

An overview of CARLA® and its applications in Parasite Management

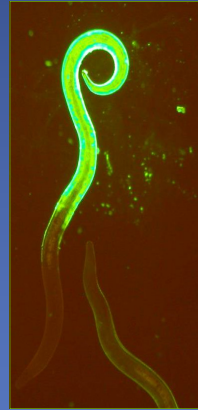


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What the CARLA® Saliva Test does?

- Identifies sheep which can handle worms – without risking those which cannot
- Measures protective immunity to ingested parasite larvae
- Works on drenched animals
- Single, easily collected sample
- Identifies animals which
 - Grow well when under a parasite challenge
 - Have lower faecal egg counts (FEC) - Contaminate pasture less
 - And pass these traits on to their offspring
- Key new tool for sustainable parasite management

The CARLA® Antibody Response



CarLA

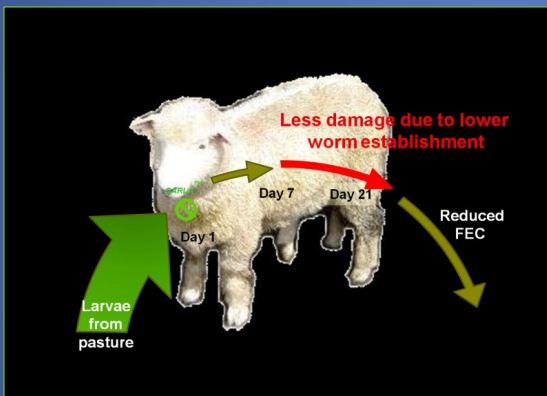
- Part of the protective coat of all internal parasite larvae (L3s)
- Present for a few days after worms are ingested

CARLA® antibodies

- Are produced by the sheep's immune system in response to larval challenge
- Bind to CarLA on the surface of ingested L3 and prevents their establishment

In controlled experiments:
Antibody to CarLA prevents **85-100%** of *Trichostrongylus* L3s establishing

CARLA® is a “good” immune response



How to measure the CARLA® response

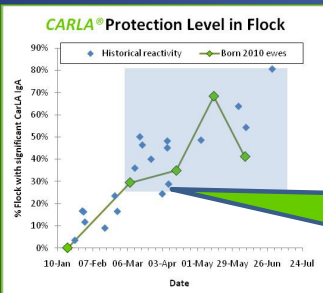
- Cotton roll is clamped in forceps
- This is placed in buccal cavity (pouch between inside of cheek and jaw) and swabbed back and forth for at least 7 seconds
- Roll is placed in labelled vial, frozen, then sent to the laboratory for assay
- Saliva is centrifuged from roll and diluted with preservative solution
- Antibody in saliva is assayed by binding to CarLA coated immunoassay plates
- After binding with secondary antibody, reactivity is measured colourimetrically
- Results reported to client as CARLA® units in graphical format, with indication of level of larval protection
- Results can be uploaded to SIL database for generating eBVs for registered users



Making sense of the CARLA® results

Birth flock	YOB	Tag	CARLA IgA	Larval Protection
4111	2009	4	0.00	None detected
4111	2009	5	4.05	Medium
4111	2009	18	0.37	Trace
4111	2009	43	0.00	None detected
4111	2009	61	1.71	Low
4111	2009	63	0.00	None detected
4111	2009	72	0.53	Trace
4111	2009	78	5.14	High
4111	2009	85	0.00	None detected

Individual animal results reported to client in units of CARLA® and approximate level of protection the animal is afforded



An historical graphical representation of the client's flock CARLA reactivity and its relationship with other flocks tested

Most flocks produce good CARLA response from March onwards

Advantages of selecting sheep with elevated CARLA® antibodies

- The CARLA® test measures the ability of the sheep to respond to larval parasite challenge
- Animals can be sampled anytime from approximately 5-7 months of age and unlike FEC, drenching does not affect the test
- Saliva is relatively easy and clean to collect, no missed samples
- Heritability for CARLA® (30%) is better than that for FEC
- Animals with elevated levels of CARLA® antibodies have 20 – 30% lower FEC (Genetic correlation 0.5) and are up to 1.5kg heavier than non-responders (genetic correlation of 0.2-0.8)

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