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Lunar Rhythms and Plants

Experiments with seeds and plants have shown that our cultivated plants respond differently to seeding them in different lunar cycles. The greatest effects were caused by rhythms of new and full moon, of the ascending and descending moon, as well as of apogee and perigee.

From the beginning of time people were conscious that there is a connection between life on earth and the movement of the stars. Realizing that a thriving plant world guarantees an adequate food supply, our ancestors observed in great detail how the growth of plants reacted to given factors, such as climate and the changes in the starry heavens. The insights learned were passed on in the form of ancient peasant weather folklore and wisdom, which to some extent today is still made available in farmer's almanacs and the like. A great number of such weather rules originate from the time between 4000 and 2000 B.C. and later were collected by Plinius the Elder (27–79 A.D.). Present-day collections of peasant wisdom explain that through the flourishing of astrology in the late middle ages earlier human insights into the workings of the moon in plant life were distorted and falsified or arose out of superstition. Often such publications (e.g. Hauser, 1973) give contradictory advice for the same lunar aspects.[1]

Only Partial Scientific Verification of Moon Rules

Recent scientific experiments show, however, that not all traditional moon lore is pure nonsense. Even today the waxing or waning position of the moon are taken into account when cutting trees for lumber, for example. Lumber cut during periods of the waxing moon is believed to decay sooner and become more attacked by destructive insects. The validity of this statement was confirmed through experiments in Austria and Cuba by Jahn in 1982 and by Leon and Barrio in 1987. They showed how firs and pines, which were felled before the full moon, were attacked more frequently by the bark beetle (*Ipidae* spp., *Pityogenes*) than those trees cut before new moon.

Not taking into account these and a few other examples, today the traditional heritage of peasant lore plays only a minor role in the practice of the "modern" farmer and gardener; only in biodynamic agriculture and horticulture are planetary rhythms still considered. In recent years various moon calendars attracted interest again, especially among home gardeners and hobbyists. In these a great number of indications are given which differ from each other. The suggestions are based on four to five different planetary systems, which mostly differ in the assignment and classification of the positions of the signs of the zodiac (Spiess, 1997).

Different Moon Cycles

The moon circles the earth at alternating speeds, different angles, and varying time periods. In doing so, it attains the most diverse positions in relation to the other planets, creating five major rhythms and several hundred so-called inequalities. The most common and best known is the synodical moon rhythm in which the moon circles the earth in 29.5 days in relation to the sun, making visible the phases of the moon, of full and new moon. This cycle causes changes in the reflection of the sunlight, the gravitational pull, and the electro-magnetic field intensity.

Due to the elliptical orbit of the moon, the moon comes closest to earth at perigee (or Pg), and reaches its fullest distance from the earth at apogee (or Ag). The period between the two is the anomalistical rhythm of 27.6 days.

Sun, planets, and the moon move along a background of fixed star constellations, commonly called the zodiac, with its various signs. The moon needs 27.3 days to move through all the constellations, thereby establishing the sidereal rhythm. As it passes through, it reaches a high point in the sky (in the Twins) and a low point (in the Archer). The cycle between high and low points is called the tropical rhythm or orbit. Finally, there is the draconian rhythm with 27.2 days, which describes the path of the apparent intersecting points, or moon nodes, of the sun's and moon's orbits and the eclipses related to them. Due to the super-imposition (interferences) of the individual moon cycles, including the multitude of the planetary constellations, there are endless possibilities of combinations. This eliminates the possibility in the entire cosmos for a certain constellation to ever be exactly repeated.

Lunar Rhythms Scientifically Proven

Today it is known that there exist more than six hundred organisms which reveal a link to lunar rhythms either in their reproductive cycles or in their feeding habits. All scientifically proven cases show a dependency upon the rhythms of the synodic moon or the cycles of the tides,

which are governed by the moon. The following plants, for example, respond in their metabolism to the lunar synodical rhythm and are mentioned in the literature: germination and water uptake in beans; root growth in beans and sunflowers; respiration in potatoes, carrots, and sunflowers; growth rate in cress and various wild plants; absorption of nutrients in Sudan grass and corn; DNA formation in potatoes and formation of cytokinin in seaweeds (literature survey: Spiess, 1994; Endres and Schad, 1997). Recent findings show an effect of lunar rhythms on the germination and rate of growth of tropical trees. The percentage of germination and successive rate of growth were highest when seeding took place two days before full moon (Zuercher, 1998). Furthermore, the magazine *Nature* published observations which showed that tree trunks expanded and contracted in conjunction with the cycles of the tides (Zuercher et al, 1998).

Steiner Encourages Research in Cosmic Rhythms

In 1924 Rudolf Steiner, the founder of biodynamic agriculture, encouraged the study of relationships between moon and plant growth. Within the framework of his "Agriculture Course" he pointed out the moon's influence upon plant growth and in particular to the phases of the moon, and he stressed the need to verify this through scientific investigation. These references resulted in numerous experiments, as for example those made by Kolisko. In tests with seeds and seedlings it was repeatedly shown that plants seeded before full moon brought higher yields and better quality than those seeded before new moon (Kolisko, E. and L., 1939). Schultz (1935) did more than three hundred series of experiments which, in addition to those evaluating the phases of the moon, also included the moon's constellation within the zodiac and other lunar rhythms. In 1936 Jaeger, who followed astrological indications given by Paracelsus and Albertus von Magnus, published the results of his investigations. Other authors, however, could only partly verify his findings in subsequent tests (see Spiess, 1994).

In the 1950s and 1960s a sowing calendar with astronomical references was published for the first time for farmers and gardeners by Franz Rulni and H. Schmidt. References were made in particular to the phases of the moon, to perigee and apogee, to the moon nodes, and to the planetary rhythms. The recommendations given in this calendar were picked up by Maria Thun who made, however, different observations. In 1963 she observed after successive daily sowings of radishes that different plant types emerged within a siderial moon month, repeating themselves in trigons that could be distinguished as root, flower, leaf, and fruit/seed types. This classification, together with other rhythms of moon and planets, became the basis of her sowing calendar *Working with the Stars*, which was published every year since 1963.

It is important here to mention that other authors (e.g. Paungger and Poppe, 1992) actually use the same classification of trigons, but in contrast to Thun give the position of the moon as seen in front of the astrological signs of the zodiac. A similar calendar is being offered in the U.S., called *Llewellyn's Lunar Organic Gardener*, published in St. Paul, Minnesota. In comparing Thun's version with the others, a difference of between one to two days occur in relation to the astronomically defined zodiac which Thun uses. This leads to misunderstandings for practitioners and consultants. For example, recommendations are given for pruning fruit trees which supposedly are based on the phases of the moon as suggested in the Thun calendar (fruit days). (Consulting service "Ecological Fruit Production", notice of 22 February, 1999). A closer look shows, however, that the indicated time periods do not coincide with recommendations given in Thun's *Working with the Stars*, but instead with information given in the moon calendar of Paungger and Poppe; as a consequence the expected benefits of the fruit days, as indicated by Maria Thun, are in fact only rarely targeted. Further scientific experimentation should sort out these matters.

Scientific Investigations of Moon Calendars

In the 1970s and 1980s several Ph.D. dissertations in Germany and Switzerland, as well as results of experiments made in Austria became available on the effects of the moon-zodiac trigons. In the majority of cases an influence upon plant growth could not be verified (see Spiess, 1994).

The latest results addressing these issues come from the Institute for Biodynamic Research. Systematically controlled seeding experiments over several years were undertaken at the Demeter-certified Dottenfelder Hof in Bad Vilbel under varying experimental conditions, using five different plant varieties with the intent to study the effects of lunar rhythms on the growth and quality of the selected plants (see Spiess, 1994).

The plants clearly responded to primary growth factors, such as changing warmth, moisture, and length of day during the course of the year. The effect of lunar rhythms in these comparisons, lasting over several years, could only be detected after a trend adjustment of the results by way of polynomial regressions. The findings in general could not confirm the advice given in the Thun calendar *Working with the Stars*. On the other hand, it

was definitely shown that crop species responded to the moon rhythms in different ways.

Rye

Experiments over five years with winter rye showed clear differences in field germination (Spiess, 1990). Rye germinated especially well when seeded before the full moon and not as well when seeding occurred before new moon (see Figure 1). The rye crops compensated for these early differences in their later growth, and grain yields were not influenced. However, lunar effects related to the time of seeding appeared again in differences in the capacity for germination. The plants seeded in the waxing second moon quarter had significantly better germination than those plants seeded in the waning moon.

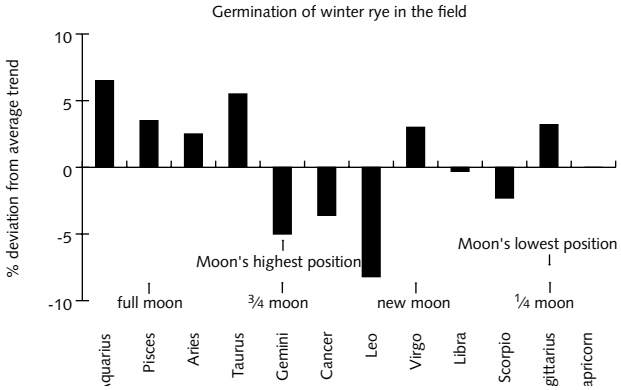

Figure 1. Relative deviations of the number of germinated rye seeds based on the annual mean in relation to the position of the moon at the time of seeding; average of five years.
Source: arranged by Spiess, 1994

Carrots

In all years of testing, statistically significant differences were apparent in the yields of carrots according to the moon's position at the seeding date. The highest relative yields were harvested from crops which were sown one to three days before full moon (moon in Virgo). The difference was statistically significant in comparison to the lower yields from seeds planted within the period of the waning first moon quarter (Scorpio to Aquarius), to the yields obtained at the highest and lowest position of the moon, and to yields obtained in the first lunar quarter (Cancer). The storage quality of the carrots followed the synodic lunar cycle with the least losses due to decay from seeds sown before full moon and the greatest losses when seeding was done before the new moon (see Figure 2). These results coincide largely with those made by Kolisko (1939).

Potatoes

In a trial with potatoes, which was conducted parallel to those with carrots, the outcome was nearly opposite as to yields of potato tubers, meaning the lowest yields (-11%) were recorded when the potatoes were planted before full moon. Planting near perigee yielded the highest (+16%) crops. Even though these differences over a mean period of four years could statistically not be established, they were nonetheless highly significant in the particular years of the trial. Popp (1933) came to the same results.

Bush-type Beans

Beans grown in containers responded strongest to the ascending and descending tropical lunar rhythms, as well as to the moon in perigee. The highest yields of numbers of pods for the first picking occured when plants were seeded when the moon was in its highest position in Gemini, and the next highest yields were found when plants were seeded at perigee. In the growth of the bean foliage similar differences were evident between seeds started at the moon's highest and lowest positions (see Figure 3 on next page).

Radishes

The growth of radishes showed variations similar to those of the beans, with respect to dependence upon the ascending and descending moon, the full moon, and perigee. Radishes grew best when seeded at the first ascending moon period (between Sagittarius and Pisces), differing significantly from plants seeded in descending

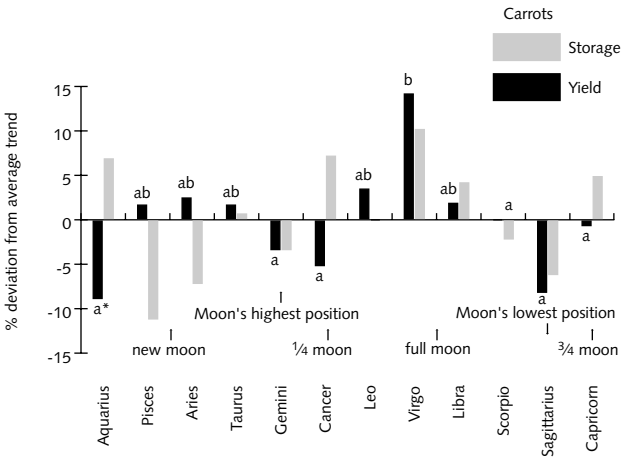

Figure 2. Relative deviations of yield (dry mass) and storage quality of carrots based on the annual mean in relation to the position of the moon at time of seeding; average of three years. (*Uneven letters show significant differences, i.e. <=5%)
Source: arranged by Spiess, 1994

moon. Highest yields were found at perigee (+20%). In contrast, the yields from plants seeded at full moon were the lowest in Sagittarius (-11%), though those radishes lasted the longest in storage. The heaviest growth of leaves (+11%) came from crops seeded at the lowest position of the moon, and the least growth (-13%) occurred from plants seeded at apogee.

Relevance for the Practical Grower

The established different behavior of selected cultivated crops to the synodical and tropical moon rhythms could be an explanation for the existence of more than one planting calendar, all referring to the same crops in relation to the phases and position of the moon. On the other hand, it is remarkable that uniform results are available in connection to the anomalistic moon rhythms, showing that seeding or planting of all cultivated plants done at perigee results most of the time in significant increases in yields of those plant organs which are harvested for food purposes. Based on these findings, it may be assumed that cultivated plants are to be distinguished according to lunar periodic response types, similar to the division of plants into photo-periodic response types (short day, long day, day neutral plants). This hypothesis would need to be further supported by more trials. Rudolf Steiner's indications seem confirmed that the phases of the moon influence both the germination of seeds and in general the growth of plants.

It is interesting to note that also in North America certain peasant rules (peasant lore) survived, which seem to support above research results. Farmers in North Carolina plant potatoes in the waning moon; the Pennsylvania Dutch in Buffalo Valley plant beans in the ascending moon and seed grains in the waxing moon because of faster germination.

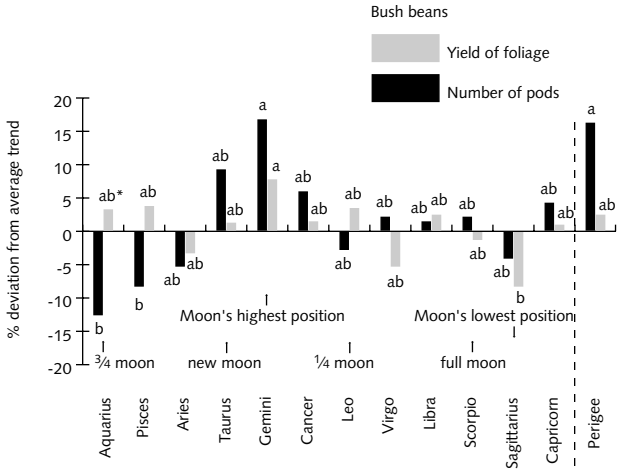

Figure 3. Relative deviations of number of pods and yield of leaves (dry mass) of bush beans based on the annual mean in relation to the position of the moon at time of seeding; average of four years (*Uneven letters show significant differences, i.e. <=5%)
Source: arranged by Spiess, 1994

The results here presented by Spiess (1994) prove that effects relevant to practical farming and gardening can be expected to occur if the position of the moon at time of planting or seeding is taken into account. A transfer of the results to all conditions of agriculture would, however, be premature, since this would first require time constrained and representative investigations for the specific localities. While moon rhythms can only be marginally considered for large-scale farms due to the organizational setup, the acceptance and application of moon rhythms is possible in horticulture and similar activities. The experimental results indicate that the consideration and practical application of seeding according to lunar cycles seems most appropriate for seed research, seed growing, and for the growing of medicinal herbs, all specialty areas which strive to achieve the highest quality in the final product.

Note

A list of the articles referred to in the text is available by contacting the managing editor at the address given on the contents page of this issue. Please note that they are for the most part German language publications.

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