Tank-mixing

Graham Paul offers another opportunity to earn valuable BASIS points

To mix, or not to mix – that is the question. In this article we shall consider the legal position regarding the practice of tank-mixing chemical pesticides and look at why we may need to adopt this strategy in the management of amenity areas.

The Amenity industry has traditionally been a haven for 'pure' chemical sprays; one product to do one job. The complication of combining two chemicals together to get a more complete result has not been a priority for most Groundsmen in the past. However, in the agricultural market it has been a different story. Intensively farmed arable crops demand a variety of inputs to control weeds pests and diseases whilst the cost in fuel, manpower and the lost yield caused by disturbing the crop with machinery need to be kept to a minimum to maximise profit, so now is the time to consider this working practice more seriously. The question often asked is; are you legally allowed to tank-mix two or more approved pesticides together? When the Control of Pesticides Regulations were first drawn up and agreed by Parliament in 1986, the rules regarding tank-mixing of approved products appeared to be stricter than they are today. Under Schedule 3 of the original regulations, section 2 declared:

"No person shall combine or mix for use two or more pesticides except in accordance with the conditions of the approvals given in relation to those pesticides."

On paper this looked 'cut-and-dried' and was interpreted by many as meaning; if a mixture was not officially sanctioned ie. on the label or on a list of approved mixes, then it was outlawed. The regulations were updated in 1997 by The Control of Pesticides (Amendment) Regulations 1997 which made the position a bit clearer:

"No person shall combine or mix for use two or more pesticides unless —

(a) all of the conditions of approval given in relation to each of those pesticides, and

(b) the labelling of the container in which each of those pesticides has been sold, supplied or otherwise marketed to that person, can be complied with."

The answer to the question; "Are you legally allowed to mix chemicals?" is "YES you are". Tank mixing, when referring to a distributor or contractor backed tank-mix recommendation, is perfectly legal provided all the label requirements are followed for the tank-mix constituents and partner products. This is called a 'convenience tank-mix' and allows a reduction in the number of spray operations.

However, if a manufacturer or approval holder wishes to claim enhanced activity or biological compatibility from a specific tank-mix (called a 'positive tank-mix), this must be demonstrated to the Chemical Regulation Directorate (CRD) to be allowed to be part of the label claims. This is not required when referring to a distributor or contractor backed tank-mix that does not feature on the product label.

There are separate rules governing the mixing of anticholinesterase compounds:

"No person shall combine or mix for use two or more pesticides which are anticholinesterase compounds unless such a mixture is expressly permitted by the conditions of the approval given in relation to at least one of those pesticides or by the labelling of the container in which at least one of those pesticides has been sold, supplied or otherwise marketed to that person."

In order to stay legal when tank-mixing it is important to stick with the following guidelines:

• Check with your supplier that the proposed mixture is suitable for the intended use. A supplier offering to support a mix should have tested it and will know if there are any compatibility issues or effects on the performance of the products.

• Note that when mixing two or more pesticides in a tank-mix all conditions of approval on all of the product labels and safety data sheets must be complied with.

• If any product in the mix is subject to a LERAP requirement, then this applies to the tank-mix as well.

• Two or more anticholinesterase compounds should not be mixed unless such a mixture is expressly permitted by the conditions of the regulatory approval on at least one of the products.

Once all ingredients have been carefully mixed the tank must be continuously agitated and the mixture applied immediately. It must not be held as a mixture in the tank for longer than necessary as there is a risk of components reacting with one another or precipitating out of solution and blocking the filters and pipe work in the sprayer.

So why do we need to consider a change to the way chemicals are applied in the Amenity sector? The main reasons are:

• To reduce the chance of fungicides developing resistance – many of the new products that contain a single active ingredient have been assessed by Government scientists as having a greater risk of encouraging the development of resistant strains of fungal pathogens. (See Table 1 below)

• To improve the effectiveness of fungicide applications – increasing the reliability of control and in some cases reducing the overall cost involved.

• To increase the weed spectrum of selective herbicides sprays so that the job can be completed with one application.

• To improve the efficiency of spray application by reducing the frequency of operations.

The practice of tank-mixing is especially important in producing a strategy for control of fungal diseases of turf. Many of the new active ingredients being introduced are likely to develop resistance if used too frequently as a single product. The table below shows the data used to assess the likelihood of a single active ingredient encouraging the development of resistant strains of fungi. The work is carried out by the Government sponsored 'Fungicide Resistance Action Committee' (FRAC)

In high disease situations, where the infection is already established within the plant, the pathogen will continue to express itself through leaf symptoms even after the application of a fungicide and they

will continue until the life cycle has been arrested. Mixing a product that has curative properties with a fast acting systemic fungicide can provide an answer in this situation.

Many fungicide products now contain two of more active ingredients to give a broader spectrum of control with reduced risk of resistance eg. 'Astute', 'Dedicate', 'Headway' and 'Instrata'. However, tank-mixing gives complete freedom and flexibility to choose exactly the right treatment for the situation in hand – providing it is backed by reliable recommendations from a technically competent supplier or contractor.

Research has shown that the effectiveness of some fungicide applications can be improved by adding growth stimulants to the spray mix. These can work alongside the fungicide, encouraging rapid healing once the disease has been treated. In such a trial, conducted by the (STRI) the fungicide iprodione (Chipco Green) was applied with the 'P-Kursor', a. product designed to promote plant health and support the plant's natural defences.

The recommendation for the use of Iprodione to control Anthracnose is a relatively recent addition to the Chipco Green label. This trial demonstrated excellent control of the foliar blight stage of the disease, especially when applied with 'P Kursor'. The results were particularly impressive, as the Chipco Green in the mix was used at 10L/ha (half the normal rate) - a factor that has implications for cost savings as well as in reducing the impact of chemicals in the environment. The excellent performance of this treatment is attributed in part to the beneficial effects of P-Kursor in encouraging rapid recovery of the health of the grass plants after the fungicide has cured the disease.

The third area where tank-mixing can be extremely useful is in the control of weeds in turf with selective herbicides. The variability of weeds present in turf combined with the diverse growing conditions such as climate and soil type; make it difficult for manufacturers to come up with a product that suits all weeds in all situations. A sports pitch with deep-rooted weeds such as thistle or docks might benefit from an application with extra 2,4-D or MCPA to improve the effectiveness against these species.

Selective weedkillers may also benefit from the addition of a liquid fertiliser to give a weed and feed application. This can sometimes be accomplished by the addition of a liquid fertiliser product or a soluble fertiliser such as Urea to the mix. If using a soluble product, one should ensure that the fertiliser is completely dissolved before adding the herbicide. Weed and feed can often give faster, more complete weed control than using a selective herbicide on its own.

As a general rule, do not mix selective herbicides with fungicides, as the wetting systems in the latter are very powerful and can produce severe scorch in the grass. Turf managers should seek advice on this from a technically qualified supplier before mixing selective herbicides.

Active Ingredient	FRAC Code	Fungicide Group	Risk of Resistance	Mobility	Products
Azoxystrobin	11	QoI (Strobilurin)	High	XMS	Heritage
Fludioxonil	12	Phenylpyrole	Moderate	C	Medallion
Iprodione	2	Dicarboximide	Moderate	C/LS	Chipco Green
Myclobutanil	3	DMI	Moderate	XMS	Masalon
Propiconazole	28	DMI	Moderate	XMS	Banner Maxx
Pyraclostrobin	11	QoI (Strobilurin)	High	LS	Insignia, Mascot Eland
Trifloxystrobin	11	QoI (Strobilurin)	High	LS	Scorpio

NOTES:
• FRAC (Fungicide Resistance Action Committee) codes indicate the biochemical target site of action. Products with the same code, target the same biochemical site and are therefore cross resistance could occur
• Fungicide Group: Products are grouped together by their mode of action against the fungi. DMI = demethylation Inhibitor; QoI = 'Quinone outer Inhibitor'
• Mobility: C = Contact (= protectant) fungicide; LS = locally systemic; XMS = xylem-mobile systemic (sometimes called 'acropetal penetrant')

Table 1 - FUNGICIDE PRODUCTS USED IN AMENITY – CONTAINING ONLY ONE ACTIVE INGREDIENT

SELF ASSESSMENT

Use the questions below to check your understanding of this topic. Readers can claim two BASIS points if the questions are answered correctly!

Circle the correct answer(s)

1) When did the Control of Pesticides Regulations first appear on the statute books?
a) 1985
b) 1997
c) 1986
d) 1984

2) In the amended Regulations, which group of chemicals is governed by special regulations when it comes to tank-mixing?

a) Anti-coagulant compounds
b) Anticholinesterase compounds
c) Antifoaming products
d) Anti-cholesterol agents

3) If a pesticide manufacturer or approval holder wishes to claim enhanced activity from a specific tank-mix involving one or more of their products they must provide data to which of the following organisations?

a) The British Crop Protection Council
b) The Environment Agency
c) The Chemical Regulation Directorate
d) Department for Environment Food & Rural Affairs

4) In the trial data for the Anthracnose tank-mix trial, how long were the results recorded after the initial treatment?
a) 3 months
b) 2 months
c) 34 days
d) 83 days

5) As a general rule when tank-mixing selective herbicides, which type of product should be avoided to prevent problems with scorching?
a) Insecticides
b) Fungicides
c) Growth Regulators
d) Liquid Fertilisers