

The 2020 Pumpkin Season - PYO Case study

FACTSHEET

NOTE- For references to on-label approvals and EAMUs for use of pesticides in pumpkin crops those noted in this factsheet were correct at the time of writing.

The start of the 2020 season was difficult. Late frosts until the first week in May and dry soils delayed planting, but heavy rains then delayed planting further. On the small-scale, planting under plastic can be used to improve access and weed control during the early part of the season, but may be impractical on the large scale without suitable machinery. As well as keeping moisture in the soil without allowing it to be waterlogged, this will warm the soil and improve early season growth rates. Good conditions across the summer in July and August gave strong growth, but many crops stayed vegetative and produced female flowers later than usual. This led to later ripening than normal, although the majority of fruit achieved full colour in time for autumn sales.



MARCH/APRIL/MAY

Effective weed control in pumpkin is essential in growing a crop that maximizes its potential. Weed control should be carried out before and after planting, although the reduced range of actives will mean that you are unlikely to achieve a perfectly clean crop. Given below is some general guidance on weed control, but it is highly recommended that suitably qualified agronomic advice is sought throughout the season for best outcomes.

Pre-planting Weed Control

Low weed pressure at planting will allow a strong crop to establish, although pumpkins are normally drilled or planted in early to mid-May and this can meet the first flush of weeds germinating through March. Land should be free of perennial weeds, notably couch grass and thistles. To get the best results some pre-planning is useful. Ideally go for a previous crop that has had good weed control, this usually means cereals or maize so there is a reduced weed burden, particularly of broadleaf weeds. Starting with a stale seedbed is a useful important approach for this crop.



The soil is cultivated down and fertilizer/lime is applied (if required) and worked in 4-6 weeks ahead of planting. The land is then left for a flush of weeds to appear and these are burnt off, normally with Glyphosate at 2 weeks ahead of planting.

Planting or drilling is then carried out with the least possible soil disturbance and immediately after planting or drilling the residual herbicides are applied. This is typically carried out in May, so if the

weather has been good then the soil should be dry and warm enough to support the young crop, although if there is poor soil structure or it is worked too finely then it can slump or become “sad”.

After drilling or planting a residual tank mix of herbicides is applied to the crop. Propyzamide (e.g. Kerb Flo) can be used under EAMU (2416/08) as a general herbicide, applied at up to 1.875 L/ha at 400g/L. This is useful on a range of weeds including grasses, but ineffective on composite weeds including mayweeds, groundsel and fleabane. Small, immature plants may see a small check in growth but this will be short lived. Clomazone (e.g. Gamit 36CS) can be used under EAMU (2831/15) as a broad spectrum herbicide to control cleavers, chickweed, fools parsley, speedwell, dead-nettle and shepherds purse. This can be applied at a rate of 0.25 L/ha, although often half this rate is used. Similarly, this can give a small check in growth of the crop. Dimethenamid-p + Pendimethalin (e.g. Wing-P) can also be applied under EAMU (0619/18) to control annual meadow grass and broadleaf weeds with a maximum dosage of 4 L/ha. Wing-P can significantly impact crop growth so it must be used with caution – it should only be used as an inter-row herbicide in a planted crop, and it is not recommended for use in a drilled crop, it is best to use it at a reduced rate to minimise impact on the crop.



Mayweed (L) and Fat Hen (R) can establish later in the season and can quickly smother a crop. This can be particularly problematic for PYO pumpkin crops where weeds can impede customer access to pumpkins in the field.

The actives given above have little contact action and so must be applied before weed emergence. After emergence/planting keep an eye on the progress daily, if weeds are seen take action immediately with direct contact herbicides. Cultivation and hoeing can be used here, but the previously applied herbicides will be disturbed and may allow more weeds to germinate. In good conditions, the crop emerges and plants grow away rapidly and soon cover the soil surface, inhibiting weed germination. Avoid application in cold or windy weather to avoid negative impacts on the crop, although this can be difficult during cold/wet May or June periods. Poor weather and herbicide applications checks crops in many cases and performance can be weakened so it is important to only treat in ideal conditions if possible. Late germinating weeds (e.g. fat hen) can emerge later (even if the soil is dry) and can quickly outgrow the crop so it is important to act when the weed is small. *Polygonum spp* including redshank, knotgrass and black bindweed are often a problem, as are mayweeds.

Organic growers could use a light excluding membrane such as black mulch polythene on a bed or a woven ground cover material with a long life such as Mypex, which could be used for 10 years if looked after. An effect similar to stale seedbed could be achieved preplanting with a similar type of cover to the above, removed after a month or more and drilled/planted.



JUNE

Crops Establishment & Irrigation

Pumpkin planting should be finished by June – either by drilling or by transplant – and the crop well established. Planting was difficult in 2020 with the prolonged dry spells, as it is necessary to avoid planting if conditions are hot and dry. Some growers direct drilled and saw patchy germination where fields had been dry and this can leave gaps for later on in the season. When your first drilling has not established well, there may be time for an

additional drilling. Irrigate after planting to promote good root development. If you are drilling, you can irrigate directly with the drill, or overspray the crop with a tank and slurry spreader. Depending on your soil you may get to water about 10 – 15cm near the surface, so you only need to apply a small amount to bridge the gap between the soil moisture and the surface. Surface moisture will also help to ensure your residual herbicides can work fully to help limit emergent weeds after planting.

Powdery Mildew

Powdery mildew is likely to be a risk from July onwards. You should plan to keep this out of your crop until August, after which it can be useful to deleaf the crop and help light to reach the developing fruit. Potassium bicarb, whilst organic, is effective only as an eradicant rather than a protectant, so you may wish to consider conventional treatments first. Suitable treatments generally have a 3 day or less harvest interval, so you can safely use them on your crop at this stage. Signum can be expensive, but Amistar, Takumi and Tallius are good choices to consider. You should also make sure to use a variety of FRAC codes to avoid any resistance developing. Be careful with general fungicides – more options are available for courgettes, but are not registered for use on pumpkin.



Weed Control

As the pumpkin crop establishes, the weed risk will continue until the canopy closes over. Fat Hen will thrive well in the drought and is a very common problem in England and can quickly smother the crop. Red shank and other late emerging weeds will become more of a problem as the crop grows. A stale seed bed will be a very good early start (you should aim to cultivate twice before planting, to strip out any germinating weeds, generally three weeks before planting), and hand hoeing can be useful in controlling weeds before they become too established, although this can be expensive on the large scale. For well-structured plantings, a manually steered mechanical hoe can be effective with 15cm setting.



A variety of chemical options are also available. Flexidor needs soil moisture to work effectively – this can be used at 0.5L/Ha. Gamit can also be effective, but can check the crop growth, especially in cold conditions, so don't use if there is any risk of frost. This can be used up to 0.25 L/Ha, but you may wish to reduce this to 0.1 – 0.15 L/Ha on sand, where it can still have some impact but is easily washed out. This can also lead to fringes around irrigation if the soil is dry. Kerb Flo is also available, with applications around 1.6 L/Ha, but for general use this is dropped to about 1.1 L/Ha and can really only tackle grasses. If you are late drilling, a late application of glyphosate could be put on before the crop emerges.

Product	Active Ingredient	Maximum Individual Dose	Maximum Total Dose	Latest Time of Application
Gamit 36 CS EAMU 2831/15	Clomazone	0.25 L/Ha	0.25 L/Ha/Year	Before 2 true leaves.
Flexidor EAMU 0883/20	Isoxaben	0.5 L/Ha		Before 3 true leaves. 1 max application a year.
Kerb Flo EAMU 2416/08	Propyzamide		1.875 L/Ha/Year	Before 3 true leaves

Cultural control can also be important for limited weed growth. Black plastic mulches can be useful if this can be afforded within gross margins, although this might be limited to the small scale. Planting through mypex can also be effective, but this is likely to be practical on the small scale. Straw mulches and cover crops may be of benefit –for example cloves can enrich the nitrogen in the soil, but you made need to find a slow growing variety to prevent overgrowth of the crop.

JULY

Welsh pumpkins were variable as of July 2020, a lot of fruit were still to set, whilst the fruit at some sites are reaching football-size. Considerable variation was seen in establishment and early growth, even within rows of the same cultivar. The target drilling and planting window was the 14-20th May, although many growers missed this due to dry ground. Pumpkins tend to set near the original plant, but growers have tried different methods of training pumpkin stolon's to keep them out of wheeling's as much as possible, to minimise damage. Training pumpkins into the centre of the row can help, as well as planting rows parallel to the prevailing wind. The latter can train them quite effectively, and they need little intervention to keep them in the rows.

Flowering

Flowers are likely to start developing from early July. You'll see an initial flush of male flowers, followed by female flowers 1 – 2 weeks later.

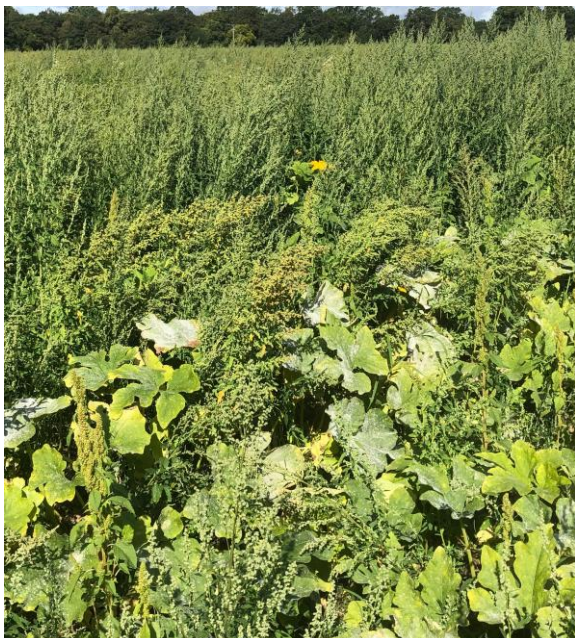
Pollination

Pumpkins have male and female flowers (right and left respectively), and both are needed for fruit to set. Bumblebees and flies act as pollinators and, in good conditions, a single day of activity from these insects will see a crop set. While other crops need supplementary hives, pumpkins normally show a good set with wild bees and other pollinators. Bad weather, or very hot dry weather, can reduce bee activity and this can adversely affect fruit set. Some studies have shown that providing supplementary hives can help to ensure high levels of pollination, and can increase average fruit weight by increasing seed number. Hives can also provide local honey for sale to customers.



Disease Control

Powdery mildew was starting to appear on pumpkin crops in July. This can be an issue when fruits are still small, and becomes something growers need to control. When fruit are full size, foliage infected with powdery mildew can be allowed to die down, revealing the pumpkins in situ for harvest. The reduced foliar canopy will allow the pumpkins to get some sun and develop a good colour. Perseus (EAMU 4197/19) or Signum (EAMU 2651/15) offer a good chance of controlling this disease and will persist for about 2-3 weeks. These wide-spectrum fungicides may also treat other rots which come in through the flowers, e.g. botrytis, see our factsheet on blossom end rot specifically. Treated plants should recover fine and continue to grow. Alternatively, potassium bicarbonate can be a useful method of quickly knocking back severe infections which you want to prevent from spreading – Karma can be used under EAMU 2503/19. While the weather is warm, applications in the evening would be recommended, and a wetter will be required.



Weed Control

Keeping weeds under control was a significant challenge, with fat hen establishing quickly. Plants reached 2m tall, being unfeasible to pull once they reach this size, as labour costs would approach £3k per acre and would cause a lot of soil disturbance. However, you can still grow decent pumpkins beneath a canopy of fat hen and this weed should die back by October, so shouldn't be a hinderance to PYO farms. If growers want to take action towards controlling fat hen, tall plants can be tackled with loppers (perhaps when cutting the pumpkins). Pelargonic acid (e.g. Finalsan, EAMU 1609/20) and Wing-P (EAMU 0619/18) are authorised for post-emergence inter-row use. Wing-P has been effective in trials, though this product has been seen to migrate into the crop following rain, causing notable damage. Pelargonic acid appears safer, though can be costly as it has an application rate of 17 L/ha and needs a wetter. Once pumpkins are ready, weed control can be particularly challenging as herbicide damage to the fruit must be avoided. Using a weed wiper with glyphosate could be an option, as long as this equipment is properly set up and in good working order, so there is no risk of the chemical dripping on the pumpkins. The use of in-row cultivators is increasing, though this technology can be costly.

Hoing has been a successful weed control method for Welsh growers, though quite time consuming.

Storage

If the forecast looks fine, a couple of weeks of good weather can really advance a pumpkin crop. However, even if pumpkins are looking good in August, wet weather at the end of summer can leave you with a ruined crop in October. Keep an eye on the forecast for September, and shift pumpkins under cover if poor conditions are expected.

- A suitable storage area is somewhere warm and dry, — a, empty glasshouse would be ideal.
- Do not keep pumpkins in refrigerated storage.

If there isn't the option to shelter pumpkins, growers could layer fleece in a dry area of the field and place pumpkins here after harvest to keep them from sitting in damp conditions. If pumpkins are intended for PYO sale, they can be moved back out into the field after the storage period. If yields have been low, growers may choose to buy in additional pumpkins to bulk out the field.

2020 Year overview

Diseases

Powdery mildew was largely under control in this year, with symptoms only appearing towards the season end when it can be helpful in maturing the fruit. Conditions approaching harvest were much better than 2019 with the ground remaining dry which helped to reduce rots in the field. However, the late maturing fruit with thinned skins increased rot and damage risk. Trial results have indicated that a calcium foliar spray can help to reduce rot incidence and severity.

The main disease of concern in pumpkin during the early season is powdery mildew, and this can start to be a problem from June onwards, starting with flowering. A powdery white fungal infection of the leaves can spread across the leaf surface until it leads to leaf drop. This reduces the amount of sugar available to the growing fruit, leading to a smaller fruit size. When you crop walk, look for signs of powdery mildew throughout the canopy – warm shaded conditions, typically around the older leaves in the lower canopy are more prone to developing the disease. A range of products are available for powdery mildew control (see below), and a food-grade bicarbonate treatment is available for organic growers. Bicarbonate will only treat the disease that is present when it's applied as it lacks a lasting protective action. Powdery mildew is less of a concern later in the season once the fruits start to mature, as leaf shed will allow light to reach the maturing fruit.





Secondary rots

In addition to powdery mildew, secondary rots can be of concern. Leaf damage can risk the development of Botrytis on the leaf material, but a spray of a suitable fungicide (e.g. Signum) can be used to control development if there is a significant risk in the crop. Fruit rots, either from wounds or from the blossom scar, can be a problem later in the season. Careful management of calcium nutrition can be useful in strengthening the fruit to resist rot development. If fruit is to be lifted they should not be washed, but stored in a warm (or ambient) store to cure without chilling. Fruit can be stored this way for many months without spoilage allowing for spring marketing.

Weeds

Weed control was difficult due to conditions during establishment, with Fat Hen being especially dense. Many growers were able to achieve a stale seed bed in advance of planting, complete with a spray, a week before planting – some growers were able to continue spraying until the third week of May. Trials have suggested that increased weed cover can have a slight impact on the number of fruit set per planted area, but does not necessarily impact fruit size at harvest once it has set. Heavy weeds can also prevent ripening. Herbicides for the 2021 season were set to include Roundup for a stale seed bed, followed by Gamit, Kerb and/or Flexidor for residual use, up to 24 hours before emergence. Kerb, Flexidor and Gamit are also safe to use over the emerged crop or transplants, but are not effective at controlling emerged weeds. Wing-P can be used as a directed residual although there have been some reports of crop damage this year. Finalsan and Shark can be used as carefully directed contact herbicides. Application rates can be adjusted to suit crop and soil conditions.

Marketing

Despite the challenges of COVID there was strong uptake from customers in this year as the popularity of Halloween pumpkins continues to grow. Social media was an essential tool in communicating with customers. Many growers had to implement a book-in-advance system to manage customer flow through their site. This could be based on an allotted time period, or on arrival time without restricting time on site. Charging in advance helped to ensure booked slots were not wasted, but the charge could be linked with a redeemable sum against a pumpkin purchase. Given groups are likely to be based around families, it may be easiest to allow booking and charging to be based on a car space rather than on a per-head basis. Depending on the service used you may need to charge a booking fee, but you can adjust your prices to accommodate this. While covid has created the need for these approaches to marketing, many growers are finding they have eased customer management, and this strategy may be of benefit into future years. When pricing fruit you need to think about ways of ensuring consistency in prices – some growers may charge by weight or by size, and displays of pre-picked pumpkins can give customers an idea of price before picking fruit. Smaller fruit such as munchkins have been particularly popular this year selling for £1 - £1.50 a fruit compared with £2-4 for medium fruit (3-5kg), £5-8 for large (5-8kg) and £10 for monsters over £10kg.

Planning for the next year

It's never too early to start planning for the next season, particularly for ordering seed. A broad range of cultivars are available and a summary is given below. When planning cultivars, plan what you need to match against customer demands, but also consider your land: for example Racer may perform better on



exposed coastal sites compared with Harvest Moon. For seed numbers consider 10,000 to 12,500 plants per ha, although the lower end of the scale may be too few for direct drill sites. Modules will take around 3-4 weeks under protection to reach maturity, but both direct drilled and module plants will need to be planted around the 20th of May if the weather is warm enough.

You can always consider alternative crops to complement pumpkins to either extend the season or broaden your offer to your customers. Sunflowers, a maize maze or PYO corn can be very attractive, although you would need to consider careful scheduling and variety choice, to match the sweetcorn with likely pumpkin marketing periods. Other activities such as digging for potatoes may not offer significant returns but can enhance the experience for customers and increase time spent on site, driving up sales in other areas like a farm café.

Size Guide	Variety	Type	Supplier	Weight Estimate
Monster	Kratos	Halloween (H)	Clause UK	>10kg
	Captain Jack	H	Sakata	>10 kg
	Gold Medal	H	Tozer	>8 kg
	Champion	H	Tozer	>8 kg
	Large Marge	H	Sakata	12kg
	Mr Wrinkles	H	Sakata	12 kg
	Early King	H	Moles	12kg
	Polar Bear	White	Tozer	>8kg
	Diablo	H	Sakata	8kg
	Earlipack	H	Sakata	8kg
	Wicked	H	Tozer	8kg
Large	Magic Lantern	H	Clause	7kg
	Racer	H	Tozer	5-7kg
	Gladiator	H	Clause	5-6 kg
	Mrs Wrinkles	H	Sakata	7kg
	Harvest Moon	H	CN	4-5kg
Medium	Magician	H	Clause	3-4kg
	Gomez	H	Clause	3-4 kg
	Cargo	H	Tozer	3-4kg
	White Flat Boer	White	Sakata	4kg
	Bellatrix	H	Enza	4kg
	Mars	H	Tozer	2-4 kg
Small & Mini	Spitfire	Mini (M)	Clause	1kg
	Full Splendour	M	Sakata	2kg
	Jack Sprat	M	Sakata	1-2kg
Warts	Toad	Warty (W)	Sakata	1kg
	Goosebumps	W	Tozer	2kg
	Warty Gnome	W	Clause	2kg
	Warty Goblin	W	Clause	2 kg
	Knuckle head	W	Moles	5-7kg

Powdery Mildew Control Options for Pumpkin						
Product	Active Ingredient	Max no. applications	Max Individual Dose (L/ha or kg/ha)	Max Total Dose (L/ha or kg/ha)	Harvest interval (days)	FRAC no.
Amistar EAMU 0893/2017	azoxystrobin	2	1.0	-	3	11
Serenade ASO EAMU 0706/2013	<i>Bacillus subtilis</i> strain QST 713	20	10.00	-	0	44
Signum EAMU 2651/15	boscalid + pyraclostrobin	-	1.5	3.0	1	7 + 11
Takumi SC EAMU 2915/16	cyflufenamid	2	0.15	-	1	U06
Prestop EAMU 2843/18	<i>Gliocladium catenulatum</i> strain J1446	3	6.00	-	Apply before fruit has reached full size on main stem	BM02
Karma EAMU 2503/19	potassium hydrogen carbonate	8	3.0	-	1	N/A
Talius EAMU 2627/2015	proquinazid	1	0.25	-	3	13

Disclaimer

Every effort is made to ensure the accuracy of information and recommendations given in these notes. All applications of crop protection chemicals should be made in accordance with label recommendations, which should be consulted before spraying. Some of the pesticides mentioned in these notes may not be supported by label recommendations for their use on pumpkin crops but are permissible via Extension of Authorisation for Minor Use (EAMU) in the UK under 'The Revised Long Term Arrangements For Extension Of Use (2002)'. In these cases, the use of the pesticide is at the risk of the user. The references to on-label approvals and EAMUs for use of pesticides in pumpkin crops are noted and are correct at the time of writing. These are subject to change and approval may be withdrawn at any point. It is the grower's responsibility to check approvals before use of pesticides. If in doubt a grower should seek advice from a BASIS qualified advisor.

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