Advisory note for Briercliffe Parish council regarding Introducing woodland ground flora within existing woodland and best practice.

When plant introduction is appropriate

Plant introduction is most appropriate for improving the species diversity of isolated, recent (secondary) woodlands with a sparse field layer, and little prospect of colonisation by shade-tolerant plants. A wide variety of such species can be successfully established in these woods over a period of three to seven years. Small-scale introductions are unlikely to swamp wild populations, especially when they are spatially remote from ancient woods, and local collections can maximise genetic diversity. But if overdone, there is a danger that introductions could obscure natural biogeographical boundaries (i.e. River Don Biological Heritage Site and adjoining semi-improved pasture).

When not to introduce plants

For nature conservation reasons, introducing herbaceous plants into the woodland field layer of ancient woodland, including PAWS, should generally not be undertaken. In the past, species such as wild daffodil and bluebell have been planted to make woods look 'more attractive', or in the belief that woodland biodiversity can be increased by planting species which would otherwise be unlikely or very slow to colonise. This assumes that the species introduced would naturally occur in that particular area or habitat. However, such planting risks bringing non-local ecotypes into the local landscape which could be detrimental to other components of the woodland ecosystem. Introduced plants may also have a narrow genetic base resulting from their artificial selection in a nursery and, in some cases, non-native species can be accidentally introduced, which are more vigorous and subsequently hybridise with native species. Spanish bluebell is a good example, which may now be present in up to 15% of Britain's woodlands. If Spanish or hybrid bluebells are present in your wood, they should be removed to prevent them spreading further into the countryside; for identification and further information see 'Bluebells for Britain' (Plantlife, 2003). Existing semi-natural herbaceous plant communities in woodland rarely need to be artificially modified through indiscriminate planting for aesthetic purposes. There may be a better argument for reintroducing species which have been lost, but even this must be carried out very carefully. Planting into recent woodlands in close proximity to ancient woods is also to be discouraged, to avoid risks to the ancient woodland flora. In any case, a woodland so positioned has a better chance of natural colonisation by the desired species, although the rate will be very slow for most ancient woodland species. However, there are exceptions, and some ancient woodland species may colonise the margins of recent woodland (Table 1.1), but even these species must compete with faster colonising shade-tolerant plants such as common nettle and bramble.

Table 1.1

Examples of ancient woodland plants capable of dispersal from lowland ancient woodland into the margins of recent woodland.

Black bryony	Enchanter's-nightshade	Remote sedge
Bluebell	Moschatel	Three-nerved sandwort
Common spotted-orchid	Pendulous sedge	Wood speedwell
Dog's mercury	Pignut	Yellow archangel

Selecting and sourcing plants

If the conditions for introducing plants into the woodland field layer fit the criteria, there are several options for obtaining seed or plants. Ideally, you should carefully select a mix of species based on site conditions in your wood and on the ground flora present in local woodland reference sites for increased success of desired vegetation cover. A range of woodland herbs, grasses and sedges should be specified, although species with limited distributions would not normally be included. The cost per species from a commercial wildflower seed company will be higher than if you purchase their standard woodland mixes, but may be less expensive if fewer species are specified. A useful reference to support species selection is the Highways Agency's 'The establishment of an herbaceous plant layer in roadside woodland' (Highway's Agency, 2005) available on their website, which includes lists of native herbs and grasses appropriate to the Forestry Commission's seed zones throughout the British Isles, together with their preferred soil types and conditions. Commercial seed companies also offer 'generic' woodland and hedgerow mixes which typically contain 15–20 wild flowers alone, or mixed with grasses. However, the wildflower component often includes species chosen for their colour and reliable germination, and may not have been collected locally (Table 1.2). Some grow well both in light and shade on moderately fertile soils, but others are less tolerant of shade. Only a small proportion of ancient woodland plants are usually included in a mix. Wild flowers are likely to do less well when mixed with grasses which compete for the same resources, particularly in mixes containing a high percentage by weight of turf grasses such as common bent and smooth meadow-grass. Herb mixes alone, or supplemented with a low density of local woodland grasses such as wood meadow-grass are more likely to succeed.

A more expensive option is to plant small patches with cell-grown plants, particularly those species which are difficult to propagate by seed. The range of plants available commercially is more limited, but includes species such as primrose, bluebell, violets, woodruff and yellow archangel. Again, the provenance of plug plants purchased from commercial companies may not be local.

To overcome some of these concerns, consider collecting your own seed from local ancient woods on similar soil types, in which case its local provenance would be assured. Collections also offer the chance to maximise genetic diversity and reduce the risks to co-evolved species such as insect feeders and pollinators. It is important though to avoid over-harvesting; plants should not be dug up, and there is still the risk of imposing artificial selection pressures in small collections. The landowner's permission will be required, and collecting seed can be time-consuming. Many species seed early in woodlands:

Table 1.2

Herbs which are typically found in commercial mixes of woodland plants.

Ancient woodland plants	Faster colonising woodland herbs	Shade-tolerant herbs
Bluebell	Foxglove	Agrimony
Nettle-leaved bellflower	Garlic mustard	Betony
Pignut	Greater stitchwort	Cowslip
Primrose	Hedge woundwort	Hedge bedstraw
Ramsons	Red campion	Meadowsweet
	Upright hedge-parsley	Perforate St John's-wort
	Wood avens	Ragged-robin
	Wood sage	Selfheal
		Tufted vetch
		Yarrow

some will need to be collected from May onwards and stored in a dry, cool place. If you miss the critical time, the seed may already have been shed – ramsons, for example, loses most of its seed within a week when ripe. The sowing conditions are important and a good seedbed is essential for effective germination and establishment. Suitable preparation can be provided by light surface cultivation or, if much vegetation is present, it can be pre-treated with herbicide and the seed sown directly into the killed sward. Alternatively, if the vegetation is sparse, the seed can be broadcast and covered with a thin surface mulch of leaf litter or other suitable material. Sowing into a continuous cover of vegetation without any ground preparation will achieve nothing.

Introduction methods

Introducing herbaceous plants into large areas of woodland would be prohibitively expensive and unnecessary. Sowing or planting in discrete patches should both enhance the diversity of the woodland field layer, and allows for plants to colonise other parts of the wood. A number of factors to consider when determining the suitability of the site are listed in Table 1.3. Most of these parameters need to be met if the introduction of plants is to be successful, with appropriate light levels and lack of weed competition being especially important; planting in open areas or under the deep shade of conifer plantations for example will not be successful.

Plants of the woodland interior such as bluebell, primrose and ramsons are likely to establish best in shady areas where there is little competition, but even these species will struggle if light levels are too low. The fast-germinating woodland edge herbs included in commercial woodland mixes would do better in areas with more variation in sunlight, such as the shrubby margins of rides and glades. More rapid growth and flowering is likely to occur in this environment, but competition from bramble, ivy, bracken or grasses such as cock 's-foot may be more of a problem. In established woodland where the ground vegetation is sparse, there should be no need for any special ground preparation. Sow the seed in the autumn (September–November), avoiding waterlogged soils, or early spring before the frosts finish (February–April) to provide the chilling required by many woodland species. Sowing rates depend upon which species are being sown, but rates of 1 g per m_2 for grass/herb mixes and 0.5 g per m_2 for herbs alone should suffice. If a standard woodland mix is used, the fast-germinating herbs will initially dominate, with interior woodland species not becoming prominent for three years or so. This may not be a problem if you design a woodland interior mix, rather than accepting a proprietary mix.

The more light-demanding species planted along the woodland edge will also benefit from periodic management of the scrubby edge by coppicing and thinning, providing this does not result in too much competition from invasive weeds. If bramble, ivy, bracken, common nettle, thistles or sward grasses become a problem, their spread can be controlled, remembering that these species are also valuable components of the woodland flora.

For cell-grown plants, Francis et al. (1992) found that 6–9 plants per m_2 gave good results, with species such as bluebell, primrose and wood sage, and that this could be reduced to 3–4 plants per m_2 for species with good vegetative spread such as bugle and yellow archangel. Cell-grown plants are best planted out in spring whilst the soil is still moist, in small groups, possibly in combination with sown plants.

Table 1.3

Site suitability for introducing field layer herbaceous woodland plants (after Highways Agency, 2005).

Site parameters	Preferred state
Overall quality	Good structural diversity in canopy, understorey and leaf litter, leading to varied light conditions.
Light level	Shady to control competitive light-demanding weeds; 15–40% daylight at ground level
Canopy composition	Mixed canopy of native broadleaves and/or native Scots pine, avoiding dense single species plantations
Existing ground vegetation	<30% existing ground vegetation
Dominant weeds	<10% bramble, ivy or bracken; no grassy sward
Soil characteristics	Humid and moist, avoiding winter waterlogged or compacted areas
Aspect and slope	North, east or possibly west-facing slopes, and those less than 1:1.5 are less likely to dry out
Leaf litter	At least 30% cover of leaf litter on soil surface to provide good germination conditions
Patch size	Minimum area 5 x 40 m (0.02 ha)
Location of wood	>1 km from ancient woodland

The above info and guidelines are generic with regards to planting within existing woodlands.

Site specific planting and methods are available as part of a comprehensive and bespoke planting plan and scheme upon request.