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CEREALS: THE BASICS

Growing cereals in Wales can give home-grown traceable energy feed. Barley, oats, triticale or wheat may be grown for grain, for crimped grain or as an arable or wholecrop silage. Spring-sown cereals are a useful cover crop for grass/clover leys and give extra forage (7-9t DM/ha) in the establishment year. Cereal crops fit well with agri-environment scheme Tir Gofal cropping options.

Crop Choice - Will depend on:

- Soil type, fertility and climate
- Livestock needs
- Market requirements
- Machinery/contractors
- Agronomic experience
- Storage and handling
- Weed and pest burdens
- Rotation plan

Wheat

Winter wheat has the highest potential - but is the most demanding for fertility.

Best on fertile clays and loams not subject to surface flooding. First cereal, following ley break.

Winter wheat - sow September.

Spring - sow Feb. to 1st week of May.

Need N for good tillering and protein (140-180kg/ha). Spring wheat gives lower yields; 'take all' a risk with consecutive cropping.

Needs pH >6.2.

Barley

Grows well on light soils and good loams.

Grain to straw ratio lower than for wheat but higher nutritional quality.

Winter barley - sow from early September; Spring barley - sow from February.

N required: winter sowing - upto 165kg/ha; spring sowing - up to 125kg/ha.

Good for undersowing to established leys. Malting quality easier with spring varieties.

Needs pH >6.2.

Triticale

Wheat and Rye hybrid. Good second cereal. Suited to marginal land and lighter soils. Resistant to "take-all" and Barley Yellow Mosaic virus. Can be grown with a legume e.g. peas or as wholecrop.

Autumn sown, very winter hardy.

N required: upto 150kg/ha. Spring varieties now widely available. High feed quality.

Needs pH >5.5.

Oats

Excellent weed competitor. Thrives on low fertility but high yield potential on good fertility.

Good second or third cereal. High oil content.

Suitable for non-ruminants.

Autumn (from Sept) and Spring (from February) sown; N requirement up to 120kg/ha.

Less requirements than wheat/barley for fungicides and pesticides. Well suited to organic systems.

Less sensitive to pH: needs pH >5.5.

Mixed crops - with legumes. (Peas beans, vetches or lupins):

Increases protein content of the diet.

Fixes nitrogen for following crop.

Complicates growing, harvest and storage.

Less suitable (too competitive) for undersowing.

Harvest options

Arable silage: harvested young and leafy at 11-12 weeks at 35%DM, when grain is at cheesy dough stage, fermentation is more stable. Ideal for undersowing.

Wholecrop: harvested at a mature crop stage (50% DM+) to maximise yield and starch level. Some crops preserved with alkali additive, including urea products (20-30kg/tonne fresh forage). ('alkalage').

At high DM use a corn cracker to improve digestibility and consider using an additive.

Used as a starchy feed alternative to forage maize for dairy or beef rations.

Bale or clamp: care is needed with drier crops to ensure even consolidation and good covering in clamps.

Vermin a problem in bales - extra wrapping, cover and site bales carefully.

Crimped grain: harvested at 65%+ dry matter about ten days before dry combining date.

Allows earlier harvest in marginal cereal areas. Following crops established earlier; reduces grain loss risk due to; weather, birds and disease; gives softer, less dusty straw available; and no processing needed before feeding.

Dry grain: combined and fed as straights, mixed on farm or sold off farm for feed, seed or processing.

Winter or Spring sown cereals?

Winter cereals have higher yield potential but are more demanding and costly for weed, disease and pest management and fertility.

Cereals, particularly barley and wheat, are intolerant of surface water or prolonged periods of soil saturation; avoid sites with this risk for winter crops.

Spring crops provide winter stubble area for livestock, for cover catch crops, for manure applications and wildlife sites.

Spring crops allow greater opportunities to control perennial weeds and grass weeds.

Feed quality - wholecrop silage

Wholecrop provides a high yield of forage of moderate energy value. Suitable as a ration component for mid-late lactation dairy; autumn calved sucklers and cattle requiring a moderate growth rate before grass turnout.

With high quality grass/legume silage there is benefit in 'forage mixture' and wholecrop can be used for slightly higher performance rations.

Cereal type and grain: straw ratio influences forage quality - Starch (energy) is highest in wheat, then barley, triticale and oats but these differences may be over-ridden by growth stage. Triticale is an alternative to wheat with less demanding agronomy and better protein. Legumes (peas, beans or vetches, singly or in mixture) add protein.

Crops harvested at/or above hard-cheese ripeness result in poor grain digestion and lower feed value. Harvesters with 'grain crackers' help digestion of mature grain.

To improve overall forage quality, the crop can be cut higher but yield will suffer. Straw provides fibre to energy dense complete-diets and may explain the health and nutritional benefits of 'mixed forage' diets.

| Typical analysis* | DM% | CP% | ME% | Fibre% | Oil% | Starch% |
|-------------------|-----|-----|------|--------|------|---------|
| | 40 | 9.5 | 10.5 | 23 | 3 | 25 |
| Urea treated | DM% | CP% | ME% | Fibre% | Oil% | Starch% |
| | 55 | 25 | 10 | 23 | 2.5 | 25 |

* will vary widely with crop type and harvest date.

Feed quality - crimped grain

Harvested moist, the grain is 'crimped' by a machine that breaks and flattens it. Preservatives include molasses, acids, bacterial and enzymes systems in clamps or bags. Minimise spoilage by excluding oxygen, heat and moisture. Cut, rather than dig, the feed from the face, removing material from the whole face every 2-3 days.

Digestibility compared with dry rolled or milled cereals is higher, and rapid breakdown of starch in the rumen (acidosis) is not a problem. Nutrients in the grain are also used more efficiently. Suitable for all classes of farm livestock.

| Typical analysis | DM% | CP% | ME% | Oil% | Starch% |
|------------------|-----|-----|-----|------|---------|
| | 66 | 13 | 13 | 3.5 | 59 |

Feed Quality - grain

Wheat

Very high in energy, with average protein (13%). High in starch (65%), low in fibre and low in vitamins. High levels of gluten can result in a sticky dough if grain is excessively ground, reducing digestion.

Triticale

A naked grain-like wheat with high energy, moderate protein (although variable) of relevance only to pigs & poultry, triticale contains more lysine and methionine than wheat. Can be higher in phosphorous, magnesium and potassium than other grains

Barley

Grown for malting and animal feed. Ideal ruminant feed, at 12-14% protein of 'average' quality but deficient in lysine. Good starch encourages fast growth. More fibre and less starch than wheat. Ideal to complement forages but needs careful vitamin /mineral balancing.

Ruminants may suffer acidosis and/or bloat if fed high levels in a feed.

Oats

Husked seed - spring varieties higher in fibre. Usually rolled or flaked to enhance digestibility except for sheep. Poorer energy value than wheat or barley but higher in unsaturated oils. Popular in ruminant diets due to higher fibre. Ideal for horses.

| Typical analysis | DM% | CP% | ME% | Fibre% | Starch% | Oil% |
|------------------|-----|------|------|--------|---------|------|
| Barley | 86 | 12.3 | 13.2 | 5.1 | 57 | 3 |
| Oats | 86 | 11.8 | 12.2 | 10 | 43 | 4.5 |
| Triticale | 87 | 14 | 13.5 | 2.5 | 63.5 | 2.3 |
| Wheat | 86 | 13 | 13.8 | 3 | 65 | 2 |