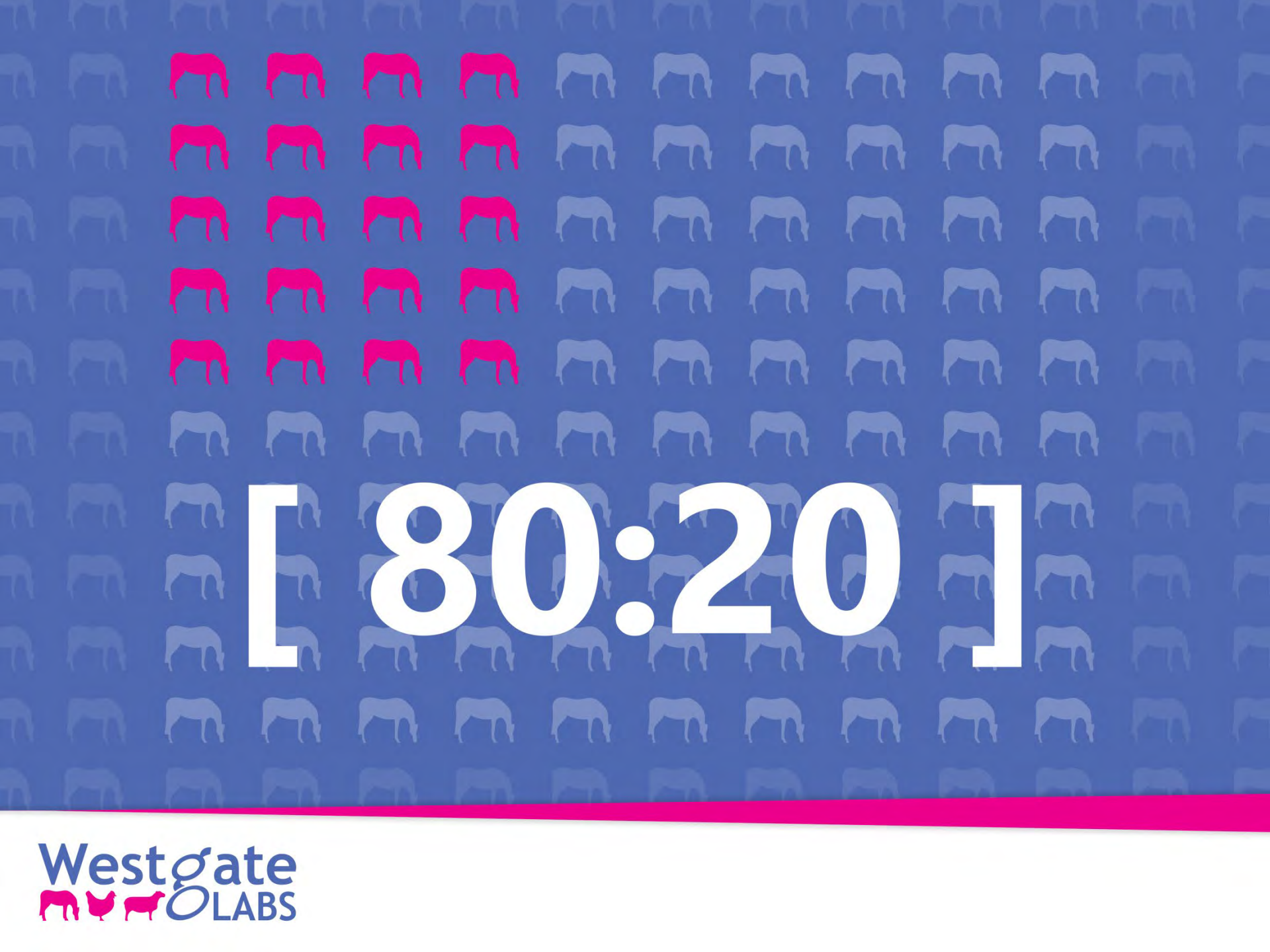
Weather



- Warm wet weather increases risk of parasite infection
- Spring & autumn highest risk times
- Extremes of weather help to break lifecycles



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750 e.p.g.
<50 e.p.g.
50 e.p.g.
100 e.p.g.
<50 e.p.g.
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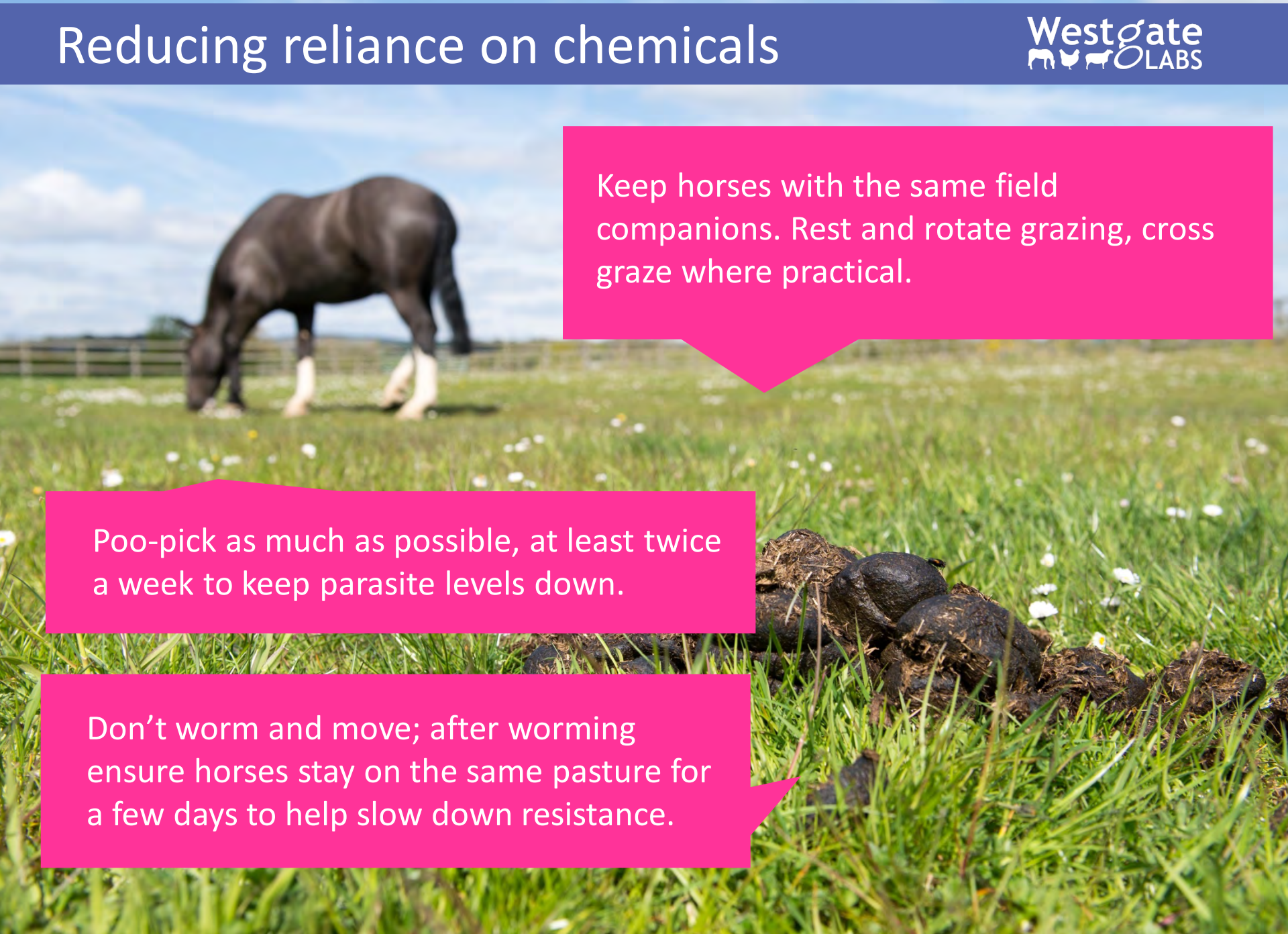
Reducing reliance on chemicals



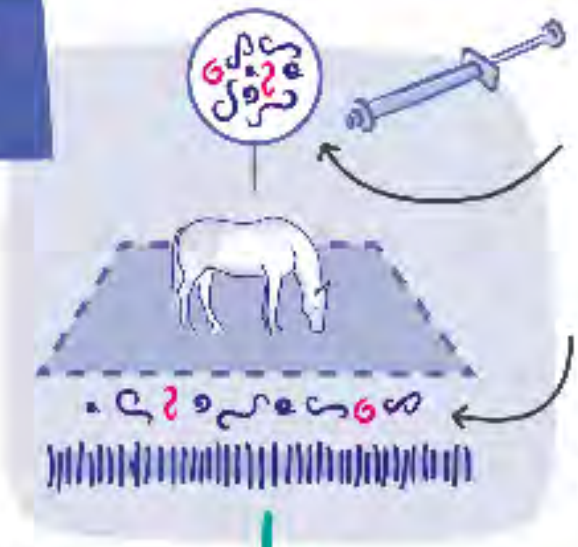
Keep horses with the same field companions. Rest and rotate grazing, cross graze where practical.

Poo-pick as much as possible, at least twice a week to keep parasite levels down.

Don’t worm and move; after worming ensure horses stay on the same pasture for a few days to help slow down resistance.

Pasture Management to slow wormer resistance

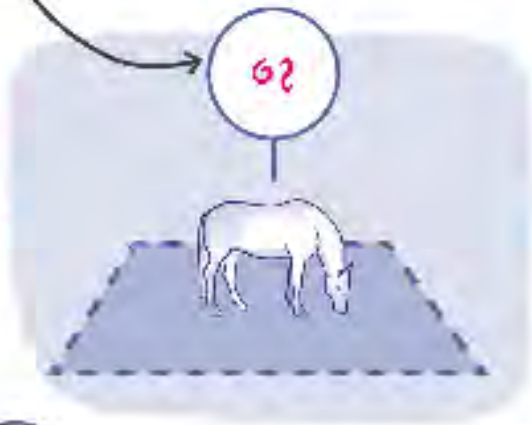
A worm count shows a horse has a worm burden that needs treatment



A small number of the worms are naturally resistant to the wormer.

Parasite eggs and larvae exist on the pasture that have been shed by egg laying adult worms in the horse.

The wormer kills all but a small number of resistant worms in the horse.



Horse A is moved to clean pasture immediately

Horse B stays on the existing field for 1-2 weeks

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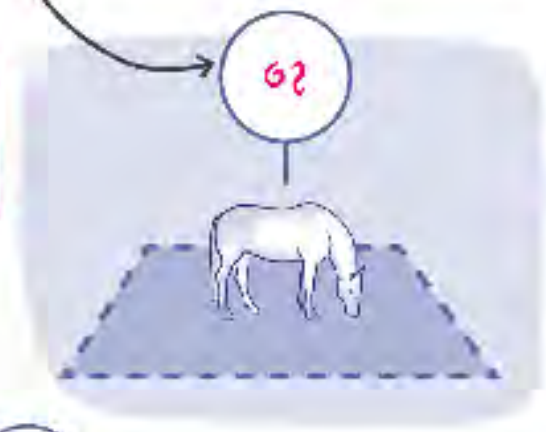

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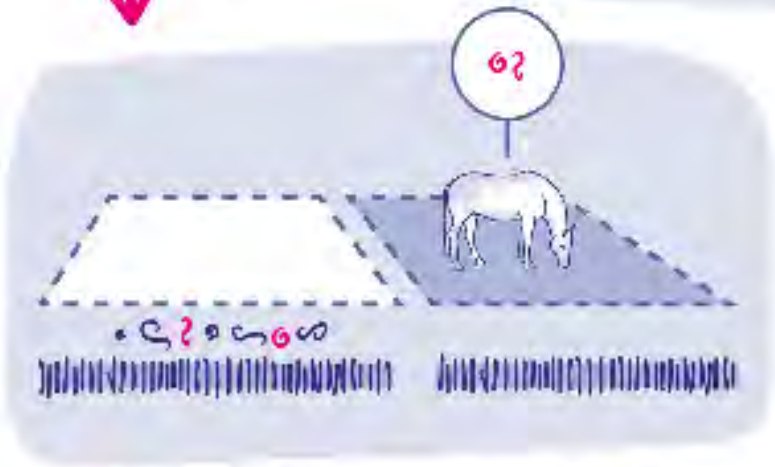
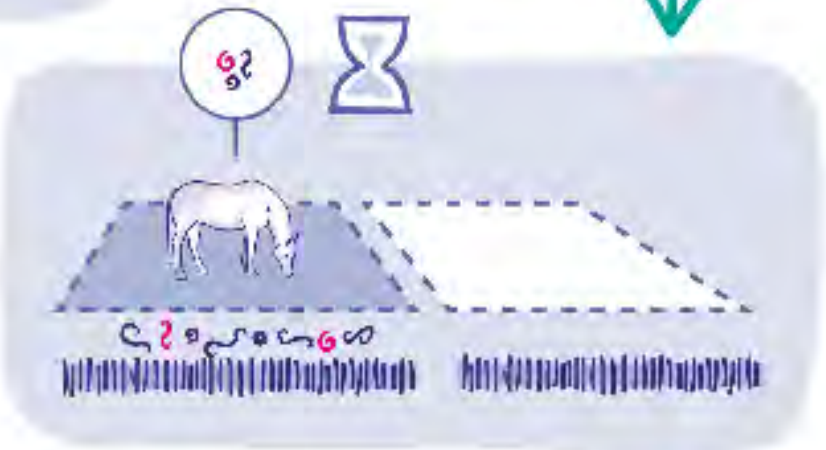




The resistant worms breed, shedding their eggs onto the pasture

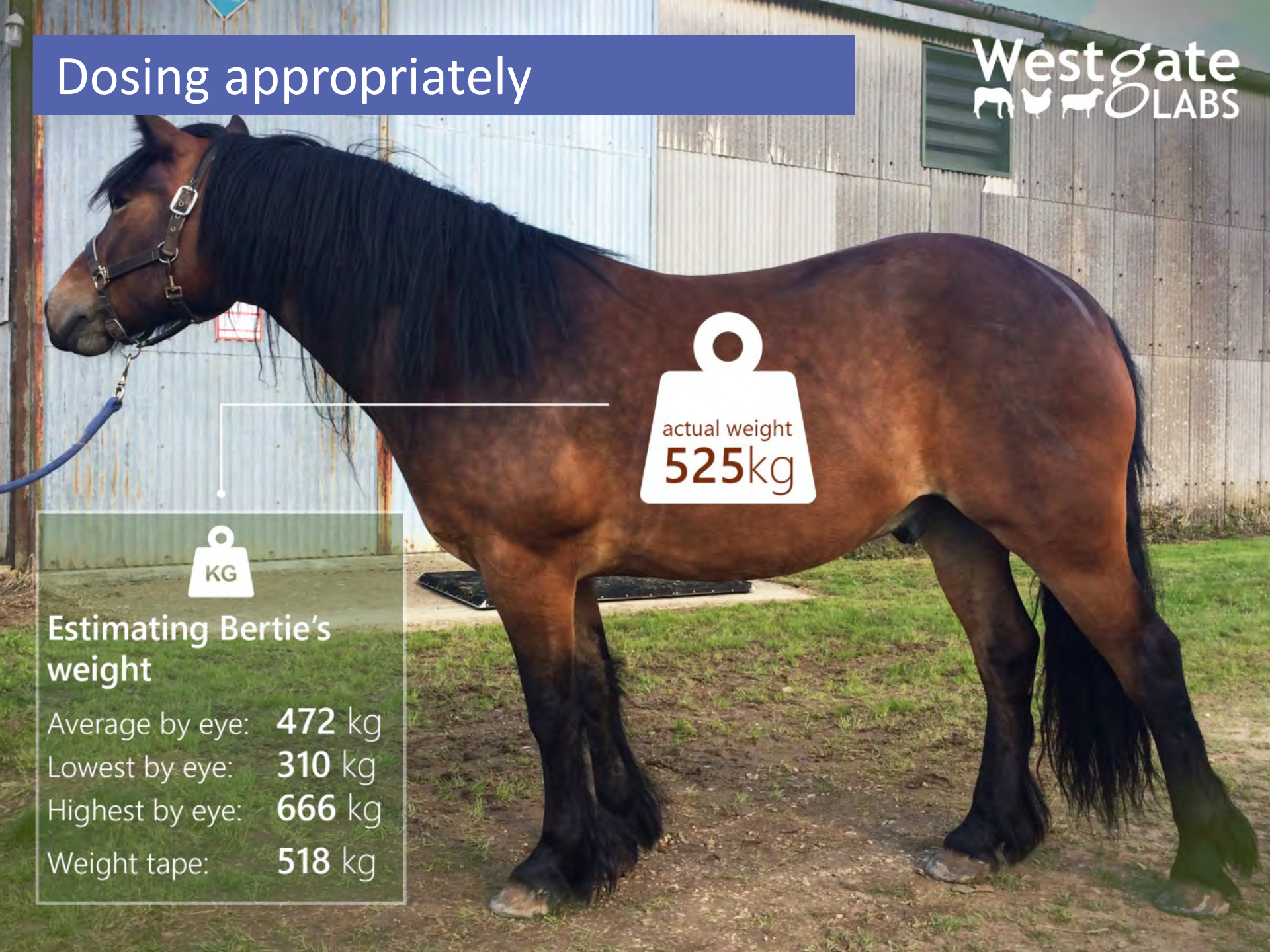
The horse is reinfected by some of the worms on the existing pasture

Targeted worming for yards

The more horses kept together the more important good parasite control becomes.

- Worm count & Equisal test regularly to identify high egg shedders
- Target wormers appropriately
- Quarantine new horses
- Co-ordinate testing and treating
- Test for resistance

Dosing appropriately



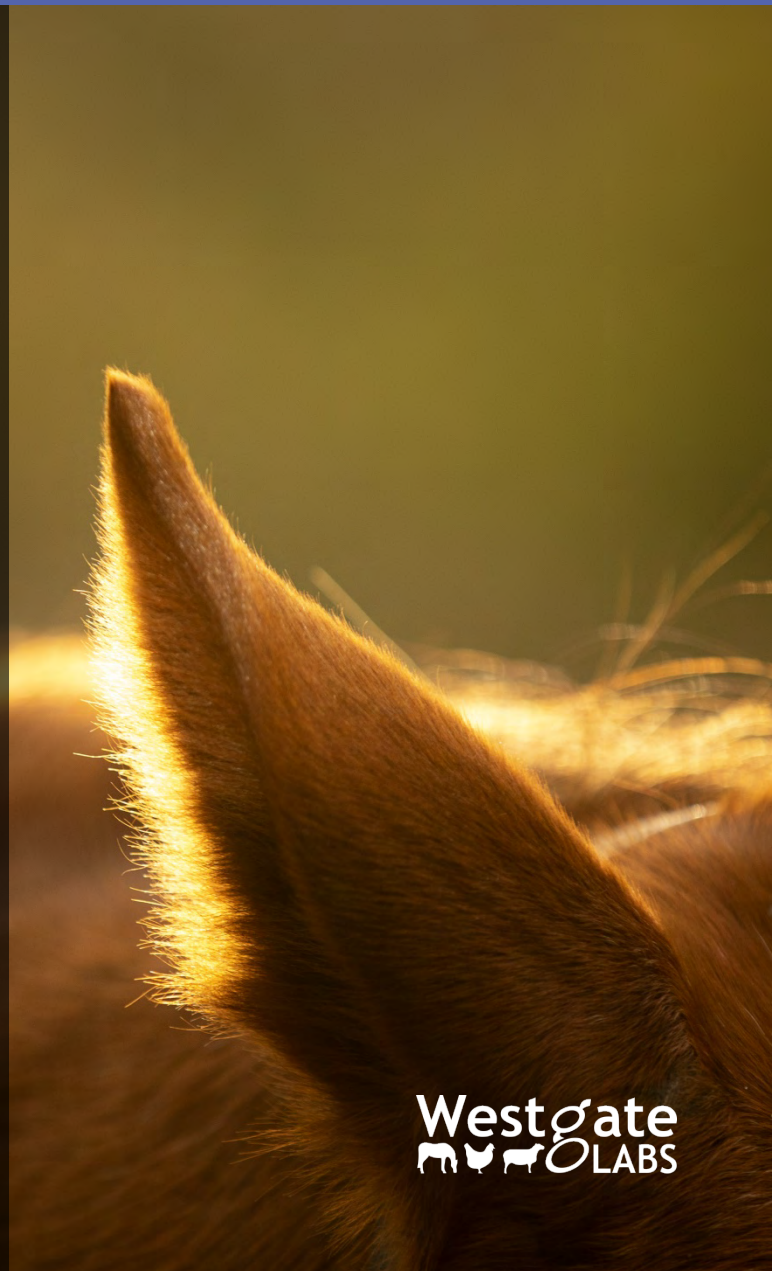
Questions to ask when assessing treatment options

- How old is the horse?
- What and when was the last wormer given?
- Was the horse wormed for encysted redworm in the late autumn/winter?
- When was the horse last tested or treated for tapeworm?
- Is it in good condition? Are there any health issues?

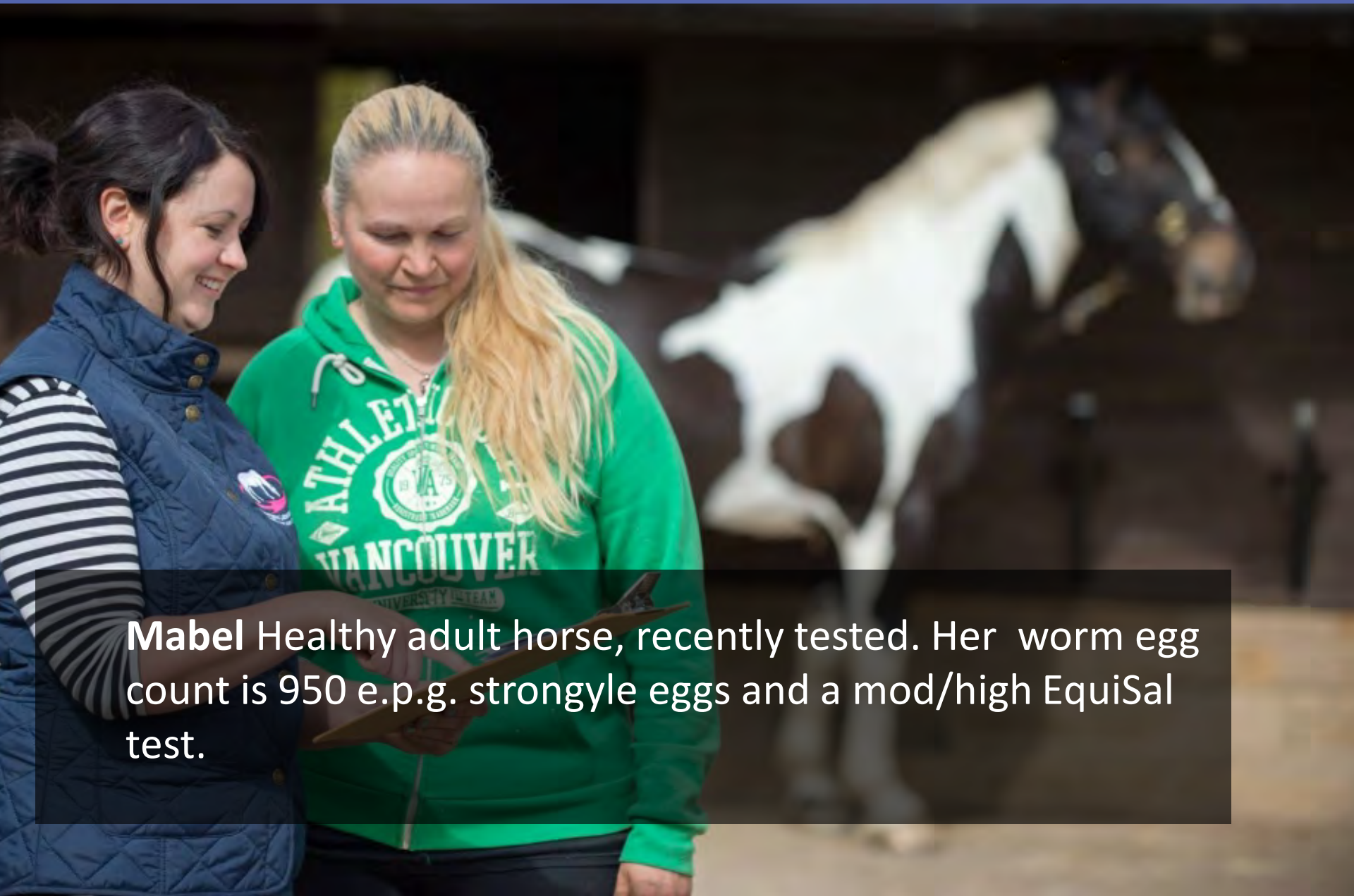
- What is the horse's grazing like? Does it travel away to competitions or training?

- Check that they know the weight of the horse?

- Is the horse destined for the food chain?



Scenarios: Mabel, JULY



Mabel Healthy adult horse, recently tested. Her worm egg count is 950 e.p.g. strongyle eggs and a mod/high EquiSal test.

Scenarios: Mabel, new horse JULY

DOSING OPTIONS

- Ivermectin/praziquantel

OR

- Double dose pyrantel

OR

- Praziquantel then ivermectin if sensitive with probiotic

THEN

- Follow up with reduction tests

Avoid moxidectin where possible

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Scenarios: Bertie, MARCH

Bertie is a 5 year old Highland pony who was wormed in December with Equest . It's March now and he has a count of 1000 e.p.g.

Scenarios: Bertie, MARCH

PREFERRED ROUTE

- Question correct amount given? Did he get the full dose? How much does he weigh?
- Question potential parasite challenges? Husbandry? Other health issues?

No concerns – ivermectin & retest

Any doubts – moxidectin & restest

Scenarios: Teddy, APRIL

Teddy is a riding club horse. He had always been treated regularly for tapeworm, the most recent dose in Equest Pramox in January, three months before. In April the owner decided to EquiSal test him. He came back with a high saliva score at 13.

Scenarios: Teddy

- Change the drug and double dose pyrantel.

- Test again after 2 months
  Saliva score -0.4 borderline

- Treat again with praziquantel

- Test again after 2 months
  Saliva score low test again in 6 months

Scenarios: Fern

Fern is a two year old Dales Pony purchased as a weanling.

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She has a consistent redworm count every 8 weeks when worm egg counted. Has been on a weighbridge to ensure correct dosage administered each time. Treated under the vet as required more frequent treatment than an SQP could advise.

Test date	Result	Wormer
20/04/2018	1000epg	Panacur 5 day
17/05/2018	50 epg	
21/05/2018	100epg	
01/06/2018	200epg	IVERMECTIN
11/07/2018	700epg	MOXIDECTIN
30/08/2018	1700epg	Panacur 5 day
13/09/2018	200 res	Double Strongid-P (two tubes) as Mod/high EquiSal result
25/09/2018	<50	
22/10/2018	250epg	IVERMECTIN GRANULES
30/11/2018	<50	
11/12/2018	400epg	Equest-17/12- saw redworm
11/02/2019	300epg	Equest 13/2

Fern had a worm count when tested but this responded to the Panacur – she didn't come with resistant worms

The worm egg count rose steeply despite treatment!

She has picked these up from the new pasture

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Test date	Result	Wormer
15/04/2019	200epg	Eraquell
10/06/2019	200epg	Eraquell
08/08/2019	<50	
29/08/2019	<50	
11/09/2019	<50	
03/10/2019	<50	
04/11/2019	300epg	
21/11/2019	200epg	
03/12/2019	400epg	Equest
17/01/2020	<50	
07/02/2020	<50	

Worms never regain sensitivity to drugs once they become resistant but we see the count stabilising as Fern's own immune system becomes better able to deal with the infection.

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Scenarios: Djinn, APRIL 2020

Djinn is a 2 year old fell pony. She had an encysted redworm treatment in December. WEC show:

30/12/2019	50 e.p.g.
07/02/2020	<50 e.p.g.
16/03/2020	<50 e.p.g.
22/04/2020	5000 e.p.g strongyles lice infection

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SUMMARY

1. Avoid regular dosing, reserve moxidectin
2. Make testing the centre of a worm control programme, test for chemical resistance
3. Remember the limits of worm counts and address encysted redworm once per year

Thank you!