HONEYBEE FORAGE

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BORAGE

For many beekeepers in the East Yorkshire area, the development of commercially grown Borage has been something of a miracle. Although oil seed rape remains the bread and butter for many Borage has become the 'jam'.

Although most people who live in the Hull and East Riding area are familiar with the deep blue fields of Borage dotted about the county in the summer, most of us are probably ignorant about why, and how Borage is grown. With a little investigation its possible to build up a picture of this new crop. The story that unfolds is one of up-to-date quality farm production, and leading edge biochemistry.

BACKGROUND

Borage (*borago officianilis*) has been known to English herbalists for hundreds of years. Its cucumber tasting hairy leaves were chopped into summer drinks, and its flowers were candied as cake decorations. It has always been known to be a favourite of bees indeed it is also known as 'bee borage'.

The reasons for the emergence of Borage as a commercial crop in the 1980s are linked to the demand by the pharmaceutical and food industries for accessible sources of particular types of Polyunsaturated Fatty Acids (PUFA) essential to human metabolism. Although fats generally have had a bad press, PUFA are seen as one of the desirable substances needed to maintain a balanced diet.

THE PHARMACEUTICAL INDUSTRY

There are two groups of essential PUFAS, the first obtained from fish is usually obtainable fairly easily. The second type is known as gamma linoleic acid (gla) and is found in certain vegetable oils, such as Evening Primrose and now Borage Oil. Borage yields perhaps 25% gla, whereas Evening Primrose only produces 9%–12%. The pharmaceutical industry requires gla as both a food additive and as a 'health' food in its own right. It is one of the building blocks used by the body to create prostaglandins, the mysterious hormone known to be the key to many of the bodies regulatory processes. The absence of this hormone can lead to increased risks of heart disease, skin disorders and arthritis. Products that include gla are such things as baby milk formula and skin creams and although the industry is looking for other uses there are no obvious mass markets in view of the cost of seed production and processing.

EVENING PRIMROSE

The gla in Evening Primrose Oil has been marketed to help women offset premenstrual tension by helping to regulate prostaglandin production. Borage Oil can have the same effects and is often seen either in pure capsule form or mixed with Cod liver Oil. The label will say 'Star Flower Oil' as the marketing men find the name Borage somewhat unpalatable, but Borage it is in those packets you find on the High Street.

Incidentally though Evening Primrose contains less gla it does crop much more heavily than Borage and is easier to grow. It is unlikely to be grown much in the UK however as the Chinese have cornered the world market and driven the price down. This means it is not now economically feasible to grow it in Europe.

Borage

BORAGE CULTIVATION

Although it is an international crop, Borage cultivation has been developed in England and the expertise exported to the world. Its cultivation in England also tends to be in fairly close proximity to either the extraction plants or the expert agricultural managers.

Nationally MAFF report around 1,000 hectares (that

is 2,470 acres in old money) of Borage are grown in the UK each year. This is concentrated in certain parts of the country (including East Anglia) though a large proportion is grown in East Yorkshire. Due to the stringent quality controls required by the pharmaceutical industry, Borage is usually grown by farmers under contract to an agent acting for the end user. In East Yorkshire May and Dawson, acting for Swiss based Hoffman la Roche, control much of the Borage production. Annual contracts are entered into with farmers to grow an agreed acreage at an agreed price. May and Dawson provide intensive support and direct much of the detailed operations. Steve Watkinson, agronomist with May and Dawson, spends much of the growing season out in the fields. This is a difficult and costly crop to produce and his expertise is essential to ensure a quality return.

Borage – as far as the eye can see – a good forage crop for honey bees

CROP PRODUCTION

Borage is sown in April and requires nothing special in terms of soil type. It will not tolerate drought so good moisture retention is essential. No pesticides or herbicides can be used on Borage and farmers must rely on old fashioned manual methods to keep down the weeds. Once it has got away though, Borage will compete well. The key to successful Borage cultivation is attention to detail based on the expert advice of the agronomist.

POLLINATION

Flowering begins in early July and it is then that the bees are needed. Although there seems to be no recommended ratio of hives per acre, Steve Watkinson feels that 'the more the merrier' is the key. It is not only honey bees that flock to a Borage field. Stand amongst the blue flowers in mid July and you will see just about every species of bumble that you can imagine. Steve describes a visit to New Zealand to observe Borage growing there when the relative shortage of native bee species was marked by the reduced 'hum'. It is never quiet in an English Borage field! This reduction in pollinators led to an average crop yield per acre, 50% less than that in this country. Each Borage flower opens for only a day, so bees are needed from the day before flowering begins. Every day of bad weather means more unpollinated flowers.

HARVESTING

As Borage seed is not carried in pods and falls from the plant very easily, the entire crop is 'swathed' or cut down just before the last flowers have been pollinated. OSR is also swathed but its seeds are carried in pods and do not fall to the ground so easily. This happens in late July/ early August and the plants lie on the ground for 3/4 weeks. The stems and leaves dry out and the seeds mature. Some seeds are lost as they fall to the ground and growers do notice a significant amount of self sowing of Borage in each field the following year.

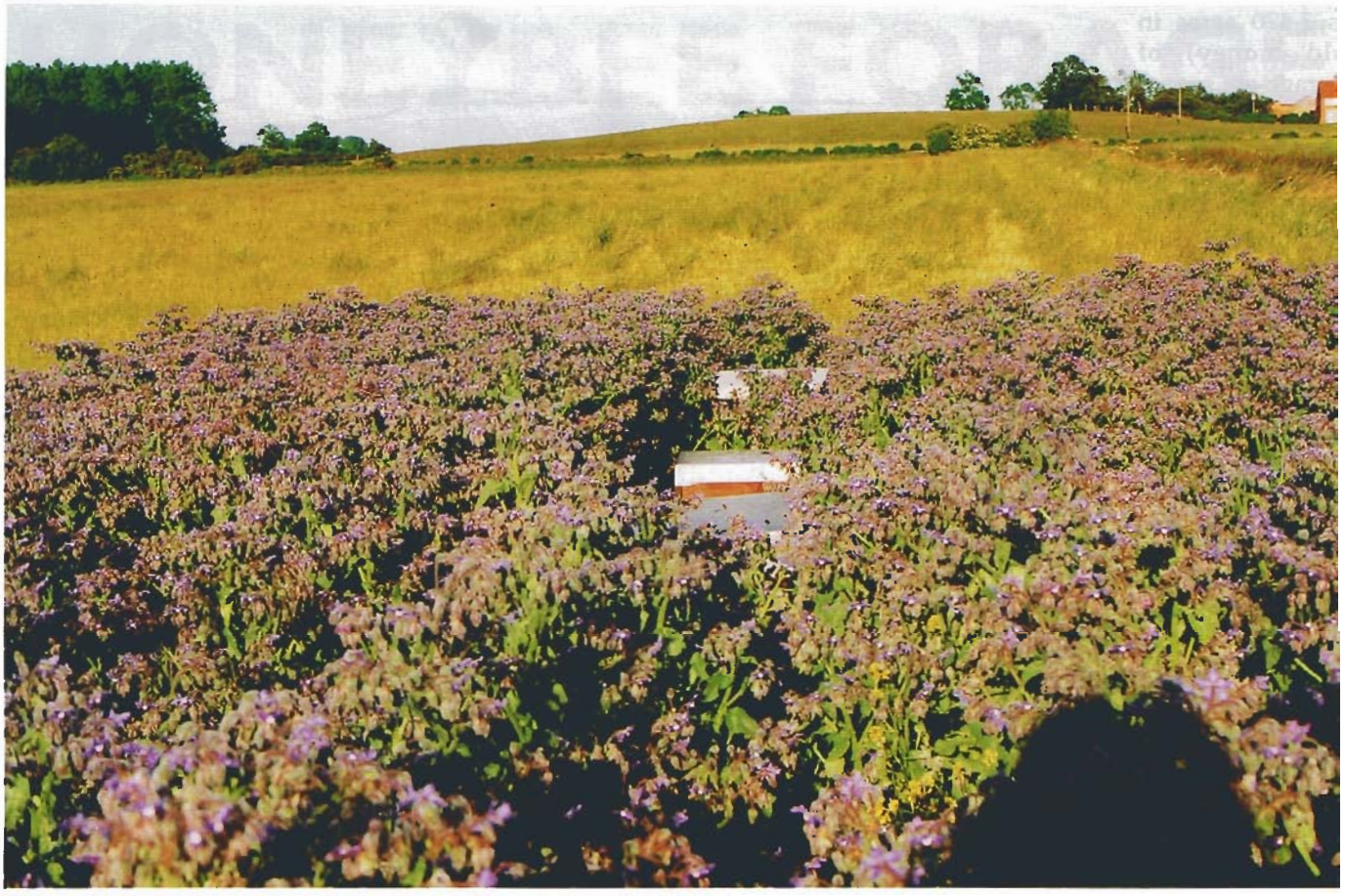
A combine harvester, lifts the swath and extracts the seed. Average crops are around 350–400lbs per acre and Borage seed fetches around £2,000 per ton. Harvesting is a critical time and deciding when to swath and when to harvest is the responsibility of the agronomist.

PROCESSING

Borage seed produced in East Yorkshire is cleaned and dried locally and then sent to Roche Lipid Technologies (RLT) at Heanor in Derbyshire. This subsidiary of Hoffman la Roche boasts a purpose built plant for the extraction of gla from Borage, Evening Primrose, and fish oils. RLT insist upon auditable controls for all their processes, hence their reliance on such companies as May and Dawson.

LIKELIHOOD OF EXPANSION

With the cost so high and the production per acre relatively low, it seems unlikely that Borage cultivation will progress further from the speciality end of the market. If costs could be reduced or new uses found for gla, then we may



Bees are essential for gord pollination of the crop

see more acres of Borage, until then the total acreage remains relatively static. On the positive side the fact that Borage is grown without EU subsidy, means it is not subject to the vagaries of the CAP and any changes to these rules will not affect its commercial viability.

THE BORAGE HONEY CROP

Borage honey is startlingly clear and almost colourless, slow to crystallise and ideal for cut comb and chunk honey. On the negative side it seems to have a rather bland taste without some of the more delicate traces found in other honeys. Although Borage honey can be viewed with some suspicion by customers at first it soon commands a loyal following especially when it is explained which flowers it comes from. In display with other honeys it adds another colour to the readily identifiable heather, OSR and darker floral honeys.

Although there are trades descriptions difficulties in actually labelling any honey as monofloral, the public are usually willing to pay more for a honey with links to one particular floral source and this can be a boon when marketing Borage honey. I personally would not go so far as the label I saw on a commercial beekeepers honey which described the contents as 'Borage herbal honey'.

My best ever Borage honey crop was taken in three weeks last July (1996) when I harvested 500lbs from 8 colonies. May and Dawson confirmed that they also got a record crop from the same field so perhaps my good fortune was not just down to excellent beekeeping as I thought!

Although Borage provides good continuity between OSR in May/ June and the heather in August I have found that the bees can work themselves out on Borage. The 8 colonies that worked so well for me on the Borage last year went to the moors and returned a poor heather crop. Bee populations were relatively low and even though they were all headed by 1996 queens brood rearing seemed to stop earlier than those that did not go to the Borage.

VARROA AND THE FUTURE

The impact of varroa, recently arrived in East Yorkshire, should be viewed with concern by Borage growers. Although native bees will do their bit the presence of adult honey bees in significant numbers can mean the difference between an average and an above average crop. If growers and the pharmaceutical industry want to improve the harvest per acre then possibly further work needs to be put in to investigate the link between colony numbers and seed production. Given that Borage is only a minor crop in the UK it seems unlikely that MAFF would be interested in such a study so maybe it is up to the industry. If bee populations do fall and the colonies available for pollination reduce then beekeepers will be in demand. The relationship between grower and beekeeper is for mutual benefit, although I am not aware of anyone charging a pollination fee at the moment. "As long as I get a good honey crop why bother?" If the demand for colonies on Borage does increase, and pollination is seen to have commercial benefits, pollination fees may become the norm. Until then I for one will continue to enjoy putting my hives beside those deep blue fields and watching the honey flow in... ■