



CULTIVATION AND VEGETATION FERTILIZATION MAIZE AND SUNFLOWER



10 reasons why to grow corn

1. New maize hybrids, growing techniques, and wide spread production utilization enable expansion of the growing areas without fundamental influence on the cropping pattern.
2. Maize has an enormous energy potential – 32 400 MJ/ha.
3. With comparable costs (CZK/ton) it achieves 1.5 to 2 times higher production compared to densely sown cereals.
4. Its growing season is short and thus it does not occupy resources.
5. Maize is very resistant to rainfall deviations and dry periods during the growing season.
6. The harvest can be scheduled in advance and it can be controlled by the selection of proper hybrids.
7. With a controlled maize nutrition it is possible to substantially reduce mineral fertilizer consumption by 25% in average.
8. Maize significantly reduces the amount of greenhouse gases - the production of 1 ton of dry matter consumes 1.5 tons of CO₂ while producing 1 ton of oxygen.
9. Maize is a highly efficient renewable source of energy. It consumes 0.7 TOE (tonnes of petroleum equivalent) and produces 2.1 TOE per hectare.
10. Its yields are stable and high in suitable regions of production and the realization price is very good over the long-term.

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MAIZE AND SUNFLOWER CONTROLLED NUTRITION

The controlled nutrition of wide-row crops during the growing period with zone application of liquid fertilizers using PPL cultivator in the soil, together with the application system will handle the complete system of maize vegetation growing nutrition with the starting fertilizer doses „to the roots“ using the seeding machine. For practical uses, this system showed its advantages in comparison with a standard application of mineral fertilizers, especially with a focus on the following:

1. Increasing grain yields by up to 1 ton per hectare.
2. Improving grain-to-straw ratio for silage maize.
3. Reduction of the growing period by up to 5 days depending on the weather.
4. Grain moisture reduced by 1 % to 1.5 % during the harvest time.
5. Mineral fertilizer consumption savings by 20 % to 30 % without yield impact.

PROFITABLE PLANT NUTRITION RESPECTING ENVIRONMENT PROTECTION CONDITIONS

- PPL cultivators are intended for row cultivation and liquid fertilizer application to the roots of maize and sunflower. The row cultivation effect is very suitable for the maize fields. Weeding plant is mechanically destroyed, the soil is strip cultivated and aerated. Aeration reduces moisture evaporation and thus improves water relations in the soil.
- The cultivator with zone application of liquid fertilizers is a suitable accessory of the supplementary fertilizing „to the roots“ planting.
- The economic benefits of using the cultivator with supplementary liquid fertilizers consists of a fast return of investments due to the fact that a smaller amount of fertilizer is applied in the soil compared to the standard soil surface fertilization.
- Depending on the soil and climatic conditions, the mineral fertilizer costs can be reduced by up to 60 €/ha based on the current fertilizer prices.
- Zone application of liquid mineral fertilizers greatly reduces environment damages compared to the soil surface or plant leaves application.



CULTIVATOR PPL-6



CULTIVATOR PPL-8



CULTIVATOR PPL-12

TECHNICAL PARAMETERS	MODEL		
	PPL-6	PPL-8	PPL-12
Length	2850 mm	2850 mm	1570 mm
Working width	5100 mm	6300 mm	9320 mm
Transport width	3000 mm	3000 mm	3000 mm
Working height	2450 mm	2450 mm	1500 mm
Transport height	3200 mm	3200 mm	2900 mm
Empty weight	1950 kg	2220 kg	2050 kg + 394 kg*
Fertilizer tank volume	1350 l	1350 l	1800 l
Flushing water tank volume	30 + 30 l	30 + 30 l	200 + 15 l
Working speed	12–14 km.h ⁻¹	12–14 km.h ⁻¹	12–16 km.h ⁻¹

* weight of the tank

PPL 12 – Unique technical solution introduced by P&L company on the EU market. Main frame is designed to be mounted in the tractor front hitch. Fertilizer tank with a volume of 1 800 litres is mounted in the tractor rear hitch. With this solution, the complete system is optimally balanced and the front axle is sufficiently loaded to ensure the maximum steering accuracy in combination with the GPS navigation. The machine operator has a good overview of the machine operation since the complete working range is in the field of view. This enables accurate cultivation even at high working speeds. Main frame follows the ground profile in three sections. The outer wings preload can be increased with use of the machine hydraulic system.

PPL 8 – Compact design of the machine enables its mounting in the rear hydraulic hitch of the tractor as a semi-mounted tool. Cultivation unit uses shanks with tines or other working tools. All cultivation units are fixed to the frame through scissors mechanisms (parallelograms). The system with gauge wheels and hydraulic preload system enables following the ground over the complete working range and easy setting of the working depth. Cultivation units and working tools are identical for all PPL types. The user selects from a wide choice of working tools depending on the soil conditions. PPL 8 cultivator can be used also as a front mounted implement with the fertilizer tank mounted in the rear tractor linkage.

ROBUST FRAME DESIGN



The frame consists of a robust profile with hydraulic components mounted on it for easy folding between working and transport positions. The transport position gives the operator a good view for a safe transport on public roads.

PUMP DRIVE FROM THE GAUGE WHEEL



A simple rate setting in the range of 70 to 150 l.ha⁻¹. The metering pump is driven from the gauge wheel via the sprocket gear. The fertilizer rate is changed by changing the sprockets.

LARGE FERTILIZER TANK



Large volume fertilizer tanks – 1800 l for PPL 12 or 1350 l for PPL-8 and PPL-6 ensure a high performance of the machines. Fresh water tank enables easy flushing of the distribution system with filters at the end of the work.

BASIC WORKING TOOLS



Basic working tool consists of a tine with two disc coulters that ensure a perfect separation of cultivated ground stripes and protect plants from possible damages.

FERTILIZING SYSTEM WITH COULTERS



Application units with coulters are intended for soil-protecting techniques with a high amount of plant residues left on the soil surface. The mulch protective function is not affected and working tools do not get clogged.

HIGH OPERATING SPEED



High operating speeds up to 12 to 16 km/h allow daily PPL output in the range of 70 to 80 ha at a low fuel consumption.

COULTERS WITH APPLICATION CHISEL



The version with outer cutting coulters and central application chisel is intended for difficult soil conditions with a high amount of plant residues left on the soils surface.

STAR CULTIVATING WHEELS



Star cultivating wheels with fertilizer application discs are used to break-up the soil surface and work perfectly in the light compaction conditions when operating on medium soils.

STRIP TILL TECHNOLOGY



The line soil cultivation together with the mineral fertilizer application brings stimulation in the fertile lands. The seeding machine sows the specific crop in the cultivated soil lines. This procedure is optimum for autumn or spring periods before sowing. It is suitable for cover crops or catch crops.

STRIPTILL – A MODERN TECHNIQUE FOR FERTILE AND MOSTLY LEVEL LANDS

The PPL cultivator can be equipped with working tools that apply liquid mineral fertilizers into the soil in autumn (depot) and create a ridge or just a stripe on the surface of the cultivated soil. This technique is called StripTill and belongs to the stimulation methods of maize growing, especially on fertile and mostly level lands.

For cropping patterns of maize growing after maize growing season with use of reduced tillage and/or in cases of sowing maize according to the erosion-protection regulations, PPL cultivator may be equipped with chisels and cutting coulters. These working tools are perfect for conditions when there is a large amount of plant residues on the soil surface or shallowly under the soils surface. There is no clogging of the working tools with the plant residues.

WHERE IS THE ECONOMIC BENEFIT OF THE PPL SYSTEM?

According to the maize growing procedures, this crop has a nitrogen growing uptake more than 180 kg per hectare. Farmer should then supply approximately the same amount of nitrogen in the soil before sowing, during sowing, or during the growing period. If the PPL system is used for vegetation fertilization, the total nitrogen rate may be reduced by 20–30 % (which means approx. 45 kg of nitrogen) without affecting, or even lowering yields. It is due to the fact that the nitrogen that is locally applied in the soil in a liquid form can be utilized by the plant root system in a significantly better and faster way than when the nitrogen is applied on the soil or leaf surfaces. If the saved (i.e. non-purchased) nitrogen in kg is multiplied by the cost price with added application costs, and the sum is multiplied by the number of maize hectares, it can be clearly seen that the return of investment in the PPL is approx. 400 to 450 ha of maize cultivated area.



Front mounted PPL-8 cultivator

is a version of PPL machine that has the frame with the working tools mounted in the front linkage and the liquid mineral fertilizer tank is mounted in the rear linkage of the tractor. The advantage is the easier machine control and weight distribution between both tractor axes.

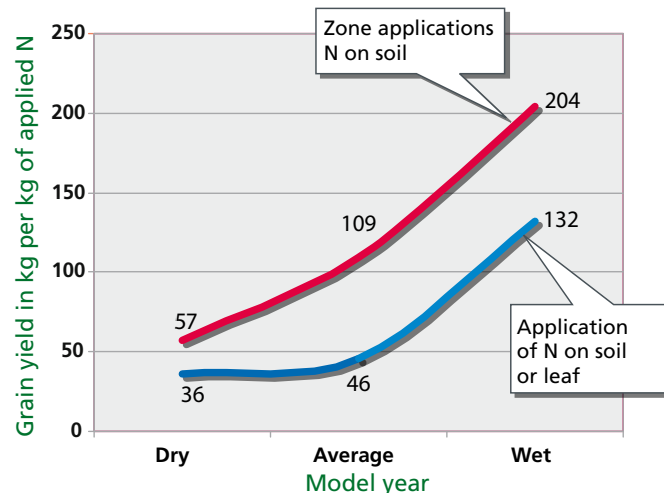


Soil skin elimination between rows

is important for the maize dynamic growing. Compacted and merged soil surface prevents the air from entering the root system of the plants. This situation occurs regularly after rainfalls on the lands that are susceptible to the soil compaction. This big soil issue can be solved only by row cultivation.



Production efficiency of various ways of the nitrogen application



The liquid mineral fertilizer applied directly into the soil is the most suitable for the maize vegetative supplementary fertilizing.

MAIZE AND SUNFLOWER CONTROLLED NUTRITION

PPL technique greatly influences not only the environment but it also has economic benefits for the user. The diagram shows that the grain yields per one kg of the nitrogen applied in the soil to the roots may bring as much as a double effect compared to the standard application on the soil or leaf surfaces. These results can be achieved only with use of suitable liquid nitrogen-based mineral fertilizers that perform even under drier soil conditions unlike granulated dry fertilizers.



The maize and sunflower crop can be cultivated in an inter-row way from the four true leaves growing phase up to the crop height about 0.5 m.