

## The Synergistic Garden By Emilia Hazelip

Translated from French by Linda Hull

### Part 1 Of 3

Emilia Hazelip, who introduced the concept of permaculture to France over a decade ago, is constantly evolving her work and has been developing a food growing method which she calls 'Synergistic Agriculture'. Emilia Hazelip's work is strongly influenced by Masanobu Fukuoka's system of 'natural agriculture', by permaculture and Marc Bonfils's agronomical research, as well as by her own experimental work growing food crops with minimal inputs in the south of France and in other Mediterranean countries.

The first surprise when you enter Emilia's kitchen garden is seeing vegetables growing in a quite disorderly fashion on oblong mounds of earth 1.2 meters (5ft) wide by 8 meters (26ft) long. The rule is to make space for the feet and space for the plants, because putting feet where plants are to grow leads to soil compaction and where there is no air in the soil nothing will grow. The cultivated areas are well demarcated, their elevated form giving a notable increase in surface area for production.

Moreover, they are all covered with mulch - covering the soil to preserve the organic material, preventing erosion and compaction by rain, diminishing evaporation in summer and maintaining a soil microclimate which reduces the adverse effects of temperature extremes. Protecting the soil in this way removes the need to aerate it each year. Emilia claims that there is no need to fertilize the soil because it is left to maintain itself: 'soil autofertility'. Instead of pulling out all the plants and leaving the ground bare over winter to suffer the effects of erosion, some plants and all roots are left in the soil, their decomposition assuring a continuous reserve of organic matter in the soil.

This also has other benefits. Leeks, for example, are cut down to the white part, then left two to three weeks to produce a second crop. Afterwards roots are left in the soil where they regenerate making seed for the following year.

In this experimental garden, the gourd is neighbor to the tomato seedling which itself is found beside beans or peppers. Because thought is given to companion planting and guilds, diversity helps plants to defend themselves better against diseases and pests. This combination of plants also supports the soil's autofertility.

You can see, here and there, flowers and weeds, or rather what are called here 'spontaneous plants'. You don't pull these out (not all, anyway) because, being indigenous, they attract insects and other organisms in the soil which are beneficial. For all these reasons, it is better to combine the greatest diversity of plants, even those which we think of as useless.

Emilia says it's necessary to allow a certain number of pests (or so-called pests) to live in the garden because they sometimes work as the gardener's helpers. If, for example, you eradicate the colonies of greenfly, the ladybirds which feed on them will no longer come and will not be there to regulate the greenfly population or to fight off the next new invasion of insects.

However, the problem of slugs is still not resolved. The ducks, which have a small pond in the middle of the garden, turned out to be inefficient (they're asleep when the slugs are in full swing!). Emilia is looking for other predators to intervene in the biological struggle. She's going to reintroduce the hedgehog and, with the co-operation of a local agricultural researcher, experiment with the efficiency of the scarab, a small beetle which is a natural predator of the slug.

Finally a synergistic garden is an ecosystem that is consciously designed to allow all the dynamic life forms present in a wild soil to remain present while still growing crops (on whatever scale). It is that simple. But that's not the view commonly held in the sphere of science or in the politics of agribusiness which rule France. Emilia exclaims passionately: "The living world is not understood by the technician, and since it is not understood, it is not studied for its diversity. People always want to apply mechanical laws to it..."

## The Synergistic Garden Part 2 Of 3

We have inherited an agriculture which has always disturbed the soil in order to prepare the next crop. The ancient agriculture of the Incas, the Mayas and the Orient also prepared the fields in such a way. Culturally, this activity has been honored and sung by poets. Ecologically, pedologically, it is a catastrophe. A natural, non-traumatized soil presents a subtle balance of thousands of diverse specific organisms. From friendly bacteria to fungi, the presence of all these invisible subtle lives allows complex interactions - the 'Synergistic Effect'. Among the dynamic processes in the soil, I think that the ethylene-oxygen cycle is a good example of this wondrous world.

How can we give back to the soil something to compensate, and return it to natural uncultivated health? We cannot recreate that quality while we keep on destabilizing the rhizosphere. The only way is to learn a type of agriculture that will reconcile the maintenance of soil 'wildness' and the production of crops. This has been my endeavor for over 20 years. I call the system I have evolved 'Synergistic Agriculture', utilizing the self-fertility of the wild soil as fertilizer. This agriculture can be practiced on any scale and all the machinery used in the U.S.A. and Canada for no-till agriculture can be used for Synergistic Agriculture.

### THE BACKGROUND

The foundation of my research is the work of Masanobu Fukuoka, whose book *The One Straw Revolution* changed my life in 1977 when it was published in English. In Fukuoka's natural agriculture no machines are used, nor greenhouses, nor all those things we normally have to do when working in a difficult climate. To me what seemed most important was to be able to obtain crops without 'exploiting' the soil, even if a compromise is made regarding machines.

Before encountering Fukuoka's work, I had been working near Chadwick, in Santa Cruz, California in the late '60s. Following the reading (also in the '60s) of Ruth Stout's books *Gardening Without Work* and *How to Have a Green Thumb Without an Aching Back*, I began covering beds with a variety of materials. Since then I have made raised beds in all my gardens, although the difference in volume came only from the soil taken off the path and put on the bed... no double-digging at all.

In 1985, during the first permaculture design course with Sejo Jackson in the Pyrenees, Marc Bonfils gave a presentation on self-fertile cereal production. Since then Marc has been teaching about the agronomical reasons behind this new method of agriculture. Nowadays, microbiologists like Alan Smith and Elaine Ingham are also providing much needed evidence of the well found need to stop altering the soil's stability and stressing it to exhaustion by plowing. I cannot call this agriculture 'do-nothing' agriculture since, on the contrary, there is much to do to establish a succession of cultures where what you are leaving behind is as important as what you are harvesting. A detailed plan indicating the plant mixtures and successions, paying attention to the kind of root residue the soil is receiving combined constantly with nitrogen-fixing plants of the legumes variety, is a must.

### SOIL AND PLANT SYNERGY

Although to start the system the soil can be dug over thoroughly, once we start the garden we must be sure not to disturb the soil deeper than the sowing depth, and only then where it is sown. What consumes organic matter in the soil is the chemical reaction that follows when atmospheric gases are put in intimate contact with the soil while plowing. Although by mineralizing humus, a quick instant fertilizer has been produced, the price you pay for this is much too high. Plants' growth and health also depend on other substances like ethylene gas which enhances the assimilation of iron. Plants will be healthy if all the digestive flora in the soil are present. Soil and plants are a single organism.

Plants are the 'antenna' of the soil, capturing light and creating solid, organic, vegetable matter from the space above, since 95% of needed nutrients come from gases and light. In other words, the plant is only taking 2 1/2% of its needs from the soil in the form of minerals and trace elements. The

remaining 2 1/2% of nutrients is nitrogen, which can be obtained in a symbiotic way by combining with nitrogen-fixing plants, mainly from the legumes family, like beans, chickpeas, favabeans, lentils and peas.

Harvesting is as important as the rest of the process. The soil is a living mass of interacting beings, and they all eat just like everything alive on this planet. Their foodchains are a wonder of intricate relationships covering the mineral, the vegetal, and the animal/insect/bacteria worlds. When we disturb the soil by plowing it, despite our best intentions we are creating stress in it. The moment we stop doing this we can organize our garden or farm in such a way that the soil functions as if 'in the wild'. A maximum of what has grown in it is left either by its roots (for an above the ground crop) or by following a rootcrop by another crop which will leave generous amounts of roots in the soil, such as Swiss chard.

These residues, together with a biodegradable mulch, amount to surface composting, leaving more organic matter in the soil than the crop has removed. From the moment we stop mineralizing the humus, litter accumulates on the soil as well as in a myriad of microsites within it, hosting happy bacteria cycling between ethylene and oxygen, releasing biological gas essential to the wellbeing of all types of roots. The less we disturb the soil, the more diversity and intensity of interactions will take place in its mass, so the healthier the plants and the fewer problems there will be for us. It is time for us to acknowledge that the soil needs to be itself while we produce our crops. We must respect this organism enough to let it function in its natural way although 'domesticated' by our technical care.

The organisms in the soil are like the bloodstream of the human body which carries nutrients and participates in the assimilation of the minerals that are present. Above the ground leaves act like photovoltaic cells, capturing light and producing energy. The only bridge doing this fantastic job is plants; it has always struck me as odd, that, although in the wild, plants are the first link in the food chains and are responsible for the creation of 'soil', in agriculture, on the other hand, they are accused of destroying the soil. Typical of *Homo occidentalis*, the crops have been made a scapegoat for the negative effects of plowing!

The soil should never be opened up and forced, not even with the best made compost ever. Leave only to the soil what is grown in it. As for the rest put it above the soil, as mulch. And let all the soil occupants absorb it into its mass. I truly believe that as long as we have not found peace with the soil, we won't find peace above the ground. That as long as we justify the exploitation of an organism, other exploitations will follow and we will remain parasites, consuming more than participating and spiralling into entropy until we commit mass suicide.

## The Synergistic Garden Part 3 Of 3

### The Four Principles Of Synergistic Agriculture

1. Keep the soil undisturbed and uncompacted.
2. Use the soil's self-fertility as fertilizer.
3. Integrate the litter zone with the agricultural soil profile.
4. Establish a partnership with beneficials to protect crops.

Raised beds are only needed where crops are harvested continually. For areas where produce is harvested once only, a good layer of mulch will be enough to protect the soil from compaction. The following examples apply to raised beds in regions with a temperate climate, where nighttime temperatures in the winter do not fall below -10 degrees C. For gardens in more extreme latitudes, or at high altitudes, a quite different strategy is needed. Equally for climates that are frost-free in winter an alternative planting and cropping succession plan will apply.

In my experience the positive or negative results that I have had with sowing dates have happened as a result of studying the development of plants throughout the season, in relation to weather etc. (I've long since given up following the lunar/cosmic calendar, there being insufficient evidence of results to justify the time and complication of applying it.) Perhaps certain influences come from our attitude rather than from further afield... and besides a happy, self-fertile soil does influence germination and the growth of plants.

Let's look then at how to handle production for a three-year cycle (which can be repeated indefinitely) on three different raised beds.

### RAISED BED 1

YEAR 1, April - Sow root vegetables in lines, planted 25-30 centimeters apart, of carrots and/or beets, as well as turnips on the flat top of the raised bed. When sowing small seeds, push back the mulch in the line to be sown, and without 'working the soil', simply make an indentation the same length as the line, put your seeds in as you normally do and sprinkle some soil on top. Then put some pressure on the soil so that it adheres to the seed. If the seeds are small do not replace the mulch, but do keep the area moist. This crop can be combined with any type of sweet garden pea, which can be sown either in pockets or across the narrow bed every 2-3 meters.

On the sides of the raised bed plant in a zig-zag pattern; try onion sets or seedlings interspersed with any type of lettuce or salad chicory. Keep the sides permanently planted with cut and come again salads, planting new seedlings next to the plants that are going to seed. When the onions are harvested, use the same zone for new onion varieties, or for garlic or leeks.

Over a period of time you should try to plant 'salads' where the onions were, and put the liliaceous varieties where the salads were. The sides of all raised beds should be treated similarly except where you want to grow perennial chives or other perennial or self-seeding members of the same family. Be sure to sow flowers too in all your beds: calendula (predominantly the orange variety), as well as all types of French marigolds and nasturtiums, paying attention to their growth pattern. Each bed should have at least one of each of these plants as beneficial companions to the crops. Plant them on the flat top of the raised bed, but don't let them take up too much space.

YEAR 1, July - As you harvest the root crop, sow mustard greens in the same spaces. As the sweet garden peas are cut and left as mulch, sow pockets of beans at random.

YEAR 1, September - October - Sow winter varieties of spinach as the mustard greens are harvested.

YEAR 1, November - Sow broad beans or sweet garden peas among the spinach.

YEAR 2 , March - April - Plant lines of Swiss chard plants among the broad beans. Sow legumes now if you didn't plant them last autumn (or if they didn't survive the winter).

YEAR 2, June - August - Before harvesting the legumes, sow beans between the Swiss chard; continue putting in beans throughout the summer.

YEAR 2, November - Sow broad beans or sweet garden peas (different varieties than last year), parallel with the lines of chard.

YEAR 3 , March - April - Continue harvesting the Swiss chard until it begins to go to flower. As soon as this happens cut most of the plants back as low as possible. Depending on the size of the bed and how many plants you have, choose at least two, but not more than four, to stake and let go to seed. (Space doesn't allow for details of selecting which plants to choose for seed production). Planting parallel to the spent Swiss chard roots, begin a further root vegetable sowing following the Year 1 pattern; when choosing succession plants bear in mind the crop rotation, and try to avoid having two plants of the same family following each other.

## RAISED BED 2

YEAR 1, March - April - Sow small peas in pockets, at 50-60 centimeters distance.

YEAR 1, May - In the center of: the bed plant tomatoes in two zig-zag lines. In front of the tomatoes sow basil and coriander.

YEAR 1, June - Sow beans among the tomatoes all through the summer.

YEAR1, November - Sow broad beans in between the dying/dead plants that have been cut and left as mulch.

YEAR 2, March - April - Tomato plants like growing on soil where tomatoes have been grown before, so no rotation strategy is needed - so repeat the Year I pattern although it's worth moving the plants round so that roots are distributed through all the soil (put the coriander where you had the basil and vice versa).

YEAR 2Autumn - For winter legumes alternate each year between sweet garden peas and broad beans.

YEAR 3, Spring - Repeat Year 1 or follow the pattern in raised bed 3 if you prefer to integrate a rotation pattern.

## RAISED BED 3

YEAR 1, March - April - Sow small peas.

YEAR 1, May - Plant (or sow) two rows of any type of squash in a wide zig-zag line towards the center of the bed, together with some sweet corn.

YEAR 1, June - Begin sowing your beans.

YEAR 1, August - In the spaces between the squash leaves, plant Chinese cabbage, broccoli or Brussels sprouts (the squash leaves providing shade to protect the transplanted seedlings).

YEAR 1, November - Sow broad beans or sweet garden peas in between the cabbages.

YEAR 2 Spring - As harvesting progresses (always ensuring that you cut the plants and leave the roots undisturbed in the soil), you can sow spinach, mustard greens and/or borage and New Zealand spinach.

YEAR 2, Summer - Sow beans among the other plants.

YEAR 2, Autumn - Broad beans or sweet garden peas.

YEAR 3, Spring - Year 1 can be repeated or alternate with raised bed 2 (or another one).

## WATERING

Install a drip irrigation hose (a simple narrow hose with perforations every 25-30 centimeters works fine and shouldn't suffer from chalk build-up). 2 hoses per bed is the optimum, placed in parallel about 10 centimeters from the edges of the flat top of the raised bed.

## SUPPORTS

If you want to set up a system of supports which can be left permanently in place in the garden and which will not be damaged however strong the wind, try 6 meter long building rods (10 or 12 centimeter gauge) forming an arch across the beds. Attach a strong wire from the apex of each crossed arch to the next and these will form good supports for winter climbing peas as well as summer beans. Be sure to use biodegradable string for attaching plants to the supports, so that at the end of the season you can simply undo the knots from the support and let string and plants mulch together on the bed. Cucumbers, melons and many squashes can be encouraged to climb in this way, thus freeing up a lot of space at ground level.

## REMEMBER

Gardening the self-fertility way produces a rich harvest: the more plants which live and die in the soil the richer and more fertile it becomes.

## Further Readings

Masanobu Fukuoka, *The One-Straw Revolution*. 1978. Rodale.

*The Natural Way of Farming*. 1985. Japan Publications

*The Road Back to Nature*. 1987. Japan Publications.

Ruth Stout. *Gardening Without Work*. 1961. Devin-Adair.

*How to Have a Green Thumb Without an Aching Back*. 1968. Exposition Press.

*The Ruth Stout No-Work Garden Book*. 1971. Rodale Press.

Alan Smith. "Secrets of the Living Soil." 1981. *Permaculture International Journal* #1  
(or again in PIJ #39).

Lea Harrison. "Soil Fertility." *Permaculture Activist* #26.

Elaine Ingham. "Life in the Soil: Understanding the Soil Foodweb." Jan. 1997, *Aeres*, U.S.A.

B. Mollison & D. Holmgren. *Permaculture One*. 1981. Tagari.

Marc Bonfils. *LeSol et l'Erosion*. 1985. Las Encantadas.

Emilia Hazelip (1938 - 2003)

### **The Synergistic Garden Video Tape By Emilia Hazelip**

This is an excellent educational video on no-till synergistic gardening that describes the step-by-step processes developed by Emilia Hazelip to create an ecological agriculture.

She became interested in Fukuoka's work in 1977 and this video shows the cultural and climatological adaptations she has developed in the course of years of research.

Available in Spanish, French, Italian & English in many formats.

