

# Chemicals registered to treat lice and flystrike

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NSW sheep producers spend more than \$30 million per annum on chemicals to treat or prevent infestations of body lice (*Bovicola ovis*) and flystrike by the sheep blowfly (*Lucilia cuprina*). Clearly, with this level of investment it is important that they make wise treatment choices and only use products registered for these purposes.

Product choice is likely to be influenced by price, safety to the user, effectiveness of the product and the residue consequences of treatment such as withholding period, export slaughter interval and market access.

Chemical residues in wool can threaten access to some markets e.g. European processors. 'No chemical' or 'low chemical' residue wools may have a market advantage over wool with residue levels above, for example, the EU eco-label residue limit.

Woolgrowers should try to reduce their reliance on chemicals and only apply chemicals to sheep in strict accordance with label directions.

## Benefits of producing low or no pesticide residue wool

Reduced cost of production due to less chemical use.

Reduced occupational health and safety risks.

Access to particular wool markets by meeting customer needs.

Maximised market access for 'clean' wool and perhaps influence wool prices by attracting more competition for clean wool.

## Chemical groups

There are currently seven main types of chemical available to control or eradicate sheep lice and blowflies:

Organophosphates (OP): Diazinon, propetamphos, temephos - interfere with nerve signal transmission.

Synthetic pyrethroids (SP): Alphacypermethrin, cyhalothrin, cypermethrin, deltamethrin – over exciting the insect nervous system causing paralysis.

Insect growth regulators (IGR's): Benzoylphenyl ureas, triazine and pyrimidine derivatives - diflubenzuron, triflumuron, cyromazine, dicyclanil - prevent an insect from reaching maturity by interfering with the moulting process.

Macrocyclic lactones (ML): ivermectin, avermectin, abamectin, – block nerve signals.

Spinosyns: spinosad - over exciting the insect nervous system causing paralysis.

Neonicotinoid: imidacloprid - overstimulate the insect nerves.

'Others': principally magnesium fluorosilicate (registered for use in organic production systems – gut poison), amitraz, piperonyl butoxide, rotenone, and sulphur are additives that enhance the activity of other chemicals controls.

## Know the risks

The different chemical groups have various degrees of risk relating to operator health, pest resistance and wool residues as shown in Table 1.

Understanding these risks will help when deciding which (if any) chemical is to be used.

Table 1. Potential risks associated with use of and exposure to insecticides.

| <b>Group</b>   | <b>Human health<sup>4</sup></b> | <b>Pest resistance</b>   | <b>Raw wool residues</b>    |
|--|---------------------------------|--|-----------------------------|
| Organophosphate (OP)   | High*                           | Common in flies & maggots  | low                         |
| Synthetic Pyrethroids (SP)                                   | Medium                          | None in flies<br>Common & high in lice                                 | High in LW <sup>1</sup>     |
| Insect Growth Regulators (IGR)<br>Diflubenzuron/ triflumuron | Low                             | Common & high in maggots <sup>2</sup><br>Common & high in lice         | Medium in LW <sup>1,3</sup> |
| Insect Growth Regulators (IGR)<br>Dicyclanil/cyromazine      | Low                             | Low level resistance detected <sup>5</sup> ;<br>Not applicable to lice | Medium in LW <sup>1,3</sup> |
| Spinosyn   | Low                             | None reported  | Low                         |
| Macrocyclic Lactones (ML)                                    | Low                             | None reported  | Low                         |
| Magnesium Fluorosilicate                                     | Low                             | None reported  | Low                         |
| Neonicotinoid  | Low                             | None reported  | Low                         |

Source: Liceboss ([www.liceboss.com](http://www.liceboss.com))

\* High human health risk is in relation to diazinon. Some organophosphates pose a low human health risk e.g. temephos.

<sup>1</sup> LW – Long wool is defined as more than 6 weeks after shearing.

<sup>2</sup> Fly resistance to diflubenzuron (Dfb) has been reported. Diflubenzuron is no longer registered in Australia for the prevention of flystrike on sheep.

<sup>3</sup> Except CLIK, this can be used up to 3 months before shearing and cyromazine products up to 2 months before shearing; CLIKzin can be used up to 1 month before shearing.

<sup>4</sup> See Special Note: Human health risks

<sup>5</sup> At time of writing low level resistance had been detected in only one population of sheep blowflies. Thorough application of the correct dose of dicyclanil or cyromazine is still effective.

## Application method

The tables on pages 5, 6, 7, 8 and 9 have been organised according to the application methods for the lice and fly products. They are intended to be used as a management tool when making decisions about which insecticide or application method to use in a given situation. ‘Situation’ includes length of wool growth and usual time of shearing, physiological state (e.g. non-pregnant, lactating), facilities and labour available. The ‘situation’ is usually a principal determinant of application method.

## Calibrate and maintain application equipment

Some products must only be used with specified applicators e.g. handguns for pour-on lousicides.

All equipment used to apply chemicals to sheep should be maintained and calibrated carefully, to ensure they deliver the appropriate dose. Calibrate by measured volume, or pressure, or a combination as appropriate. Follow the instructions. Clean-up and storage are particularly important and the manufacturer’s instructions for cleaning after using all chemicals should be followed carefully.

## Comparing alternative treatments

Registered products containing the same concentration of the same active constituent (chemical) e.g. cyromazine 500 g/L, and registered for the same use, with the same instructions, can be considered as identical and therefore as direct alternatives. You should compare alternatives based on the treatment cost per head (\$/hd) after

allowing for, for example, appropriate body weight, wool growth and age.

## Withholding periods – WHP

The Meat WHP is the minimum period of time which must elapse between the last treatment of an animal with a product and slaughter for human consumption in Australia.

Recently, the Australian Pesticides and Veterinary Medicines Authority (APVMA) which registers all these products has specified that the term WHP will no longer be used in relation to wool. Instead, two new terms are to be used: Wool Rehandling Period and Wool Harvesting Interval.

**Wool Rehandling Period** refers to the period between the sheep being treated and when the sheep or wool can be safely handled without the need for protective clothing. This rehandling period is important for the occupational health and safety of shearers and other workers that are handling sheep and/or wool.

**Wool Harvesting Interval (WHI)** refers to the period between treatment and when the wool is able to be harvested and satisfy Australian environmental requirements.

**Export Slaughter Interval (ESI)** is the minimum recommended time interval that should elapse between the last treatment with a product and slaughter for export.

Meat WHPs ESI and WHI (as at 6 February 2012) are given in the tables. If any animals are still within a WHP or ESI at the time of sale, the product used and date of application must be specified in Question 4 of the **National Vendor Declaration and Waybill (Sheep & Lambs)**.

Chemicals used and application dates must also be entered in Section 4 – Other Health Information on the **National Sheep Health Statement**.

## Reducing chemical usage

The key to reducing reliance on chemicals is to use an integrated pest management (IPM) approach to control flystrike or eradicate lice. If you need to use chemicals, select those with the minimum risk and apply them strictly as directed to ensure their maximum effectiveness.

The four main IPM elements are:

- Management options: e.g. reduce susceptibility to breech strike by implementing correct tail length at lamb marking; match shearing/crutching time with periods of increased fly activity and reduce the risk of lice introduction.

- Genetic improvement: e.g. increase resistance to body strike and breech strike by selecting for resistance to fleece rot and for less wrinkle.
- Utilising the blowfly life cycle: e.g. using fly traps to monitor blowfly population and treating struck sheep to steady the increase in population.
- Selective and effective use of chemicals: e.g. only treat sheep for lice if they are lousy and apply chemical to **every** sheep correctly.

## Availability of the products

Some products listed in the tables may not be available at your agricultural chemical supplier. This may be because:

- Your supplier does not stock that manufacturer's products.
- The manufacturer has recently or temporarily stopped supplying the product.
- The product may not be readily available in NSW, despite being registered for all States.

## Further information

The list of registered veterinary chemicals changes every year. Users can check the current registration details for any chemical from the APVMA PUBCRIS database at [www.apvma.gov.au](http://www.apvma.gov.au), or <http://services.apvma.gov.au/PubcrisWebClient/welcome.do>

The FlyBoss internet page has information on management of flystrike including chemicals at <http://www.flyboss.org.au/tools/flystrike-decision-support-tools.php>

The LiceBoss internet page has information on management of lice including chemicals at [http://www.wool.com/Grow\\_LiceBoss.htm](http://www.wool.com/Grow_LiceBoss.htm)

Other information on the NSW DPI website ([www.dpi.nsw.gov.au](http://www.dpi.nsw.gov.au)):

Primefact 843 – *Hand jetting sheep*

Primefact 844 – *Spray-on flystrike prevention*

Primefact 845 – *Treating flystruck sheep*

Primefact 485 – *Sheep blowflies*

Primefact 848 – *Triggers leading to blowfly strike*

Primefact 918 – *Breeding merinos for less breech strike*

Primefact 483 – *Sheep lice*

## Contacts for enquiries

- Your local NSW DPI Sheep & Wool Officer
- LHPA Veterinarians and Rangers
- Edward Joshua: (02) 6881 1275 or email [edward.joshua@dpi.nsw.gov.au](mailto:edward.joshua@dpi.nsw.gov.au)

## Special note

### Definitions

The labels of registered lice products usually refer to the product either 'controlling' or 'treating' lice. No label claims to 'eradicate' lice are made, however eradication is possible following the correct use of an immersion dipping system. 'Control' means to reduce lice in short wool sheep to non-detectable levels 20 weeks after treatment. 'Treat' means to reduce lice in long wool sheep 90 days after treatment by more than 95%.

### Human health risks

Users who follow the directions for use will always have a lower risk of exposure to chemicals. This is because the use of the correct protective equipment and correct application technique will protect against significant exposure to chemicals.

The 'pure' or molecular form of many chemicals is highly hazardous to human health. However, because of dilution with 'carriers' which may assist with mixing and/or spread over the animal, the product you purchase may or may not be less hazardous. If further diluted with water for application, the chemical 'as applied' is likely to be less hazardous again.

There is some variation between chemicals within the broad groups e.g. OP, SP, IGR. In addition, some chemicals exhibit markedly different degrees of hazard between oral/inhaled and body (skin) contact. Refer to the product's Safety Data Sheet (SDS) for toxicological information. Your chemical reseller is required to provide the MSDS to you on request. For safety reasons treat all chemicals with respect and handle them according to the manufacturer's recommendations.

This Primefact contains the registered label claims for sheep ectoparasiticides. The list is comprehensive at the time of printing (September 2012). The tables are grouped according to the method of application. This information should be read in conjunction with the material referred to above so that recommendations from NSW DPI for the use of these registered chemicals can be followed.

## Always read the label

Users of agricultural or veterinary chemical products must always read the label and any permit before using the product. Users must comply strictly with the directions on the label and the conditions of any permit. Users are not absolved from compliance with the directions on the label or the conditions of the permit by reason of any statement made or not made in this publication.

Labels specify appropriate application technique and recommend minimum standards for protective equipment to be used. You should request a Safety Data Sheet (SDS) when the chemical is purchased as this document gives further information on the chemical and what to do in cases of spillage or poisoning.

### Workplace health and safety (WHS)

WHS regulations require that employees applying chemicals are appropriately trained and supervised in their use. The *Pesticides Act (1999)* also requires all users to be trained to use chemicals. Since July 2002 the same regulation has also required you to keep records of all pesticide applications. You will also need these records to complete National Vendor Declarations and Sheep Health Statements. Storage and handling recommendations on the label should be strictly adhered to for two reasons:

- to comply with WHS regulations
- to ensure that the shelf life of any remaining product is not compromised.

## Acknowledgements

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| Off-shears backline treatments           |                         |              |           |                              |           |                             |  |
|--|-------------------------|--------------|-----------|------------------------------|-----------|-----------------------------|--|
| Active                                   | Trade Name              | Manufacturer | Parasite  | Withholding periods (days)   |           | Label claim/recommendations |  |
|  |                         |              |           | Meat WHP                     | Wool Days | ESI                         |  |
| <b>Organophosphates (OP)</b>             |                         |              |           |                              |           |                             |  |
| Diazinon 93.3 g/L                        | Eureka Gold OP Spray-On | Coopers      | Lice      | 21                           | 60        | 21                          | For off-shears control of the sheep body louse   |
| <b>Synthetic Pyrethroids (SP)</b>        |                         |              |           |                              |           |                             |  |
| Cypermethrin 25 g/L                      | Outflank                | Fort Dodge   | Lice, ked | NIL                          | NS        | 14                          | For the control of sheep body lice & ked   |
| Cypermethrin 25 g/L                      | Spurt                   | WSD          | Lice      | 3                            | NS        | 14                          | For the control of body lice on off-shears sheep   |
| Cypermethrin 25 g/L                      | Cypermethrin 25         | 4Farmers     | Lice      | 3                            | NS        | 14                          | For control of body lice on off-shears sheep   |
| Deltamethrin 10 g/L                      | Clout-S Backline        | Coopers      | Lice      | 3                            | NS        | 14                          | Controls body lice on sheep and lice on goats  |
| <b>Insect Growth Regulators (IGR)</b>    |                         |              |           |                              |           |                             |  |
| Triflumuron 25 g/L                       | Command Pour-On         | WSD          | Lice      | 14                           | NS        | 66                          | For control of body lice on shorn sheep up to 7 days off-shears & lambs at foot  |
| Triflumuron 25 g/L                       | Exilice                 | Pharm Tech   | Lice      | 14                           | 60        | NS                          | For the control of body lice on shorn sheep up to 7 days off-shears & unshorn lambs up to 3 months of age  |
| Triflumuron 25 g/L                       | Exit                    | Ancare       | Lice      | 14                           | NS        | 66                          | For the control of body lice on shorn sheep up to 7 days off-shears & unshorn lambs up to 3 months of age  |
| Triflumuron 25 g/L                       | Triffik                 | Jurox        | Lice      | NIL                          | 60        | 60                          | For control of body lice on shorn sheep up to 7 days off-shears and unshorn lambs up to 3 months of age  |
| Triflumuron 25 g/L                       | Clipguard               | Novartis     | Lice      | 14                           | 60        | 66                          | For the control of body lice on shorn sheep up to 7 days off-shears & unshorn lambs up to 3 months of age  |
| Triflumuron 25 g/L                       | Triflumuron 25          | 4Farmers     | Lice      | 14                           | NS        | 66                          | For the control of body lice on shorn sheep up to 7 days off-shears & lambs at foot  |
| Triflumuron 25 g/L                       | Cannon                  | Procare      | Lice      | 14                           | 60        | 66                          | For the control of body lice on shorn sheep up to 7 days off-shears & unshorn lambs up to 3 months of age  |
| Triflumuron 25 g/L                       | Zapp                    | Bayer        | Lice      | 14                           | 60        | 66                          | For the control of body lice on shorn sheep up to 7 days off-shears & unshorn lambs up to 3 months of age  |
| Diflubenzuron 25 g/L                     | Magnum                  | Coopers      | Lice      | 0 off shears<br>42 Long wool | 180<br>42 | 0<br>7                      | For the control & treatment of body lice on sheep off-shears & unshorn lambs up to 3 months of age. Aids in the control of body lice infestations in long woolled sheep              |
| Diflubenzuron 20 g/L                     | Stampede                | Coopers      | Lice      | 7                            | 180       | 7                           | For the control & treatment of body lice on sheep up to 7 days off-shears & unshorn lambs up to 3 months of age. Aids in the control of body lice infestations in long woolled sheep |
| Dicyclanil 50 g/L                        | Clik Spray-On           | Novartis     | Fly       | 28                           | 90        | 120                         | For the protection of sheep off-shears or with any length wool, against flystrike for 18-24 weeks. For the protection of marking wounds on sheep against flystrike.                  |
| Dicyclanil 50 g/L & diflubenzuron 15 g/L | Clik Plus               | Novartis     | Fly, lice | 21                           | 180       | 70                          | Protects against flystrike for 18-24 weeks. Controls & treats body lice on sheep treated off-shears or within 7 days of shearing & unshorn lambs up to 3 months of age.              |

| <b>Spinosyn (Spin)</b> |                   |         |      |    |     |    |  |
|------------------------|-------------------|---------|------|----|-----|----|--|
| Spinosad 25 g/L        | Extinosad Pour-On | Elanco  | Lice | 14 | NIL | 21 | For the control of lice in sheep off-shears and with long wool.                        |
| <b>Neonicotinoid</b>   |                   |         |      |    |     |    |  |
| Imidacloprid 35 g/L    | Avenge Pour-On    | Bayer   | Lice | 21 | 180 | 63 | Pour-On Lousicide For Sheep. Controls susceptible body lice on shorn sheep off-shears. |
| <b>Ivermectin</b>      |                   |         |      |    |     |    |  |
| Abamectin 6.0 g/l      | Maverick Pour-On  | Coopers | Lice | 21 | 42  | 28 |  |

| <b>Jetting Fluids</b>                 |                                |              |            |                     |           |          |   |
|---------------------------------------|--------------------------------|--------------|------------|---------------------|-----------|----------|---|
| Active                                | Trade Name                     | Manufacturer | Parasites  | Withholding periods |           |          | Label claim/recommendations   |
|                                       |                                |              |            | Meat days           | Wool days | ESI days |   |
| <b>Insect Growth Regulators (IGR)</b> |                                |              |            |                     |           |          |   |
| Cyromazine 500 g/L                    | Cyrazin Liquid                 | Ancare       | Fly        | 7                   | 60        | 21       | Protects long wool sheep for up to 14 weeks from strike by blowfly.   |
| Cyromazine 500 g/L                    | Cyromazine 500 SC              | 4Farmers     | Fly        | 7                   | 60        | 21       | Protects long wool sheep for up to 14 weeks from strike by blowfly  |
| Cyromazine 500 g/L                    | Clout Blowfly Destroyer liquid | Coopers      | fly        | 7                   | 60        | 21       | Protects long wool sheep for up to 14 weeks from strike by blowfly  |
| Cyromazine 500 g/L                    | Venus Liquid                   | Norbrook     | Fly        | 7                   | 60        | 21       | Protects long wool sheep from flystrike for up to 14 weeks  |
| Cyromazine 500 g/L                    | Virbazine Liquid               | Virbac       | Fly        | 7                   | 60        | 21       | Protects long wool sheep for up to 14 weeks from strike by blowfly  |
| Cyromazine 500 g/L                    | Cy-Guard SC                    | WSD          | Fly        | 7                   | 60        | 21       | Protects long wool sheep for up to 14 weeks from strike by blowfly  |
| Cyromazine 500 g/L                    | Cyro-Fly 500                   | Jurox        | Fly        | 7                   | 60        | 21       | Protects long wool sheep for up to 14 weeks from strike by blowfly  |
| Cyromazine 500 g/L                    | Cyromazine Liquid              | Youngs       | Fly        | 7                   | 60        | 21       | Protects long wool sheep for up to 14 weeks from strike by blowfly  |
| Cyromazine 500 g/L                    | Exi-fly liquid                 | Bomac        | Fly        | 7                   | 60        | 21       | Protects long wool sheep for up to 14 weeks from strike by blowfly  |
| Cyromazine 500 g/L                    | Lucifly liquid                 | Norbrook     | Fly        | 7                   | 60        | 21       | For the control of blowfly strike in long wool sheep for up to 14 weeks   |
| Cyromazine 500 g/L                    | Proguard Liquid                | Procare      | Fly        | 7                   | 60        | 21       | Protects long wool sheep for up to 14 weeks from strike by blowfly  |
| Cyromazine 500 g/L                    | Vetrazin Liquid                | Novartis     | Fly        | 7                   | 60        | 21       | Protects long wool sheep from flystrike for up to 14 weeks  |
| Diflubenzuron 250 g/L                 | Strike                         | Coopers      | Lice       | NIL                 | 180       | NIL      | For the control & treatment of lice on sheep  |
| Diflubenzuron 250 g/L                 | Fleececare                     | Virbac       | Lice       | NIL                 | 180       | NIL      | For the control & treatment of lice on sheep  |
| <b>Macrocyclic Lactones (ML)</b>      |                                |              |            |                     |           |          |   |
| Ivermectin 16 g/L                     | Paramax Multi-Purpose          | Coopers      | Fly & lice | 7                   | 42        | 7        | Treatment of & protection against flystrike for up to 12 weeks under low to moderate fly pressure & treatment of biting lice in long wool. Oral treatment for control of internal nematode parasites, nasal bot & itchmite. |
| ivermectin 16 g/L                     | Zinjet                         | Agvantage    | Fly & lice | 7                   | 42        | 7        | Treatment of & protection against flystrike for up to 12 weeks under low to moderate fly pressure & treatment of biting lice in long wool   |
| Ivermectin 16 g/L                     | Blowfly & Lice                 | Coopers      | Fly & lice | 7                   | 42        | 7        | Treatment of & protection against flystrike for up to 12 weeks under low to moderate fly pressure and treatment of biting lice in long wool   |

| Spinosyn (Spin) |   |        |            |     |     |     |  |
|-----------------|---|--------|------------|-----|-----|-----|--|
| Spinosad 25 g/L | Extinosad lice, fly and maggot eliminator | Elanco | Fly & lice | NIL | NIL | NIL | For the control of lice in sheep with short wool & long wool. For treatment & prevention of blowfly strike on sheep. For blowfly strike protection in mulesing & other wounds. |

| Hand dressings  |                          |                    |           |                     |           |          |   |
|---|--------------------------|--------------------|-----------|---------------------|-----------|----------|---|
| Active  | Trade Name               | Manufacturer       | Parasites | Withholding periods |           |          | Label claim/recommendations   |
|   |                          |                    |           | Meat days           | Wool days | ESI days |   |
| Organophosphates (OP)   |                          |                    |           |                     |           |          |   |
| Diazinon 200 g/L  | Diazinon                 | Coopers            | Fly       | 14                  | 60        | 21       | Used as a dressing for the control of blowfly strike on struck sheep, and as a dressing for marking wounds  |
| Diazinon 200 g/L  | Diazinon                 | WSD                |           | 14                  | 30        | 21       | For use as blowfly dressing for struck sheep & dressing for marking wounds on sheep   |
| Diazinon 3 g/L + ODB 150 g/L + cresol 30 g/L                        | KFM Blowfly Dressing     | Bomac              | Fly       | 14                  | 60        | 21       | For treatment of sheep blowfly strike   |
| Chlorfenvinphos 2.5 g/L & cresylic acid 25 g/L + oils + naphthalene | Defiance S               | Fort Dodge         | Fly       | 3                   | NS        | 14       | Antiseptic & insecticidal dressing for treatment of blowfly strike on sheep, and for use at mulesing & marking. Helps protect wounds from blowfly strike  |
| Diazinon 15 g/kg & PBO 0.8 g/L & pyrethrins 1 g/kg                  | Coopers Flystrike Powder | Coopers            | Fly       | 14                  | NS        | 21       | For control of flystrike (including poll strike on sheep) & as a general wound dressing on all animals.   |
| Diazinon 15 g/kg & PBO 0.8 g/L & pyrethrins 1 g/kg                  | Flystrike Powder         | WSD                | Fly       | 14                  | Nil       | 21       | To control flystrike & for wound dressing for animals   |
| Diazinon 15 g/kg & PBO 0.8 g/L & pyrethrins 1 g/kg                  | Mulesing Powder          | WSD                | Fly       | 14                  | Nil       | 21       | Wound dressing following mulesing operation; general wound dressing for sheep, cattle & goats   |
| Paradichlorbenzene 400 g/L & propetamphos 14.4 g/L                  | Young's Deadmag          | Arysta Lifescience | Fly       | 14                  | 60        | NS       | For the treatment of blowfly struck sheep. Will protect against flystrike for up to 20 days   |
| Insect Growth Regulators (IGR)                                      |                          |                    |           |                     |           |          |   |
| Cyromazine 500 g/L  | Venus Liquid             | Norbrook           | Fly       | 7                   | 60        | 21       | For the control of blowfly strike in long wool sheep for up to 14 weeks when used as directed   |
| Cyromazine 500 g/L  | Vetrazin Liquid ***      | Novartis           | Fly       | 7                   | 60        | 21       | Protects long wool sheep from flystrike for up to 14 weeks  |
| Cyromazine 60 g/L   | Vetrazin Spray-on ***    | Novartis           | Fly       | 7                   | 60        | 28       | Will protect long wool sheep against fly strike for 11 weeks  |
| Cyromazine 500 g/L  | Cyro-Fly 500             | Jurox              | Fly       | 7                   | 60        | 21       | Protects long wool sheep for up to 14 weeks from strike by blowfly  |
| Cyromazine 500 g/L  | Cyrazin Liquid           | Ancare             | Fly       | 7                   | 60        | 21       | Protects long wool sheep for up to 14 weeks from strike by blowfly.   |
| Cyromazine 500 g/L  | Clout Blowfly Destroyer  | Coopers            | Fly       | 7                   | 60        | 21       | Protects long wool sheep for up to 14 weeks from strike by blowfly  |
| Macrocyclic Lactones (ML)   |                          |                    |           |                     |           |          |   |
| Ivermectin 16g/L  | Paramax Multi-purpose    | Coopers            | Fly       | 7                   | 42        | 7        | Treatment of & protection against flystrike for up to 12 weeks under low to moderate fly pressure & treatment of biting lice in long wool. Oral treatment for control of internal nematode parasites, nasal bot & itchmite. |

| Spinosyn (Spin)  |                              |        |     |     |     |     |
|--|------------------------------|--------|-----|-----|-----|-----|
| Spinosad 25g/L   | Extinosad Aerosol for wounds | Elanco | Fly | NIL | NIL | NIL |
| For the treatment & prevention of blowfly strike in mulesing, marking & other wounds of sheep. Contains an antiseptic. |                              |        |     |     |     |     |

| Longwool (backline) treatments        |                             |              |           |                     |           |          |   |
|---------------------------------------|-----------------------------|--------------|-----------|---------------------|-----------|----------|---|
| Active                                | Trade Name                  | Manufacturer | Parasites | Withholding periods |           |          | Label claim/recommendations   |
|                                       |                             |              |           | Meat days           | Wool days | ESI days |   |
| <b>Synthetic Pyrethroids (SP)</b>     |                             |              |           |                     |           |          |   |
| Alpha-cypermethrin 50 g/L             | Vanquish                    | Coopers      | Fly, lice | NIL                 | 60        | 7        | Spray on lice treatment and blowfly preventative for long woolled sheep & unshorn lambs   |
| <b>Insect Growth Regulators (IGR)</b> |                             |              |           |                     |           |          |   |
| Cyromazine 60 g/L                     | Clout Spray-On              | Coopers      | Fly       | 7                   | 60        | 28       | Will protect long wool sheep against fly strike for 11 weeks  |
| Cyromazine 60 g/L                     | Venus Spray-on              | Norbrook     | Fly       | 7                   | 60        | 14       | Will protect long wool sheep against flystrike for 11 weeks   |
| Cyromazine 60 g/L                     | Virbazine Spray-on          | Virbac       | Fly       | 7                   | 60        | 14       | Protects long wool sheep against flystrike for 11 weeks   |
| Cyromazine 60 g/L                     | Vetrazin Spray-on           | Novartis     | Fly       | 7                   | 60        | 14       | Will protect long wool sheep against fly strike for 11 weeks  |
| Cyromazine 60 g/L                     | Proguard Spray-on           | Procure      | Fly       | 7                   | 60        | NS       | Will protect long wool sheep against flystrike for 11 weeks   |
| Cyromazine 60 g/L                     | Cyro-Fly 60                 | Jurox        | Fly       | 7                   | 60        | 14       | Will protect long wool sheep against flystrike for 11 weeks   |
| Cyromazine 60 g/L                     | Lucifly Spray-on            | Norbrook     | Fly       | 7                   | 60        | 14       | Will protect long wool sheep against flystrike for 11 weeks   |
| Cyromazine 60 g/L                     | Cyromazine Spray-on         | Novartis     | Fly       | 7                   | 60        | NS       | Will protect long wool sheep against fly strike for 11 weeks  |
| Cyromazine 60 g/L                     | Cyrazin Spray-on            | Ancare       | Fly       | 7                   | 60        | 14       | Will protect long wool sheep against fly strike for 11 weeks  |
| Cyromazine 60 g/L                     | KFM Spray-on                | Bomac        | Fly       | 7                   | 60        | 14       | Will protect long wool sheep against flystrike for 11 weeks   |
| Cyromazine 60 g/L                     | Cy-Guard Spray-on           | WSD          | Fly       | 7                   | 60        | 14       | Will protect long wool sheep against fly strike for 11 weeks  |
| Dicyclanil 50 g/L                     | Clik Spray-On               | Novartis     | Fly       | 28                  | 90        | 120      | For the protection of sheep off-shears or with any length wool, against flystrike for 18-24 weeks. For the protection of marking wounds on sheep against flystrike.     |
| Dicyclanil 12.5 g/L                   | Clikzin Spray-On            | Novartis     | Fly       | 7                   | 30        | 21       | For the protection of sheep against flystrike for 11 weeks. For the protection of marking wounds on sheep against flystrike. Do not use on sheep off shears.            |
| Diflubenzuron 25 g/L                  | Magnum                      | Coopers      | Lice      | 42                  | 180       | 42       | For the control & treatment of body lice on sheep off-shears & unshorn lambs up to 3 months of age. Aids in the control of body lice infestations in long woolled sheep |
| <b>Spinosyn (Spin)</b>                |                             |              |           |                     |           |          |   |
| Spinosad 20g/L                        | Extinosad Pour On for Sheep | Elanco       | Lice      | NIL                 | NIL       | NIL      | For the control of lice in sheep off-shears and with long wool.   |

| Wet Dipping  |                         |              |                      |                     |           |          |  |
|--|-------------------------|--------------|----------------------|---------------------|-----------|----------|--|
| Active   | Trade Name              | Manufacturer | Parasites            | Withholding periods |           |          | Label claim/recommendations  |
|  |                         |              |                      | Meat days           | Wool days | ESI days |  |
| <b>Organophosphates (OP)</b>   |                         |              |                      |                     |           |          |  |
| Temephos 350g/L  | Assassin                | Coopers      | Lice                 | 14                  | 180       | 42       | For the control of body lice on wet or dry short wool sheep  |
| Temephos 350g/L  | Wham                    | Agvantage    | Lice                 | 14                  | 180       | 42       | For the control of sheep body lice on wet or dry short wool by plunge or shower dipping  |
| <b>Insect Growth Regulators (IGR)</b>                                |                         |              |                      |                     |           |          |  |
| Diflubenzuron 250 g/L  | Fleececare              | Virbac       | Lice                 | 0                   | 180       | 0        | For the control & treatment of lice on sheep   |
| Diflubenzuron 250 g/L  | Crusader                | Intervet     | Lice                 | 0                   | 180       | NS       | For the control & treatment of lice on sheep   |
| Diflubenzuron 250 g/L  | Strike                  | Coopers      | Lice                 | 0                   | 180       | 0        | For the control & treatment of lice on sheep   |
| Cyromazine 500 g/L   | Vetrazin Liquid         | Novartis     | Fly                  | 7                   | 60        | 21       | Protects long wool sheep from flystrike for up to 14 weeks   |
| Cyromazine 500 g/L   | Venus Liquid            | Norbrook     | Fly                  | 7                   | 60        | 21       | For control of blowfly strike in long wool sheep for up to 14 weeks  |
| Cyromazine 500 g/L   | Virbazine Liquid        | Virbac       | Fly                  | 7                   | 60        | 21       | Protects long wool sheep for up to 14 weeks from strike by blowfly   |
| Cyromazine 500 g/L   | Proguard Liquid         | Procare      | Fly                  | 7                   | 60        | 21       | Protects long wool sheep for up to 14 weeks from strike by blowfly   |
| Cyromazine 500 g/L   | Cy-guard SC             | WSD          | Fly                  | 7                   | 60        | 21       | Protects long wool sheep for up to 14 weeks from strike by blowfly   |
| Cyromazine 500 g/L   | Cyrazin Liquid          | Ancare       | Fly                  | 7                   | 60        | 21       | Protects long wool sheep for up to 14 weeks from strike by blowfly.  |
| Cyromazine 500 g/L   | Cyro-Fly 500            | Jurox        | Fly                  | 7                   | 60        | 21       | Protects long wool sheep for up to 14 weeks from strike by blowfly   |
| Cyromazine 500 g/L   | Clout blowfly destroyer | Coopers      | Fly                  | 7                   | 60        | 21       | Protects long wool sheep for up to 14 weeks from strike by blowfly   |
| Cyromazine 500 g/L   | Cyromazine 500 SC       | 4Farmers     | Fly                  | 7                   | 60        | 21       | Protects long wool sheep for up to 14 weeks from strike by blowfly   |
| Cyromazine 500 g/L   | Exi-Fly Liquid          | Bomac        | Fly                  | 7                   | 60        | 21       | Protects long wool sheep for up to 14 weeks from strike by blowfly   |
| Cyromazine 500 g/L   | Lucifly liquid          | Norbrook     | Fly                  | 7                   | 60        | 21       | For the control of blowfly strike in long wool sheep for up to 14 weeks  |
| Cyromazine 500 g/L   | Cyromazine Liquid       | Youngs       | Fly                  | 7                   | 60        | 21       | Protects long wool sheep for up to 14 weeks from strike by blowfly   |
| <b>Spinosyn (Spin)</b>   |                         |              |                      |                     |           |          |  |
| Spinosad 25 g/L  | Extinosad               | Elanco       | Fly, lice            | 0                   | 0         | 0        | For the control of lice in sheep with short wool & long wool. For treatment & prevention of blowfly strike on sheep. For blowfly strike protection in mulesing & other wounds. |
| <b>Other compounds</b>   |                         |              |                      |                     |           |          |  |
| Magnesium fluorsilicate 400 g/kg + sulfur 50 g/kg + rotenone 13 g/kg | Flockmaster MKII        | WSD          | Lice, ked, itch mite | 1                   | 60        | 1        | For the control of lice & ked & to aid in the control of itchmite in sheep off shears. Inhibits causative organism of mycotic dermatitis in dip wash.                          |

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