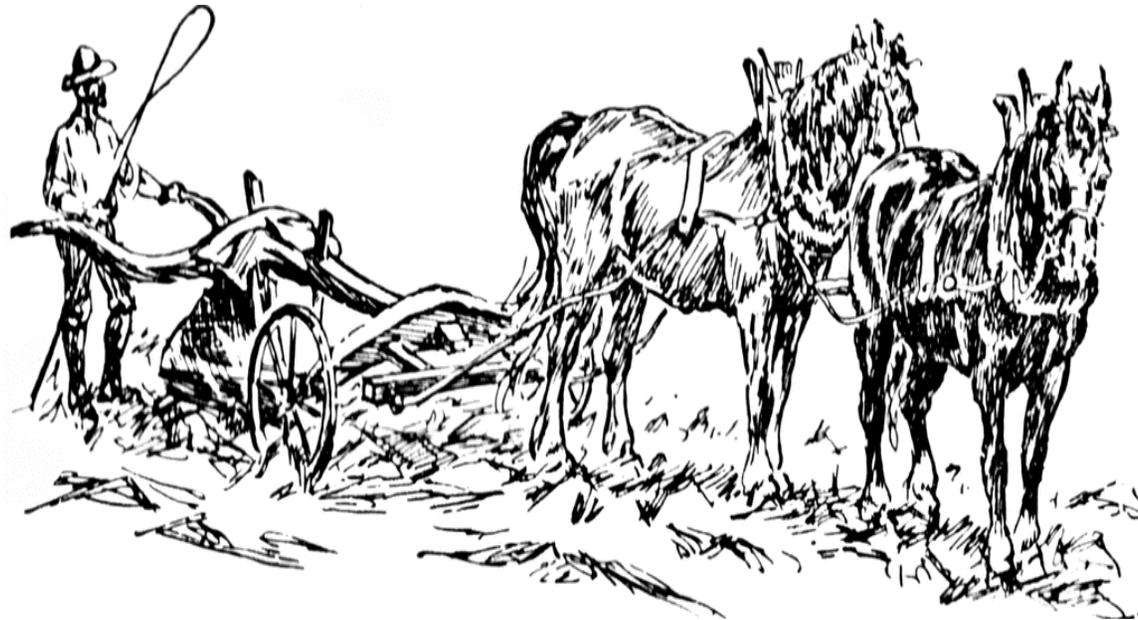


The Bach Biodynamic Research and Planting Calendar

Based on Indications Given by Rudolf Steiner



2021

Introduction

Welcome to the 2021 edition of the Bach Biodynamic Research and Planting Calendar. The planting indications given in this calendar are based on information given by Rudolf Steiner in 1923 in a course of lectures available in the book The Agricultural Course – The Birth of the Biodynamic Movement. This book is still in print and widely available. This series of lectures can also be read for free online at www.rudolfsteinerarchive.org. Unlike other biodynamic calendars, this calendar is based on indications and methodology outlined by Rudolf Steiner. All other biodynamic calendars that I am aware of rely on the methodology given by Maria Thun developed in the 1950s. The Thun method and the Steiner method of sowing differ in several fundamental respects, and as such are at variance with one another. A more detailed discussion of this variance will be discussed below. The primary objective of this calendar has been to test these two methods using a rigorous research methodology. Surprisingly, the research on these planting methods has been, over the years, quite sparse, and where research is available, exact planting dates and times are often not furnished. Knowing the dates on which seeds are sown is essential in evaluating planting results through peer review. Over the last ten years the research in this calendar has shown conclusively that the Steiner method of sowing seeds provides better germination, larger plants and higher yields. Conversely, the Thun method has not demonstrated any correlation with seed germination, plant growth and yield. Research that I have conducted in past calendars dating back at 2013 can be viewed on my website at www.bachbiodynamic.com. From this previous research, and based on Steiner's indications, the following times have been found to be favourable for sowing above and below ground crops:

- two days before a full moon
- perigee, when the moon is closest to the earth
- ascending phases of the inner planets Mercury and Venus (annuals, biennials)
- ascending phases of the outer planets for trees (longer lived plants with bark)

All of these dates are indicated in the calendar. Combinations of these influences have been found to increase the germination, growth and yields of plants. The ascending phases of the planets are given according to their position in the Northern and Southern hemisphere. A planet is considered to be ascending in the Northern hemisphere when it is moving in a northerly direction in relation to the ecliptic, regardless of its location in the either of the hemispheres. Conversely, a planet is considered to be in an ascending phase in the Southern hemisphere if it is moving in a southerly direction in relation to the ecliptic, regardless of its position in either of the hemispheres. Therefore, if a planet is in an ascending phase in the Northern hemisphere, it will be in descending phase in the Southern hemisphere, and vice versa. Rudolf Steiner's indications regarding the planets and their influence on plant growth are here quoted, taken from the

Agricultural lectures of 1923 (all of the following quotes are taken from the 2004 edition of "The Agricultural Course, The Birth of the Biodynamic Method". Eight lectures given in Koberwitz, Silesia, between 7 and 16 June 1924. Rudolf Steiner Press):

Saturn goes slowly round [the sun], in thirty years.... Sometimes it shines directly on to a given spot on the Earth. But it can also work through the Earth upon this portion of the Earth's surface. In either case the intensity with which the Saturn-forces are able to approach the plant life of the Earth is dependent on the warmth-conditions of the air. When the air is cold, they cannot approach; when the air is warm they can...if you wish to plant a coniferous forest, where the Saturn forces play so great a part, the result will be different if you plant in a so-called ascending period of Saturn, or in some other period... Assume for instance that we take firewood, wood that is derived from trees which were planted in the Earth without understanding of the cosmic rhythms. It will not provide the same heart-giving warmth as firewood from trees that were planted intelligently (p.27).

From the foregoing, the best time to plant a coniferous forest would be in the summer when Saturn is in an ascending phase in the area where the trees are to be planted. The affect of Saturn can radiate through the Earth, regardless of whether Saturn is above or below the ecliptic, so long as it is in an ascending phase. The same can be said of all the planets that are considered in biodynamic agriculture (Mercury, Venus, Mars, Jupiter and Saturn). The outer planets affect the growth of longer-lived plants, those with rind or bark- trees for the most part. Steiner indicates that Mars, for example, affects the growth of oak trees, and as because of this, they should be planted in an ascending phase of Mars.

The inner planets Mercury and Venus affect the growth of shorter-lived plants, annuals and biennials, and perhaps shrubs like blueberries and raspberries. Steiner indicates the following:

We see what Saturn does with the help of the warmth-forces of our Earth, whenever the perennial plants arise. The effects of these forces, which pass into the plant-nature via the warmth, are visible to us in the rind and bark of trees, and in all that makes the plants perennial. This is due to the simple fact that that the annual life of the plant- its limitation to a short length of life- is connected with those planets whose period of revolution is short (p 27).

Therefore, when sowing vegetable seeds and the seeds of annual fruits and bi-annuals the planets which affect growth are the inner planets of Mercury and Venus, when in ascending phases. It is an assumption on my part, that fruit trees, with thin bark and shorter lives that coniferous and oak trees are most likely affected in their growth by the planet Mars ascending. Research needs to be conducted in this are.

Another favourable time for planting that I have found in my research has been during perigee, when the moon is closest to the earth, which occurs every 27.5 days (known as the anomalistic lunar cycle). The full and new moon cycle takes 29.5 days (known as the synodic cycle). Perigee as a favourable time to sow was not mentioned by Steiner, but research performed by Harmut Speiss has also

January

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
Venus Descending NH (Ascending SH) -Jan 12	Mars Ascending NH (descending SH)-Apr 23	Jupiter Ascending NH (descending SH) -Jun 17	Saturn Ascending NH (descending SH) – May 19		1 Mercury Ascending NH (Descending SH) - Feb 4	2
3	4	5	6 fair planting days NH fair planting days SH Jan 8-9	7	8	9 perigee 07:39
10	11 new moon 21:00	12 Venus ascending NH ends SH until Jun 6	13	14	15	16
17	18	19	20 apogee 05:11	21	22	23
24 Good planting days NH fair SH Jan 25-27	25	26	27 full moon 11:16	28	29	30
31						

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found perigee to be a favourable time to plant. His research can be found at http://www.biodynamic-research.net/pdf/pdf_lda1/spbd00.pdf.

Synodic Cycle or Trine?

The synodic cycle, where the moon passes through waxing phases (culminating in a full moon), and waning phases (culminating in a new moon) was mentioned by Steiner in the Agricultural Course to significantly affect the growth of plants. He says the following:

In deed and truth, with the forces that come from the Moon on days of the full Moon, something colossal is taking place on Earth. These forces spring up and shoot in to all the growth of plants, but they are unable to do so unless rainy days have gone before (p. 26).

Research conducted by Lili Kolisko, in her book *Agriculture of Tomorrow* determined that the exact best planting date was two days before a full moon. Unfortunately, this important book is no longer in print. My research has also found this to be the case, but planting for the entire week before a full moon can be considered as beneficial to plant growth. As indicated by the above quote, moisture is a key factor in ensuring that these growth forces of the moon affect plant growth. This moisture is most ideally in the form of natural rainfall, but if this is not available, then irrigation using sprinklers, driplines, etc., is also effective. With this information, we can now form a clear picture of the best times to sow seeds using Steiner's indications. For example, in this year's calendar, March 26-29 is indicated as being an excellent planting time. This is because all of the factors which positively affect plant growth are taking place: the moon is approaching its full phase, the moon is also approaching perigee, and both of the planets Mercury and Venus are in ascending phases in the Northern Hemisphere. This planting period could be extended to include the entire week before the full moon of March 28th. How does this methodology differ from that given by Maria Thun?

Thun's methodology is based on the relation of the moon to its position in the various signs of the zodiac. Just as the Earth passes through the twelve signs of the zodiac in the course of a year, the moon also passes through the twelve signs of the zodiac, but in a much shorter period of time (29.5 days, which is the time the moon takes to orbit the earth). Thun divides the constellations of the zodiac into four types: Earth signs are considered beneficial to root growth and therefore root crops (Taurus, Virgo, Capricorn). Water signs are considered beneficial to leaf growth and therefore leaf crops (Pisces, Cancer, Scorpio). Warmth signs are considered beneficial to the growth of fruit crops (Aries, Leo, Sagittarius). Finally, light signs are considered beneficial to flower crops (Gemini, Libra, Aquarius). If the moon, for example, is in the zodiacal sign of Leo, then that period of time would be considered beneficial for the growth of fruit crops, like tomatoes or melons. Thun's method does not take into account the synodic waxing and waning phases of the moon, as indicated by Steiner. A good example of the differences in planting dates that can result from this can be seen on the dates of May 4-6, 2020. In my calendar, I considered these dates to be one of the best planting times of the entire year, in the Northern Hemisphere. May

February

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
	1 Good planting days NH and fair SH Feb 1-3	2	3 Perigee 11:33	4 Mercury Ascending phase ends NH begins SH until March 1	5	6
7	8	9	10	11 New Moon 11:06	12	13
14	15	16	17	18 Apogee 02:22	19	20
21	22	23	24 Good planting days NH and SH Feb 24-26	25	26	27 full moon 00:17
28 Fair planting days NH and SH Feb 28-Mar 1						

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5th was two days before a full moon, both Mercury and Venus were ascending, and the moon was at perigee on May 5th. In the *Maria Thun Biodynamic Almanac 2020* this date was considered an unfavourable planting time. How can such vast discrepancies be accounted for? In the Thun calendar, perigee, when the moon is closest to the Earth, is considered an unfavourable planting time. As I have discussed above, my research has found the opposite- that sowing seeds during perigee increases germination, plant growth and yield. I have conducted many trials regarding perigee in previous years, and this research is available on my website. The detailed and meticulous research of Harmut Speiss also found perigee to be a favourable planting time. I have not been able to find research conducted which would indicate the opposite is true. This is not to say that this research does not exist, but I have not been able to find it on the internet.

Perhaps the greatest difference in the theory of the Thun and Steiner method of sowing seeds has to do with the biodynamic understanding of minerals, plants, animals and the human being. For those unfamiliar with biodynamics and Rudolf Steiner, a brief description of Rudolf Steiner and the breadth of this work needs to be first discussed. Rudolf Steiner has been described as being a philosopher and a mystic, but these terms only give a vague description of this incredible human being. Rudolf Steiner was an initiate- one who could see clearly into the spiritual world in the form that is correct for the epoch in which we are now living. The breadth and scope of the revelations of his spiritual vision is truly remarkable. Education, medicine, religion, art, architecture and agriculture are all areas where Rudolf Steiner has provided guidance for the future development and evolution of the human race. A great deal of Steiner's efforts was in describing the modern path of spiritual development, in accordance with the times in which we now live. Steiner described how the gates of the spiritual world, which have been closed for over 2000 years, are now opening again, giving humanity the opportunity to peer clairvoyantly into the spiritual world again. All of the teachings and information that Steiner gives in the Agricultural Course must not be viewed as coming from investigations into the material world. They must rather be viewed as instruction given by spiritual beings that have been imparted to Steiner through his spiritual vision. There is in our culture today scepticism to such proclamations given by human beings. How can the reports of so-called clairvoyant investigations be proven, as they cannot be confirmed by the faculties of other human beings, asks the sceptic? This is a valid argument, and as Steiner is a forerunner, an advanced guard so to speak, of what lies in the future of humanity there are none, or perhaps very few who can verify the accuracy of Steiner's information. Steiner speaks of the world that we live in being filled with elemental spiritual beings- gnomes, undines, sylphs and salamanders. How can this be proven? He also speaks of hierarchies of good and evil beings- ahrimanic and luciferic beings, angels and archangels, and exalted seraphim. None of this can be put on a scale and weighed and measured in the physical world, and can therefore not be proven. Biodynamic agriculture is one of the few areas of Steiner's work where research using the tools of the physical world can be used. We can test these theories by weighing, measuring and observing how different planting times affect the growth of plants, and because of this, it is imperative that this work be conducted

The impulses that Steiner brings are vital for the future of agriculture and of humanity. The biodynamic preparations are meant to heal and bring spiritual impulses into the world again. But what if those unfamiliar, or perhaps sceptical of Steiner's work take it upon themselves to put to the test the information contained in biodynamic calendars? What if, as I have found in my research, there is no

March

Sunday

Monday

Tuesday

Wednesday

Thursday

Friday

Saturday

	1 Perigee 21:19	2 Mercury Ascending phase begins NH ends SH- until May 18	3	4	5	6
7	8	9	10	11	12	13 New Moon 02:21
14	15	16	17 Apogee 21:04	18	19	20
21	22	23	24	25	26 excellent planting days NH very good planting days SH Mar 26-29	27
28 Full Moon 10:48	29 Perigee 22:12	30	31			

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correlation between the moon and its position in the zodiac and plant growth? This would cast a shadow on all of Steiner's other spiritual work. The sceptic, or perhaps even one who is seeking for spiritual knowledge could then say, with justification 'the one area where Steiner's work can be weighed and measured has proven to be false- it does not work. Why should I then believe in any of his spiritual revelations that cannot be weighed and measured here in the physical world?' The impulses that Steiner has brought into the world are to prepare humanity for a new epoch in our evolution, one where the gates of the spiritual world are again opening, and humanity, will again see into the spiritual world as did the cultures of antiquity, but now with a clear sense of self and true individual freedom. I carry a deep sense of responsibility for the impulses that Steiner has brought into the world, and for me, biodynamic agriculture does not stand alone as one method among others. Biodynamic agriculture must be considered as part of a whole spiritual impulse which must transform and prepare humanity for the great changes that are about to occur in the coming generations.

Now that the foundations have been laid for a true understanding of the place and importance of biodynamic agriculture, let us return again the issue of Steiner's indications to planting times in comparison to those given by Maria Thun. Steiner spoke of the different aspects of minerals, plants, animals, and of the human being. The mineral, that realm of rocks and stones, metals and ores- what is called in science the inorganic world, contains only a physical body- it has only within it constituents of the physical world. When we rise to the world of plants, there is something in the plant of a spiritual nature that cannot be directly perceived by our physical senses. This was called by Steiner the etheric or life body. This etheric body gives the plant life- it gives the plant the impulse to grow and reproduce, to sprout from a seed and to gather the minerals of the world into itself in a living way. As the plant ages, the etheric body is depleted and the plant dies, and is again subject to physical, mineral forces of decay, returning again to the mineral world. All living things in the world contain an etheric body, and are subject to the same forces of decay which ultimately brings about death. From the realm of the plant, we ascend to that of the animal, which has, in addition to a physical and etheric body, an astral body. What is the difference between a plant and an animal? An animal moves about on the earth and is governed by instinct. Animals have sense organs and physical organs (heart, liver, organs of digestion, etc). Higher animals can also feel pleasure, pain, anger and sadness. All of these qualities are aspects of the astral body. Finally, we come to the human being. What is it that separates the human being from the animal? It is the ability to think, and the self-consciousness that gives the human being the ability to refer to itself as "I". The ability to think and to have self-consciousness, to have the higher emotions of compassion, love and a conscience, these are the result of human beings having, in addition to a physical, etheric and astral body, an ego as well. The ego, that which makes us human, is the crowning achievement of God's creation. Through our ego we are also given the ability to act in freedom- to make decisions and choices, to govern our own behaviour as we see fit, instead of being governed by iron instinct, as is an animal. A wolf can only be a wolf, an eagle an only be an eagle- there is no self determination in the realm of the animal. Thus, the human being is given mastery of the world in freedom- a gift of the gods. It is through our own free actions that the world's fate will be determined. The gods have made us custodians of the earth, and it is our responsibility to take care of the earth and all its creatures. Biodynamic agriculture is an important part of the future health of our environment and planet. We can summarise the foregoing in the following table:

April

Sunday

Monday

Tuesday

Wednesday

Thursday

Friday

Saturday

				1	2	3
4	5	6	7	8	9	10 Research trial # 1- sow leaf seeds (lettuce recommended)- and/or sow on May 8th
11 New Moon 18:31	12	13	14 Apogee 09:47	15	16	17
18	19	20	21	22	23 Mars ascending phase ends NH begins SH until end of year	24 excellent planting days NH very good planting days SH April 24-27
25	26 Full Moon 19:31	27 Perigee 07:24	28	29	30	Research trial #1 – sow leaf seeds (lettuce) - April 24th

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Mineral realm	physical body (all that we can touch and perceive with our senses in the inorganic realm)
Plant realm	physical body + etheric or life body (that which gives life and governs growth and reproduction)
Animal realm	physical body + etheric body + astral body (gives the animal the ability to move and experience some emotion, governed by instinct)
Human being	physical body + etheric body+ astral body+ ego (self awareness, ability to call oneself 'I', ability to think and live as a free thinking, moral being)

A much deeper discussion of the different aspects of the different kingdoms of nature and the human being can be found in many of Steiner's lectures and books. My aim here was to lay the groundwork for a more detailed discussion of biodynamic planting methodology. In the Agricultural Course, Steiner says the following in regards to using the method of peppering (using the ashes of burnt animals) to control pests:

*Now that we are passing from plants to animals, we come the 'animal circle'- that is to say, the Zodiac. It was not called so in a meaningless way. **To attain our end within the plant world we can stop at the planetary system.** For the animal world, that is not enough. There we need ideas that reckon with the surrounding sphere of the fixed stars, notably the fixed stars of the Zodiac (p. 113).*

The influences that govern the growth of plants are contained in the etheric forces of the plant, described above. *These forces emanate from the realm of the solar system.* The astral forces that influence animals and are used in biodynamic agriculture to combat insect and rodent problems emanate from the spiritual forces that are radiated to the earth from the Zodiac. Here the issue becomes clear. If all of the forces that govern the growth of plants are contained in the planetary system, then how would the moon's position in the Zodiac influence the growth of plants? The plant does not contain an astral body and can therefore not be affected by these astral forces in its growth. As mentioned, the research that I have conducted, and the research that has been conducted by Speiss has shown no correlation between the moon's position in the Zodiac and plant growth. In this calendar, Steiner's indications are strictly adhered to: planting during a waxing moon, and for planting annuals and biennials, planting when Venus and Mercury are ascending. In Thun calendars these two influences are largely ignored. In the 2011 edition of *The Maria Thun Biodynamic Calendar*, the following was stated: "*the waxing and waning Moon is not connected to the planting times or to the ascending and descending periods. Under normal growing conditions the effects of these Moon phases are so small that we seldom go into them*" (p. 59). From this we can see the huge discrepancies in these two planting approaches. It has been my endeavour over the last decade to research these two planting methods and two ascertain which is the most effective in bringing about positive results. As is have stated, in the vast majority of the trials that I have conducted, the waxing and waning phase of the moon and the moon at perigee have shown positive results in terms of the growth and yields of vegetables. I have found no correlation to trines (also known as trigons) and plant growth.

In my earlier calendars it was my intention that a community of researchers could be established with the aim of conducting a body of research amongst a large group of people in as many different parts of the world as possible. It was and continues to be a source of

May

Sunday
Monday
Tuesday
Wednesday
Thursday
Friday
Saturday

						1
2	3	4	5	6	7	8 Research trial #1- sow leaf seeds (lettuce recommended)
9	10	11 New Moon 11:00 Apogee 13:54	12	13	14	15
16	17	18 Mercury Ascending phase ends NH begins SH until Jun 22	19 Saturn ascending phase ends NH begins SH until Oct 11	20 fair planting days NH and SH May 20-22	21	22
23	24 no plant times NH and SH May 24- 26	25 Perigee 17:52	26 Full Moon 03:14 Total Lunar Eclipse 03:19	27	28	29
30	31					

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disappointment to me that this call has not been taken up by the many readers of this calendar. As a result, over the last five years I have given the planting dates and information in the calendar, but did not provide possible research dates for others to carry out their own research, and to for a research community. I would like to again in this year's calendar ask readers to consider conducting research that compares the different planting approaches of Steiner and Thun. 2021 offers excellent conditions (the most favourable in many years) in the Northern Hemisphere for conducting this research. In the Spring of 2021 both the synodic cycle of the waxing/waning moon, and the anomalistic cycle of perigee/apogee are in close alignment with one another, so that a clear separation of the cosmic forces of Steiner's method (full moon) and Thun's (trine) is present. For example, on April 24th, 2021, both the full moon and perigee occur at almost the same time. Perigee occurs on April 27th and the full moon occurs on April 26th. Here, what I believe to be excellent conditions occur for planting all annual crops. Conversely, this date would be considered to be an unfavourable planting time in the Thun method as perigee is considered to have a negative impact on plant growth. Very similar conditions to this occur again on June 21st. Because of these exceptional conditions for comparative research, the following dates are here indicated for planting trial research. They will also be highlighted in the calendar itself:

Research planting trial 1

Planting of leaf crops 1a:

<p>Thun method: April 10th (leaf day) moon in Pisces (7.5 degrees at noon GMT) and/or May 8th (leaf day) moon in Pisces (17 degrees at noon GMT)</p>	<p>Steiner Method: April 24th, two days before a full moon, three days before perigee (fruit/root) moon in Aries (25 degrees at noon GMT)</p>
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Planting of root crops 1b:

<p>Thun method: June 9th (root day) moon in Taurus (13.25 degrees at noon GMT)</p>	<p>Steiner method June 22nd, one day before perigee, two days before full moon (flower day) moon in Libra (19 degrees at noon GMT)</p>
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Research Trial 2

Sequential planting of fruit crops (plant the same fruit crop each time):

June

Sunday
Monday
Tuesday
Wednesday
Thursday
Friday
Saturday

		1	2	3	4 annular solar eclipse 02:42	5
6 Venus ascending phase ends NH begins SH until Nov 7	7 Apogee 18:27	8	9 Research trial #2- sow root seeds (carrots recommended)	10 New Moon 02:53	11	12
13	14	15	16	17 Research trial #3- sow fruit seeds (beans recommended)	18 Jupiter ascending phase ends NH begins SH until Oct 19	19 Research trial #3- sow fruit seeds (beans)
20	21 Excellent planting days NH and SH Jun 21-24	22 Research trial #2- sow root seeds (carrot) /research trial #3 – sow fruit seeds (beans)	23 Perigee 01:58 Mercury ascending phase beings NH ends SH until Jul 20	24 Full Moon 10:40	25	26
27	28	29	30			

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June 17 th - Fruit day (Leo 23 degrees noon GMT) – plant fruit crops (I will plant beans)
June 19 th - Root day (Virgo 20 degrees noon GMT) – plant fruit crops (beans)
June 22 nd - Flower/leaf (Scorpio 4 degrees noon GMT) – plant fruit crops

Research trial 1a is in two parts, and either part can be conducted as a complete trial. It is a leaf trial, and any leaf crop can be chosen (lettuce, cabbage, spinach, etc.). Trial 1a consists of planting on either or both of the dates April 10 and/or May 8th. These are both leaf days and occur at unfavourable times in the Steiner method, as these dates are both close to a new moon and apogee. The April 24th date is not optional if you are participating in trial 1a. April 24th is an excellent date using the Steiner method, as it is two days before a full moon and three days before perigee. Two leaf (Thun) planting dates have here been given, as the weather in April can be difficult to predict. The early leaf date (April 10th) may for some still be a date where frost may occur, and therefore should be avoided, as large temperature difference are variables that will invalidate research data. I plan to plant lettuce on all three dates, weather permitting, and the option of planting on either or both of the leaf dates and on April 24th will be dependent on the conditions in your area.

Research 1b occurs in June and is a root trial, where any root crop can be planted (carrots, parsnips, radishes, potatoes, etc.). In this trial only two planting dates are given, as the weather in June is usually fairly steady in the Northern Hemisphere. Again, the Thun date is close to apogee and a new moon, and the Steiner date is on a non-root date close to full moon and perigee.

Research trial two is a sequential trial that follows consecutive Thun planting dates up to a favourable Steiner planting date. This is a fruit planting trial (cucumbers, melons, tomatoes, beans, peas, etc.) The first of these dates, June 17th, is a fruit day, followed by a root day on June 19th and finally a flower/leaf day one day before perigee and two days before a full moon on June 22nd. Sequential trials reduce weather variables, as the time between plantings is much shorter, and therefore the variables that can affect plant growth and yields that can occur from changing weather over time is diminished.

Research methodology

It is important that the following rules here described are adhered to as closely as possible, with the goal of reducing confounding variables that can affect the growth and yields of plants, and invalidate the research goal of ascertaining the various cosmic influences on plant growth.

Rule 1: Use the same seeds for all trials. For example, I will be planting lettuce in trial 1, and will use the same packet of seeds for all of the trial.

July

Sunday
Monday
Tuesday
Wednesday
Thursday
Friday
Saturday

				1	2	3
4	5 Apogee 06:48	6	7	8	9 New Moon 17:17	10
11	12	13	14	15	16	17
18	19 Very good planting days NH Excellent SH July 19-23	20 Mercury ascending phase ends NH begins SH until Sep 27	21 Perigee 02:30	22	23 Full Moon 18:37	24
25	26	27	28	29	30	31

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Rule 2: Plant research rows as nearby one another as possible. I put aside a plot of my growing space and dedicate that area to research. When research rows are side by side, the soil and light conditions for each row will be very close to equal, where rows in different areas can potentially receive different amounts of light, and also may have different soil nutrient levels.

Rule 3: Give each trial the same amount of time to mature. If I plant lettuce on April 10th, and harvest, measure and weigh the plants on May 30th, I must harvest the plants from the April 24th planting date 14 days later than the April 10th trial, to ensure that each trial has the same growing time.

Rule 4: Record any significant weather and temperature differences that happen during the trial. A frost close to a sowing time can significantly affect subsequent plant growth. I have had to invalidate the results of several trials over the years because of unexpected weather or slug and pest damage. I will record daily temperatures throughout the period of all the trials I conduct this year.

Rule 5: Harvest the entire plant for leaf trials. If you are planting lettuce for trial 1, *gently* remove the entire plant, capturing as much of the plants roots as possible. Wash gently and measure and weigh the entire plant. Carrots, parsnip, beets, radishes- entire plant; potatoes- potatoes only; beans, peas, cucumbers, melons- fruit only. Record germination rates as well. If you planting beans or other pod plants, harvest, count and weigh just the pods. You may need several harvests if some pods are mature and the plant is still flowering. In this case, several harvests are acceptable, but make sure that all plants in the trial are given the same amount of growing time for each harvest.

Rule 6: Watering- I used to water plants at the same time in their growth cycle, but later changed this method. If you water a research row during cloudy, cool weather, and then a subsequent research row in the same trial during sunny, hot weather, the soil moisture levels in these two research rows could be dramatically different for several days or more. I therefore now prefer to use a moisture meter, and water until the row is at the high level of the ideal range on the meter. Then let the soil dry out until the meter indicates that moisture levels are at the low level of the ideal range. At this point, water the row again. This way, all of the research plants are all receiving the ideal amounts of moisture for the duration of the trial, regardless of weather conditions.

Overall, it is very important to follow a systematic method so that all of the plants in your trial are grown with the same amount of time, moisture, light and soil conditions as is possible. Trials do not need to be large. For example, for the three trial dates of fruit trial 2, six bean seeds planted on each of the planting dates (18 seeds) will provide a large amount of data, without an onerous amount of data collection. Do not overwhelm yourself by conducting more research than you can reasonably conduct. One well conducted small trial is better than three large trials not conducted with scrutiny and due attention.

If you do decide to participate in one or more of the trials here outlined, please email your results to me, John Bach at jbbach363@gmail.com before December 15, 2021.

August

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
1 Apogee 23:35	2	3	4	5	6	7
8 New Moon 05:50	9	10	11	12	13	14
15 good planting days NH and SH Aug 15-17	16	17 Perigee 01:23	18	19	20 Good planting days NH very good planting days SH Aug 20- 22	21
22 Full Moon 04:02	23	24	25	26	27	28
29 Apogee 18:22	30	31				

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Pest Control Using Ashing

In lecture six of the Agricultural Course, Rudolf Steiner gave practical information on the biodynamic approach to dealing with pest control. This is done through the process of ashing, where the pest that needs to be controlled is burned in a small wood fire. These ashes are then spread over the ground in a process Steiner called peppering. Only small amounts need to be used, and can be spread over a wide area. Steiner spoke of how life forces live in the watery element, and the counter forces to these life forces live in the element of fire. Hence, when we burn a seed, insect or rodent, we create anti-life or anti-reproductive forces in this burned substance. These forces are then spread out over the garden or field when peppering takes place. These forces can be further magnified in a process called potentization, where one part of ashed substance is added to nine parts water, and the mixture is stirred rhythmically for ten minutes. Rhythmical stirring involves stirring vigorously in one direction to create a vortex (15-30 seconds in one direction is sufficient), and then stirring in the opposite direction for the same amount of time, again creating a vortex. In the transition from stirring from one direction to another, stirring should again be vigorous, so as to create a period of what Steiner refers to as 'chaos'. The creation of the vortex draws the necessary cosmic forces into the water/pepper mixture, and the chaos period infuses these forces into the mixture. After the first ten-minute stirring takes place, the first potentization has occurred (called D1). After this first stirring has been completed, one part of this D1 mixture is added to nine parts water, and the process is again completed to create the second potentization, D2. I then spray the nine parts of the D1 on the field or garden in the areas where pest control is needed. A backpack sprayer can be used for larger areas, and a simple cedar or fir branch can be dipped into a bucket, and then used to whisk the potentized substance onto the soil for smaller areas. This process is then repeated. I recommend stirring up to a D14. In her book *Agriculture of Tomorrow* (I believe to be one of the most important Agricultural book in the world) Lili Kolisko spoke of how the first seven potentizations work in the physical realm, the seven after that on the etheric realm, and the seven after that on the astral realm. For ashing of pests, it should not be necessary to work further than the ether (or life) body of an organism to create the desired conditions where these pests will not want to inhabit the peppered or potentized area. This occurs from D1-14 in the potentization process. It is, however, of paramount importance that the pest in question be burned at the correct time. In the case of insects, the timing of this correlates to the sun's passage through the constellations. Weeds should be ashed two-days before a new moon. The chart below shows the progression given by Rudolf Steiner, where winged insects are ashed in the constellation of Aquarius, those with bone marrow in their abdomen (beetles) in Taurus, and larvae (I include slugs and snails in this category) are ashed in Cancer. The ashing takes place when the sun is in the mid-point of the constellation in question. The ashing for creatures with a bony system, with a spine and skeleton, is somewhat different. Here the creature should be ashed when Venus is in the sign of Scorpio. All of these dates are achieved by using a sidereal zodiac, which shows the true position of the sun as it passes through the zodiac. I have included the dates of the sun's high point through the zodiac in the table below. It may be necessary to capture creatures before an ashing date

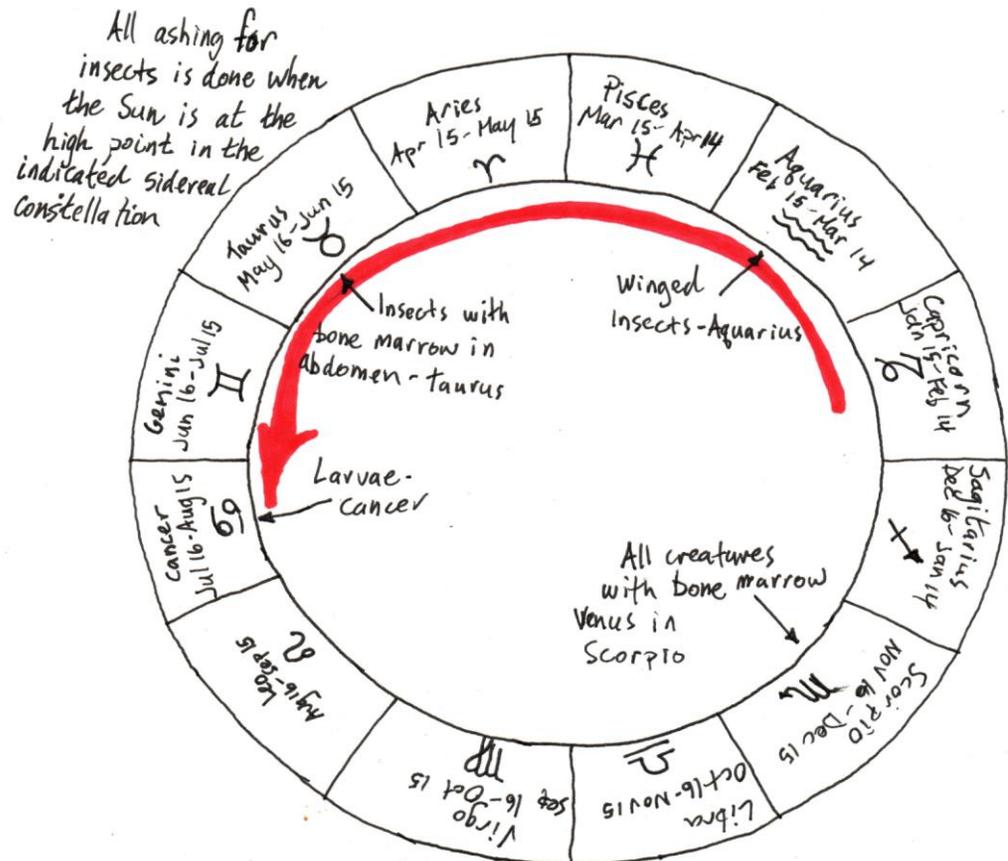
September

Sunday
Monday
Tuesday
Wednesday
Thursday
Friday
Saturday

			1	2	3	4
5	6 New Moon 16:52	7	8	9 fair planting days NH good planting days SH Sep 9-11	10	11 Perigee 02:05
12	13	14	15	16	17 good planting days NH very good planting days SH Sep 17- 20	18
19	20 Full Moon 15:55	21	22	23	24	25
26 Apogee 13:44	27	28 Mercury Ascending phase begins NH ends SH until Oct 21	29	30		

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occurs, and then to freeze them until the date in question. For example, slugs are not readily available at the beginning of August when conditions are too hot and dry for them to be active. I instead captured slugs in the spring and put them in the freezer in a zip lock bag until the August ashing date came about. Even though the slugs have been dead for several months, the ashing process will activate the forces contained in their bodies. I then save the ashes and use them in again when needed. In order for this process to be clearly effective, it needs to be conducted over several years.



Winged insects	Sun in mid-Aquarius on February 28 (afternoon PST)
Insects with bone marrow in abdomen	Sun in mid-Taurus on May 31st late (afternoon/evening PST)
Larvae	Sun in mid-Cancer August (late evening PST)
Animals with boney system	Venus in mid-Scorpio (Oct 17 morning PST)

October

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
					1	2
3	4	5	6 New Moon 03:05	7 fair planting days Oct 7-8 NH and SH	8 Perigee 09:28	9
10	11 Saturn ascending phase ends SH begins NH until end of year	12	13	14	15	16
17 good planting days NH and SH Oct 17-20	18	19 Jupiter ascending phase ends SH begins NH until end of year	20 Full Moon 06:57	21	22 Mercury ascending phase ends NH begins SH until Dec 16	23
24 Apogee 07:30	25	26	27	28	29	30
31						

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2020 Research

For the calendar year of 2020 I only conducted one trial, but it was a large trial using sunflowers. For this trial, I wanted to look at several factors all at once. I wanted to compare plants that were planted the following times: during a lunar eclipse, during perigee, and during a Thun flower date, but at a poor time using Steiner's indications. I panted 72 sunflower seeds in trays on each of the following dates (three trays total): May 23, May 30, June 5. The Jun 5th date was at the time of a lunar eclipse (and full moon, as all lunar eclipses occur on full moons), the May 30th date was 3 days before perigee, and the May 23rd day was on what it thought was a Thun flower day, the day after a new moon. The flower day was obtained from the online website *Rhythms of Nature*. I normally obtain Thun planting dates from *The Thun Biodynamic Alamac*, published the Thun family, but there was a delay in mailing the calendar because of the Covid pandemic. As is customary, in the process of checking my data when the trial was completed, I notice there was a discrepancy between the Thun planting dates in *The Maria Thun Biodynamic Almanac 2020*, which had arrived by the time I was collecting my data, and the *Rhythms of Nature website*. I checked the dates using my source for planetary data, *The American Sidereal Ephemeris 2001-2025*, a very accurate publication used by astrologists and astronomers, and considered a standard in these fields. Upon further investigation I discovered that the dates provided by the *Rhythms of Nature website* were inaccurate by what seemed to be about two days, a significant error for the planting times I used. The dates for the Thun family calendar were accurate. I have not investigated further into this, and cannot there comment on this years' *Rhythms of Nature* calendar or past calendars published by this website. As a result of this, I am was not able to compare Thun and Steiner data for this trial. I can, however, comment on the different moon positions and also on the effect of the eclipse on plant growth and development.

November

Sunday
Monday
Tuesday
Wednesday
Thursday
Friday
Saturday

	1	2	3	4 New Moon 13:15	5 Perigee 14:23 fair planting day NH and SH	6
7	8 Venus ascending phase begins NH ends SH until end of year	9	10	11	12	13
14	15	16 fair planting days Nov 16-17 NH and SH	17	18 no plant days November 18-21	19 Full Moon 00:58 Partial lunar eclipse 01:03	20 Apogee 18:14
21	22	23	24	25	26	27
28	29	30				

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The table below lists final germination dates when each of the trays were moved from the greenhouse and planted outdoors:

Date planted sown indoors:	Date sown outdoors:	Total number of plants planted out
May 23 (1 day after new moon)	June 26 th	36 /72 (50% final germination)
May 30 (3 days before perigee)	July 3 rd	49/72 (68% final germination)
June 5 (on full moon during a lunar eclipse)	Jul 9 th	43/72 (60% final germination)

It is interesting from the results that at the time of the new moon planting (1a) germination rates were lower. I have found this to be a poor planting time from previous research, and have noted poorer germination in previous trials at times of a new moon. It was also of interest to me that the heights of the plants for the May 23rd planting was higher than for the other trial plantings, but the flower size was significantly smaller. The best germination for the trial occurred on the May 30th sowing, three days before perigee. The June 5 planting occurred during the time of a lunar eclipse, on the date of the full moon. The germination rate was slightly lower in this trial than the May 30 sowing (60% versus 68%), but the flower sizes were about 9% larger. I have, in past trials, found that lunar eclipses can have a significantly negative effect on plant growth and germination, but that did not seem to be the case in this trial. I think that the reason for this is that the June 5th eclipse occurred in Europe and Africa, not the North American continent, and was a penumbral eclipse, not in the heart of the shadow of the earth, but on the outer shadow. Previous negative correlations observed in sowing during an eclipse were when the eclipse in question fell directly on the location of the research taking place. From this the conclusion can be drawn that planting during an eclipse can be done, so long as the eclipse does not fall directly on the area to be sown. This is a preliminary finding that needs to be confirmed with more research.

December

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
			1	2	3 Total Solar Eclipse 23:33 New Moon 23:43 Good planting days Dec 3-4 NH and SH	4 Perigee 02:01
5	6	7	8	9	10	11
12	13	14	15 fair planting days NH and SH Dec 15-17	16	17 Apogee 18:16 Mercury ascending in NH until end of year	18 Full Moon 20:36
19	20	21	22	23	24	25
26	27	28	29	30	31	

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2021 Research

It has always been my intention to conduct larger trials and more thorough trials, but over the last 3 years I have been building a house and barn on a 10-acre piece of farmland in Princeton, British Columbia. I have also worked as a teacher for much of this time as well. This process is now very close to completion, and I am also now working much less as a teacher. This will now allow me to focus more on beekeeping, growing food and biodynamic research. 2021 offers an excellent opportunity to test and compare Steiner and Thun methods of biodynamic planting calendars. I plan to conduct the trials here indicated in the calendar, using larger numbers of plants than in the past. The biodynamic agricultural movement is vital to the future health and welfare of the Earth and all its inhabitants. It is my sincere wish that you, as a reader of this calendar, who understands the important of growing healthy food in a sustainable way that nourishes the Earth, will consider participating in one or more of the research trials indicated in this year's calendar. Please submit any research that you conduct to me via email at jbbach363@gmail.com. Any research conducted in this year's calendar will be published in the 2022 edition. Any comments or questions can also be directed to this email.

Thank-you and happy planting,

John Bach

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