

2. Peppering for Pest Control

Rudolf Steiner first proposed “Peppering” (so-called as the final ash resembles pepper) as a method of pest control, in the 1920's. Rudolf Steiner was the founder of the Biodynamic agricultural movement that had its beginnings in Europe. In 1924 Rudolf Steiner was invited to present a series of eight lectures on various agricultural topics. The concept of peppering animal, insect and weed pests was introduced during the sixth lecture.

Lecture six, presented on June 14, 1924 (Steiner, 1993) covered animal, insect and plant pests, and plant diseases, along with a brief description of the spiritual-scientific ideas that relate to these. The lecture was not given as a definitive answer for pest control but more as a guideline for future experimentation. Steiner presented a series of examples, along with practical advice to convey his ideas and principles behind peppering. Steiner believed peppering was totally species specific and will only affect the plant, insect, or animal used to make the pepper, e.g. a pepper made from mice will not affect other rodents; likewise a pepper made from nodding thistle will not disrupt the germination of Scotch thistle seed.

Steiner (1993) asserted plants grow with the influence of cosmic forces arising from the stars, and moving through the planetary spheres and the Earth's Moon before being absorbed by the Earth. These forces work onto plants from above, on their way in, as well as from the Earth, as they work back through the plants. The Moon, or lunar forces are especially influential on the watery growth of plants. The Moon is not only reflecting the Sun's energy and light down to the Earth, but also the entire cosmic forces that come to it (Steiner, 1993). These forces are absorbed by the plants and aid in the development of reproductive plant processes, eg. starting with cell division and tissue formation and finally showing in the fertility of seeds (Steiner, 1993).

Steiner (1993) suggested taking some of the seeds of the plants we desire to eradicate, and burning them in a simple wood fire. The burning, Steiner implied, inverts the fertility present in the seeds; once burnt the ash is collected. Steiner (1993) goes on to say that this ash contains the opposite force to what developed in the seeds with the aid of the lunar forces, so reverses the effects of the Moon by preventing the treated earth from absorbing these forces. When this ash is spread

over the desired area, its influence is to disrupt the germination of seeds of the plant species burnt (Steiner, 1993). Total cover of the area with the pepper ash is not necessary; Steiner believed there is a substantial radiating effect from a well-made pepper. The cosmic influences have a four-year cycle, i.e. It can take up to four-years for the influence to be totally effective; so while the effect should be noticeable in the second year, by the fourth year there should no longer be any of the weed present in the treated area (Steiner, 1993; Kolisko, 1939).

Steiner (1993, p 125) in lecture six states:

“It is important to develop a relationship to the Earth where we know – on the one hand – that it is right that the Earth is enabled by the lunar and watery influences to bring forth plants. On the other hand, however, what is in the plant, what is in every living thing, also carries in itself the germ for its own destruction. Just as water is indispensable for fertility, so is fire a destroyer of fertility. Fire consumes fertility. Therefore, if something that is ordinarily treated with water in order to promote fertility is instead treated with fire, then within the household of nature you bring about the opposite – namely destruction. Under the influence of Moon-saturated water, a seed develops fertility and proliferates: under the influence of Moon-saturated fire – or fire saturated with any other cosmic force – the same seed spreads a force of destruction”.

With plants, Steiner (1993) stipulates that the effect of the lunar forces alone are sufficient in the plant kingdom to push the growth process, such as cell division, into a reproductive phase, but in the animal kingdom a greater emphasis needs to be placed on the effects of the planets, and the zodiac – ‘animal circle’. Steiner (1993) goes on to state, that when peppering animal pests, only the skin of the animal is required, as the Moon forces are understood to help form the reproductive organs before ending in the formation of the skin. The size of area being treated will determine the amount of ash (pepper) required, while a small area i.e. a 1-hectare block may only require one animal skin, while a 10-hectare block may require five or more, depending on the size of the animal being peppered (Steiner, 1993).

Steiner (1993) stated that the effects of the Moon need to be supported by Venus for successful reproduction in animals. For this reason, when making an animal pepper eg. mice; for the best results the animal skin, along with testes of males (Pearce, 1993), should be obtained and burnt in the period when Venus is in the constellation

of Scorpio (Scorpio is chosen as it is the constellation that rules the reproductive ability (Atkinson, pers. comm.; Pearce, 1993)). The ash obtained through the burning process at this time will contain the negative force of the animal's reproductive force, and will disrupt the Moon's fertility influence of the treated animal pest, so discouraging it from staying or breeding in the area (Steiner, 1993). Once this ash is spread over the desired area the pest usually vacates the area within a few weeks, in some cases only days (Atkinson, pers. comm.). Anecdotal evidence by Kemp (2003), and other members of the Biodynamic association has suggested that peppering animal pests is one of the quickest, and most successful long-term approaches to controlling animal pests (Appendix B, pg 91). Insects and weed peppers can take considerably longer to be effective, as previously stated.

Garuda Biodynamics has adopted a homeopathic method to produce their pepper preparations. The insects for the FRW and scale pepper solutions Garuda Biodynamics provided for this trial were all collected from the local area. The peppers were prepared according to Steiner's astrological guidelines, within the 12-months prior to the commencement of the trial.

2.1 Importance of the zodiac constellations in relation to the 'twelve groups of animals'

Peppering insects requires a different approach to that of the higher animals, as insects are considered to be 'lower' animals, and so are subject to a totally different range of cosmic influences. Eugen Kolisko published a paper in 1936 titled '*The twelve groups of animals*', in which he has associated a different group of animals to each zodiac constellation (Figure 1).

Kolisko (1936) divided these groups in two. The first seven phyla embrace the totality of the invertebrate sub-kingdom – animals with no true skeleton and soft bodies. The five remaining phyla are members of the vertebrate sub-kingdom – animals with true skeletons. As you proceed anticlockwise around the circle the organ development of the groups becomes more differentiated. Each of the major organs has an associated planet; therefore the more organ differentiation present in the group the more planetary influence has taken place (Kolisko, 1936) and so more notice of the planets needs to be considered when working with the higher animals than with the lower animals (Atkinson, pers. comm.).

THE TWELVE GROUPS OF ANIMALS

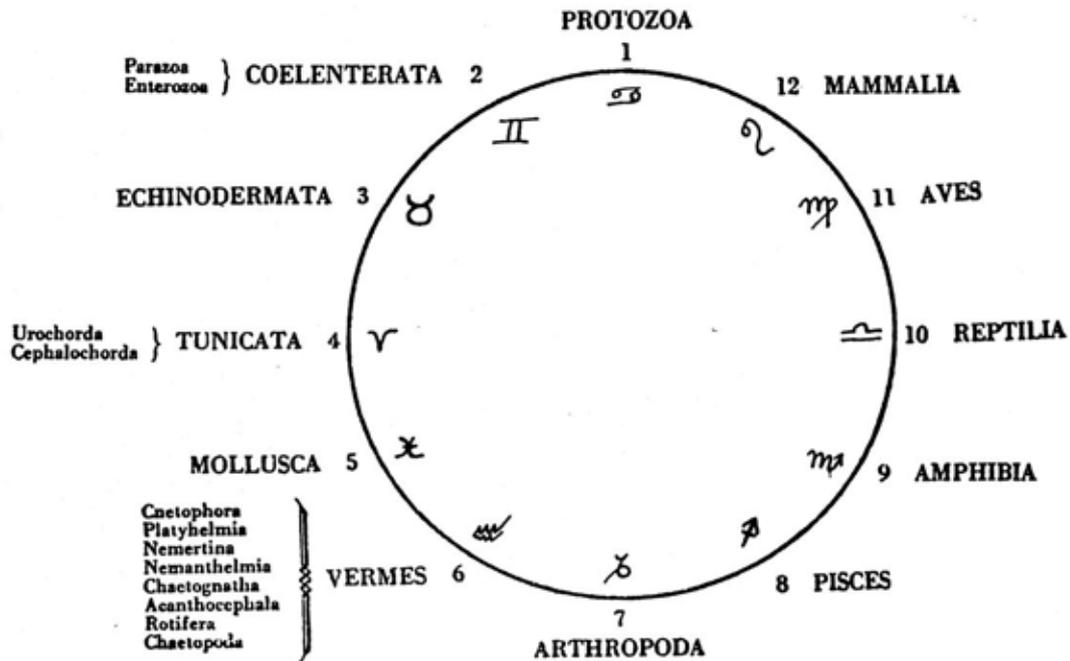


Figure 1: The twelve groups of animals by Kolisko (1936)

Since insects have little organ differentiation, when peppering insects the influence of the constellation is more important than that of a planet. With mammals, eg. mice, there is a far greater differentiation and development of internal organs to that of insects, so in these instances the planets have the greater influence (Atkinson, pers. comm.). With insects it is imperative that the whole insect is burnt, but for optimum results the burning process needs to be carried out when the Sun is in Taurus (Steiner, 1993). For this reason it may be necessary to dry and store the insect pests until the time is right. Steiner (1993) said that the forces that develop as the Sun moves through the zodiac houses of Aquarius, Pisces, Aries, [Taurus], Gemini and Cancer affect the whole insect world, Taurus to the greatest extent and Aquarius and Cancer to lesser extents.

Once this ash is spread over the designated area, the Moon's influence is reversed, thus discouraging the insect from reproducing within this area (Steiner, 1993). The insect pepper is usually applied several times each season to ensure control, but fewer applications appear to be required in subsequent years (Atkinson, pers. comm.).

2.2 Dr Lievegoed's theory of the cosmic influences on all species

Some of Dr. Steiner's own agricultural work was based on earlier work conducted by Goethe (mid 1800's). Goethe's concept suggests life manifests on Earth, due to a harmonic resonance being established on Earth, from the constant interplay of forces emanating from the Fixed Stars. These forces from the stars are mediated by, and altered as they pass through the planetary spheres of our Solar System (Lievegoed, 1950). All the planets, and the asteroid belt radiate their respective energy fields not only along their orbit paths, but also as a complete envelope as shown in the schematic drawing in Figure 2 (Atkinson, 2002). It is not so much the planetary body itself, but the whole sphere of electro magnetic activity that the planet exists in that is influential (Atkinson, pers. comm.). Astronomy has shown that each star force has its own unique resonant signature. It is this signature that is characterised as an archetypal imprint that eventually manifests as the individual plant, insect or animal species (Atkinson, pers. comm.).

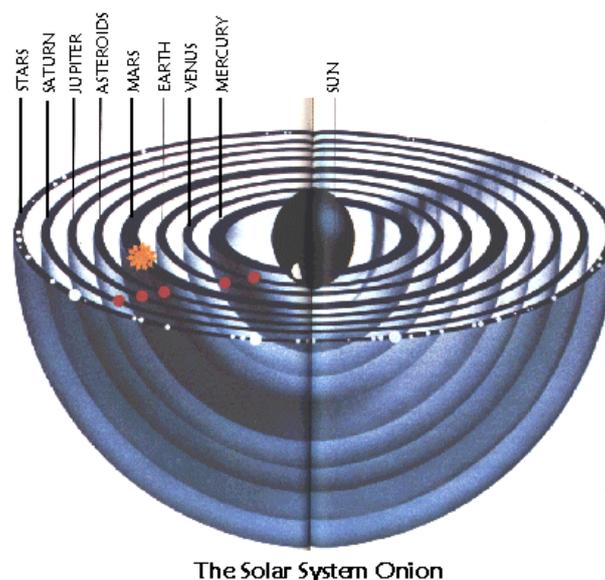


Figure 2: The solar system onion. (Atkinson, 2002).

It was Lievegoed (1950) who extrapolated Goethe's original work to make it easier to understand. In Goethe's 'Being' and 'Manifestation' diagram (Figure 3) he described the formation of manifest life forms as a two-stage process. A 'primary' building up of potential, he called 'Being', followed by a 'secondary' process where this potential comes into 'Manifestation'. This two-stage process occurs regardless of whether the entity is an animal, insect or plant.

The 'Primary planetary processes' (Fig 3), are built up as the cosmic forces emanating with a constant force/electromagnetic pulse, from the stars in the other galaxies, move towards the Earth, through the planetary spheres. Saturn initially mediates these star forces (Atkinson, pers. comm.). Saturn focuses these forces' direction and strength to incarnate the 'Archetype' (Lievegoed, 1950), or core intention of the species. Each species (plant, animal, insect etc) has its own associated star 'Archetype' force (electromagnetic resonance), eg. the archetype force that makes a rose a rose is different to the archetype force that makes a Fuller's rose weevil a Fuller's rose weevil (Atkinson, pers. comm.).

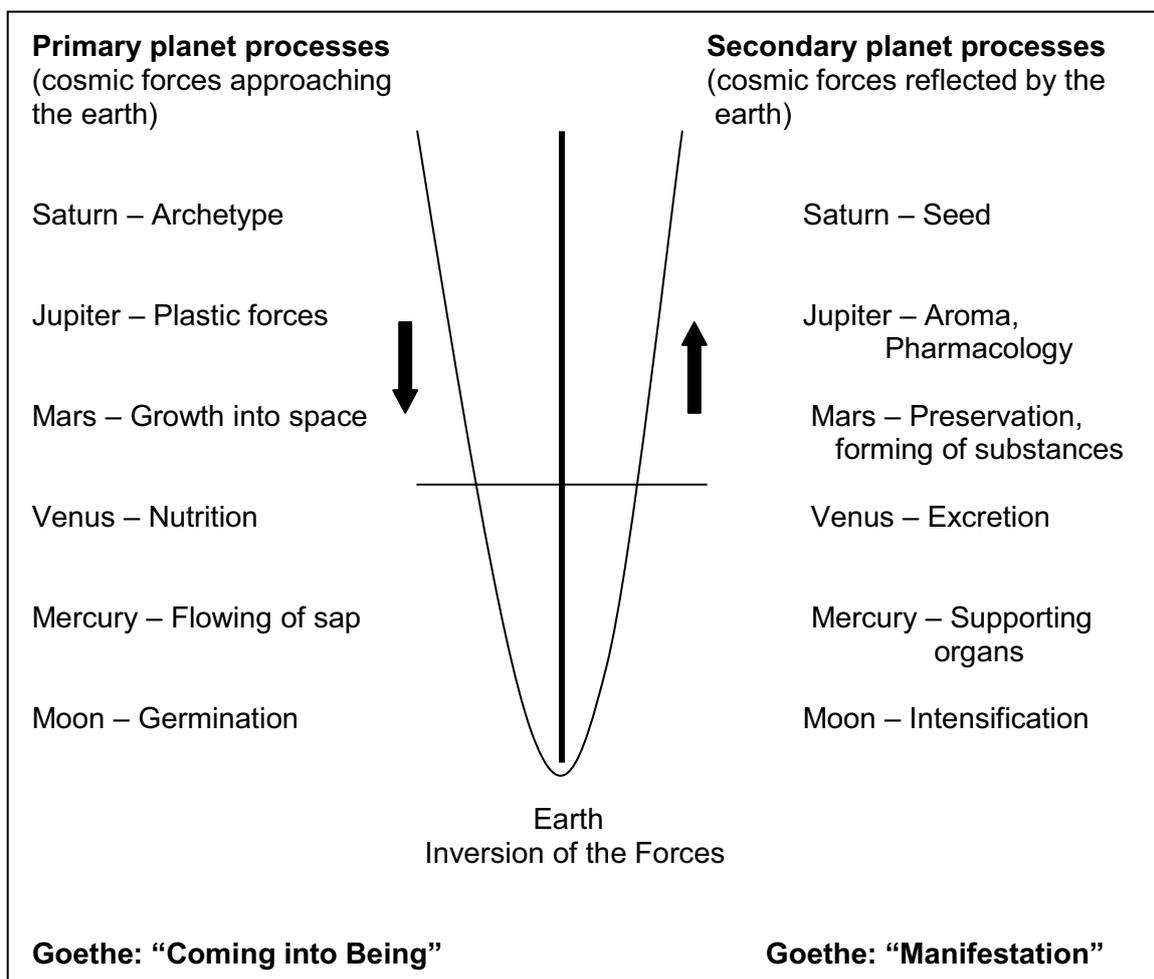


Figure 3: Goethe's 'Being' and Manifestation' model showing the primary and secondary processes associated with each planet (Lievegoed, 1950).

Saturn focuses the building blocks to start the process of 'the desire for life'. This basic impulse holds true throughout the subsequent stages until it reaches fruition in reproduction. While the Saturn activity holds the plant on track "to be a rose" it also shows strongly in animals in their skeletal structure, while in the plants this archetypal

force works through the silica processes, providing the plants structure and physical support (Atkinson, pers. comm.).

The forces that are influenced by Saturn are then passed on to Jupiter, here they are moulded and softened. Jupiter's process gives rise to order and harmony moulding the forces, so they can fit into the environment they find themselves and later into organs and muscle in animals, and in plants the supporting tissues (Lievegoed, 1950). Mars forms and orders the substances that enable growth to expand; blood flow and protein formation in animals. Mars takes this organised and moulded impulse and thrusts it into its new environment.

Lievegoed (1950, p 10) states:

“Mars represents the force by means of which the Spiritual archetype of the plant pierces through and penetrates into the physical, and which also pushes it out again into the world”.

Initially this brings the plants desire 'to be' to the Earth and secondarily it shows as the plants ability to push out back into the space around it, at its growing tips. It is responsible for the shooting and sprouting of buds and seeds each spring (Lievegoed, 1950). In plants, the Mars process is involved with the nitrogen cycle and building healthy protein, as well as the act of fertilisation. This Mars process is seen as the plant's growing part pushes into space (Lievegoed, 1950). The Venus process creates an environment of growth, and is particularly concerned with the nutrition of the cells in both plant and animals (Lievegoed, 1950), and preparing it for the fertilisation of the Mars activity. The Mercury process initially helps the plant adapt to its environment further. In its secondary phase it forms the lymphatic system in animals, and sap flow in plants (Lievegoed, 1950). Moon's processes are active wherever cell division, reproduction and propagation are active. It is responsible for all eternal repetition and heredity (Lievegoed, 1950).

The 'Primary planet processes' are seen as occurring prior to germination, taking place outside the plant in the environment around the plants, rather than in the plant itself. This can be explained by following an annual plant through the seasons. From mid-summer until late autumn the activity of plants moves increasingly back towards the Earth. As the fruits of the present season are ripening, effectively fulfilling the 'manifest' stage of the present plant, there is an invisible dynamic phase taking place around the plant (Atkinson, pers. comm.). It is as if the environmental conditions of

the present season act as the carrier of these activities. In late autumn and winter the ripe seeds and the new 'Being' impulses crystallise together in the Earth, so that once the seed germinates this 'Being' potential from the last season begins its 'Manifestation' phase.

As the fruit forms, the Saturn archetype forces are present ensuring that a tomato will continue to grow into a tomato (Lievegoed, 1950; Steiner, 1993). The secondary Jupiter processes become active in the ripening process, while at the same time helping to mould the developing seed to the environment it will grow in next season. Mars's process ensures the production of proteins and starches which in turn help the Venus process to provide adequate nutrition for the seed. The Mercury process continues to carry the nutrition in the sap around the plant while ripening is occurring (Lievegoed, 1950).

The Moon processes in the ripening period are condensed into the seed and show as the seeds inherent fertility; however they also build up in the environment and soil as a potential for next season (Atkinson, pers. comm.). Without the moon processes the seed could not germinate, the insect or animal could not reproduce, as cell division would not be possible. It is this Moon process that peppering interferes with and terminates while the effect of the pepper is present. If the pepper is not regularly applied the effect wears off and so the Moon process can continue again.

At the bottom, or winter phase of the cycle, the growth processes enter into the Earth; this is where the inversion of the forces takes place and the growth processes begin to move outward again into the next season (Atkinson, pers. comm.). This can be likened to what happens in winter; seeds lie dormant until the soils start to warm up in spring to germinate; larvae feed on roots and organic matter then pupate, so when spring arrives they are ready to emerge as adults; some insect eggs remain in a dormant state in bark crevices until the air temperatures warm up so signalling spring. In many animals the adult female carries the unborn young until time of birth in spring.

This leads on to the 'Secondary planet processes' (Fig 3) or the spring to mid-summer phase. It starts with the Moon process, or intensification, here the cell division begins and tissue formation takes place (Lievegoed, 1950), the seed has germinated and started to grow, while in animals the young are born. The Mercury process develops the supporting structure of the plant, such as wood formation or the

nervature of the leaves (Lievegoed, 1950). In animals the bones are growing and getting stronger. Closely related to this Mercury process is the Venus process described as excretion. All the substances no longer required by the plant are excreted in some way eg. excess salts are excreted in the bark of some trees, or in cellulose formation (Lievegoed, 1950). In animals the kidney formation sees to the excretion processes where excess salts and waste products are excreted as urine and faeces, providing food for soil organisms (Bacchus, pers. comm.).

The secondary Mars process is involved in the nitrogen chemistry, the shooting into space and the formation of proteins in later growth (Atkinson, pers. comm.). These substances are preserved in different ways; liquid sugars are stored in leaves until needed later for bud maturation, or fruit formation; starches are deposited in seeds or storage stems (potato), or a more permanent form as in sugar cane (Lievegoed, 1950). In animals the excess substances are deposited and stored as fats and sugars around kidney, liver and gall bladder areas for later use (Bacchus, pers. comm.).

Jupiter's process is described as the chemist; for it is here that the aroma and pharmacological effects are bestowed on the flowers and fruits as colour, flavour and aroma. Sugars are broken down to form glucosides, disintegration proteins form alkaloids, and out of the carbohydrates the ethereal oils are formed (Lievegoed, 1950). Jupiter's function in animals/insects is linked to the development of the hormones responsible for fertility/maturity, so enabling reproduction (Bacchus, pers. comm.).

During the Saturn process comes the completion of the seed formation (Lievegoed, 1950) and for annual plants the death of the plant. In insects the Saturn process is borne out in egg laying, prior to death in many insect species; in animals the mating period. The Saturn process can also lead to the further breakdown of substances left over from the Jupiter process, so with the excretion of hydrogen and oxygen, the finer cyanogen aromas evident in the plum, peach and apricot arise. It is said that in the apple we eat Jupiter, but in the plum we eat Saturn (Lievegoed, 1950; Steiner, 1993).

Atkinson (pers. comm.) explained Goethe's model by saying, simply put, what is being stated here is that the archetypal 'formative' forces coming from the stars pick up the different planetary forces as they pass through the energy fields of each of the

planets (Figure 2), until the earth absorbs them. This is the 'Up-building stream' or coming into 'Being' as Goethe explained it. An inversion process takes place in the Earth, the absorbed cosmic forces then work back upwards from the Earth and 'manifest' themselves in the forms of the plant, insect, mammal or other life forms during the "secondary planetary process.

Steiner (1993, p35) in lecture two states:

"In the seed we have an image of the whole universe. Each single time a seed is formed, the earthly organizing process is led to its end, to the point of chaos. And each time, within the seed-chaos, a new organism is built up out of the whole universe. The parent organism simply has the tendency, through its affinity for a particular cosmic setting, to bring the seed into relationship with the forces from the proper directions, so that what emerges from a dandelion is a dandelion and not a barberry. But the image reflected in the individual plant is always the image of some cosmic constellation and is built up out of the cosmos.

2.3 Potentisation

When peppering small insects such as scale or Fuller's rose weevil, it is impractical to collect large quantities of ash to treat large areas. Some researchers have been experimenting with potentising peppers as a way of better utilizing small quantities of raw materials. Samuel Hahnemann (1755-1843) conceived the principles of potentisation of substances, also known as Homoeopathic dilutions, in an attempt to decrease the dosages of toxic substances to reduce their side effects, without reducing their 'curative powers'. To his surprise he discovered by trials on patients, that by subsequent dilutions the 'curative powers' actually increased while after a number of dilutions there was no longer any detectable molecules of the original substance (Pearce, 1993).

Potentisation is a process of rhythmic dilutions (to the power of ten) of a substance; in the case of peppering this is the pest ash; eg. the first potency is 10^1 and usually referred to as 1x. Potentisation requires one part material to nine parts water, or alcohol; this solution is succussed (rhythmically shaken) for a number of minutes; this is the *first* potency (1x). One part of the first potency is then added to nine parts water/alcohol, succussed for same time, this results in the second potency (2x) or a

dilution of 1: 100 (10^2). This process continues until the desired potency is reached eg. 8x or dilution of 1: 100,000,000 (10^8) (Kolisko, 1939; Pearce, 1993).

Kolisko (1939) showed that the potency of a substance does not increase with every dilution, but rather plots out in a wave pattern. Kolisko (1939) conducted numerous experiments to determine the potency peaks of a substance; this allowed them to trial the most potent, and beneficial dilutions.

While it has been noted by some members of the Biodynamic association that the treatment effect with un-potentised peppers can last many times longer than potentised peppers, however, with insects in most cases the practicality issues limit the use of un-potentised ash (Atkinson, pers. comm.).

2.4 Developmental work of Steiner's guidelines for peppering

Maria Thun with the assistance of her staff carried out peppering experiments on weeds between 1968 and 1979 (Thun, 1990). Their findings suggested that the effects of the application of a pepper lasted over four years. They noted that if the pepper was mixed in water and stirred biodynamically (stirring in one direction until a vortex is created, then changing direction until vortex again created, etc) for one hour prior to applying, that the effect could last even longer than four years (Thun, 1990). Thun (1990) took Steiner's work further and experimented with homoeopathic solutions of the peppers, which has enabled large amounts of a pepper to be produced from relatively small amounts of ash. In Thun's book '*Gardening for life – the biodynamic way*' (1999), she gives more precise times in relation to which constellation the Sun should be in at the time of burning (Table 1), depending on type of pest.

Thun has conducted numerous experiments and trials to substantiate her findings, but has never released any of the results to be scrutinised by other scientists. Many biodynamic farmers and growers have also conducted their own trials, but mostly without control areas for comparisons, so rendering the results anecdotal.

There are biodynamic farmers and growers that have been experimenting with using potentised peppers for a number of years. Thun, as stated above and Garuda Biodynamics mainly use 8x potencies, and Kemp (2003) in Australia mainly uses 12x

potencies. Members of the biodynamic associations in Australia, and New Zealand have conducted numerous anecdotal pepper trials over the years, some of these have been summarized in Appendix B, p91.

Table 1: Thun's pest peppering table ('Gardening for life – the biodynamic way', 1999. pg 94).

Pests	Time
Day-flyers, such as Cabbage White, flies and midges, white fly	Sun and moon in Twins, <i>also</i> Venus and moon in Twins
Night-flyers and moths	Sun and moon in Ram, <i>also</i> Mercury in Ram
Colorado beetle, Varroa mite (pest of bee family), Turnip gall weevil, all beetle pests	Sun and moon in Bull
Cutworm, leatherjackets (jar worm)	Sun in Bull and moon in Scorpion
Scale insects and slugs	Moon in Crab, <i>also</i> moon and Mars in Crab
Aphids	Moon in Twins, <i>also</i> Venus in Twins
Blossom weevil	Moon and Venus in Twins
Mites, red spider mite	Venus or moon in Waterman

Atkinson (pers. comm.) added that it should be noted that when looking at treating large areas, whatever the species, that it is desirable to source the material to prepare the pepper from as wide a range as possible. The reason behind this is to give as diverse a phenotype (genetic variations as a result of environmental factors), within the genotype (genetic constitution of an organism) of the pest/weed as possible.

Garuda Biodynamics have shown in their trials that insect peppers made from pests sourced within the Bay of Plenty, are not as effective in the Waikato, as peppers made from insects obtained within the Waikato itself (Atkinson, pers. comm.). A Kaipara farmer peppered thistles from one area on his farm then spread the ash over the whole farm. He found it only affected the germination of the thistles in the area from where the thistles for the pepper were gathered; it was not until he made a pepper from thistles collected from different areas of the farm that he achieved the desired result.

There are a number of kiwifruit growers in the Bay of Plenty region that have been applying the passion vine hopper pepper for a number of seasons now (Atkinson, pers. comm.). Upon interviewing a number of orchardists applying Garuda Biodynamics peppers, it became apparent that while most of these growers believe that applying the peppers has helped reduce the damage caused to their kiwifruit, none of them have ever left a control block for comparison. Garuda Biodynamics' (now BD Max) released the scale pepper for commercial use for the 2001-02 season but has to date has yet to conduct field research to determine the effectiveness of their peppers.

Garuda Biodynamics made their scale pepper from scale insects collected from a range of sites throughout the Bay of Plenty region. Garuda Biodynamics however do recommend for the best results, making the pest pepper from insects collected off the orchard concerned. This is usually only feasible on large orchards due to cost of preparing pepper.

2.4.1 Possum peppering trial based on Steiner's principles

Various Biodynamic growers' association members and organic growers have experimented with peppering possums to keep them out of gardens and orchards, but these have mostly been small-scale trials. Blake and Bacchus (2000) conducted the first large scale peppering trial during 1998-99, to eradicate possums from a 200 ha site in the Tararu Creek catchment block, north of Thames, North Island, New Zealand.

Environment Waikato conducted a possum count prior to the possum pepper application and two afterwards. Environment Waikato concluded that since the total number of possums captured increased each time, that the trial was unsuccessful and the peppering had not worked. Blake & Bacchus (2000) found it interesting to note that while the numbers of possums caught on one of the two trapping lines inside the treatment zone decreased, the numbers of possums caught on two of the three lines outside the treatment zone increased.