

Herbicides in forests and farm woodlands

by Ian Willoughby, Forestry Authority, Alice Holt Lodge, Farnham, Surrey

A major revision of Forestry Commission Field Book 8 - 'The use of herbicides in the forest' - has been completed and publication is due in March/April. All products with full approval or off-label approval for use in forestry and farm woodlands are included.

As in previous editions, within sections covering specific weeding problems such as grass and herbaceous weeds, bracken, heather, woody weeds, rhododendron, and farm woodland weeds, products are treated in detail. Advice is given on crop tolerance, product rates, method of application, timing of application, protective clothing and special safety precautions. Additional sections deal with application patterns, costs, pesticide legislation, training, storage and transport of pesticides, disposal, tank mixes, protective clothing and application equipment.

Guidance is given on minimising the risk of contamination of watercourses and the wider environment. Step-by-step guidance on the decision chain involved in devising a weeding programme, and simple calibration guides for users to photocopy, are included.

There are also charts which aim to give users a quick and simple method of selecting suitable herbicides for specific situations, from the sometimes confusing range of options available. References for further reading, and sources of further advice from herbicide manufacturers to government bodies, are listed.

Few new products have been marketed in recent years, since the forestry sector remains a relatively small field of use as far as manufacturers are concerned. Table 1 shows the amounts of pesticide product used in Forestry Commission woodland in 1992/3. No figures for the private sector are available but, based upon the total areas planted in Great Britain, we might assume a total Great Britain usage of at least double the Forestry Commission figure.

Private sector usage is likely to include a significant proportion of products which are specifically approved for new planting on ex-agricultural sites, none of which are listed in Table 1. Extrapolating from Table 1, we could estimate a total usage of pesticides in the UK at <280 tonnes of active ingredient in 1992/3 (using a rate of

40% active ingredient in one litre of herbicide). If the usage of Urea, a substance which has a variety of non-pesticidal uses, and only a minor role as a pesticide, is excluded, this figure reduces to <30 tonnes

of active ingredient of pesticides for the UK.

In marked contrast, around 32135 tonnes of active ingredient of pesticides were applied in agriculture and horticulture in 1992/3 - over 1000 times more than in forestry. The relative small scale of the forestry market compared to agricultural and horticultural situations for pesticide products means that few new products are specifically developed for forestry.

Applications to the Pesticides Safety Directorate require detailed information from manufacturers on efficacy, crop tolerance and environmental and operator safety. This procedure can cost several thousand pounds and manufacturers may not

Table 1. Pesticides used in FC woodlands, October 1992-September 1993

	N&E(E)	S&W(E)	Wales	N(S)	S(S)	GB	Unit
Ammonium sulphamate	5			10		15	kg
Asulam	1538	3628	919	306	472	6863	L
Atrazine	2861			289		3150	L
Atrazine/Dalapon		52				52	kg
2, 4-D	231	5		495	820	1551	L
Fosamine ammonium		39				39	L
Glyphosate	3866	3024	3076	1324	1147	12437	L
Hexazinone	143	354	20		24	541	L
Propyzamide liquid	78	427	99	86	139	829	L
Propyzamide granules	1141	27	1045	887	719	3519	kg
Terbuthylazine/Atrazine	30	279	115	15	52	491	L
Triclopyr	108	179	6	108	6	407	L
Imazapyr		120	995			1115	L
Mixture B		64	15	122	32	233	L
Lindane 80%				21	5	26	L
Permethrin dip	1992	54			123	2169	L
Permethrin spray	33	27	152	91	129	432	L
Electrodyn permethrin	18		938	670		1626	L
Cyanide	304					304	kg
Phosphine	36	11	1	174	2	224	kg
Warfarin	101	432	30			563	L
Urea prills	150	28505		5861	2000	36381	kg
Urea liquid	169000	37100	33650	299281	20524	281761	L
P. gigantea	1700					1700	Sachets

Note: GB = Great Britain
 N&E(E) = North & East England
 S&W(E) = South & West England
 N(S) = North Scotland
 S(S) = South Scotland

Table 2. Forestry herbicides with full approval, February 1995

Active ingredient	Product name (manufacturer)	Application
Ammonium sulphamate	Amcide (BH&B) Root-out (Dax Products):	<i>Rhododendron</i> and other woody weed control; cut stump application.
Asulam	Asulox (RP Environ)	Bracken control (translocated).
Atrazine	Atlas atrazine (Atlas) Unicrop flowable atrazine (Unicrop)	Grass and herbaceous weed control.
2, 4-D	Dicotox Extra (RP Environ)	Heather control in plantations.
2, 4-D+ Dicamba + Triclopyr	Broadshot (Cyanamid)	Perennial and woody weed control.
Dalapon and Dichlobenil	Fydulan G (Nomix-Chipman)	Grass and perennial weeds in trees >2 years.
Dicamba	Tracker ¹ (Shell/Cyanamid) Tracker (PBI)	Bracken control; soil acting.
Diquat and Paraquat	Farmon PDQ (Farm protection) Parable (Zeneca)	Pre-plant control of annual and perennial weeds; directed spray.
Fosamine ammonium	Krenite (Du Pont) ¹	Broadleaved woody weed control non-crop areas.
Glufosinate-ammonium	Challenge (Hoechst) Harvest (Hoechst)	Annual and perennial weeds; directed spray.
Glyphosate	Roundup (Schering) Stetson (Monsanto) Glyphosate 360 (Top Farm) Portman Glyphosate 360 (Portman) Barclay Gallup (Barclay) Barclay Gallup Amenity (Barclay) Stefes Glyphosate (Stefes) Stefes Kickdown 2 (Stefes) Clayton Glyphosate (Clayton) Glyphogan (Makhteshim Agan) Helosate (Helm) Stirrup (Nomix-Chipman) Hilite (Nomix-Chipman) Roundup Pro Biactive (Monsanto) Roundup Biactive (Monsanto) Stacato (Unicrop) Roundup Biactive Dry (Monsanto) Outlaw (Barclay)	Annual, perennial and woody weed control. Chemical thinning. Cut stump treatments. Stem injection. [CDA formulation] [CDA formulation]
Hexazinone	Velpar liquid ¹ (Selectokil)	Selective control of annual and perennial weeds, dicotyledons, woody weeds in plantations.
Imazapyr	Arsenal 50F (Nomix-Chipman)	Pre-planting total vegetation control. Pre-planting <i>Rhododendron</i> control.
Isoxaben	Gallery 125 (DowElanco) Flexidor 125 (DowElanco) Tripart Ratio ¹ (DowElanco)	Farm woodlands: on pre-emergent annual dicotyledons.
Paraquat	Gramoxone 100 (Zeneca, Schering) Scyth LC (Cyanamid)	Annual and perennial weed control.
Propyzamide	Kerb Flo (PBI, Rohm+Haas) Kerb 50W (PBI, Rohm+Haas) Kerb Granules (PBI, Rohm+Haas)	Grass weed control; soil acting.
Triclopyr	Garlon 4 (Nomix-Chipman) Timbrel (DowElanco) Chipman Garlon 4 (Nomix-Chipman)	Woody weed control; cut stump, stem injection.
Propaquizafop ²	Falcon (Cyanamid) Shogun 100 EC (Ciba)	Post emergence. Grass weed control, farm woodlands only.

¹ No longer being produced, but stock still covered by label approval.

² Farm Forestry label approval.

consider it economically justifiable for the forestry market alone. Consequently, forestry approvals tend to be obtained for products developed for industrial or agricultural situations. Some products have been subject to a review of their approval status by the Pesticides Safety Directorate, and manufacturers may not consider the expense in developing any required data worthwhile. Products are also withdrawn purely because of the low level of sales. The net result is that some products of particular importance to foresters, for example Gardoprim A, Velpar, Holtax, Atlas lignum and Krenite, have been withdrawn from the market over the last few years for commercial reasons. Fortunately a range of products are available that can still be used in forestry.

In contrast with earlier editions, all products with approval for use in forests, not just those recommended by the Forestry Commission for use within its forests, are now included in the new edition of Field Book 8: these products are listed in Table 2.

In some instances the Pesticides Safety Directorate will issue off-label approval for existing products, which may be of importance at a local level but where anticipated sales volumes are not sufficient to persuade manufacturers to carry out the research and development required to obtain full on-label approval. In these instances all applications are made at the user's own risk, and all conditions of use detailed on the label and on the off-label approval must be complied with. Approvals are usually sought to deal with specific problem weeds where no suitable product already exists, after small-scale trials on crop tolerance and weed efficacy, using existing products with approvals in other fields of use. Table 3 lists those products which have off-label approval for use in forestry or farm woodlands.

Detailed guidance on the use of these products, as well as copies of the relevant off-label approvals, are included in the revised edition of Field Book 8.

Table 4 shows current Forestry Commission applications for off-label approval. This list has recently been rationalised, but applications have been taking about four years to become approved. A fast stream is available for applications of an emergency nature, where *no* products exist to control a potentially threatening pest or weed.

Current research is looking at identifying products that will control herbaceous weeds on farm woodland sites, and that can be applied safely over actively growing broadleaves. Techniques are being examined for controlling *Deschampsia flexuosa*, weed control in natural generation and direct seedling situations, alternatives to herbicides for weed control, and the control of specific problem weeds.

Information on currently approved herbicide products is contained in Forestry Commission Research Information Note 246 - 'Approved herbicides for use in forestry (1994)'. Eamonn Wall's article (p27-32) deals with the practical issues in using some of the products mentioned here in more detail.

Table 3. Forestry and farm woodland herbicides with off-label approval, 1995

Active ingredient	Product name (manufacturer)	Application
Clopyralid	Dow Shield ² (DowElanco)	Farm woodland early post-emergent activity, not on grasses
Cyanazine	Fortrol ¹ (Cyanamid)	Mainly pre-emergent activity on grasses and dicotyledons.
Fluazifop-P-butyl	Fusilade 5 ¹ (Zeneca)	Post-emergent grass control; tractor mounted application only.
Metazachlor	Butisan S ¹ (BASF)	Mainly pre-emergent activity on annual dicotyledons and grasses.
Pendimethalin	Stomp ¹ (Cyanamid)	Mainly pre-emergent control of annual dicotyledons and grasses.

¹ Products with farm forestry off-label approval.

² Forestry off-label approval.

Note: Products with farm forestry approval cannot be used in conventional forest situations. Products with forestry approval can be used in farm forestry situations.

Table 4. Forestry Commission off-label applications, as of 14 September 1994

Active ingredient	Product	Use
Cypermethrin	Ambush C	Pesticide
Cypermethrin	Ambush C	Pesticide
Fosamine-ammonium	Krenite	Within crop woody weed control
Maneb	Trimangol 80	Fungicide
Permethrin	Permasect 25 EC	Pesticide
Permethrin	Permasect 25 EC	Pesticide
Sulphur	Kumulus S	Fungicide
Cycloxdim	Laser	Gramminicide
Chlorbufam chloridazon	Alicep	
Chlorthal-dimethyl	Dacthal	Farm forestry/nursery weed control
Cyanazine	Fortrol	Forestry weed control
Amitrole	Weedazol	Farm forestry weed control
Lenacil	Venzar	Farm forestry weed control
Lindane	Gamma-col	Farm forestry weed control
Metamitron	Goltix WG	Farm forestry weed control
Napropamide	Devrinol	Farm forestry/nursery weed control
Oxadiazon	Ronstar liquid	Farm forestry weed control

A basis for confidence

Established in September 1992, the 'Professional Register' - set up under the aegis of BASIS* - already boasts around 2200 members. Its purpose in life - of benefit to both pesticide users and practitioners - is to identify qualified plant protection specialists.

It requires members to maintain a current awareness of developments in the industry through a process of 'continuing professional awareness' (CPD). Individuals with the requisite knowledge of plant protection from holding a BASIS qualification, can join the register by paying a £10.00, one-off registration fee.

Once on the register, members are required to attend recognised training activities: internal company schemes, external conferences and symposia, for instance. Information about such events is published in a newsletter.

To maintain high standards, the Professional Register has formulated a code of conduct. 'Many organisations are now demanding proof of qualification before discussing business in this increasingly competitive market', BASIS Registration points out.

Plant protection is a 'far-ranging subject that influences many facets of life, be it vegetation control, forestry, amenity and agriculture. It is a fast-moving, scientifically based industry for which the register is a means of showing that those in the industry are caring, professional people'.

*BASIS is an independent, self-regulatory scheme, working with government, to maintain standards and check that they are being met in supply and use of herbicides, fungicides and insecticides. It is based at 2 St John Street, Ashbourne, Derbyshire DE6 1GH.