

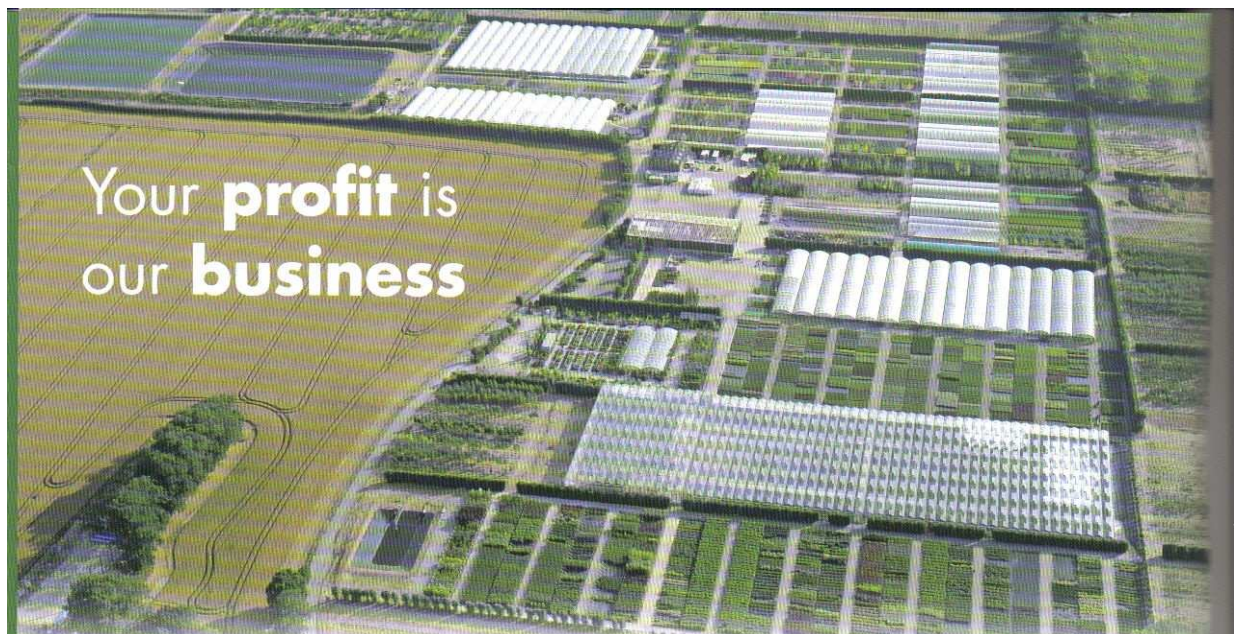


PALMSTEAD
NURSERIES

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Report of my first training period, in ENSHAP 1:

PALMSTEAD NURSERIES LIMITED



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Promotion 2007-2010

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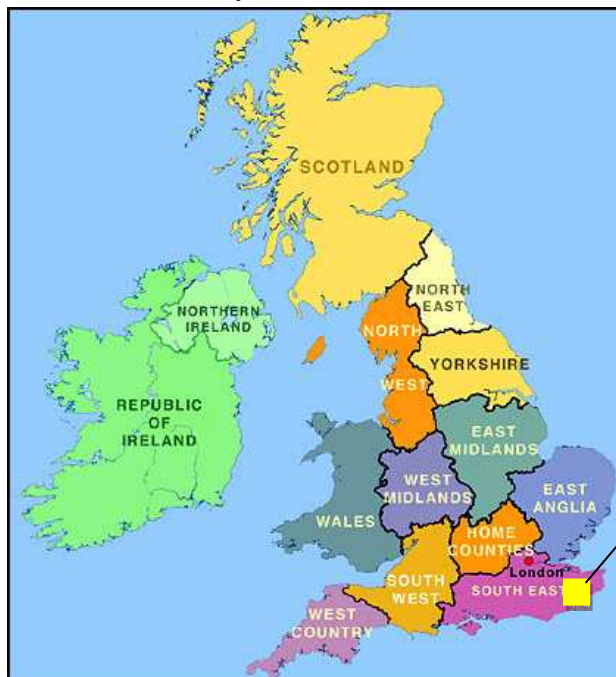
Introduction:

For my first training period, I went to *Palmstead Nurseries Limited* which is a famous company in the horticulture field. The goals of the training period were to discover the world of one firm, to understand how it works as a whole. Also, I aim to identify its position in the field and to study what are the technologies existing. Moreover, it is an occasion to go into a specific problem: the biological control; and to find some parts of the solution.

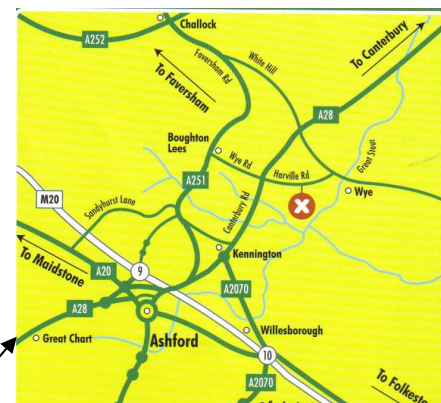
This training period was also an opportunity to discover a job, another culture, and to improve my English.

I°) Palmstead Nurseries Limited:

In 1968, a nursery was created by John Langman and his family at Palmstead and was named after the area it was created at. This small company of only 3 acres sold plants to local nurseries and Garden outlets, producing only small numbers of plants during a short season. At the beginning, most of the sales were done by contacts, but prime minister M.Tatcher established competition and privatization. In order to be more competitive, the nursery became cheaper and produced with quality. So, thanks to the development of new techniques and the expansion of the landscaping in the 70^s, the company succeeded and grew. That is why the company moved to Wye in 1988, near Ashford (Kent), to become the successful business it is today.



Zoom in
Ashford.
(Kent)



Map 1: Roads around Palmstead
(Wholesale Plant catalogue
of Palmstead. 2008)

On the left side:

Map 2: England (site web
feetforlife, 2008)

This new location had been elected in 1988 for different reasons. Indeed there was a good soil for this activity, moreover it was not far from the highway (London at 1 hour) and main roads, the climate was good and there were only two competitors near Wye. The company is renting this land to the owner of Palmstead, and only uses 2/3rds of the surface (extension possibility).

Today, Palmstead Nurseries is one of the major growers of trees, shrubs and perennials for the Landscape industry and other wholesale nurseries. The 53 hectare nursery has increased its production over to 1.000.000 container grown plants and almost 200.000 field grown trees. The



Photo 1 : Aerial view of Palmstead Nurseries Limited (Palmstead)

The nursery sells ornamental plants for new houses, road or town sites, for landscape and individual gardens (the cash and carry is very good even if most of the production is sold wholesale). Established in that niche, the corporation does not want to diversify the market anymore and wants to keep its customers. And most of the older competitors have disappeared in the region which is good.



Map 3 : Delivery area and charges (Wholesale Plant catalogue of Palmstead, 2008)

The strategy is to propagate a lot to be able to satisfy each demand. A wide range is good because customers can find whatever they want, and it is now possible to do that thanks to the protected areas and climate change. The corporation produces a lot of plants on its own, but still buys 18% of them. Things come from a lot of different countries in the world (Europe, China, Australia...) however all the production is sold relatively near Wye, and most of the plants are sold within a year. (The company has got a building in London to deliver farer).

Thanks to this, this nursery is now one of the top 10 in England and the 4th in providing for the landscaping sector.

Palmstead nurseries produces 1 million cuttings, making 800 000 pots, and buy 24 trucks of peat for its annual working. Thanks to the technological improvements they can now produce during all the year, up to five times a year for the same plant. The main running costs are for labour, automation, irrigation and electricity (even if there is no heating in winter). The annual expenses are £1m for wages and £129 000 for the biological control, chemicals, compost and fertilizers. The company has also to pay a levy to HDC (horticulture research) even if some trials are made internally in the nursery, and to pay a tax on profit (40%); they

have no partners and no subsidies except for the petrol on site which is less taxed; fortunately, the water is not expensive.

The automation allows to generate cheaper plants, although lots of tasks are impossible to be mechanized. Actually this work is job-seeker (47 full time staff) and needs more people with plant knowledge but the problem is that it is not very well paid. That is why the administrators try to keep their employees interested by improving some social aspects (Christmas dinner, a trip every year, a common room to eat...).



Photo 2 : Some beds at Palmstead (Alice Denis)

With a turnover which is increasing every year (£3 million in 2007), and an exceptional profit of 13 per cent, the company can make investments and give bonus to employees. The money is invested in banks, in shares (in this business or in others), and in improvements for the company. Indeed, the four directors want the company

to prosper and grow. They will soon build a new propagation department to again improve this key sector of the nursery. It is true that this division is able to produce exactly what they need, so to be reactive at the customer demand; and to follow plants from the beginning to obtain a good quality. They also want to improve the automation in order to reduce labour costs (especially with the actual inflation).

To facilitate contacts, Palmstead nurseries pay to be in the front page of the *Horticulture week*, a specialized magazine. In addition the directors and sale persons attend exhibitions, shows and customers are invited to visit the nursery.

II°) My job during this training period:

During 8 weeks, I worked at the propagation's department. Our job was to produce new plants, especially by cuttings. Most of our days were composed in two stages, the first one consisted of a walk in the nursery to take material. Then, we come back in our room and took cuttings. (Create trays with compost, take cuttings, be careful with the plants' stress, put the cuttings in a good rooting environment).



Photo 3 : The cutting table at Palmstead (Alice Denis)

Photo 4 : I am working in the machine which produce the trays. (Delephine Souillat)



The compost employed was free of any other additive, which allowed us to add exactly what the different plants needed and did not squander products. Afterwards the young plants are fed once a week with liquid food in water. Furthermore, it is just interesting to note that cuttings usually don't need hormone powder to root. Only plants such as Viburnum, Photinia and Eleagnus are rooted with rooting powder. In the case of Photinia, acetone is used in addition before the hormone is applied. It is true that some callus can appear and acetone breaks it down allowing successful rooting. We had to sterilize our secateurs too, because the reducing of the leaves can produce necrosis. Photinia are in fact really susceptible to diseases and infections, not so the other plants we utilize. Actually, it was impossible to succeed in doing some Photinia cuttings before the experiments made by Geoff and Nina. They developed different strategy to make cuttings, in order to find the best way possible. They try to change the compost composition, the plants used for cutting material (parts of the plant, at the different seasons...), the hormone used and the possible additive. Thanks to their experiments, a good way to do cuttings was found, and they received a prize for that.

But we also do others jobs in the nursery; we had to do weeding, to sharpen, to transplant, to do some biological control in which I was really interested...and to move some trays in order to keep them in the best conditions. In effect, the cuttings are placed in the fog or in the mist where the atmosphere is really humid (almost 100% humidity). This photo shows the fog, and the reactor which produces condensation at regular intervals of time. And the humidity is not the same everywhere in the room; it depends on the reactor's proximity. That is why plants needs to be moved, because too much humidity for a long time is not good form them, neither is too less.



Photo 5 : The fog at Palmstead (Alice Denis)

Really interested and implicated in our work, I was happy to work with the two supervisors (Geoff and Nina) who explained to me all the time why we need to do that. Asking a lot of questions, I understood better this work, and its goals for the future. And when we needed to work on our own, I was pleased to receive more responsibility and to supervise our work during Geoff and Nina's absence. With more responsibility and a better knowledge, the work was truly attractive.



Photo 6 : A one hour Viburnum grafting (Alice Denis)

Photo 7 : A one year Viburnum grafting (Alice Denis)

I could learn about grafting as well, watching during a session of Viburnum grafting. With the aim to produce a plant bushy with a trunk, the stock is a cultivar non to vigorous which produces a trunk and the scion is a vigorous cultivar very bushy. After a starving period, to reduce the sap's activity, the grafting can be done. Then the plant has to be placed in good conditions for 3 weeks for the grafting to

succeed. Afterwards it is kept in a favorable environment in order for the plant to become strong and to be sold.

And I had the opportunity to go on a trip with our company: *RHS Garden Wisley* which is a very famous English landscape garden. This day was very interesting. I could see the English landscaping, learn a lot about thousands of plants, discover their study on the creation of varieties ...It was extraordinary diversified, there were orchards, a Pinetum, Trials field, Wild garden, Alpine garden, Vegetable garden, Herb garden, Model garden, Country garden, ...and a enormous glasshouse full of tropical plants and desert plants. Simply wonderful!

III°) The exemple of Lavendulas:

The company produces a lot of ornamental plants dedicated for landscapers, local authorities and some individual customers. The most important production is for hedging trees, hebes and lavandulas. But lavandulas are used a lot in England and are for that reason like a symbol of that country. That is why I chose to study this production, one of the most important at Palmstead Nursery Limited.



Photo 8 : Lavandulas for sale at Palmstead (Alice Denis)

In the company, the beginning of the lavender's cycle of life takes place in the propagation department with the production of a lot of cuttings. The necessary material can be taken from plants in production for sale (taking of samples) or in plants in stock field. But this plant is demanding for the temperature, in truth the rooting is not good when it is too hot. That is why most of lavender's cuttings are made in April and May, not later in the summer. But if the culture can be well followed, it is possible to make cuttings from January. The cuttings are kept between 2 to 4 weeks in the fog, where the environment is very humid and favorable for them.

Then the rooted lavandulas can go into beds (other part of

the propagation department) where they are monitored and maintained. They are watered, weeded, and sheared to produce bushy plants, and they can grow in good environmental conditions.



[Photo 9](#) : the transplanting machine (Alice Denis)

Ten months to one year later the creation of the cutting, the young lavandulas are transplanted in 2 Liters pots and moved into the glasshouse. They are watered, weeded and sheared again to become saleable. Most of them are sold within a year, because when they are more than one year old, they already have a good shape and size. But a few are kept for one more year before being sold. They are transplanted in 5 litre pots, and can increase in value.

The customers that really request lavandulas at Palmstead are landscapers, other nurseries and some individuals. A lot of different cultivars are available as lavandulas are one of the best sellers: 'Helmsdale', angustifolia, angustifolia 'Alba', angustifolia 'Hidcote', angustifolia 'Munstead', angustifolia 'Rosea', angustifolia 'Twickle Purple'/'Royal Purple', x intermedia 'Grosso', stoechas 'Madrid White' and stoechas ssp. Pedunculata. (You can find their prices in the website of the nursery or in their wholesale plant catalogue.).

Lavandulas are not prone to diseases or pests too much. But nurserymen have to be careful with Botrytis and Mildew. Some fungicides can be used, but the most important is to control the humidity and the air flow. An experiment made by HDC explained some important points to fight against grey mould (Botrytis). (HDC Factsheet, November 2002) Those points are to reduce the sources of infection, to maintain a healthy plant, to be careful in good ventilation and irrigation, plus to apply fungicides if necessary (alternating fungicides of different chemical groups to prevent resistance). The watering is automatic and is assisted by computer. It is in fact possible to choose the humidity necessary to the plant. Thanks to some sensors the environment is known (humidity, temperature...) and the computer can ask the optimal watering.

[Photo 10](#) : A lavandula bed in the glasshouse (Alice Denis)



Some important things need to be controlled. The pH has to stay between 5 and 6, indeed if it is too low the plants become yellow, and sick. The magnesium rate had to be checked too.

IV°) The Biological Control in the company:



Photo 11 : The glasshouse under biological control (Alice Denis)

One year ago, the company decided to try biological control to protect plants in the nursery. In fact, the environment protection and employees safety is an important question nowadays. I am really interested in that problem because I would like to work in the plant's protection field and in the environment, so I decided to go into details on this subject.

I will try to understand why they chose to use biological control, how they proceed and what are the advantages and disadvantages of that method.

Pesticides are expensive and not always adapted to treat everything. In addition a lot of them are likely to be withdrawn if they are not already. That is why biological control could be an alternative to fight against some pests or diseases. But this method cannot be used on its own, because the area must not be over infested to be efficient. Nevertheless it is a very good tool to keep the nursery clean of pests in a long term, using it regularly. Sometimes, in the case of infestation, a chemical method can be used to reduce pests before using biological control. A lot of discoveries are made in that field at the moment and are a hope for the future.

At Palmstead, the main treatments are for aphids, spider mites, thrips...but it depends on the pests which are damaging at that moment. Employees should look after plants carefully to notice the damages and pests present. So, they can fill in a form which explains the damages, in the direction of applying the adequate treatment. Special pests, like aphids, thrips and spider mites are treated almost each week to prevent an increase of their number. The treatments are bought at Certis BCP, which offers protection solutions to growers (in Europe and Japan). This company provides pest management advice, all key beneficial and bees, also soft pesticides. Certis BCP also explains when to release insects into the crop and at what rate, how to recognize when control is established and what steps to take when it is not. BCP Certis Mission Statement is "To be a leading provider of reliable and profitable integrated pest control to the specialty crop sector". (Certis BCP website)

The examples of the treatments employed during my training period at Palmstead nurseries:

Thrips: A lot of Thrips species exist but they are no all damaging for crops. The most common species found on protected crops are Thrips tabaci (onion thrips) and more recently Frankliniella occidentalis (western flower thrips or W.F.T.). The protection used is AMBSURE (Amblyseius cucumeris in units of 25,00 in vermiculite sprinkler pack).

Photo 12 : A thrip (Certis BCP)



The problem with *Amblyseius cucumeris* is that it can only feed on young thrips and does not survive very well on plants. That is why frequent introductions are necessary, once a week in our case. But this predatory mite is also able to eat immature stages spider mites and pollen, as for thrips

Spider mites: There are the most damaging pests for horticultural crops, especially because they reproduced quickly and can make resistance to chemicals more easily.



[Photo 13](#) : Spider mites (Certis BCP)

The biological control used for those pests is PHYTOSURE (*Phytoseiulus persimilis* in units of 2,000)

Phytoseiulus persimilis is a predatory mite, it feeds only on spider mites and is capable of devouring large numbers. *Phytoseiulus* adults are orange or red, with a shiny appearance. They are very vigorous and produce long eggs. But those beneficial need to be put on each spider mites colony because they do not move to find them. They are particularly efficient at high temperatures for the reason that they multiplied more than spider mites in those conditions.

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[Photo 14](#) : A plant damaged by spider mites at Palmstead, its colour is yellow (Alice Denis)

Aphids: Aphids are small insects, their color can be different (various species). With their alarming rate of reproduction and increasing resistance to pesticides, they are becoming a much more serious threat to greenhouse crops. All aphids feed by inserting their stylets into the conducting vessels of the plant and feeding on plant sap, which damage it.



[Photo 15](#) : Aphids (Certis BCP)

Two biological products are used in the nursery, and are APHISURE (*Aphidius colemani* in units of 500) and APHIDOSURE (*Aphidoletes aphidimyza* in units of 1000).

Female *Aphidius* can lay their eggs on aphids; they are small, black, parasitic wasps between 2-4mm long. Once an egg is laid the wasp larva feeds internally on the live host. The aphid continues to feed and develop until the parasite is mature when the aphid dies and an adult parasite emerges by cutting a hole in the aphid's skin. *Aphidius colemani* is effective against small aphids such as *Myzus persicae* and *Aphis gossypii*.

[Photo 15](#) : A *Chaenomeles* infested by aphids at Palmstead (Alice Denis)



The Aphidoletes aphidimyza adults lay their eggs on aphid's colony. Two or three days later, the larvae born and need food: aphids. The larvae inject a poison into the aphid to paralyze it and dissolve the body contents.

A project is being made by HDC from one year to find others solutions to kill aphids. (HNS 162, 2007) In fact, those pests usually live in the underside of leaves so are difficult to target and the contact insecticide is not efficient in the aphid's waxiness. Investigators said that "beech aphids overwinter as the egg on young beech shoots and it may be possible to target these eggs using 'winter washes'." The results will soon be known, and maybe permit a new fighting against aphids. (HDC website)

Slugs: As snails, they damaged especially young leaves and shoots, causing irregular holes. They are able to eat seeds, leaves, stems as well as flowers and roots. Those damages are directly visible on crop, producing losses and downgrading. The biological control proposed by Certis crop is NEMASLUG® Phasmarhabditis hermaphrodita (in units of 12 million, 30 million or 250 million).



Photo 16 : A slug
(Certis BCP)

Nemaslug® can be used after water addition, and sprayed everywhere. This solution contains the mollusk parasite nematode Phasmarhabditis hermaphrodita. Nematodes can penetrate the slugs by their dorsal pore (they breath thanks to that hole in the mantle) and invade those pests. They reproduce in the body, even when the slug body is dying, then they can penetrate others victims. It is better to apply this product in the evening when the temperature is not too high because nematodes suffer desiccation. This biological control is not dangerous for employees or the environment.

A research has been made in 2001 by HDC in order to find a integrated control strategy for slugs and snails. Thanks to that, "benefit to growers will be reduced plant losses, improved plant quality and marketability, and a sustainable control strategy which will satisfy increasing customer demands for ornamentals grown with minimal use of pesticides".(HDC News, October 2001). During this research they used Nemaslug® as biological control and different chemical controls. "These results indicate that 'Nemaslug' may be more affective in killing *O.pfeifferi* than chemical molluscicides [...]". (HDC website)

The disadvantages are that biological control cannot really be used outside because of the movements of air, pests...only the chemical approach seems to be efficient for the moment. The biological control can barely be employ in addition of chemicals. And the costs are not lower with this type of approach, even a bit more expensive.

However a lot of good things are coming with biological control. The safety of the employees is better thanks to the reduction of chemicals. The environment is also superior; it is visible with the apparition of a lot of animals in the nursery like lizards, toads, birds, newts, caterpillars, ladybirds...And this is a good thing to create the ecosystem, because those animals can help to reduce the development of pests forming a continued alimentary chain. This method is a long term one because it permits the level of pests to remain at an acceptable level, without destroying the balance of others things. And it is well commenting that a lot of

research is made in that field, which is very good for the future of the biological control. It is visible in the HDC website where the English researches in horticulture are listed. Palmstead nursery pays every year to that organism to improve the knowledge in plants.

For the moments the results in that nursery are conclusive because any big problem is reported and the plants are in good health. And if problems appeared a team of Certis BCP can come to do some tests and attempt to find solution with Palmstead's staff.

Conclusion:

Palmstead nurseries limited is large and very well managed, that is why it was really interesting to go there and try to understand how it works as a whole. The example of Lavandulas permitted me to appreciate entire life of one plant on this nursery. Besides, the work I did was interesting because I could learn a lot about plants during that training period. And what I especially liked was to learn more about biological control, because of my eco friendly fillings.

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