

The Bach Biodynamic Research and Planting Calendar

Based on Indications given by Rudolf Steiner



2015

Introduction

Welcome to the 2015 edition of the *Bach Biodynamic Research and Planting Calendar*. This year's calendar will continue to investigate the various lunar and cosmic rhythms that affect the germination of seeds and subsequent growth and vitality of plants. In the 2014 calendar, planting trials were conducted during the waxing and waning moon phases of the synodic cycle, and also during apogee (when the moon is furthest from the earth) and perigee (when the moon is closest to the earth). This rhythm is known as the anomalistic cycle. An additional trial to investigate the effect of the waning moon cycle on the growth of below ground (root crops) was conducted in June and July using beets and turnips, following the results from the April radish trial of the 2014 calendar. A full report of results of last year's calendar research can be found on page 23. A brief summary of the research conducted is as follows: In the April radish trial, highest yields were found during the waning synodic phase (2 and 3 days before a new moon), and also at perigee. There was a full lunar eclipse at this time, and some colder temperatures at the beginning of April (in Vancouver), during the waxing phase of the trial may have affected results. To further investigate if the waning synodic cycle increased plant yields another root trial (with beets and turnips) was conducted in June. Temperatures throughout this trial were ideal for all but two or three days from the months of June through September. The results from this trial also favoured the waning phase, where the highest root yields were obtained. Both apogee and perigee occurred close to the middle of both phases, so this trial can be considered as one where the influences of the anomalistic cycle were minimal. The results confirmed the results of the April radish trial, giving the highest yields two and three days before a new moon. No perigee plantings were conducted for this trial.

The next two trials involved above ground crops in the months of May (lettuce) and June (bush beans). The Vancouver lettuce trials produced a fairly clear data set trend: best results were achieved in waxing cycles (2 and 3 days before a full moon) and at perigee, although the waning data in trial 2 three days before a new moon produced slightly higher lettuce weights than the waxing set three days before a full moon. The Swiss lettuce data set produced the best results during the waxing phase, but perigee produced low yields, and apogee higher yields. I consider this data to at variance with the rest of the results of the trial, which have shown high yields associated with perigee. Temperatures were high (28-30 degrees Celsius) at perigee in Switzerland at perigee, which may explain the poor results.

The Vancouver bush bean trial conducted in June gave the clearest pattern of all of the trials conducted in 2014. Temperatures were very close to ideal for the duration of the trial. The waxing phase and perigee provided the best yields, followed by the waning phases and apogee.

I also attempted to super-impose the ascending-descending phase of the tropical cycle over the data from 2014, but did not obtain consistent results. This cycle was found by Harmut Spiess to be correlated to good yields in most of the crops he studied. This cycle will be more closely studied in the 2015 calendar. Trignons were also studied in this trial, but no relationship could be found to high yields and planting on dates associated with corresponding trigon days (root, flower, fruit, leaf). This was also found to be the case with the 2013 calendar data sets. Research conducted by Harmut Spiess and by the team of Walter Goldstein and Bill Barber was also unable to find any correlation with trigons and plant growth. Because of this trigons will not be recommend in this calendar as effective in enhancing plant growth. Best planting times in this calendar will be at the following times in the synodic and anomalistic lunar cycles:

Waxing phase (3 and two days before a new moon)	All above ground crops
Waning phase (3 and two days before a new moon)	All below ground crops
Perigee	Good for planting all crops

Planting during a waxing phase when perigee is near to the ideal waxing phase date (2 or 3 days before a full moon) should be considered as an ideal time to plant above ground crops, while planting during a waning phase when perigee is near to the ideal waning phase date (2 or 3 days before a new moon) should be considered as an ideal time to plant below ground crops. All of these dates and ideal planting times are specifically indicated on the dates when they occur in this year's calendar. Best planting dates will be indicated as 'superior' for either below ground or above ground crops. Apogee, where the moon is furthest from the earth should be considered as a poor time to plant all crops, and when apogee occurs at or near a corresponding favourable waxing or waning phase, these planting times will be designated as 'inferior'. An exception to planting below ground crops during a waning phase may occur with carrots. Harmut Spiess found that carrots gave the highest yields when planted three days before a full moon, when the moon was in mid-descent in Virgo in the tropical cycle. Barber and Goldstein also found that carrots gave highest yields during the waxing phase before full moon. A planting trial to attempt to validate these findings will be carried out in May-June in this year's calendar. There is not, however, an ascending time when the moon is in Virgo and in a waxing phase during the ideal northern hemisphere planting times of April, May and June. Carrot trial plantings will instead occur three days before a full moon, three days before a new moon, at perigee, and also when the moon is in Virgo. The moon is in Virgo on June 6th, three days after a full moon and three days before perigee. Here Virgo is on its own, so to speak, with the full moon behind it and perigee in front of it. It will be interesting to see which date gives the best results, when these three cosmic events are almost perfectly separated.

With regards to perennials used in farming (blueberries, raspberries, fruit trees, etc.) attention should also be made to planetary-lunar relationships, if possible. Rudolf Steiner spoke in his 1923 agricultural lectures, which form the foundation of the biodynamic movement, of how the inner planets have a significant effect on the growth of plants. The inner planets, Venus and Mercury, affect the

growth of short lived annuals, and the outer planets affect the growth of longer lived plants, specifically those with rind or bark. Steiner gives the following examples:

If someone wishes to plant an oak, it is of no little importance whether or no he has a good knowledge of the periods of Mars; for an oak, rightly planted in the proper Mars period, will thrive differently from one that is planted in the Earth thoughtlessly, just when it happens to suit. Or, if you wish to plant coniferous forests, where the Saturn-forces play so great a part, the result will be different if you plant the forest in a so-called ascending period of Saturn, or in some other Saturn period (p. 108).

An ascending planet is one that is moving from the horizon towards midheaven (the point directly above you). With respect to perennial crop plants (blueberries, raspberries, etc.), I believe the best combination for growing these plants would be to plant seed in a waxing phase with both an inner planet (Venus, ideally), and an outer planet (Mars, ideally) ascending. I would also give this advice for starting fruit trees from seed. Such a date does occur this year on May 1st, which is two days before a full moon, and also where both Venus and Mars are ascending, and are close to their highest point in the northern hemisphere. As most fruit trees today are started from grafts, the question as to whether this is also a good time to graft is one I cannot answer, as Steiner did not give direct indications regarding grafting. I am, however, planning on tarting some blueberries and raspberries from seed on May 1st and then again on May 7th (when Venus is in opposition with the moon), and a third time on May 15th, two days before a new moon. In all of these cases, Venus and Mars will be ascending, and the goal of these sowings will be to attempt to ascertain which of the accompanying phases (full moon, new moon or planetary opposition) will provide the best assistance to Venus and Mars in their ascending phases. Complete results from this work will take several years, as the most important data to be collected will be the yields that these plants provide over time. Any fruit growers who are reading this may consider grafting on the dates indicated, and then following the growth of the development of the grafted stock over time. I would be very interested in any work conducted in this manner.

Planting Trials 2015

This year's planting trials will mirror the trials conducted in the 2014 calendar, with the goal of replicating and further validating its findings. Lettuce will be planted in April, beets in May, and bush beans in June. Each of the trials will have a sowing that occurs on each of the following dates: 3 and 2 days before a full moon, 3 and 2 days before a new moon, apogee and perigee. As with last year's calendar, the trigon planting dates for each of the sowings will be compared with both the anomalistic cycle data (apogee and perigee), and with the synodic data (full and new moon). I will also study the ascending and descending lunar patterns of the tropical cycle, to see if any patterns develop. This calendar also has harvest dates for all of the planting trials. These dates should only be considered as approximations, and are reflected in the specific types that I am growing. For example, in this year's April lettuce trial, I will be

planting romaine lettuce, which matures in about 50 days. I start my lettuce indoors, with a combination of natural and artificial light, in order to regulate temperatures for the first three weeks of growth. If you plan on participating in one or all of this year's trials, the varieties that you sow may have different maturity dates, and if you direct sow outside, germination times can be dramatically affected by ground soil temperatures. If you arrive at a harvest date and feel that the plants are not mature enough to harvest (this may be very apparent with bush beans and beets), then you may have to delay harvesting for a week or two until plants reach maturity. The most important point to remember with harvesting is that *all plants are given the same number of growing days*. Also, if there are significant differences in planting temperatures over the course of a planting trial, please note this information on the data sheets provided in the calendar. Bush beans are given two harvest dates- one at 60 days and one at 80 days, as beans flower over time. The data sheets here provided are meant to make it easier for you to record your data. However, if you find these sheets cumbersome, please feel free to use whatever means works best for you. Please e-mail all results you receive to me at: jbbach1@yahoo.ca . If you have any questions or comments about this calendar, please use this email as well. My essay *Rudolf Steiner's Indications Regarding Cosmic Influences Upon the Growth of Plants*, which forms the basis of this calendar is available on my website at: www.bachbiodynamics.com . You will also find information on biodynamic beekeeping there as well. The goal of this calendar is to research the most effective and beneficial rhythms that affect the growth of plants. It is assumed that planting at the best times will provide not only the highest yields, but also the healthiest and most robust plants and food. This calendar is also meant to be a collaborative effort, where farmers and gardeners become researchers and this learn firsthand, through direct experience, of the different cosmic influences that pour down to the earth from above. Please consider partaking in one, or all of the trials here indicated. All research conducted by readers of this calendar is greatly appreciated.

Warm Regards,

John Bach

☾ - Moon
☿ - Mercury
♀ - Venus
♂ - Mars
♃ - Jupiter
♄ - Saturn
♋ - Opposition

Legend

Grey dates indicate research trial sowing days
Green highlighted text indicates research harvest days
Yellow highlighted text indicates best planting times
Red highlighted dates indicate no plant times (lunar eclipse dates)

January

Sunday

Monday

Tuesday

Wednesday

Thursday

Friday

Saturday

				1 ☾♂♃- 10:53 Plant above ground crops Jan 1-2	2	3
4 Full Moon- 20:53	5	6 ☾♂♀- 07:53	7	8 ☾♂♂- 09:05	9 Apogee - 10:17	10
11	12	13	14	15	16	17 Plant below ground crops Jan 17-18
18	19	20 New Moon- 05:14 All plant days Jan 20-21	21 Perigee-12:06 ☾♂♃- 12:21	22	23	24
25	26	27	28 ☾♂♃-20:44	29	30	31 Plant above ground crops Jan 31-Feb 1

Notes:

February

Sunday
Monday
Tuesday
Wednesday
Thursday
Friday
Saturday

1	2 ☾♂♀-21:30	3 Full Moon- 15:09	4	5 Apogee- 22:25 ☾♂♀-22:02	6 ☾♂♂-14:09	7
8	9	10	11	12	13	14
15 Plant below ground crops Feb 15-16	16	17 ☾♂♂-17:59 All plant days Feb 17-18	18 New Moon- 15:47 Perigee- 23:29	19	20	21
22	23	24	25 ☾♂♂-05:24	26	27	28

Notes:

March






Sunday Monday Tuesday Wednesday Thursday Friday Saturday

1	2 Plant above ground crops Mar 2-3 (inferior)	3 ☾♂♀-00:48	4 Apogee- 23:35	5 Full Moon-10:05	6	7 ☾♂♂-17:41
8 ☾♂♀- 08:58	9	10	11	12	13	14
15	16	17 ☾♂♂- 01:13 Plant below ground crops March 17-18 (superior)	18 All plant days March 17-18	19 Perigee- 11:38	20 New Moon- 02:36	21
22	23	24 ☾♂♂- 14:53	25	26	27	28
29	30	31 Plant above ground crops Mar 31-Apr *(inferior) Plant Lettuce 1 a				

Notes: * Do not plant after 05:00 PST on April 2nd, due to the adverse effects of a lunar eclipse

April

Sunday Monday Tuesday Wednesday Thursday Friday Saturday

			1 Apogee- 05:59 Plant lettuce 1b	2 No plant time April 2-5	3  -14:57	4 Partial Lunar Eclipse-04:01 Full Moon- 05:06
5  -19:58	6	7  -13:42	8	9	10	11
12	13  -08:15	14 All plant days-Apr 15-16	15 Plant below ground crops (superior)- Apr 15-16 – Plant lettuce 1 c	16 Perigee- 20:53 Plant lettuce 1d&e	17	18 New Moon- 11:57
19	20  - 23:00	21	22	23	24	25
26	27	28 Apogee- 19:55 Plant lettuce 1f	29	30 Plant beets 2a Plant above ground crops April 30-May 1		

Notes:* Do not plant after 05:00 PST on April 2nd, due to the adverse effects of a lunar eclipse

May

Sunday Monday Tuesday Wednesday Thursday Friday Saturday

					1 Plant beets 2b Sow seed perennials (blueberries, raspberries, fruit trees, etc.)	2
3 Full Moon- 2:42	4 ☾♂♂♂♂-18:49	5 ☾♂♀♂-15:32	6	7 ☾♂♀♂-10:51	8	9
10 ☾♂♂♂♂ - 16:51	11	12	13 All plant days- May 13-14	14 Perigee- 17:23/ Plant below ground crops- May 14-15 (superior)/ Plant beets 2c&d	15 Plant beets 2e	16
17 New Moon- 21:23	18 ☾♂♂♂♂ - 05:50	19	20	21	22	23
24	25 Harvest lettuce 1a	26 Apogee- 15:12/ Plant beets 2f Harvest lettuce 1b	27	28	29	30 Plant above ground crops May 30-31/Plant bush beans 3a/Plant carrots 4a
31 Plants bush beans 3b						

Notes:

Trial 1- Data Sheet – Lettuce

Plant	Trial 1a- plant length	Trial 1a – length- head only	Trial 1a – total weight	Trial 1b – plant length	Trial 1b – length–head only	Trial 1b- total weight	Trial 1c- plant length	Trial 1c- length-head only	Trial 1c- total weight	Trial 1d- plant length	Trial 1d- length- head only	Trial 1d- total weight	Trial 1e- plant length	Trial 1e- length- head only	Trial 1e- total weight	Trial 1f- plant length	Trial 1f- length- head only	Trial 1f- total weight
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10																		
11																		
12																		
avg																		

E-mail results to:
jbbach1@yahoo.ca

June

Sunday
Monday
Tuesday
Wednesday
Thursday
Friday
Saturday

	1	2 Full Moon- 09:19 ☾♂♀ - 01:27 ☾♂♂ - 15:31	3	4	5 ☾♂♀ - 23:02	6 Moon in Virgo - plant carrots 4d
7 ☾♂♂ - 04:06	8 All plant days – June 8-9	9 Perigee- 21:39 Plant bush beans 3c/Plant carrots 4b	10 Harvest lettuce 1c	11 Harvest lettuce 1d&e	12	13 Plant below ground crops June 13-14/ Plant bush beans 3d/Plant carrots 4c
14 ☾♂♂ - 10:53 Plant bush beans 3e	15	16 New Moon- 07:05	17	18	19	20
21	22	23 Apogee- 10:01 Plant bush beans 3f Harvest lettuce 1f	24	25	26	27
28 Plant above ground crops June 28-29	29	30				

Notes:

July

Sunday Monday Tuesday Wednesday Thursday Friday Saturday

			1 Full Moon- 19:20 ☾♂♂ - 10:32	2	3	4 ☾♂♂♂ - 18:37 ☾♂♀ - 21:32 All plant day July 4-5
5 Perigee- 11:54	6	7	8	9 Harvest beets 2a	10 Harvest beets 2b	11 ☾♂♂ - 14:52
12 Plant below ground crops July 12-13	13	14	15 New Moon- 18:24	16	17	18
19	20	21 Apogee- 05:02	22	23 Harvest beets 2c&d	24 Harvest beets 2e	25
26	27	28 Plant above ground crops July 28-29	29 Harvest bush beans 3a	30 ☾♂♂♂ - 04:24 Harvest bush beans 3b	31 Full Moon- 03:43	

Notes:

Trial 2 - Data Sheet – Beets

Plant	Trial 1a- plant length	Trial 1a – total weight	Trial 1a –weight– root only	Trial 1b – plant length	Trial 1b – total weight	Trial 1b- weight-root only	Trial 1c- plant length	Trial 1c- total weight	Trial 1c-weight-root only	Trial 1d- plant length	Trial 1d- total weight	Trial 1d- weight-root only	Trial 1e- plant length	Trial 1e-total weight	Trial 1e- weight-root only	Trial 1f- plant length	Trial 1f-total weight	Trial 1f- weight-root only
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10																		
11																		
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avg																		

E-mail results to:
jbbach1@yahoo.ca

Trial 3- Data Sheet – Bush Beans (first harvest)

Notes:

Plant	Germination	Trial 3a- # of pods/plant	Trial 3a- total pod weight	Trial 3b- # of pods/plant	Trial 3b - total pod weight	Trial 3c-# of pods/plant	Trial 3c total pod weight	Trial 3d-# of pods/plant	Trial 3d total pod weight	Trial 3e-# of pods/plant	Trial 3e total pod weight	Trial 3f-# of pods/plant	Trial 3f total pod weight
1													
2													
3													
4													
5													
6													
7													
8													
9													
10													
11													
12													
avg													

E-mail results to:
 jbbach1@yahoo.ca

Trial 3- Data Sheet – Bush Beans (second harvest)

Plant	Germination	Trial 3a- # of pods/plant	Trial 3a- total pod weight	Trial 3b- # of pods/plant	Trial 3b - total pod weight	Trial 3c-# of pods/plant	Trial 3c total pod weight	Trial 3d-# of pods/plant	Trial 3d total pod weight	Trial 3e-# of pods/plant	Trial 3e total pod weight	Trial 3f-# of pods/plant	Trial 3f total pod weight
1													
2													
3													
4													
5													
6													
7													
8													
9													
10													
11													
12													
avg													

Notes:

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August

Sunday Monday Tuesday Wednesday Thursday Friday Saturday

						1 ☾♂♃ - 12:16 ☾♂♀ - 15:02 All plant day Aug 1-2
2 Perigee-03:11	3 Harvest beets 2f	4	5	6	7 ☾♂♃ - 19:40	8 Harvest bush beans 3c
9	10	11	12 Plant below ground crops Aug 12-13	13 Harvest bush beans 3d	14 New Moon- 07:54 Harvest bush beans 3e	15
16	17	18 Second harvest bush beans 3a Harvest carrots 4a	19 Second harvest bush beans 3b	20	21	22 Harvest bush beans 3f
23		25	26 Plant above ground crops Aug 26-27	27 ☾♂♂ - 21:24	28 ☾♂♀ - 03:18 Second harvest bush beans 3c/Harvest carrots 4b	29 Full Moon- 11:35 All plant days- Aug 29-30
30 Perigee-08:24	31 ☾♂♀ - 21:05					

Notes:

Trial 4 Data Sheet – Carrots

Plant	Trial 1a- plant length	Trial 1a - length – root only	Trial 1a – total weight	Trial 1b – plant length	Trial 1b – length- root only	Trial 1b- total weight	Trial 1c- plant length	Trial 1c- length- root only	Trial 1c- total weight	Trial 1d- plant length	Trial 1d- length- root only	Trial 1d- total weight
1												
2												
3												
4												
5												
6												
7												
8												
9												
10												
11												
12												
avg												

Notes:

E-mail results to:
jbbach1@yahoo.ca

September

Sunday Monday Tuesday Wednesday Thursday Friday Saturday

		1	2 Second harvest bush beans 3d/Harvest carrots 4c	3 Second harvest bush beans 3e	4 ☾♂♃-03:02	5 Harvest carrots 4d
6	7	8	9 Plant below ground crops- Sep 9-10	10	11 Second harvest bush beans 3f	12 New Moon- 23:41
13	14 Apogee- 04:28	15	16	17	18	19
20	21	22	23 Plant above ground crops- Sep 23-24 (inferior)	24 ☾♂♀ - 21:02	25 ☾♂♂ -13:30 No plant days- Sep 25-28	26 ☾♂♃ -04:39
27 Perigee- 18:46 Lunar Eclipse-18:48 Full Moon- 19:50	28 ☾♂♀ -03:32	29	30			

Notes:

October

Sunday

Monday

Tuesday

Wednesday

Thursday

Friday

Saturday

				1 ☾♁♃-14:53	2	3
4	5	6	7	8	9 Plant below ground crops Oct 9-10 (inferior)	10
11 Apogee- 07:17	12 New Moon- 17:06	13	14	15	16	17
18	19	20	21	22	23 ☾♁♂♃-21:29 ☾♁♃-23:21	24 ☾♁♂♂-04:18 Plant above ground crops- Oct 24-25 (superior)
25 All plant days- Oct 25-26	26 Perigee- 05:59 ☾♁♂♀-05:25	27 Full Moon- 05:05	28	29 ☾♁♃-05:41	30	31

Notes:

November

Sunday
Monday
Tuesday
Wednesday
Thursday
Friday
Saturday

1	2	3	4	5	6	7 Apogee- 13:48
8 Plant below ground crops Nov 8-9 (inferior)	9	10	11 New Moon- 09:47	12	13	14
15	16	17	18	19	20 ☾♂♃- 14:06	21 ☾♂♂-16:15
22 ☾♂♀- 07:57 Plant above ground crops (superior)/All plant days Nov 22- 23	23 Perigee- 13:06	24	25 Full Moon 14:44 ☾♂♃-20:46 ☾♂♀-23:26	26	27	28
29	30					

Notes:

December

Sunday
Monday
Tuesday
Wednesday
Thursday
Friday
Saturday

		1	2	3	4	5 Apogee- 06:56
6	7	8 Plant below ground crops Dec 8-9	9	10	11 New Moon- 02:29	12
13	14	15	16	17	18 ☾♂♃-12:42	19
20 ☾♂♂- 02:50 All plant days Dec 20-21	21 Perigee- 00:53	22 Plant above ground crops Dec 22-23(superior)	23 ☾♂♃-11:45	24	25 Full Moon- 03:11	26 ☾♂♀- 16:21
27	28	29	30	31		

Notes:

2014 Bach Planting and Research Calendar Results

The 2014 Bach Biodynamic Planting and Research Calendar focused on continuing the exploration into biodynamic approaches to sowing in accordance with cosmic influences that began with the 2013 calendar. The focus for the 2014 calendar was to look at the different synodic and anomalistic phases of the moon, and the effect that these phases had on the growth and yield of vegetable crops. Seeds were planted during both waning and waxing phases of the moon. Additionally, seeds were sown on both apogee (when the moon is furthest from the earth during its 28 day synodic cycle), and during perigee, when the moon is closest to the earth during this cycle. Three outdoor planting trials took place over the months of April, May and June. The vegetables that were planted were radishes (April), lettuce (May), and bush beans (June). Sixteen seeds were planted at each of six different phases of the synodic cycle as follows: 3 days before a full moon, 2 days before a full moon, 3 days before a new moon (synodic cycle), 2 days before a new moon, on apogee and on perigee (anomalistic cycle). The trigon days of each of the plantings (fruit, flower, root, leaf) was also recorded for each of the plantings, and the data from the harvest of all of the trials compared the efficacy of the different plantings to synodic, anomalistic, and trigon rhythms. Lastly, early trials (radish trial 1) indicated that root crops might best be planted during waning phases, so a small trial was conducted with beets and turnips to further investigate this phenomenon. The data in this year's trials has led to the conclusion that the sowing of seeds is most effective at the following times:

Above ground crops- during a waxing phase of the moon
Below ground crops- during a waning phase of the moon
All seed types- perigee

The 2015 calendar will adopt this practice. It has been my intention in publishing this calendar that a collaborative research model could be developed, where the research indications of the calendar could be undertaken by a wide number of people from a wide geographic scope. This goal has unfortunately not been achieved. Even though there have been many thousands of visits to my website, and many downloads of the calendar, only one person partook in this year's research. All research is made more valid by larger amounts of data that confirm results of research conducted in the same way by different researchers. I hope that in future publications more participation will occur, providing larger data sets and thus giving the results more validity. Having said this, I have conducted the planting trials with vigour and an eye to detail, to ensure that the conclusions drawn from the data are as accurate as possible. I would like to thank Conradin Obrecht in Switzerland for his participation in this year's research.

Radish Trials

This first trial was conducted in two geographic locations more than 8,200 kilometers apart and the two graphs below show the data from both trials (JB - John Bach CO - Conradin Obrecht).

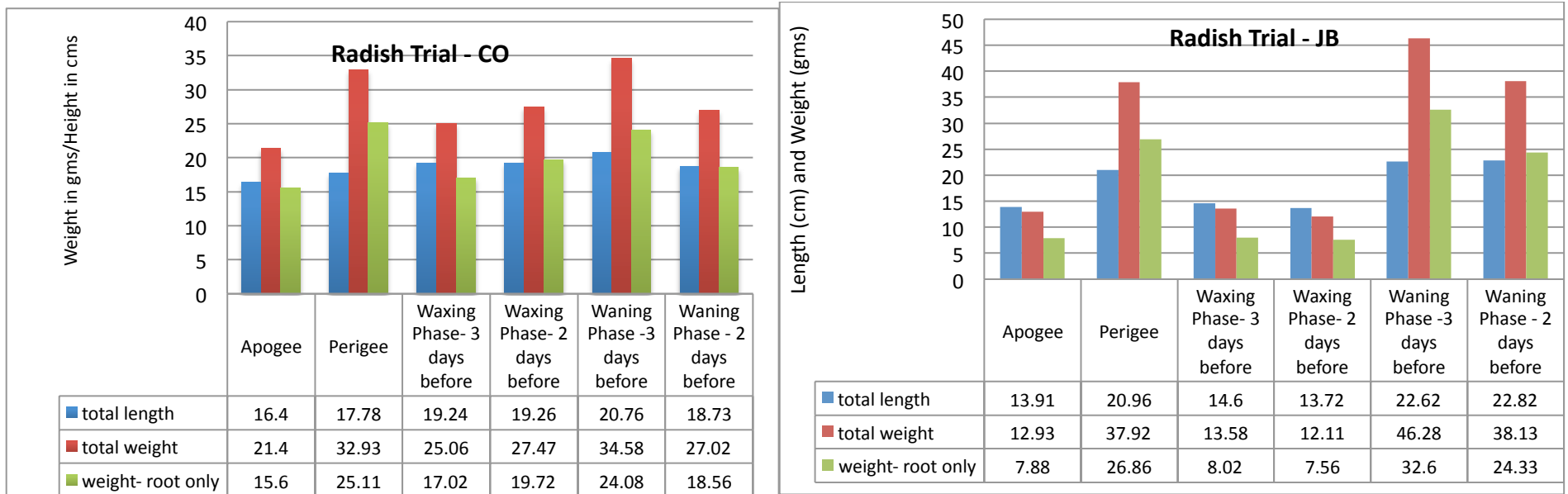


Table 1a: weights (in grams) of the roots of each trial are given in the table below, from largest to smallest.

CO- perigee (Apr 22)	25.11 grams	13.3 ° C	ascending	JB- waning (3) (Apr 25)	32.6 grams	13.7 °	ascending
waning (3) (Apr 25)	24.08 °	12.0 °	ascending	perigee (Apr 22)	26.86 °	13.2 °	ascending
waxing (2) (Apr 13)	19.72 °	9.8 °	descending	waning (2) (Apr 26)	24.33 °	13.9 °	ascending
waning (2) (Apr 26)	18.56 °	11.6 °	ascending	waxing(3) (Apr 12)	8.02 °	11.1 °	descending
waxing (3) (Apr 12)	17.02 °	10.0 °	descending	apogee (Apr 8)	7.88 °	10.5 °	descending
apogee (Apr 8)	15.6 °	11.0 °	descending	waxing (2) (Apr 13)	7.56 °	11.4 °	descending

Both of the data sets had the largest radishes in the perigee and waning (3 days before a new moon) phases, while radishes sown during apogee in both sets gave poor results. In the Swiss CO data set, two of the waxing and one of the waning sets produced average weights that were within 3 grams of each other. In the JB Vancouver data set, there is an enormous difference in the size of radishes sown in the waning/perigee phase as compared to those sown in the waxing/apogee sets.

This large discrepancy in Vancouver root weights between the perigee/waning radishes and the apogee/waxing radishes was in all likelihood partially due to cold weather in the first half of April, when the waxing/apogee radishes were sown, and warmer weather in the last half of April when the waning/perigee radishes were sown. The average temperatures for the first ten days of each of the trials is included in the table 1a. In lecture one of his Agricultural Course, Rudolf Steiner stated "...with the forces that come from the Moon on days of the full Moon, something colossal is taking place on the Earth. These forces spring up and shoot into all the growth of plants, but they are unable to do so unless rainy days have gone before...the Earthly forces of growth are feeble and unable to sustain plants. Through the forces of the Moon, the forces of growth are strengthened to the point where they can then become reproductive forces¹." Here, with the growth of radishes in this trial, we must say that this has not been the case. Five of the six largest yields for radishes occurred during waning phases. Of these, two happened during perigee, which, in this trial occurred in a waning phase five days before a new moon. The first and most obvious factor that may have affected the results of this trial is the higher temperatures that can be demonstrated with most of the larger radish yields, as seen in table 1a. Is it also possible, however, that radishes, and root crops in general, grow better and larger during a waning phase, or could it be that other cosmic factors are at play?

In the 1980s and 90s, Harmut Spiess conducted large planting trials over several years to study the growth of different crops and found that different crops respond to different lunar rhythms². He not only found that plants respond to the synodic rhythm of the waxing and waning moon, but also to the anomalistic rhythm of apogee (when the moon is furthest from the earth) and perigee (when the moon is closest to the earth), and the tropical lunar rhythm, where the moon ascends and descends in relation to the ecliptic (the sun's path through the constellations over the course of a year). These three rhythms are each of slightly different lengths, and because of this, there are always different combinations of these rhythms working onto the earth that make it difficult (but I believe certainly not impossible) to determine which rhythm has the most beneficial effect on the growth of a given crop. With regard to radishes, Spiess found that the most important rhythms that affected growth were the tropical and anomalistic rhythms. Specifically, the best growth was related to perigee, and then to the ascending phase of the draconian cycle. This information can be seen in table 1a. Five of the six radish weights occurred during ascending phases, and in the CO trial the best result was on perigee, and in my trial, the second best result was achieved on perigee. Apogee was associated with poor growth and lower root weights. To summarize the important data in this trial: best results were achieved during perigee, during a waning phase, when the moon was in an ascending phase, and when temperatures were warmest. It is commonly known that cold temperatures negatively affect the germination and

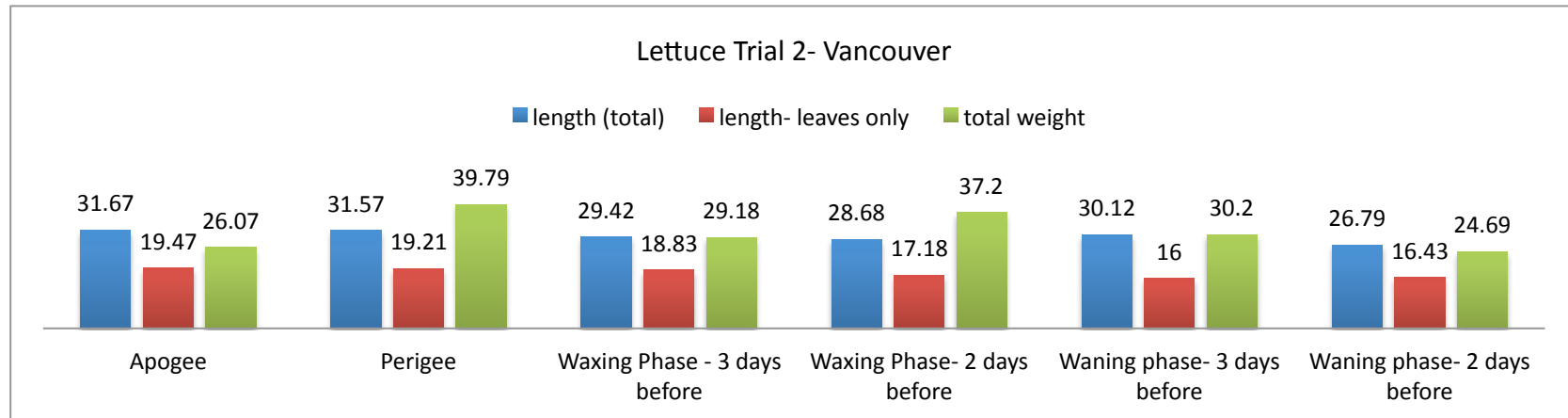
¹ This series of lectures, given in 1923 is available at www.rsarchive.org for free.

² http://www.forschungsring.de/fileadmin/ibdf/pdf/spiess/spbd00_01.pdf

subsequent growth of seeds. It is also important to note that during this trial a lunar eclipse occurred. Last year, I found that seeds sown within 48 hours of a lunar eclipse had both poor germination and growth. In my Vancouver trial, the radishes sown 2 days before a full moon (waxing 2) were the smallest of the trial. Also, because of the time difference between PST and UT the eclipse in Vancouver occurred 7 hours later than in Switzerland, and because of this these radishes were planted only 31 hours before the eclipse occurred, well within the 48-hour window where seeds should not be sown.

Lettuce Trials

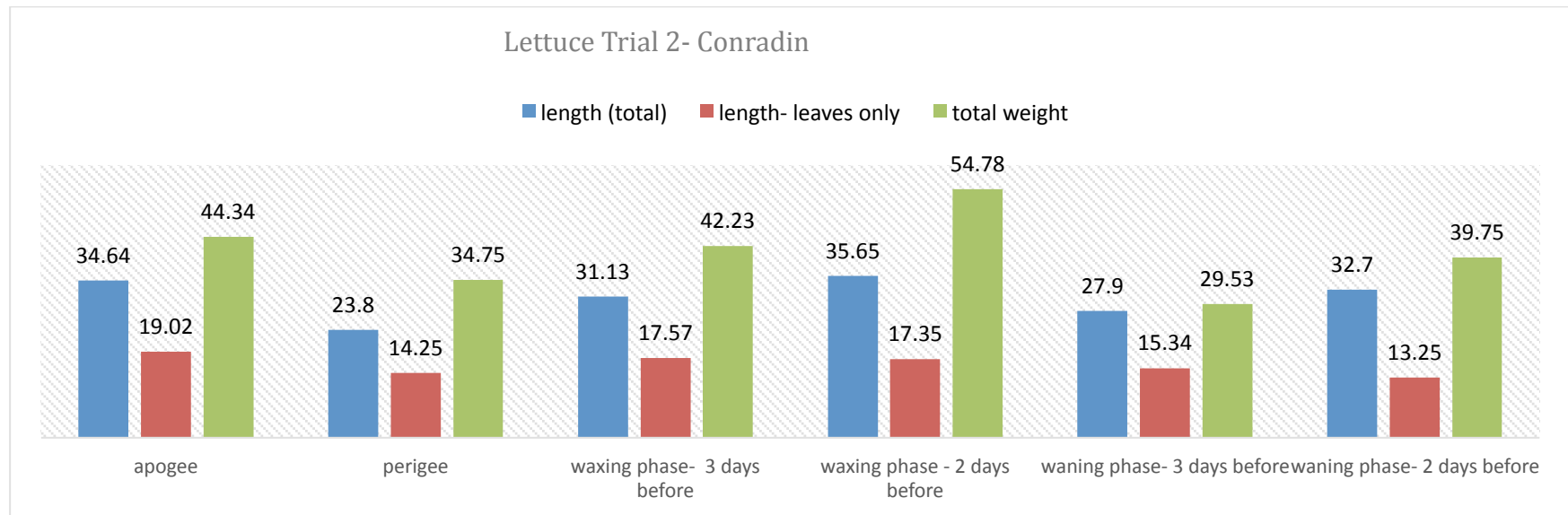
The second trial for the 2014 calendar was an outdoor lettuce trial in May. For the Vancouver trial a fast growing variety of lettuce was sown, and germinated and grown indoors with a combination of artificial and natural light for the first 17 days, with a temperature between 15-20 degrees Celsius. The Swiss trials were all sown directly outdoors. The results for both trials are shown graphically below. The Vancouver trial demonstrated an almost perfect growth distribution for what I believe to be the best and worst planting times for above ground crops. The results show perigee again giving the largest yields, followed by the waxing phase 2 days before a full moon.



The poorest results occurred for the waning phase two days before a new moon, and apogee. The waxing and waning phases 3 days before full and new moons were also the same. By contrast, the Swiss data game somewhat different results

For above ground crops, I would expect the best yields during the waxing and perigee phases of the trial, and the poorest results during the waning phase of the trial and apogee. As expected, the Swiss waxing phase yields were both good, and the waning phase yields were poor by comparison. What surprised me was the apogee yields were second highest in the trial, and the perigee yield was second lowest, only ahead of the waning trial three days before a new moon. To what could the good apogee and poor perigee Swiss

results be attributed? I speculate that the poor perigee results were obtained again because of temperatures in Basel during the first three days of sowing, but in this case, I believe the temperatures were too high. The daily highs for the first three days of the perigee trial were 26, 26 and 28 degrees Celsius. I have been trying to grow lettuce indoors under light, and in the summer most of these trials failed, as the combined heat of the house and the lights used for the trial often exceeded 30 degrees Celsius. Under these conditions, lettuce germination and growth is very poor. By contrast, the highs for the first three days of the apogee trial were 20, 20, and 19 degrees Celsius, ideal for lettuce. This is, of course, only speculation to explain what I consider to be unexpected results. In the winter months, as I write this, I am planning some indoor planting trials where temperatures and light levels can be controlled precisely. The high outside temperatures of the summer are no longer affecting indoor temperatures, and I plan on conducting a six month indoor trial of both lettuce (above ground), and radishes(below ground), to see if regular patterns emerge under well controlled trials.

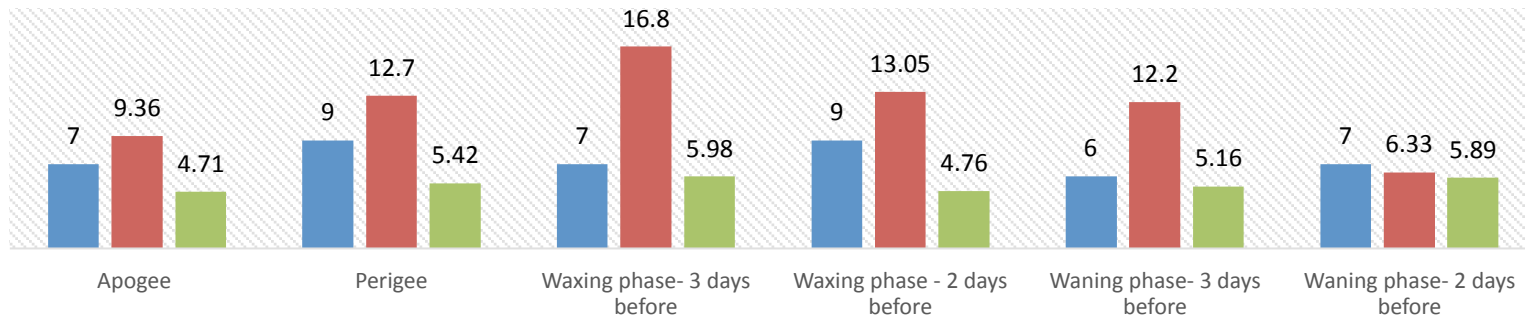


Bush Bean Trial

The bush bean trial for the 2014 calendar was conducted in May. My data set is the only one conducted for this trial. The weather for the duration for this trial was very close to ideal, with temperatures generally staying within a range of the low to mid 20s for daytime highs and between 12 and 15 degrees Celsius for night-time lows.

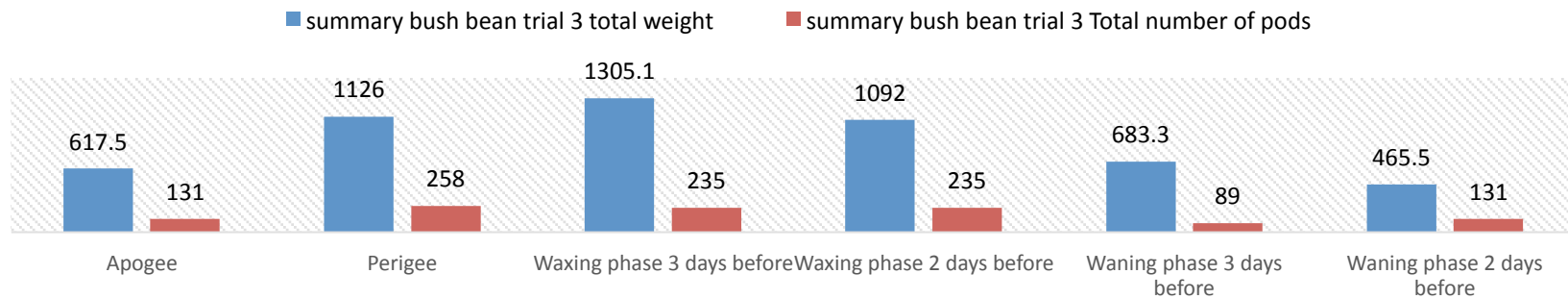
Bush Bean Trial 3- Averages

■ Bush Bean Trial 3- #of plants ■ Bush Bean Trial 3- Avg pods/plant ■ Bush Bean Trial 3- avg weight of pod



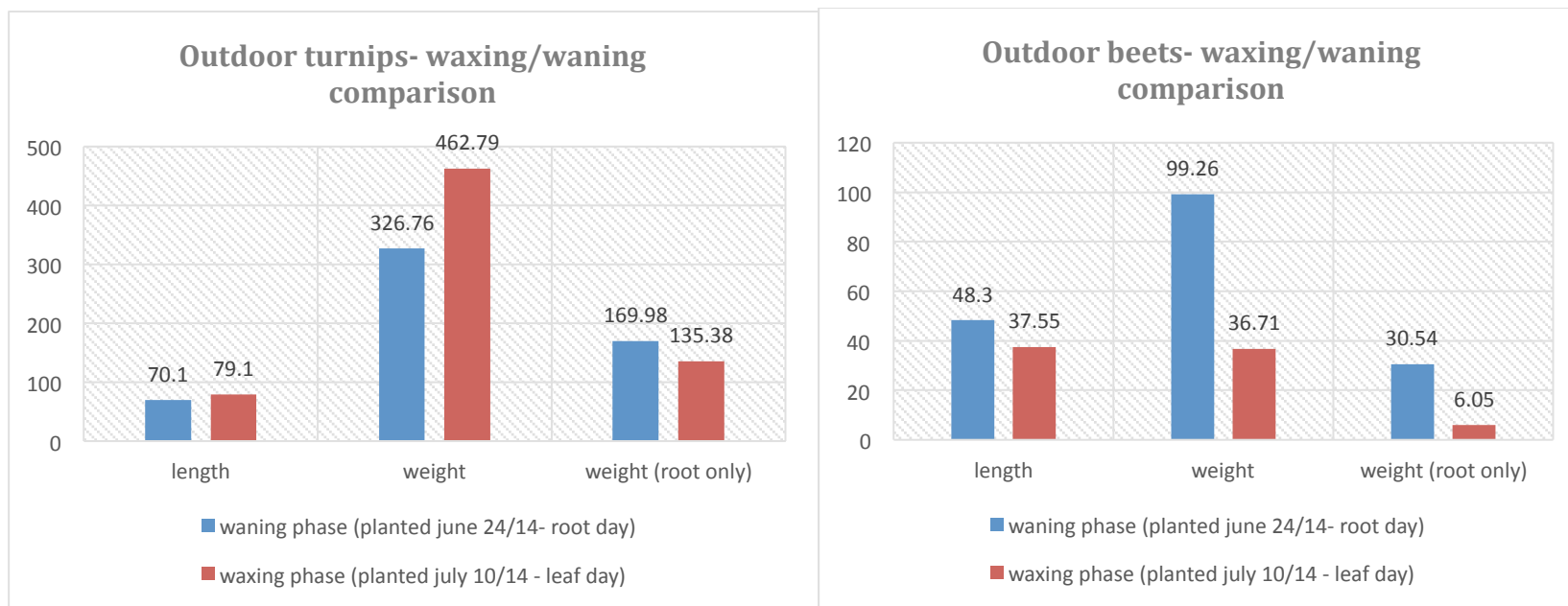
The per-plant data averages of the waxing sets gave the highest numbers, as did perigee, and the lowest numbers occurred at apogee, followed by the waning sets. These numbers become more pronounced when the total for all of the plants are given. This data shows the numbers of plants that made it to maturity. Not only did the perigee and waxing sets yield higher numbers per plant, they also had somewhat better survival rates, and were less susceptible to damping off. Interestingly, the average weight per pod was similar for most of the trials. Instead of producing high numbers of smaller pods, the plants of the apogee and waning phases produced fewer pods, but of similar size to the waxing and perigee plants. Also of note is that perigee in this trial occurred during a waning phase (5 days after the full moon). This implies that perigee is a benefit to all plant growth, regardless of whether it occurs in a waxing or waning phase. Perigee should be considered a good time to plant both above and below ground crops. The strong perigee numbers also occurred when the moon was ascending, but was three days from its low point in the tropical rhythm (in Capricorn). This does not correspond to the findings of Spiess (moon ascending close to high point on Gemini).

Bush Bean Trial 3 -total weight and number of pods



Outdoor Beet and Turnip Trial

The results of the April radish trial which showed higher yields during a waning phase were intriguing, so I decided to see if the same results would occur with other root crops. I planted 25 turnips and 25 beets on June 24/2014, two days before new moon, and then again on July 10/2014, two days before full moon. The temperatures for the months of June through September were very uniform, as mentioned above, and provided ideal conditions for research. I had earlier constructed two identical planting boxes, each 8 feet by 4 feet, and filled them with composted horse manure from the same source for each of the planting boxes. The first ten beets and turnips in each row were harvested after 75 days. The results of the trial confirmed the earlier results of the April radish trial, with both beets and turnips giving larger root yields during a waning phase.



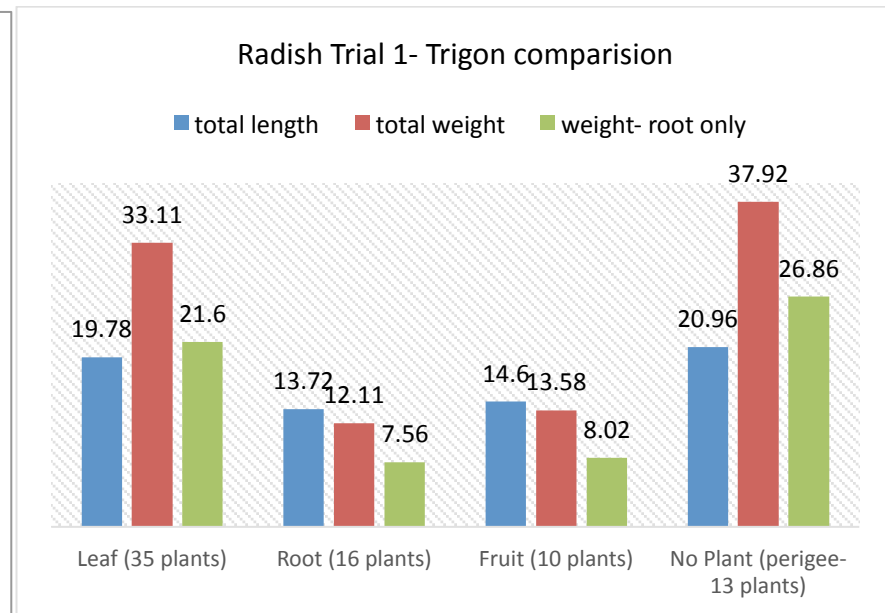
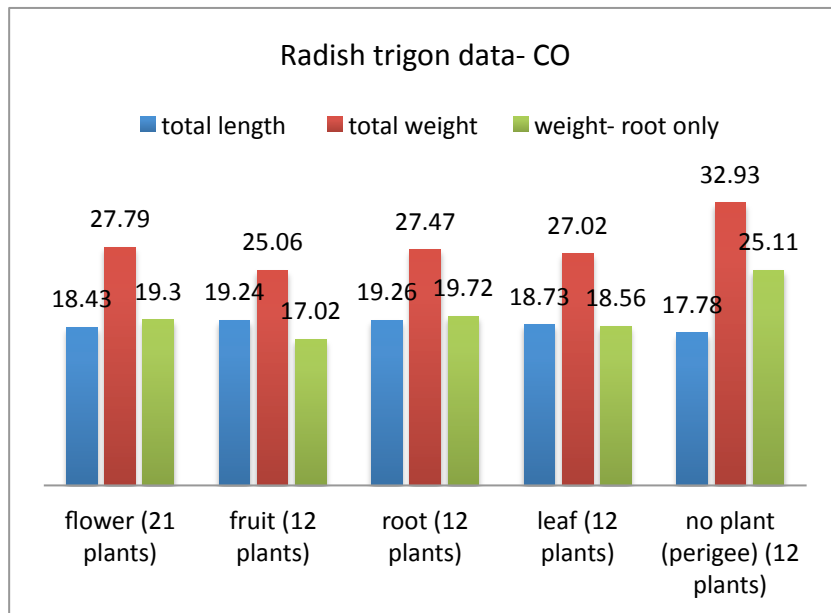
Also of interest was that the total weight of the waxing phase turnips was larger than that of the waning phase turnips, but the roots of the waning phase turnips were larger, implying that during a waning phase lunar forces of growth are directed to the root of a plant, while during a waxing phase, lunar forces are directed to the above ground portion of the plant. The waning planting dates in this trial occurred during an ascending lunar phase (with the moon in Taurus), and the waxing planting dates occurred on the lowest descending phase of the tropical rhythm. Beets and turnips were not part of Spiess research, so there is nothing with which this data can be compared.

Trigon Data

All of the data presented above has been framed in the context best planting times in relation to the synodic waxing and waning lunar rhythm, and also the anomalistic rhythm, where apogee and perigee have been studied. This data can also be studied in the context of the planting approach of Maria Thun, where the moon's passage through the zodiac is used to determine best planting times. Over the years, Thun developed a theory that plants grew and developed differently when the moon was in one of the twelve zodiacal constellations. She grouped the twelve signs of the zodiac into four trigons (a trine is a 120° angle, formed, in this case, between the different constellations). As the moon travels through these four trigons, each with three constellations, different crops are grown by type. The groupings are as follows:

Root crops (Earth element): Taurus, Capricorn, Virgo
 Leaf crops (Water element): Cancer, Pisces, Scorpio
 Flower crops (Light element): Gemini, Aquarius, Libra
 Fruit/Seed crops (Fire/warmth element): Aries, Leo, Sagitarius

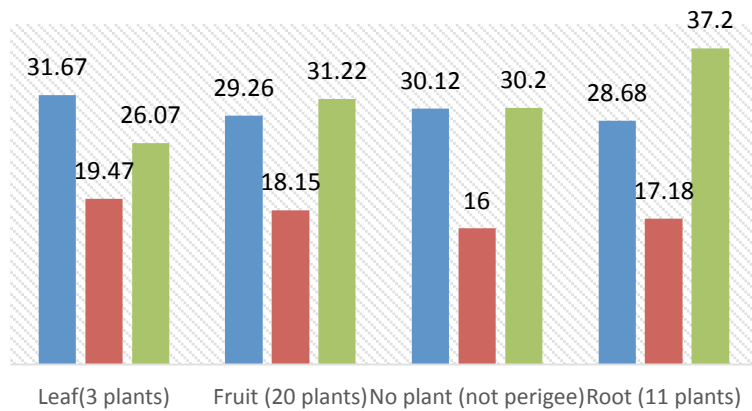
The data from the three trials in this years calendar can be presented according to the different trigons.



Both of the data sets for the April radish trial show the no-plant perigee time as the best for this crop. For the CO Swiss data set, the root day came third, and for my data set, the root day was last. For my data set the leaf day was second, while for the CO data set, the flower day came in second. In this data set there is a lack of consistency with the associated trigon for the crop planted. The data suggests, as mentioned above, that the cosmic factors most strongly associated with strong radish development and growth are related the anomalistic cycle (perigee), and the waning moon of the synodic cycle. The poor root day for the Vancouver trial was also likely affected by colder temperatures, as well as by an impending lunar eclipse, as was discussed above.

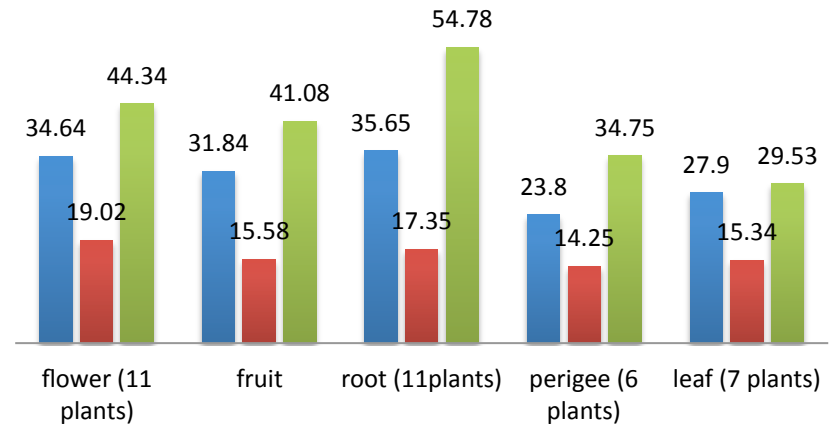
Lettuce Trial 2- Trigon comparison

■ length (total) ■ length- leaves only ■ total weight



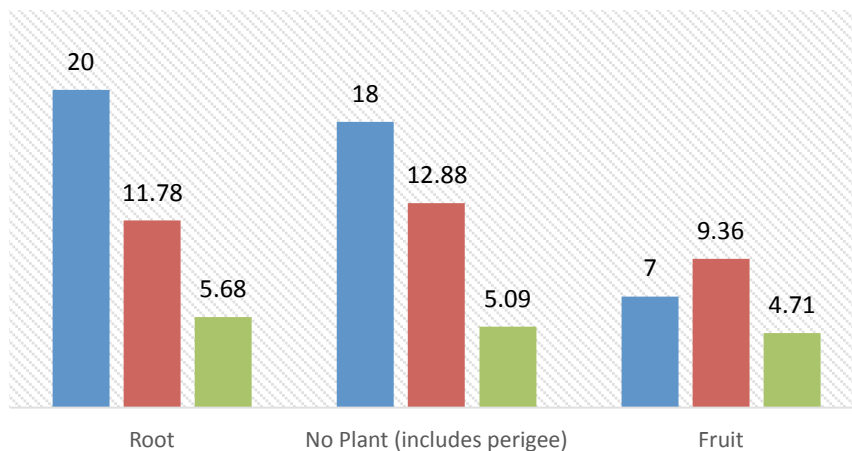
Lettuce trigon data- CO

■ length (total) ■ length- leaves only ■ total weight



Bush Bean Trial- Trigon Comparison

■ # of plants ■ Avg pods/plant ■ avg weight of pod



The trigon data for the May lettuce trial interestingly showed long leaf lengths for the leaf day in my Vancouver trial, but the total weights for the plants was the lowest for the entire group. This was also the case for the Swiss trial, where the weights on a leaf day were the lowest of the entire group. I believe that these low numbers can be attributed to planting during the weakest phase of the anomalistic phase cycle for the Vancouver lettuce (apogee), and the weakest phase of the synodic cycle for above ground crops (just before a new moon). The low apogee number for the Vancouver trials surprised me, as apogee occurred during the waxing cycle, but was eight days away from a full moon. This data does not suggest an inverse relationship to trigon planting times and yields; it simply suggests that when a favourable trigon planting time is used during an unfavourable

planting time in either the anomalistic or synodic lunar rhythms, there is no beneficial effect. This implies that trigons do not affect the germination of seeds and the subsequent growth of plants significantly.

This pattern is again present in the bush bean trial conducted in June. As mentioned above, the temperatures during most of this trial were ideal for outdoor growing. The trigon data for bush beans again shows that the favourable trigon day (fruit) was not able to give the impetus to strong growth when the seeds were sown during a poor anomalistic phase (apogee), and also a fairly weak synodic period (three days after a new moon). Based on this information, and on the data from last year's trial, I have concluded that trigons are ineffectual in their influence on the germination of seeds and the subsequent growth and yields of plants. The number of plants that I have used to come to this conclusion is small, and I will continue to study all calendar sowing methodologies to gather further data through planting trials. However, this data does not stand alone, and confirms work conducted by Harmut Spiess and by Walter Goldstein and Bill Barber.

Conclusions and Future Directions

The data from this year's work has changed my approach to planting below ground, or root crops. In last year's calendar, I recommended that all sowing is best done during a waxing phase. Based on the data from the radish trial and also from the turnip/beet trial, which both showed better results in a waning phase, I am now going to recommend that below ground crops be sown two or three days before a new moon. I will research Spiess' recommendation to plant carrots in a waxing phase (three days before a full moon, moon in Virgo) in the 2015 calendar. This year's results have shown that perigee is a good planting time for all crops, with some of the best yields occurring with plantings done on the day of perigee. In the 2015 calendar, perigee and the day before perigee will be designated as 'all plant days'. A waxing phase where perigee occurs close to a full moon should be considered as the best planting time for above ground crops, and a waning phase where perigee occurs close to a new moon should be considered as the best planting time for below ground crops. In 2015, I will broaden my research to cover a wider variety of crops, to determine if the advice given here is applicable to all crops, or whether cosmic influences are more crop specific. Also, I will continue to study the effects of the tropical rhythm, which was started in the 2014 calendar. The complete excel data sheet with all of the data sets used in the graphs of this report can be found on my website at www.bachbiodynamics.com. This report will also be included in the 2015 calendar, which can be downloaded for free, also on my website.

Any comments or questions can be sent to me via e-mail at jbbach1@yahoo.ca, or on the blog section of the website.

Warm regards,

John Bach