Biodynamical agriculture

centar
dr. Rudolfa Steinera

Rudolf Steiner work in every day
life of one farm worker

Lecturer: Amalka Vukelić, dipl.ing.agr.

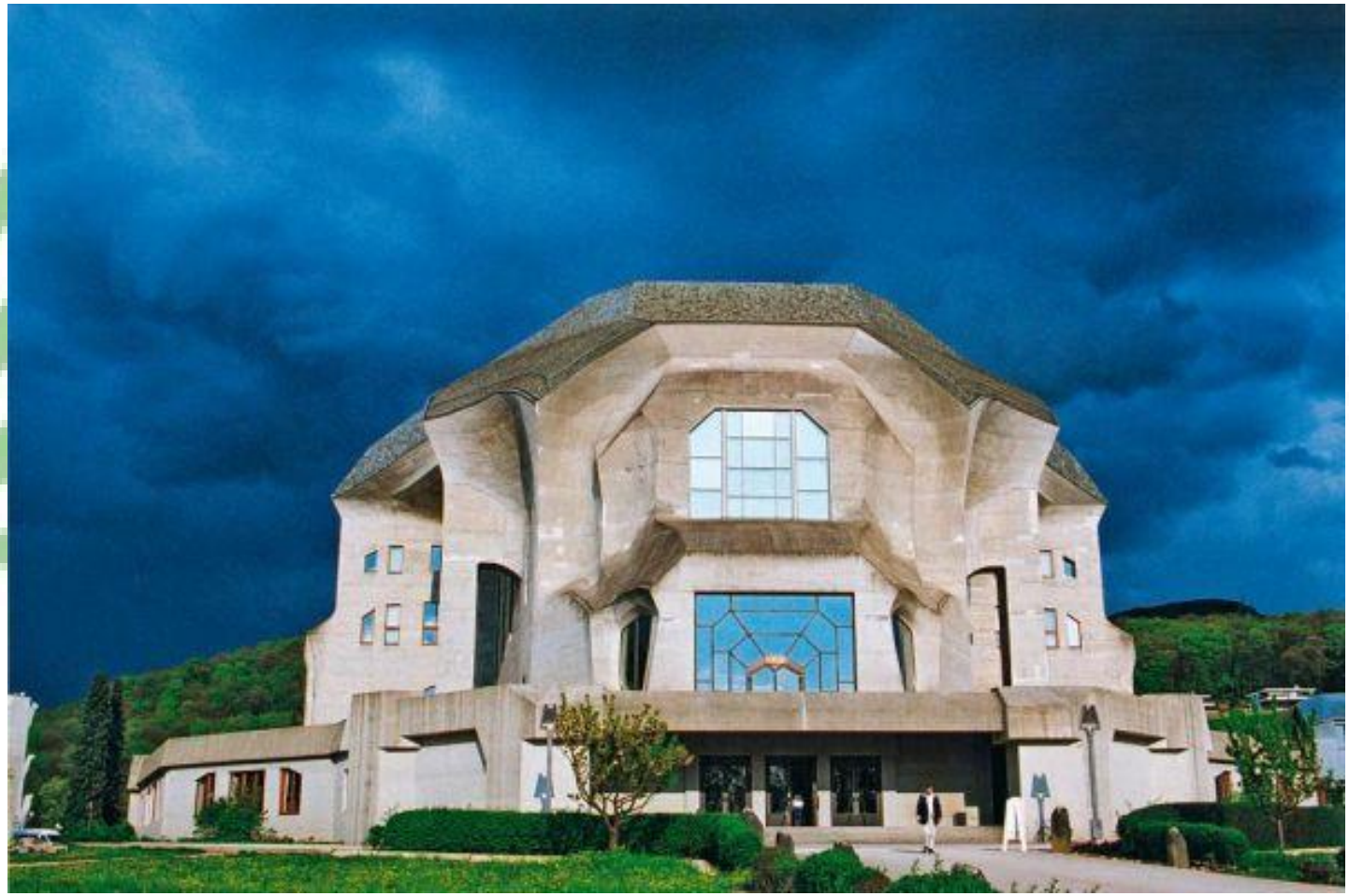
Rudolf Steiner biography

- Born in Donji Kraljevec, 27. February 1861., Austro-Hungarian empire
- At very early age he was recognized as an visionaire with different point of view on world around us
- He was doctor of mathematical studies and philosophy, with paralel studying in literature, education and medical sciences

- He founded antrophosophy, euritmy, waldorf pedagogy, organic architecture, antroposophycal medicine and biodynamical agriclture
- His work was based on knowledge and awerness of world around us and natural forces that move world, universe and whole being.
- Majority of Steiner‘s work in philosophy was based on Goethe and his work, so Steiner in1913. in Dornach (SWI), builds Goetheanum, wich is still a Center of all Steiner‘s work

Goetheanum I.

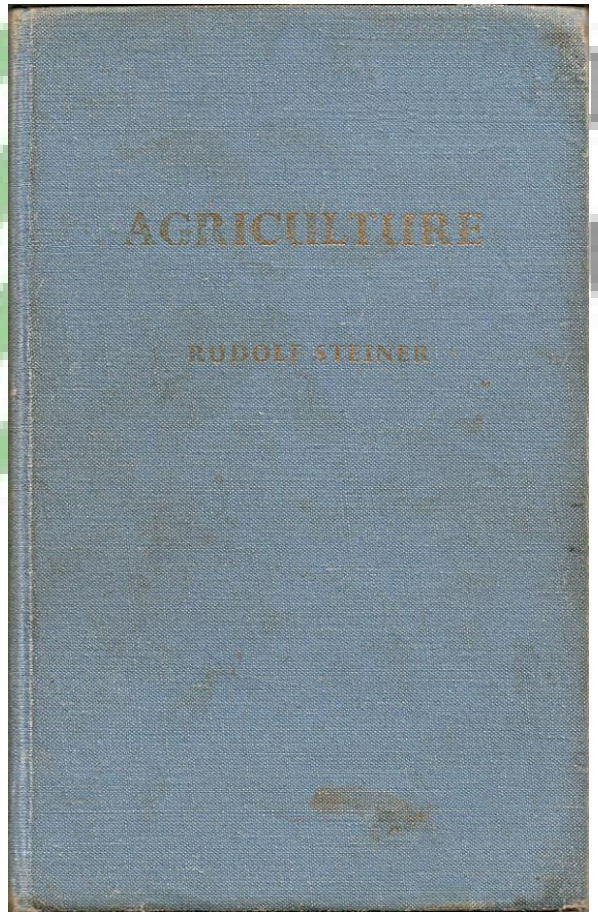
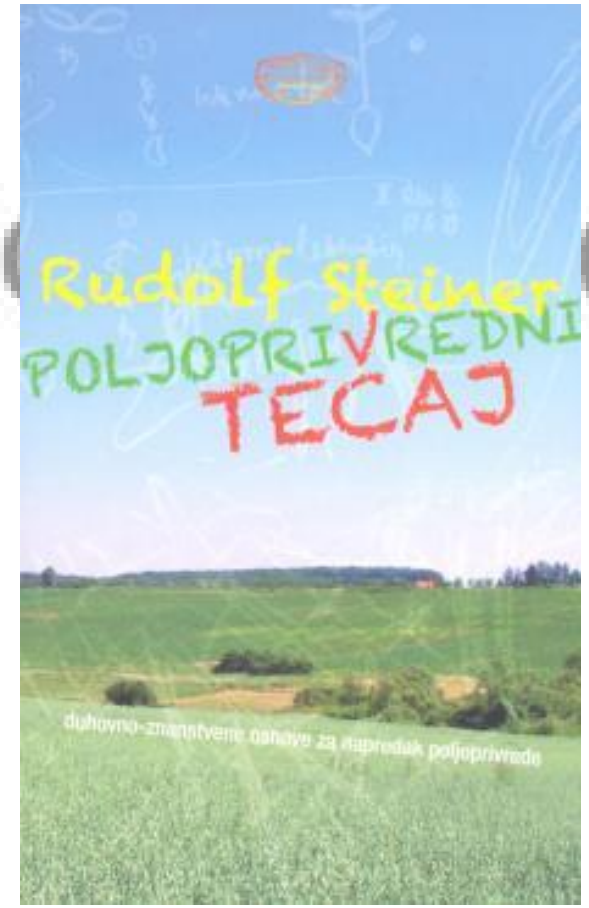
Goetheanum II.



Agricultural course – 1924.

- 8 lectures held by dr. R. Steiner in Koberwitz 07.-16. June 1924, and lecture in Dornach on 20. June 1924.
- Foundation of biodynamical agriculture that gave directions on „How to grow” in sustainable way

Handbook – Agricultural corse

English version from 1958	Croatian version
	

Biodynamical agriculture

- Biodynamical agriculture is founded on principles of one farm one organism - self sustainable
- **Few of the ground rules in biodynamic**:

❖Compost is the base of the production

❖Usage of the biodynamical preparations

❖Animals in the farm are fed by biodynamical principles

❖No usage of any sort of medications in farm

Biodynamical agriculture

- The use of organic fertilizers;
- Spray preparations numbers 500 and 501;
- The transition on the biodynamic method of husbandry and the influence of the rotation of crops;
- Consideration of other factors of environment.

The preparation of manure

- The most effective manure is a mixture in which cow dung dominates, horse dung is next in quantity, and there is a small percentage only of pig and sheep dung.
- Where such a mixture is not available it may still be applied, but it would be preferable to turn the manuree into compost

Making a compost pile

- In order to preserve energy and highly valid humus, compost piles are must have in the farm
- Composting is the easiest way to import humus and increase fertility in soil
- Whatever is capable of decay or decomposition can be turned into compost
- The only exceptions to be made are human excrement, coal ashes and newspaper – because print contains chemical ingredients that are inimical to the bacterial life of the soil

Finished compost pile in autum

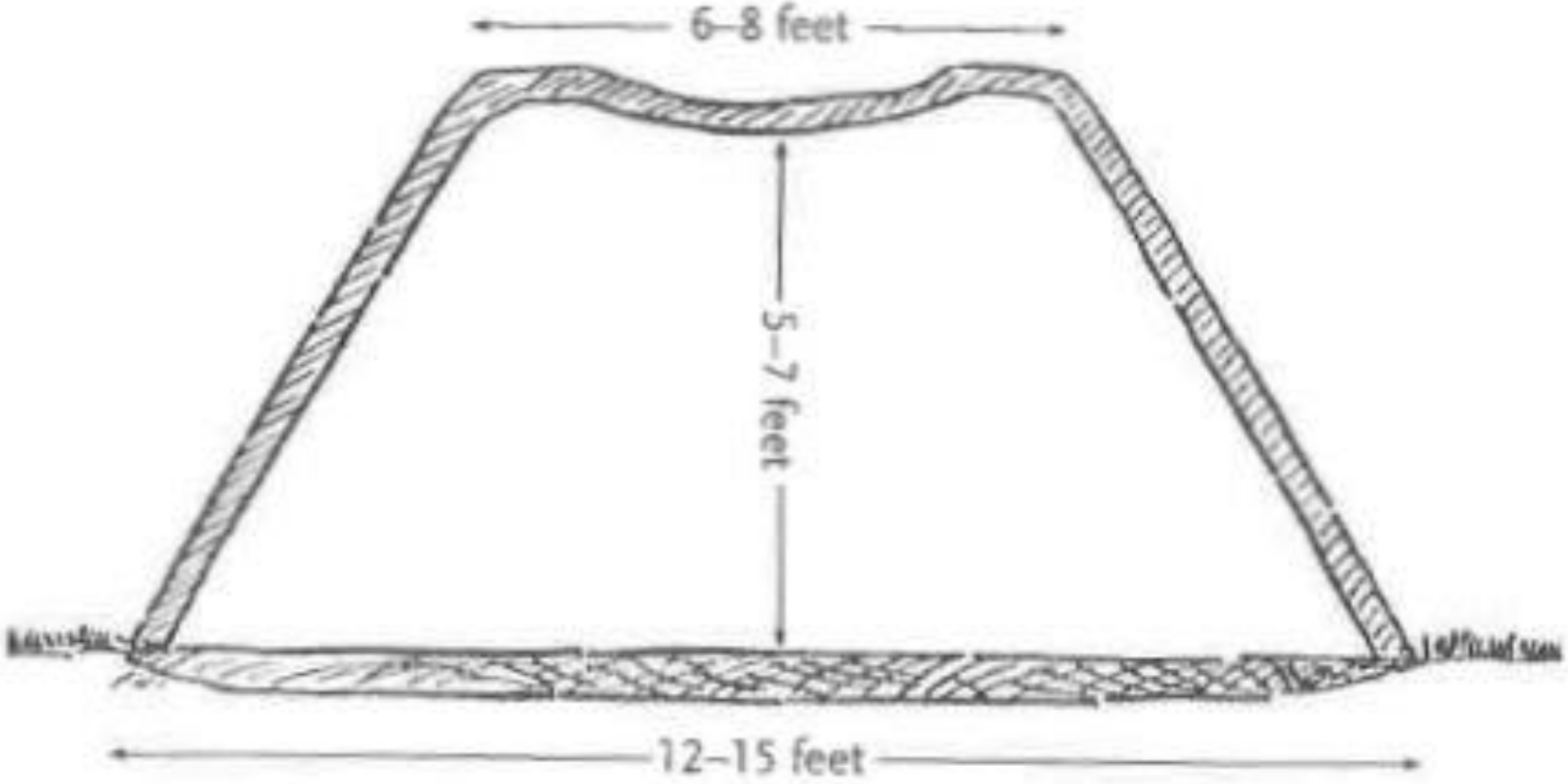
Covered compost pile that is ready for winter and maturation of compost

Making a compost pile

- A trench or ditch should be dug out evenly to a spade´s depth.
- The bottom should be covered with straw or with a thin layer of prepared manure or compost
- The most practical shape for the compost-heap is long and rectangular, 3,5-4,5 m wide at the base, 1,5-2,5 m wide at the top, and 1,5-2 m feet high
- There is no limit as to the length. If the heaps are smaller, the proportions of width at base and top, and of height should be in the same ratio.

Making a compost pile

- Cross section trough pile



Making a compost pile

- But smaller heaps can be made. The heap should be built up generously to allow for shrinkage
- Ingredients:

❖Vegetable refuse, leaves, and weeds should be placed upon it in layers.

❖Coarse pieces and small twigs should first be broken into smaller bits

❖Mature manure between layers to speed up process of decomposting

Making a compost pile

- A layer of vegetable refuse about 25-30 cm deep, then a sprinkling of quicklime, then a layer of 5-10 cm of eart, then again a layer of vegetable matter, and so on, until a height of from four to 1,8 m is reached, when the heap should be covered with earth.
- Thinner layers – 10 cm of organic matter and 5 cm of soil – give the quickest decomposition – 3-4 months.
- Lawn cuttings should never be more than 5-10 cm thick.
- The earth dug out from the trench can be used both for the layers of earth and for the covering.
- The heap may be built up by degrees

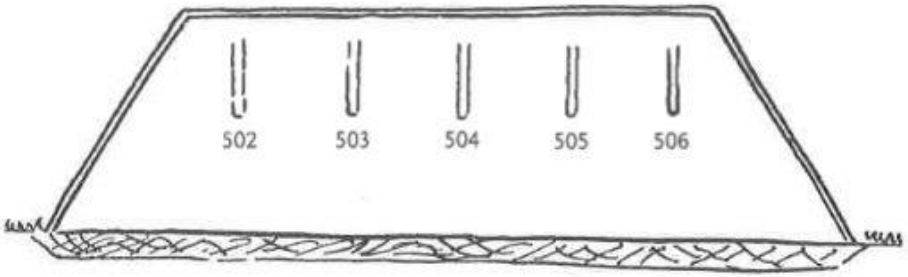
Finished compost heap

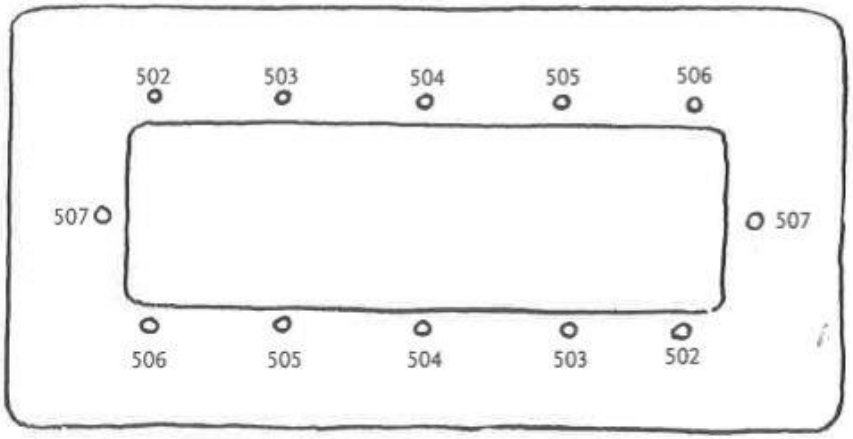
Cross section trough compost heap, ready for maturing and proceses of decomposting.

Adding the preparations

- The preparations should then be inserted – one portion of one preparation in each hole.
- A portion is ½ to 1 gram.
- The preparations 502-507 should be used in rotation, one portion in each hole, the series beginning again when six holes have been filled.

Placing the preparations in the heap





Yarrow – Achillea millefolium (No.502)

- Stolisnik (CRO)
- Planet Venus, arranges processes of Potassium and Nitrogen in soil

Chamomile – Matricaria recutita (No.503)

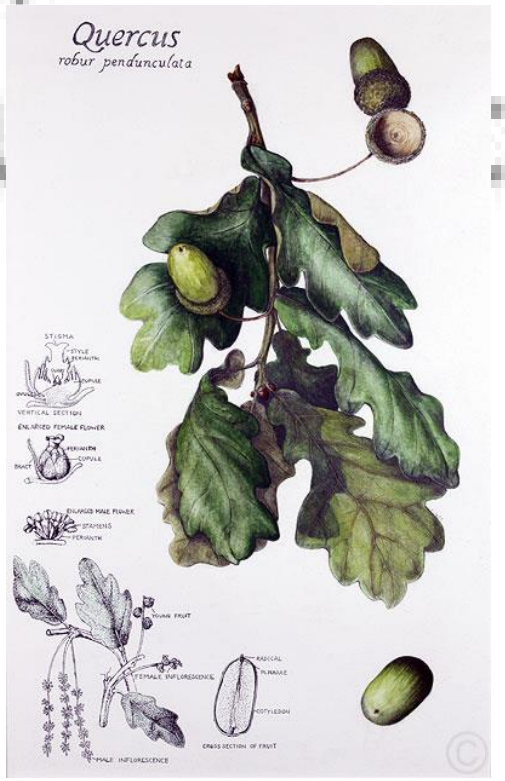
- Kamilica (CRO)
- Planet Mercury, arranges processes of Nitrogen in soil

Stinging Nettle – Urtica dioica (No.504)

- Kopriva (CRO)
- Planet Sun, arranges processes of Iron in soil

Oak bark – Quercus robur (No.505)

- Kora hrasta (CRO)
- Planet Mars, arranges processes of over growth



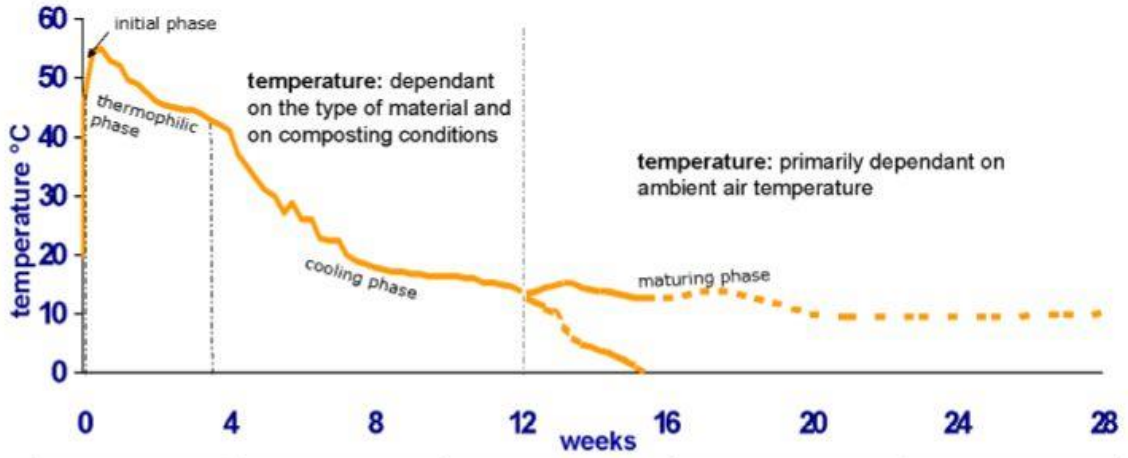
Dandelion – Taraxicum officianale (No.506)

- Maslačak (CRO)
- Planet Jupiter, arranges ratio of Silicium acid and Potassium in soil

Valerian – Valeriana officianalis (No.507)

- Odoljen (CRO)
- Planet Saturn, arranges process of Phosphorus in soil

Temperature of composting



Phase	Characteristic Processes	Important Organisms	Result	Duration
Initial	degradation	bacteria	-	few hours to a few days
Thermophilic	degradation	bacteria, fungi	ammonia	1 to 3 weeks
Cooling	conversion	bacteria, fungi	nitrates	4-6 weeks to 3 months
Maturing	synthesis	fungi animals	humus-like substances and humus	several months

- The different phases of aerobic composting as reflected by temperature; source: table: GRAY & BIDDLESTONE, 1981 (modified)

Turning the heap

- A compost pile should never be turned during the hot phase.
- If a pile is turned the practice should be carried out during the cooling phase to limit ammonia loss.
- The advantages of turning are not clear cut and it is important to balance the pros and cons before turning.

Turning the heap

- **Advantages**:

❖ Remixing the compost mechanically can prevent the likely compaction and consequent seepage due to the ongoing sagging process of the heap.

❖ Turning will move material from the colder outside edges of the pile to its centre where the higher temperature may reduce the content of viable pathogens and weed seeds.

- **Disadvantages**:

❖ Turning intensively aerates the material, resulting in an almost complete loss of ammonia.

❖ Turning a heap results in the material being chopped up. This may lead to a higher density after turning.

❖ Turning results in added costs for labour and machinery.

Losing the compost nutritients

- During the composting process nutrients can be lost as gaseous emissions and in the effluent as soluble compounds.
- The main nutrient to be lost is nitrogen, which can be emitted in gaseous form as ammonia (NH_3), nitrous oxide (N_2O) elementary nitrogen (N_2) and nitrogen oxides (NO_x), and leached out as nitrate (NO_3^-), ammonium (NH_4^+) or as a soluble organic N compound.
- Other gaseous emissions are methane (CH_4) and carbon dioxide (CO_2), which are relevant as greenhouse gases, and hydrogen sulphide (H_2S); while potassium and phosphate can be lost by seepage into the ground.

Losing the compost nutritients

- Levels of nutrient loss during aerobic composting. In Forschungsring e.V. open air composting trials, which were conducted over an 11year period, average rates of loss were:
  - Nitrogen: 33%.
  - Potassium: 17-39%.
  - Phosphate: almost zero
- Seepage occurs when the compost pile contains more water than the material can hold in its pores. Other than a high water content there are three possible causes for seepage:

❖ Rain or thaw water that soaks into an uncovered pile.

❖ Respiration water released during the aerobic decomposition of organic substances.

❖ Expressed water that results from the compression of the material during the sagging process.

Seeding calendar

- According to the work of Maria and Matthias Thun calendar is primarily based on the sidereal lunar cycle.
- The impulse determined by the predominating element each day is the most decisive factor.
- She advises following these positions systematically, whether it be for sowing, applying the biodynamic preparations, transplanting, hoeing or harvesting, always bearing in mind the organ of the plant that one wishes to develop.

Plants of the root

- All plants that we grow for root

Leaf plants

- All plants that we grow for leaf

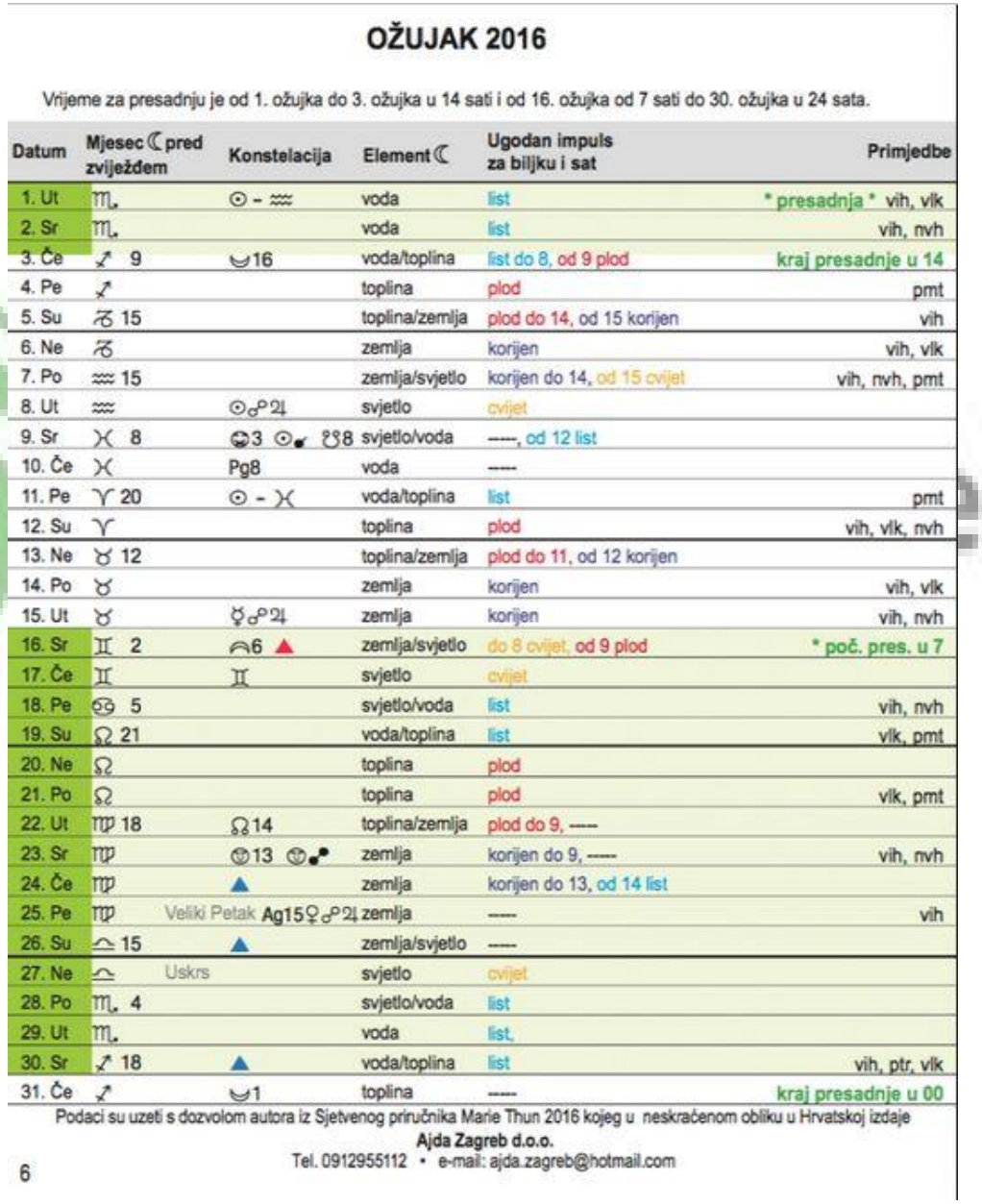
Flower plants

- All plants that we grow for flower

Fruit plants

- All plants that we grow for fruit

Seeding calendar



OŽUJAK 2016

Vrijeme za presadnju je od 1. ožujka do 3. ožujka u 14 sati i od 16. ožujka od 7 sati do 30. ožujka u 24 sata.

Datum	Mjesec ☾ pred zviježđem	Konstelacija	Element ☾	Ugodan impuls za biljku i sat	Primjedbe
1. Ut	♏	☉ - ♒	voda	list	* presadnja * vih, vlk
2. Sr	♏		voda	list	vih, nvh
3. Če	♐ 9	♑16	voda/toplina	list do 8, od 9 plod	kraj presadnje u 14
4. Pe	♐		toplina	plod	pmt
5. Su	♑ 15		toplina/zemlja	plod do 14, od 15 korijen	vih
6. Ne	♑		zemlja	korijen	vih, vlk
7. Po	♒ 15		zemlja/svjetlo	korijen do 14, od 15 cvijet	vih, nvh, pmt
8. Ut	♒	☉☌♃	svjetlo	cvijet	
9. Sr	♓ 8	♋3 ☉☌ ♉8	svjetlo/voda	-----, od 12 list	
10. Če	♓	Pg8	voda	-----	
11. Pe	♈ 20	☉ - ♓	voda/toplina	list	pmt
12. Su	♈		toplina	plod	vih, vlk, nvh
13. Ne	♉ 12		toplina/zemlja	plod do 11, od 12 korijen	
14. Po	♉		zemlja	korijen	vih, vlk
15. Ut	♉	☿☌♃	zemlja	korijen	vih, nvh
16. Sr	♊ 2	♌6 ▲	zemlja/svjetlo	do 8 cvijet, od 9 plod	* poč. pres. u 7
17. Če	♊	♊	svjetlo	cvijet	
18. Pe	♋ 5		svjetlo/voda	list	vih, nvh
19. Su	♌ 21		voda/toplina	list	vlk, pmt
20. Ne	♌		toplina	plod	
21. Po	♌		toplina	plod	vlk, pmt
22. Ut	♍ 18	♌14	toplina/zemlja	plod do 9, -----	
23. Sr	♍	♍13 ♍☍	zemlja	korijen do 9, -----	vih, nvh
24. Če	♍	▲	zemlja	korijen do 13, od 14 list	
25. Pe	♍	Veliki Petak Ag15☿☌♃	zemlja	-----	vih
26. Su	♎ 15	▲	zemlja/svjetlo	-----	
27. Ne	♎	Uskrs	svjetlo	cvijet	
28. Po	♏ 4		svjetlo/voda	list	
29. Ut	♏		voda	list,	
30. Sr	♐ 18	▲	voda/toplina	list	vih, ptr, vlk
31. Če	♐	♑1	toplina	-----	kraj presadnje u 00

Podaci su uzeti s dozvolom autora iz Sjetvenog priručnika Marie Thun 2016 kojeg u neskraćenom obliku u Hrvatskoj izdaje

Ajda Zagreb d.o.o.

Tel. 0912955112 • e-mail: ajda.zagreb@hotmail.com

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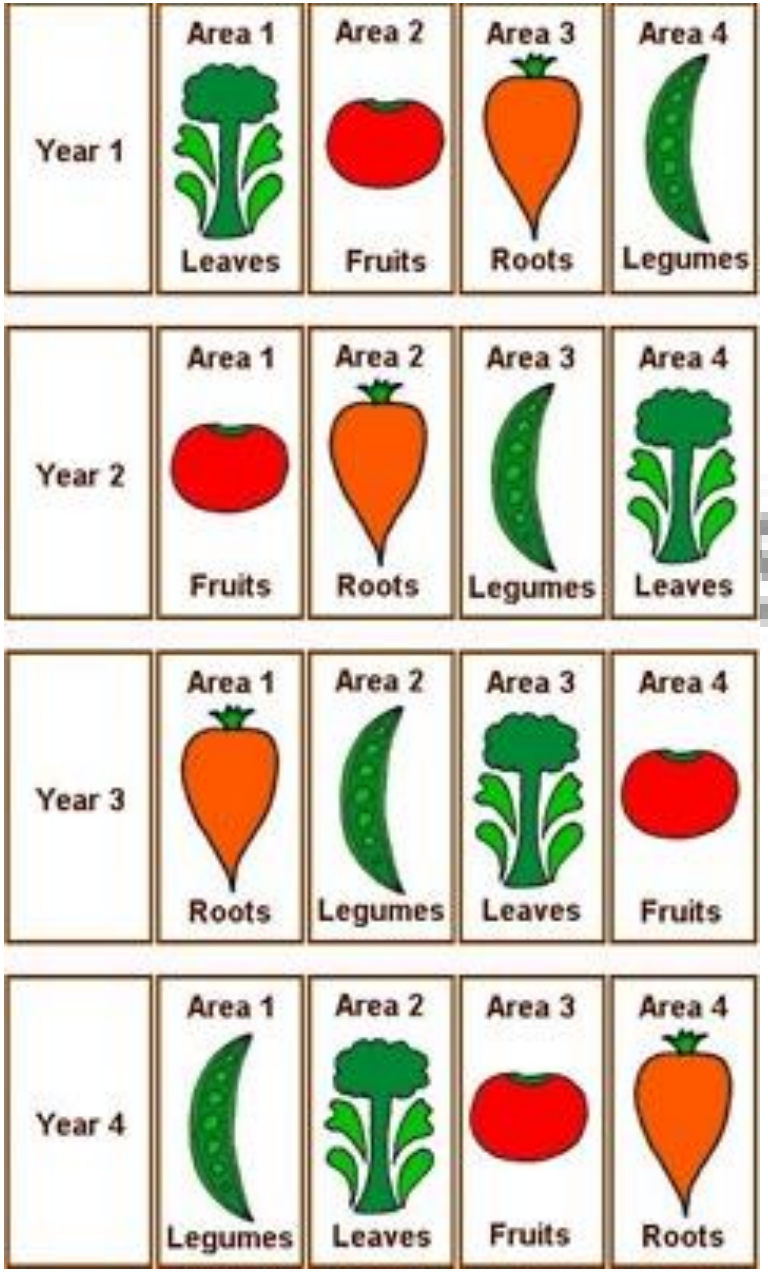
Crop rotation



Companion planting