





ALL ABOUT FLIES

ANIMAL HEALTH IS IN OUR DNA®

AfriVet
A Bimeda company

BACKGROUND ON FLIES

Flies belong to the order DIPTERA and there are currently 91 families of flies in South Africa. Several of these families and a large number of fly species are important to stock-farmers.

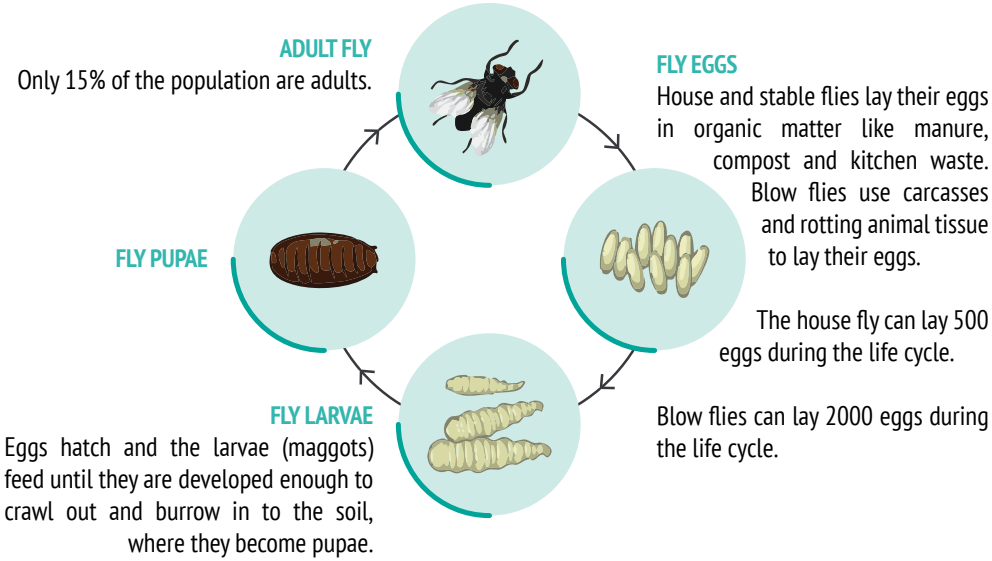
The two species most commonly seen on farmyards belong to the family Muscidae: house flies (*Musca domestica*) and stable flies (*Stomoxys calcitrans*). However, there are many more species that can play a role in animal health.

This fact sheet provides important information on South African flies, the production losses they cause, the diseases they can transmit, how to effectively control them, available products and how to use them optimally.

It is important to understand the lifecycle of insects in order to manage their numbers effectively in particular for fly control. Understanding the life cycle allows strategic and tactical application of control measures to decrease production losses and treatment expenses.

GENERALISED LIFE CYCLE OF FLIES

The whole life cycle can be completed in 7 – 15 days, depending on the adult fly species.



TYPES OF FLIES

NAME	APPEARANCE	DESCRIPTION	IMPORTANCE
House Fly *Musca domestica*		 • 6 - 7 mm long with a wingspan of 13 - 15 mm • Females have a larger wingspan than males. Males have longer legs • Lapping mouth parts	• Adult house flies feed on liquid material of any sort including manure, discharge from eyes, nose or wounds of animals • Preferred breeding site is manure • Spreads diseases like brucellosis, mastitis and eye infections
Stable Fly *Stomoxys calcitrans*		 • 6 - 8 mm in length and lighter in colour than the housefly • Mouth parts adapted to rasping	• Feeds on blood • Their bites cause irritation, resulting in less time spent feeding • Preferred breeding site is decaying grass which provides nutrients and moisture • Can transmit diseases like lumpy skin disease and anaplasmosis

NAME	APPEARANCE	DESCRIPTION	IMPORTANCE
Blow Fly • *Lucilia cuprina* (green) • *Chrysomya marginalis* • *C. albiceps* (striped) • *C. chloropyga* (copper tailed) • *C. bezziana (blue)* • *Lucilia sericata* (sheep strike) • *Lucilia cuprina* • *Calliphora vicina*		 • *Lucilia cuprina* 4.5 - 10 mm  • *Chrysomya* sp. 10 - 12 mm bodies • Metallic blue or green bodies	• Blow flies deposit their eggs in wounds, or wet areas like skin folds and soiled areas around the anus of sheep • Larvae hatch and tunnel into the viable tissue enlarging the lesion • Muscle may be destroyed and body cavities invaded • Lesions may result in death due to shock, debilitation, toxaemia or bacterial septicaemia
Face Fly *Musca xanthomelas* *M. lusoria*		 • 6 - 7 mm long with a wingspan of 13 - 15 mm	• Follow cattle around the veld • Breed in cattle manure • Feed around the eyes and wounds of cattle • Cause discomfort. • Transmit *Parafilaria* (false bruising)
Horn Fly *Haematobia irritans*		 • 4 mm in length • Piercing mouthparts project forward from the bottom of the head	• Painful bite • Feed on blood • Rarely leave animal • Found on neck, shoulder and back. • Breed in cattle manure • Can build up into very large numbers

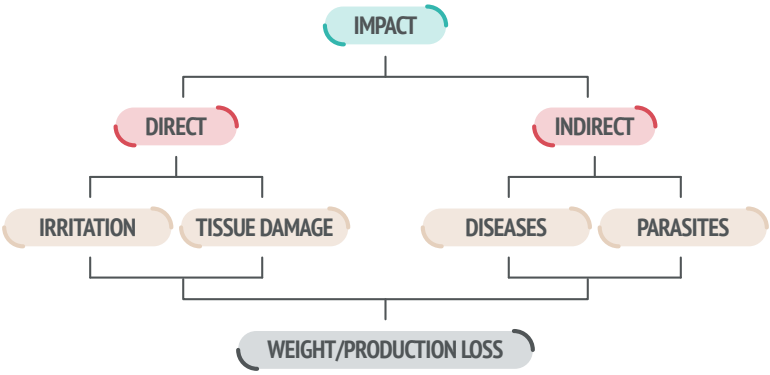
NAME	APPEARANCE	DESCRIPTION	IMPORTANCE
Midge *Culicoides sp.* *Leptoconops sp.*		 • 1.2 - 1.5 mm in length	• Active from dusk till dawn • Breed along water courses such as rivers, wetlands and around dams also in dung and rotting vegetation • Cause annoyance • Transmit diseases like blue tongue, African horse sickness, three-day-stiff sickness and Rift valley fever
Black Fly *Simulium sp.*		 • 1.2 - 1.5 mm in length	
Tsetse Fly *Glossina sp.*		 • 6 - 16 mm in length	• Occur in RSA in focal areas of KZN • Growing problem in KZN • Transmit Nagana (sleeping sickness), a trypanosomal disease
Cattle Louse Fly *Hippobosca rufipes*		 • 2 - 10 mm in length • Piercing and sucking mouth parts • Flattened stick-tight body • Can lose wings as adults and resemble ticks or lice	• Blood sucking • Cause annoyance • Painful bites • Transmit blood-borne diseases such as anaplasmosis

NAME	APPEARANCE	DESCRIPTION	IMPORTANCE
Horse-flies *Tabanus sp.*		 • Adults: 5 - 25 mm in length	• Only females bite and consume blood • Transfer blood-borne diseases such as anaplasmosis • Cause annoyance
Nasal Bot *Oestrus ovis* *Gedoelstia hässleri*		 • *Oestrus ovis*: Adults: 10 - 12 mm in length • Bots: 20 mm in length	• The larvae (bots) reside within the nasal passages • Can go unnoticed • Cause annoyance • Potential to cause rhinitis and meningitis and ocular lesions • *Oestrus ovis* most commonly affects sheep • *Gedoelstia hässleri* most commonly affects antelope, e.g. blesbuck and wildebeest. Usually asymptomatic • Can result in "uitpeuloog" (ophthalmomyiasis) in cattle and sheep and other game species • Concurrent infestation is possible
Rhino Bot Fly *Gyrostigma rhinocerontis*		 • Adults: 40.6 mm in length • Bots: 20 mm in length	• Adults lay eggs on the rhino and larvae/bots reside in the stomach of black and white rhinos • Cannot reproduce without rhinos • Suspected symbiotic relationship with

NAME	APPEARANCE	DESCRIPTION	IMPORTANCE
Horse Bot Fly *Gasterophilus intestinalis*		 • Adults: 10 - 15 mm in length • Bots: 12.7 - 19.1 mm in length	• Adults lay eggs near the horse's mouth, which are swallowed and larvae develop in the horse's stomach • Adults cause annoyance • Larvae cause sores, blockages and colic
Mango Fly, Tumbu Fly, Putzi Fly *Cordylobia anthropophaga*		 • Adults 9.5 mm in length • Bots: 13 - 25 mm in length	• Myosis, with single larvae causing a very irritant lump in skin • Several species are affected, including humans

EFFECTS ON ANIMALS

Flies can result in large production losses and carry and transmit various parasites and bacteria. These factors can culminate to large financial losses.



Direct Impact

Irritation

- This leads to stress, interrupted feeding and results in a loss of milk and meat production

Tissue damage

- Blowfly strike (Myiasis): The larvae of fl ies can cause and exacerbate wounds which are expensive to treat, loss of wool production, and a welfare concern
- In the 1990s, a South African small stock survey showed that blowfly strike results in an estimated loss of R19.8 million annually
- There are primary flies (green bottles) that can initiate strike and then secondary flies (black blowfly) that are attracted to previously damaged skin
- Other effects include blood loss and general immunosuppression

Indirect Impact

Viruses

- Lumpy skin disease
- Blue tongue virus
- Bovine leukosis virus
- African horse sickness

Bacteria

- Anthrax
- Brucellosis
- *Escherichia coli, Staphylococcus aureus,*
- *S. intermedius*
- Anaplasmosis

Ricketsia

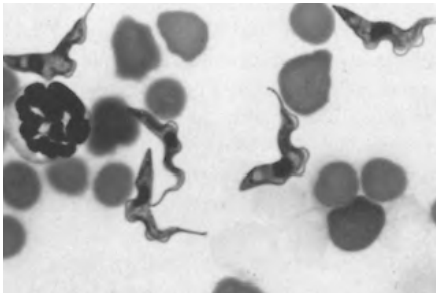
- *Coxiella burnetti*

Parasites

- African trypanosomiasis
- Besnoitiosis

AFRICAN TRYPANOSOMIASIS

This is a disease that occurs in animals and humans which is caused by parasitic protozoa. The disease is transmitted by Tsetse flies.



Trypanosoma brucei organisms in a blood smear.

Courtesy of Dr L. Logan-Henfrey, Laboratory for Research on Animal Diseases, PO Box 30709, Nairobi, Kenya.

Weight loss, depression seen in subacute trypanosomosis.

Courtesy of FGU Consulting and Engineering GmbH, Königstein, Germany, and the Regional Coordinator, RTTCP, Harare, Zimbabwe).

Clinical Signs

- The signs are variable and non-specific
- Acute, sub-acute and chronic form
- Fever (initially), sores/ulcerations, sudden decrease in milk production, abortions, ill-thrift, loss of body weight, anaemia, excessive lacrimation, standing alone, bleeding from orifices (rare)

Diagnosis

Difficult: requires examination of blood smears, or lymph node fluid or lymph node aspirates.

Differential Diagnoses

Redwater (babesiosis), anaplasmosis and East Coast fever, anthrax (rare haemorrhagic form), *Pasteurella multocida* septicaemia.

Treatment

- Trypanocidal drugs
- Holistic animal health support (feed, nutritional additives, e.g. **Electroguard® NF Gel** and **Bovi-min® Gel** etc.)
- Fly control (see table on page p. 16)

ANAPLASMOSIS (GALLSICKNESS)

A disease, caused by a rickettsial bacterium, transmitted by ticks and biting flies which infects the red blood cells.

Clinical Signs

- In young animals the disease is moderate, but in adults it can be severe to fatal
- Peracute, acute, or chronic form. Incubation period varies between 15 to 36 days
- Pale mucous membranes, depression, inappetence, decreased milk production, weakness, fever, constipation, stasis of the rumen, weight loss, dehydration, icterus (yellow mucous membranes), an increased heart rate, muscle tremors, bile-stained (yellow) faeces, abortions, and in some cases aggressive behaviour

Diagnosis

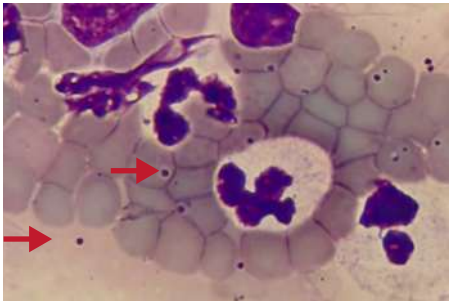
Examination of a blood smear. Rapid card agglutination test (RCA).

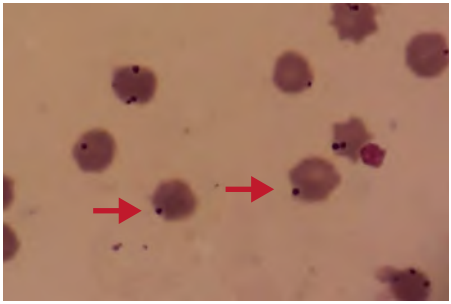
Differential Diagnoses

Bovine babesiosis (redwater), *Trypanosoma spp.* (anaemia symptoms), leptospirosis, chronic copper poisoning, *Brassica* and *Allium sp.* intoxication.

Treatment

Injection of tetracyclines (e.g. Ultratet, **Ultratet LA, Ultratet 200 LA**) or imidocarb to kill the parasites and supportive treatment for anaemia, dehydration (e.g. **Electro Guard® NF Gel**), etc.



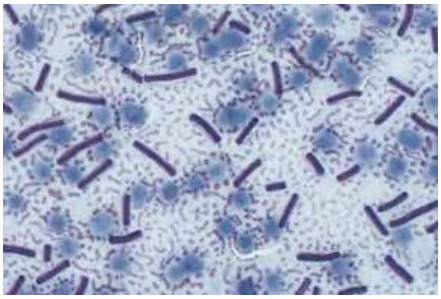


Note the small black spherical structures mostly within the red blood cells in both photos (red arrows). These are the *Anaplasma sp.* organisms.

Photos courtesy of Dr Reinhard Köhne, Howick veterinary clinic.

ANTHRAX

This highly contagious disease of many animal species and people is caused by the bacterium *Bacillus anthracis*. The disease can be transmitted by biting and non-biting flies which deposit spores onto vegetation by defecation or regurgitation. **Anthrax is a controlled disease in RSA.**



Giemsa-stained blood smear from a fresh carcass of a kudu that died of anthrax.
Courtesy of Anipedia.org.

Zebra are one of the species that show bloody discharge from the nostrils.
Courtesy of Anipedia.org.

Clinical Signs

Peracute, acute and subacute forms. Incubation period is 1 – 14 days. Sudden death, fever, anxiety, mucus membrane congestion, blood-tinged fluid running from the anus, mouth and nostrils. In the subacute form there is decreased milk production, abortions, animals lagging behind, swelling of the tongue and subcutaneous tissues.

Diagnosis

Blood smear and culture.

Differential Diagnoses

Blackquarter, African swine fever, peracute pasteurellosis.

Prevention

Annual vaccination of susceptible species.

Treatment

- Bacteriocidal antibiotics such as penicillin and dihydrostreptomycin. Treated animals can only be vaccinated 10 - 14 days later
- **Anthrax outbreaks must be reported to the state veterinarian and control measures such as quarantine and follow-up of human contacts may be implemented**

BLUE TONGUE VIRUS (BTV)

This viral disease is transmitted by arthropods (midges mainly), and affects sheep primarily, but cases have been reported in other domestic and wildlife ruminants. **This is a notifiable disesase and the local state veterinarian must be informed of cases. No control measures are enforced.**

Clinical Signs

The clinical signs vary in different breeds of sheep.

Severe symptoms include:

- High fever (41-42 °C)
- Red nose
- Salivation
- Runny nose
- Tears
- Lack of appetite
- Swollen tongue
- Smacking of lips
- Erosions or ulcers on the tongue and inside of cheeks
- Small haemorrhages
- Tongue can appear blue
- Swollen face
- Red coronary bands, mainly at the bulbs of the feet
- Lameness
- Wool breakage
- Rumen stasis
- Haemorrhagic diarrhoea just prior to death

The mortality rate is between 2 and 30%. Peracute cases usually die within a week with lung oedema. Chronic cases can die of secondary bacterial pneumonia and exhaustion, or take a long time to recover. Mild cases usually recover rapidly and completely.

Severe erosions, haemorrhage and congestion of the muzzle. Note swelling and redness of the lips.

Courtesy of Drs Massimo Scacchia and Giovanni Savini, Istituto Zooprofilattico Sperimentale dell'Abruzzo e del Molise "G.Caporale" Via Campo Boario, 64100 Teramo, Italia.

Severe swelling and protrusion of the tongue.

Courtesy of Drs Massimo Scacchia and Giovanni Savini, Istituto Zooprofilattico Sperimentale dell'Abruzzo e del Molise "G.Caporale" Via Campo Boario, 64100 Teramo, Italia.

Acute bluetongue: redness and small haemorrhages of coronary band and adjacent hoof.

Courtesy of the Department of Veterinary Tropical Diseases, Faculty of Veterinary Science, University of Pretoria, South Africa.

Diagnosis
A presumptive diagnosis is made based on clinical signs. **Febrile cases:** 10 - 20 ml blood is submitted for virus detection in EDTA (purple top) tubes. **Post mortem samples:** Spleen, lymph node, lung fresh for viral isolation. Formalin fixed samples of the lingual and coronary band lesions and other parenchymatous organs can be submitted for immunohistochemistry.

Differential Diagnoses
Secondary photosensitivity (caused by plant- and mycotoxin poisonings), foot-and-mouth disease, polyarthritis, vitamin E and selenium deficiency, foot rot, orf (vuilbek), peste des petit ruminants (PPE), laminitis, foot rot, internal parasites (e.g. haemonchosis); heartwater and pulpy kidney disease.

Prevention
Regular vaccination and midge control using a repellent pyrethroid such as deltamethrin, e.g. **Deltapor® 5.**

Treatment
Supportive therapy is needed in severely affected animals such as anti-inflammatory drugs, keeping in the shade, providing water and soft food. Antibiotics will prevent secondary infections such as pneumonia.

ESCHERICHIA COLI (E. COLI)
Most *E. coli sp.* do not cause disease but some cause septicaemia or diarrhoea. Colibacillosis is a disease seen in new born and weaner piglets, lambs and kids. *E. coli* can also cause problems in adult animals such as mastitis in dairy cattle.

Clinical Signs
Colibacillosis usually manifests as diarrhoea, but septicaemia is also seen. It is an occasional cause of abortions, urinary tract disease, oedema disease and mastitis.

Diagnosis
Detection and identification of causative bacteria.

Differential Diagnoses
Nutritional diarrhoea due to overfeeding, rotavirus, coronavirus, enterotoxaemia, *Salmonella sp., Cryptosporidium sp.,* coccidiosis, and internal parasites.

Treatment
Newborn animals must ingest sufficient good quality colostrum. Vaccination may be necessary on heavily infected farms. Supportive treatment with electrolytes, minerals and vitamins (e.g. **Electro Guard® NF Gel** and/or **Dairy-min® Gel, Ovi-min® Gel** or **Bovi-min® Gel**).

A large proportion of disease photos are from Infectious diseases of livestock by JAW Coetzer and RC Tustin. The latest editions are available online: www.anipedia.org.

COST OF FLIES

In 2007 a single nuisance fly would cost the farmer R0.18 per day per calf.

In 2019, Richard J. Hack stated that stable flies can lead to 1.49 kg/day milk production losses and a $2.2 billion (R44 billion) cost to US livestock industry. There are 94.8 million cattle and calves in the US (2019, APHIS-USDA). Therefore, the production costs due to flies were approximately R350 per animal for 2019. This is approximately R1.50 per day per animal.

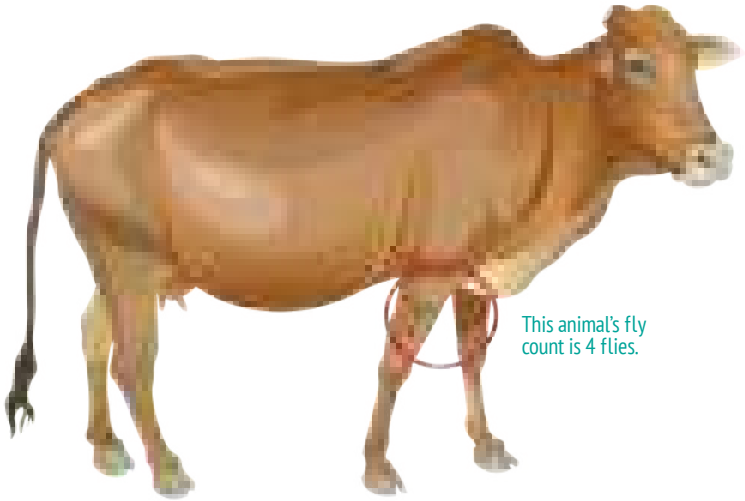
How To Determine The Severity Of Your Fly Burden

Larvae

Inspect manure piles visually for larval development hot spots.

Stable flies

During the mid-morning period, observe approximately 15 cattle that are separated from the rest of the herd. Approaching the animal from the side, count the number of flies that have their heads facing upward (towards the animal's head) on outside and opposite inside surface of the front legs of the animal. It has been reported that numbers can vary from 2 - 24 per leg. As little as 3 flies per leg can lead to economic losses.



This animal's fly count is 4 flies.

Combine the total number of flies of all 15 animals to determine the final count.

House flies

Place 3 - 4 cm wide sticky ribbons in several places throughout the stable and replace them weekly. An average count of more than a 100 flies per tape per week is seen as a high count.

INTEGRATED FLY CONTROL

One cannot get rid of flies by using insecticidal products only. An integrated, holistic approach will decrease chemical product expenses, by using the correct products in the correct areas and decrease fly burden. There are four components to integrated fly control.

1. Environmental Hygiene

- Remove carcasses
- Remove manure and compost heaps
- Spread manure out to dry
- Treat with a larvicidal
- Let wet areas dry

2. Manure Treatment

Flies lay eggs in the manure. Manure needs to be removed or treated to prevent amplification of fly numbers. Pyrethroid sprays kill flies and larvae on contact. Insect growth regulators (IGRs) such as **Afrivet's Eradifly® Granular** contains novaluron, with a long acting effect that stops the fly's life cycle at the larval stage and has no effect on earthworms and wasps. IGRs can be used around hay stacks, bales and trampled into the ground so stable- and housefly larvae cannot complete their life cycles.

3. Control on animals

Pyrethroid containing dips and pour-ons **(Deltapor® 5, Deltaforce 100, Eraditick ® Plus Pour-on, Eraditick ® Ultra, Ecobash)** are effective against flies. Pyrethroids kill adult flies and larvae and have a repellent effect on adults.

Expel Plus Jetting Fluid protects against and treats blowfly strike in sheep. It contains an IGR (novaluron) and a macrocyclic lactone (ivermectin). It has a residual effect of up to 16 weeks against blow fly strike.

Self-application control methods include bags impregnated with insect repellents. Consult with your Afrivet agent for more information.

Expel Wound Spray contains deltamethrin which kills maggots in the wound and is a fly repellent. In addition its germicidal effect it promotes wound healing. It is important to clean wounds and remove larvae to promote wound healing

Indoor residual sprays (IRS): These kill insects after contact and includes **Icon® 10CS.**

4. Control in stables

Formulations containing pyrethroids are available for environmental treatment of roofs and walls.
Baits: Poisoned baits which are attractive to flies can be placed in certain areas.
Indoor residual sprays (IRS): These kill insects after contact and includes **Icon® 10CS.**

PRODUCT	ACTIVE	SPECTRUM	COMMENTS
PYRETHROIDS			
	Deltamethrin 10% m/v	• Controls all tick species • Controls nuisance and biting flies on cattle namely: - stable flies - house flies - cattle louse flies - black flies - horn flies • Controls screw-worm infestations. • Controls Tsetse fly	• Meat withdrawal: 21 days • Milk withdrawal: 24 hours
	Deltamethrin 0,5% m/v PBO 2,5% m/v	• Stable flies • Nuisance flies (face, horn and house fly) • Cattle louse fly • Blackflies • Lice (biting and sucking)	• No milk withdrawal period – ideal for routine fly control on dairy animals during peak fly season • PBO is a synergist and enhances the effect of deltamethrin • Meat withdrawal: 7 days
	Cypermethrin 2.5% m/v Cymiozole 17.5% m/v	• Biting flies (stable, horse and tsetse fly) • Nuisance flies (face, horn, and house fly) • Tsetse fly • Cattle louse fly • Blow fly strike • Various tick species	• No milk withdrawal period – ideal for routine fly control on dairy animal during peak fly season • High cis-isomer form of cypermethrin ensures greater efficacy • Main focus is tick control with added benefit of simultaneous fly control • Meat withdrawal: 7 days
	Deltamethrin 0,5% m/v PBO 3% m/v Amitraz 1,5% m/v	• Stable fly • Nuisance fly (face, horn, house and black fly) • Cattle louse fly • Various tick species	• No milk withdrawal period – ideal for routine fly control on dairy animal during peak fly season • PBO is a synergist and enhances the effect of deltamethrin • Main focus is tick control with added benefit of simultaneous fly control • Meat withdrawal: 7 days
	Cypermethrin 2.5% m/v Cymiazole 16% m/v Chlorfenvinfos 20% m/v	• House fly • Various tick species • Particularly ticks showing resistance to other active ingredients	• Main focus is tick control on beef cattle or dry dairy cows, with added benefit of simultaneous fly control

PRODUCT	ACTIVE	SPECTRUM	COMMENTS
	Deltamethrin 0.1% m/v	Screw-worm/blowfly strike	Prevents and treats blow fly strike in wounds
INSECT GROWTH REGULATORS			
	Novaluron	• Biting flies (stable, horse and tsetse fly) • Nuisance flies (face, horn and house fly)	Start using during early spring when fly eggs start hatching to prevent larvae completing life cycle
	Novaluron 2% m/v Ivermectin 3% m/v	• Blow fly strike • Kills sheep scab mites • Kills red lice	• Ideal to prevent blow fly strike during rainy season or summer while treating other external parasites • 16 weeks residual action
SURFACE SPRAY INSECTICIDE			
	Cyhalothrin (pyrethroid)	Controls all mosquitoes, house flies, tsetse flies, bed bugs.	• A long residual effect (controlling house flies and cockroaches for 16 weeks after treatment) • Is water based, mixes easily and uses unique micro-encapsulation technology • Has an excellent safety profile with a low toxicity (LD50: 4000 mg/kg) to warm blooded animals • Is non-staining and have low odour

SUSPENSION CONCENTRATE VERSUS EMULSIFIABLE CONCENTRATE

Suspension concentrate (SC): Formulation in which the active ingredient is in the form of a stable dispersion of fine particles in water or organic liquid.

Emulsifiable concentrate (EC): A pesticide formulation consisting of an active ingredient and an emulsifying agent in an organic solvent. The solvent is usually not soluble in water. When an EC product is mixed with water prior to application, the resulting mix is a dispersion of fine, oily particles in water.

SUSPENSION CONCENTRATE	EMULSIFIABLE CONCENTRATE
Larger particles	Small particles
Slower breakdown in sunlight	More rapid breakdown in sunlight
Water based	Water-immiscible
Odourless	Mild aromatic odour
Will not stain surfaces	Oil based – stains surfaces
More environmentally friendly	Caustic to plastic and rubber

Deltaforce 100 (left); **Eraditick® 250** (right) illustrating the difference between SC (suspension concentrate) and EC (emulsifiable concentrate).
Courtesy of Afrivet

WE WOULD HURT A FLY, BUT NOT YOUR PROFITS...

AFRIVET'S INTEGRATED FLY CONTROL PROGRAMME

FOR MORE INFORMATION: 0860 833 2787 or 012 817 9060

Ecobash: Reg. No. G3382 (Act 36/1947), **Deltapor® 5:** Reg. No. G4252 (Act 36/1947), **Deltaforce 100:** Reg. No. G4367 (Act 36/1947), **Eraditick® Plus Pour-on:** Reg. No. G4251 (Act 36/1947), **Eraditick® Ultra:** Reg. No. G3976 (Act 1947), **Expel Wound Spray:** Reg. No. G3245 (Act 36/1947), **Expel Plus Jetting Fluid:** Reg. No. G4027 (Act 36/1947), **Eradifly Granular:** Reg. No. L10328 (Act 36/1947).
Registration Holder: Afrivet Business Management (Pty) Ltd, Co. Reg. No. 2000/011263/07.

ICON® 10CS: Reg. No. L7860 (Act 36/1947), Reg. No. N-AR 0814 (Namibia).
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