

UK Lettuce Production

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VCA (Vegetable Consultants Association) Chairman



Independent Agronomist specialising in outdoor & protected
specialist leafy salads and baby leaf crops

Based in Essex, south-east UK

Protected Apollo Lettuce

Mono cropped Apollo lettuce, soil
grown in glasshouses

Hand planted through black polythene
used for weed and soil contamination
control



Outdoor Whole Head Lettuce & Endives

Outdoor whole head lettuce
production



Floating Raft Hydroponics

Hydroponics growing lettuce in deep pools for specialist customers such as sandwich makers and food services



Vertical Hydroponics

At planting...



Pre-harvest



Fan Options

Horizontal fan



Vertical fan



Fusarium

Fusarium symptoms. Samples were sent to the Plant Clinic at Fera for identification



Downy mildew

Downy mildew has quickly become one of the biggest challenges growers face currently

Humidity above 85%

Temps 15-20°C



The logo consists of the letters 'IPM' in a bold, white, sans-serif font, positioned on the right side of a dark grey horizontal bar. The background of the slide is a gradient of orange and red, with a lighter orange rectangular area to the right of the dark grey bar.

IPM

Integrated Pest Management

IPM

- Choose resistant varieties
- Control the environment
- Soil sterilising
- Correct nutrition for a 'fit' crop - analyse, record, adjust, repeat
- Employ a full fungicide programme

Resistant varieties

- Choose varieties that give the best chance of resisting infection
- Keep abreast of new varieties as they become available and always be prepared to trial them throughout the season

Control the environment

- Soil - drainage. No lettuce plants want to be standing with their roots in water as it's anaerobic and pooling water creates a humid environment around the crop
- Irrigation - decision support systems are available based around data transmission units which include multi-depth soil moisture probes, temperature and humidity sensors, leaf wetness sensors etc. See www.soilmoisturesense.com for the ones many UK growers use
- Fargro's Zensie

Control the environment

- Airflow / reduce humidity. Adjust vents to release humidity. Aim to clear polythene or glass of condensation quickly in the morning by using residual heat and cracking open vents. Consider forced air flow with the use of fans alongside dehumidifying or heating
- Maintain good nursery hygiene, removing or destroying infected material, controlling weeds and sanitising machinery between sites

Soil sterilising

Steam sterilising is expensive but will help control soil born issues such as fusarium. There are no restrictions on how often its carried out

Calcium cyanamide is used by some growers to supress weeds and also sterilise soil borne issues

Re-populate with beneficial soil microbes such as Trianum or Serenade ASO after sterilising

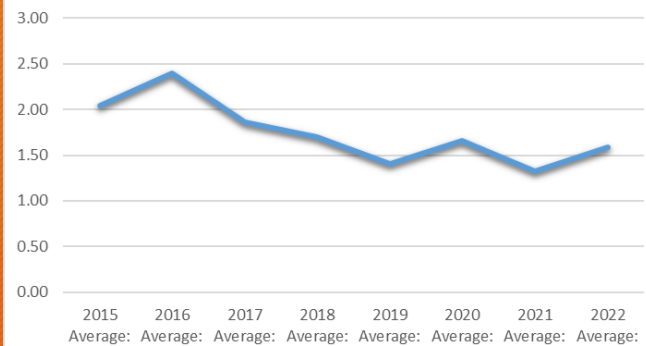


Nutrition

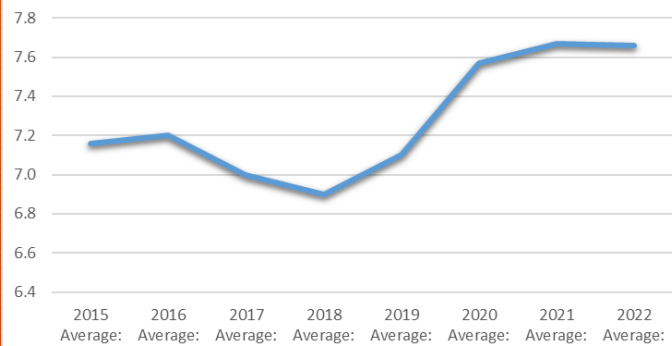
- Soil analysis - record and trend changes over time
- Leaf analysis - check how efficiently your plants are working, record and trend changes over time
- A 'fit' plant stands the best chance of fending off disease infection

Soil Nutrition Trends over time

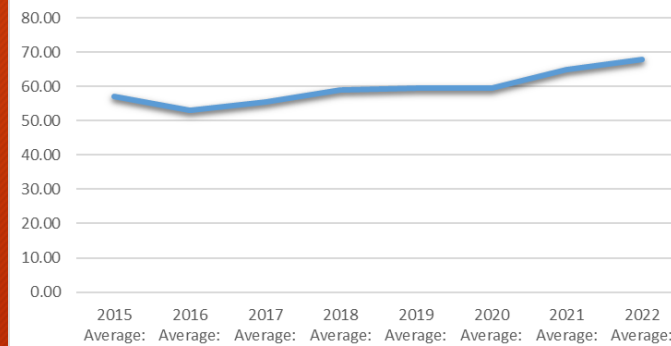
O.M.



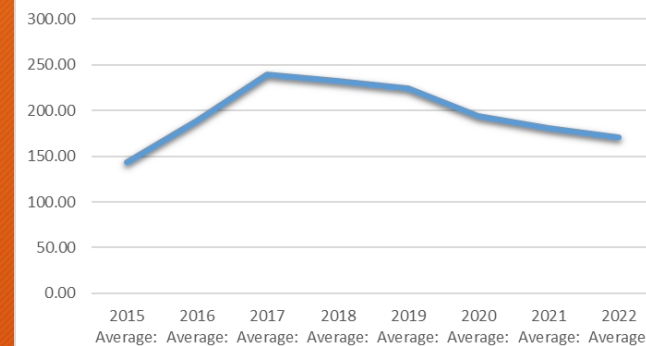
pH



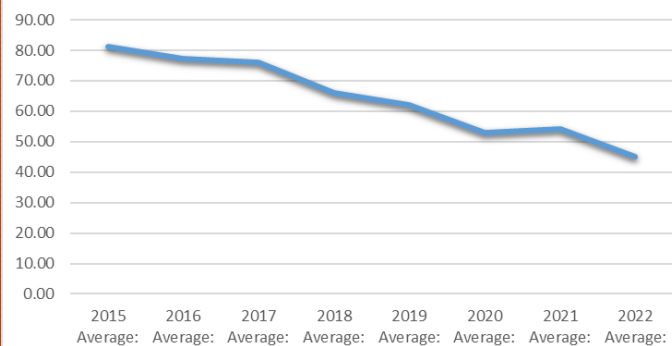
P (mg/l)



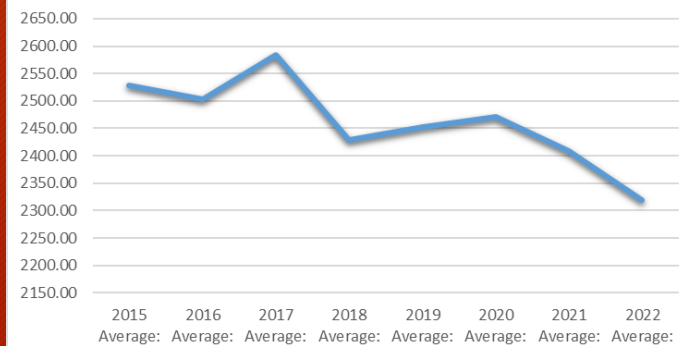
K (mg/l)



Mg (mg/l)



Cf



Fertiliser and nutrition

- Blends of nutrients or straights are applied pre-planting in response to soil analysis results
- Usually in granular form although some are looking at liquids
- Some organic type pellets made of heat treated waste has been tried to help reduce the soil EC
- All nutrition is applied in the bed pre-planting (unless the soil is particularly sandy)
- Calcium Nitrate is used for most nitrogen supply and can be top dressed

Fungicide Programmes

- Apply spray plans in optimum conditions - it's not just a tick list of getting the jobs done
- Amistar - a good start for controlling a wide range of disease issues including downy mildew. Amistar also helped the roots of the glasshouse planting in the earlier slide where fusarium was suspected. Apply as soon after planting as possible. (For outdoor production, Orondis Plus (oxathiapiprolin) from Syngenta can be applied in the UK with Amistar for additional downy mildew control but it's not approved in the EU)

Fungicide Programme - Protected Winter

Application No.	Product	Active	Reason
1	Amistar	azoxystrobin	Downy mildew, rhizoctonia
	Switch	cyprodinil + fludioxonil	botrytis
2	Fubol Gold WG	mancozeb + metalaxyl-m	downy mildew
	Movento Tracer	spirotetramat spinosad	aphid caterpillar/cutworm
3	Previcur Energy	fosetyl aluminium + propamocarb hydrochloride	damping off, downy mildew
4	Paraat	dimethomorph	downy mildew
	Croplift Pro/Mag Sulphate	foliar nutrition	nutrition
5	Signum	boscalid + pyraclostrobin	sclerotinia, botrytis, rhizoctonia
	Tracer	spinosad	caterpillar/cutworm
6	Revus	mandipropamid	downy mildew
	Switch	cyprodinil + fludioxonil	botrytis
	Markate 50	lambda-cyhalothrin	caterpillar/aphid
7	Teldor	fenhexamid	botrytis
	Croplift Pro/Mag Sulphate	foliar nutrition	nutrition
8	Hortiphyte Sulflow	phosphite nutrition/dry leaf	plant welfare nutrition/dry leaf
9	Hortiphyte Serenade ASO	phosphite bacillus subtilis	plant welfare botrytis
10	Karma	potassium hydrogen carbonate	downy mildew

Fungicide Programme - Protected Winter & Summer

- Karma (potassium hydrogen carbonate) dries infection well. Apply towards the end of the growing period to keep spore numbers down, especially when successional plantings are growing next to each other

Fungicide Programme - Protected Summer

Application No.	Product	Active	Reason
1	Revus	azoxystrobin	Downy mildew
	Switch	cyprodinil + fludioxonil	botrytis
	Movento	spirotetramat	aphid
	Tracer	spinosad	Caterpillar
2	Markate 50	lambda-cyhalothrin	aphid
	Croplift Pro/Mag Sulphate	foliar nutrition	nutrition
3	Luna Sensation	fluopyram + trifloxystrobin	botrytis, sclerotinia, powdery mildew
4	Teldor	fenhexamid	botrytis
	Croplift Pro/Mag Sulphate	foliar nutrition	nutrition
6	Hortiphyte Serenade ASO	phosphite bacillus subtilis	plant welfare botrytis
7	Karma	potassium hydrogen carbonate	downy mildew

Keep Plants Fighting Fit

- Hortiphyte or Nutriphyte appears to keep the plant buzzing and able to fend off diseases to a degree, especially downy mildew, after the PPP's have been applied
- Foliar nutrition such as Yara's Croplift Pro or Magnesium Sulphate can be applied with the phosphite products
- Foliar sulphur - applied to help shed moisture from leaves to reduce powdery mildew spread may help towards reducing downy mildew spore spread too?

Further Information

- Search for: 'AHDB downy mildew lettuce UK'
Wealth of historical research on the AHDB's legacy website
- The UK's new HCP - Horticulture Crop Protection Ltd has taken over where AHDB left off and we're currently lining up lots of work to carry on with