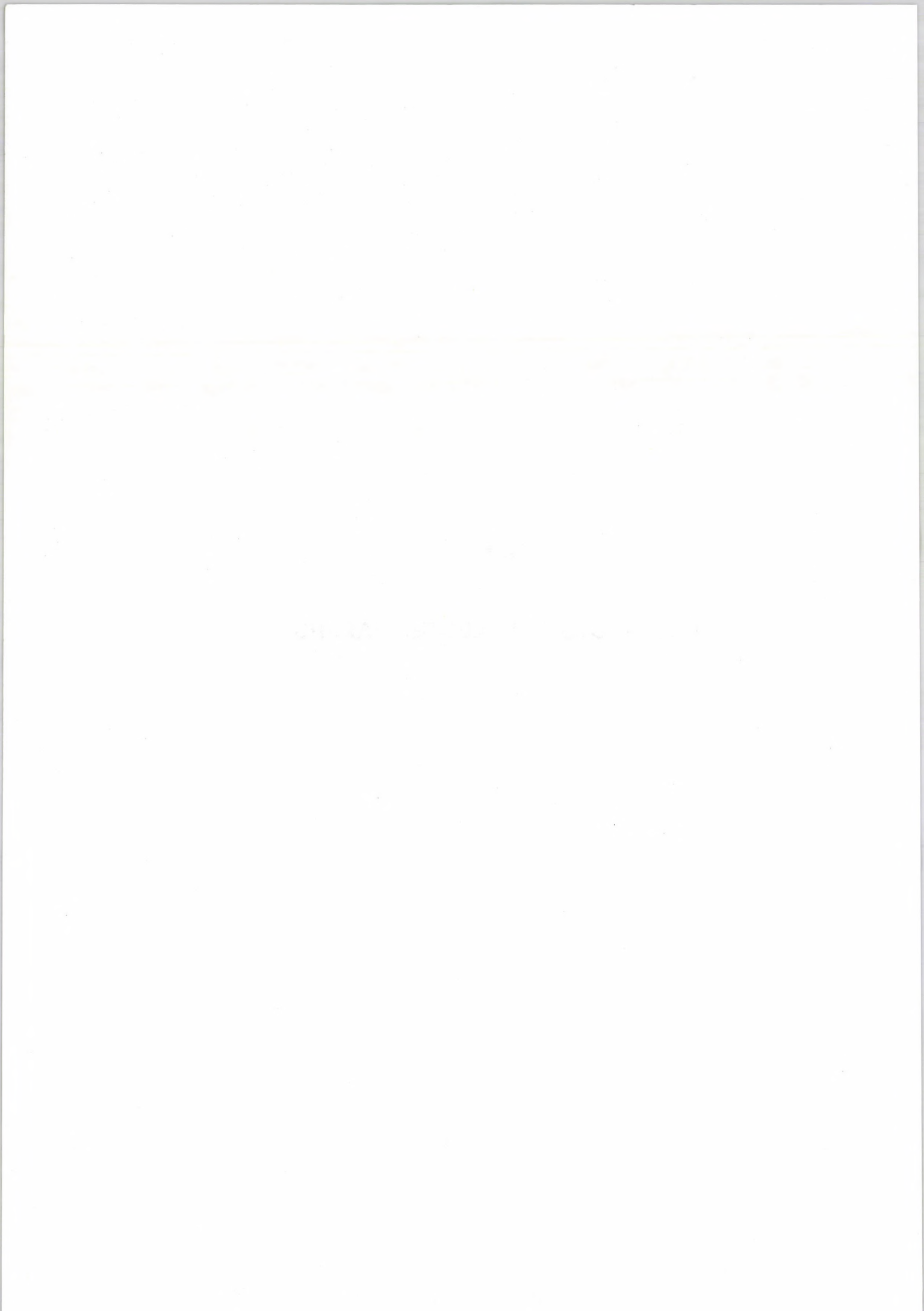


Part I.

ABSTRACTS OF SELECTED PAPERS



Technical Solutions For Bacterium Fertilization

L. HALÁSZ AND L. MÁTYÁS

Hungarian Institute of Agricultural Engineering, Gödöllő

Hungarian Agricultural Engineering, Gödöllő (No 4 1991.) . . . 13

Phylazolit, a bacterium fertilizer substituting partly N fertilizers, can be applied in dense cultures and row-crops, resp. It can be distributed in aqueous suspension using special adapters attached to rotary tillers (Ráb-8,4 type) and to corn and sugar-beet planters, resp. (IH-Cyclo-400 and Kühne-Kleine Unicorn 2-12.) According to efficacy-tests 30% of N fertilizers can be saved by this method in case of winter wheat and sunflower. Corresponding figures for sugar-beet and maize are 50% and 70%, resp. Based on long-term experiments bacterium fertilization is to be repeated at two-year intervals. Other advantage of the method is mitigation of the adverse impact of over-dosing N fertilizers, i.e., nitrate accumulation, acidification etc.

The Characteristics Features And Extent Of Losses In Function Of The System Of Sprayer And Of Facts Of Vegetation And Environment

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Hungarian Agricultural Engineering, Gödöllő (No 4 1991) . . . 15

Chemical plant protection processes endanger the biosphere in a great extent. The great amount of chemicals that are spread aren't able to be utilized and charge the environment needlessly. According to the investigations the extent of spraying losses is 15-90 percent of the whole spreaded chemicals.

The essential sources of losses are overdozing, spilling, evaporation, blowing away. The utilization of the spray materials depends on the plants being protected, the meteorological conditions and mostly the structure, adjustment and operation of the sprayer. With a proper application of sprayers the losses can be decreased by 10-40 percent.

Field Test Of The Challenger- 65 Rubber-belt Tracklayer Tractor

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Hungarian Agricultural Engineering, Gödöllő (No 4 1991) . . . 17

The most recent developing result of tracklayers is the Challenger-65 tractor equipped with rubber-belt track-drive. On the basis of the testing results it can be stated, that this tractor rises over the traditional tracklayers, due to its outstanding traction features in the speed range which are advantageous for the soil cultivating machines, as well as its technical solutions making the practical work easier and for this reason it can be a serious rival to the heavy 4-WD, so called soil cultivating tractors.

Variation Of The Germination Capacity, The Yield And Other Plant Characteristics In Case Of Seed Fractions Graded By Seed Separator

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Hungarian Agricultural Engineering, Gödöllő (No 4 1991) . . . 19

Different seeds were tested. The seeds graded are: peas, wheat, soya beans and sunflower. After grading the fractions were tested in

order to get information about the yield, the germination capacity, the field germination and other plant features. In the case of the yield and other characteristics among the fractions significant differences were observed. Numbers of the graded fractions were 4-5. This method gives useful guiding numbers in the seed preparation, but it may arouse the interest of specialists in genetics too, since the seed fractions having good features can be selected from the produced raw seeds for further propagation.

Combined Production Technology Of Silo- Maize And Soya

DR. P. SZENDRŐ – DR. ZS. SZÜLE – DR. J. NAGY –

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Large-scale experiment was started in Dunavarsány Petőfi Farmers' Cooperative in order to improve the composition of maize silage as well as the protein and carbohydrate ratio. This aim has been achieved by a determined technology, using the combined production of silo maize and soya. The growth of plant population was observed for the purpose of determining the optimum time of harvest, considering the quality requirements and the lowest loss. Different machines and harvesting adapters were tested during the harvest in the interest of the best work quality and the lowest loss. During the silage making model silos were made as well as the soya- and silo- maize was stored separately. In the farmers' cooperative feeding experiment has been carried out, based on the fermented fodder. The paper presents the results of experiments.

Calculation Of Motion-fitness Of Vehicles Moving On The Ground

DR. L. LAIB

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Hungarian Agricultural Engineering, Gödöllő (No 4 1991.) . . . 23

The calculation of motion-fitness of vehicles moving on the ground played an important role in the researches of the past few years. The mobility model that was introduced among vehicle developers and operators realised some possibilities of research directions. The paper starting from the relationship between ground and chassis, going through vehicular dynamics, discusses different research directions which give opportunities for stepping forward.

Feedrate Monitor And Forward Speed Control System

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Hungarian Agricultural Engineering, Gödöllő (No 4 1991.) . . . 25

At our institute tractor engine load control systems and combine harvester feedrate control systems were developed. On the basis of the mentioned systems and the experience with the systems, principle has been established for the monitoring of feedrate and controlling the feedrate of forage harvesters. The forage harvester should be operated at the highest feedrate, or forward speed with which the technological functioning is reliable and the engine does not stall.

The principle established is that the chopping cylinder speed is proportional to the feedrate: when the feedrate increases, the speed decreases. However, when the chopping cylinder speed is lower than the allowed minimum speed, the working quality of the forage harvester is not the wanted one, or it is not accepted.

Automatic Filling-station Without Operator

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Hungarian Agricultural Engineering, Gödöllő (No 4 1991.) . . 27

An additional equipment has been developed which makes possible the operation of filling-stations without operator, the data recording and further processing of them by suitable electronics and automatic units. The use of equipment has the following advantages:

- the operators' wages and incidental expenses can be saved.
- the losses through uncontrollable channels can be practically reduced to zero by recording exact fuel-turnover,
- the computerized data recording and processing and fuel management help to establish the exact accounts and the adequate discipline of labor.

Effect Of Change Of The Farm Structure On The Mechanization

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Hungarian Agricultural Engineering, Gödöllő (No 4 1991.) . . 29

In Hungary – simultaneously with the change of the economic system – a structural rearrangement can be expected in the agricultural production. The heavily centralized large-scale production will be replaced by such production that is based on the mixed-type small- and middle- as well as large-scale farms, which will be more suitable for the market economy. This causes significant changes in the background of production. At the market the choice of equipment, which can be used advantageously by the small- and middle – scale farms must be increased and this means new developing works for the Hungarian farm-machine industry and widening possibility for the importers.

Possibilities Of Mechanization Of Agricultural Production, Organization And Economy On The Basis Of Model-studies

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Hungarian Agricultural Engineering, Gödöllő (No 4 1991.) . . 31

Despite of a very diverse entrepreneurial segment and area size production is still motivated by extra incomes. The production factors, production structure, equipment scale, production volume, investment as well as expenses-yields etc are all variables affecting the results to be realized. Efforts are therefore to be taken to recognize the new economic relationships of general tendency so as to promote initiation or correction of the entrepreneurial decisions.

The Possibilities Of A Concerted Development Of Custom – Service And Consulting Referring To Structural Changing

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Hungarian Agricultural Engineering, Gödöllő (No 4 1991.) . . 33

In our opinion within the frame of consulting an important part of the information in the scope of choosing, acquiring, putting into

operation, running and secondarily utilizing the machines can go to the farmers through an organization that already exist and performs the custom – service of the agricultural equipment. The combination of the custom – service with the consulting activity seems to be the most practical.

Modification Of Suction-pressure Pulsation Ratio

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Hungarian Agricultural Engineering, Gödöllő (No 4 1991.) . . . 36

According to the tests the parameters of teat cups (diameter, wall thickness, hardness etc.) effect the cup movement and the speed of movement in the course of deformation. Due to this effective suction-pressure pulsation ratio – related to the characteristic curve measured at the pulsator – changes because of these parameters. Knowing the characteristic parameters the change of rate can be calculated with good approximation, but to do this, the main parameters of the characteristic curve – approximating the theoretical one – measured at the pulsator, must be known. In such a way the acceptable change can be prognosticated in advance, in the case of using different teat cups at a given milking machine.

Technical And Energetic Analysis Of Fodder Treatment Technologies

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Hungarian Agricultural Engineering, Gödöllő (No 4 1991.) . . . 39

Last years the thermic and hydrothermic methods and equipments designed – first of all – for handling of soya and other grain products were also used in Hungary. In 1989-90 in Kisalföld State farm a Hydrothermic fodder processing technology based on extruder was developed.

On the basis of the tests carried out with the earlier dry extruder technologies, as well as with the Bocchi technology we have determined the output and energetic characteristics of the thermic treatment technology.

Atomization And Spraying Characteristics Of Air Atomizing And Cone Nozzles

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Hungarian Agricultural Engineering, Gödöllő (No 4 1991.) . . . 40

The plant protection is getting more and more important role in the production technology of different crops. The improvement of work quality of the chemical plant protection methods is an essential task from economical and environmental points of view. The applied spreading devices, within this the construction of nozzle parts and their technical condition, besides the maintaining of spraying parameters at an optimum level have a basic role. The disintegration of nozzle tips, the drop size and distribution have an important role in most of the protecting methods. The tests covered the Hungarian made nozzles and the all available nozzles of foreign origin. The spraying output of nozzle tips, the spray angle and the drop size distribution have been determined. In the evaluation of the tested parameters the international standards were taken into account.

Automated Forcing Of Vegetables Without Soil

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Hydrocultural growing experiments have been conducted at the Department of Vegetable Cultivation of the Kecske-mét Faculty of Horticulture for five years.

The Department has developed an automated controlling system for hydrocultural Cultivating. Computer controlling makes possible the optimization of the major ecological factors, including parameters of the nutriment solution in respect of crop productivity. During experiments considerable improvements have been recorded in quantity and quality of crops.

Air- And Heat- Engineering Tests Of Bábolna-type Driers For Cereals And Determining Development Trends

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Z. BÉKÉSI

Agricultural Company, Bábolna

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The study gives information on the research theme of the air-and heat- engineering tests of Bábolna-type driers for cereals determining development trends.

The resistance functions determined by theoretical method and the software for computers give help to define the parameters of operation and modification at available types, further to plan new driers having similar construction.

Recent Results Offered By Three-dimensional Briquetting Of Agricultural By-products

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Hungarian Agricultural Engineering, Gödöllő (No 4 1991.) . . 44

Based on our experiments three-dimensional briquetting offers advantages not only for briquetting straw materials. Using the same machine we have succeeded in briquetting powdered and clumpy materials, as well. This has prompted construction of an universal pressing machine. The bricks of relatively low density (700 kg/m³) pressed under 40 MPa press show very favourable durability indices, compared to traditional bricks. These recently produced ones are ready to burn in furnaces or ovens of solid fuel, due to their greater weight and homogenous structure. To improve burning, sides of the straw bricks are to be channelled while pressing.

Energetics Analysis Of Crushing Theories (RITTINGER, KICK, BOND)

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Hungarian Agriculture Engineering, Gödöllő (No 4 1991.) . . . 45

We have examined the possibility of using the Rittinger-, Kick- and Bond – models serving to describe the relations of average grain

size of grits and specific power demand of crushing. We have pointed out that each theory can be equally used, there is no significant difference in the approximation exactness among the three theories, in the range of examined concrete mass flows and of average grain size at crushing of barley. The significance level was between 90-99% alike.

Testing The Specific Heat Of Pioneer-type Maize Hybrids.

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Hungarian Agriculture Engineering, Gödöllő (No 4 1991.) . . . 46

The knowledge of specific heat has got of vital importance during thermal treatment of cereals. The specific heat of cereals is the function of the material composition of seeds. However the chemical composition of seeds is affected by quite a lot of conditions (weather, type, terrain, type of soil, etc), so it is more useful if the specific heat of corns has been traced from the additive feature of moisture content and of the specific heat of dry substance. There is no significant difference among the specific heats of Pioneer-type maize hybrids. The specific heats of Pioneer-type maize hybrids. The specific heat relating the grains of maize can be described with the function

$$C = C_s + A \cdot X^a + B \cdot t^b$$

in the range of temperature 0-80 C and of dry basis moisture content 0-0,5 kg/ha, if – making more precise the additive character of specific heat, – the specific heat of 0 C dry substance (C_s) is corrected in function of material temperature (t) and of moisture content (X).

The Application Of Moisture Measurement At Microwave Frequency Of Grain – Dryers

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Hungarian Agriculture Engineering, Gödöllő (No 4 1991.) . . 48

In Hungary drying plays an outstanding role among the different methods of preservation. Nearly 80 % of the 15 million tons of grain produced annually is stored after drying.

Year by year the agricultural drying requires 10-15 PJ energy which is around 20% of the country's whole consumption. Reducing energy consumption is an important task.

Development goes on in the direction of a better use of drying air and instrumentation.

We make proper use of the drying air if it leaves the dryer in a state saturated with steam. It can be achieved through different devices of air conduct.

We can save human labour and energy through the instrumentation of dryers. According to our examinations, around 10% of the energy can be saved by continuously measuring the moisture content of the grain during drying. The operator of the drying unit usually overdries the grain because of safety reasons, to 10-11% instead of the necessary 14%. However, if it can keep the 14%, it will, of course, save energy. The system developed by us is suitable for an automatic regulation of crossflow dryers. Regulation is carried out through the operation of the emptying mechanism of the dryer on the basis of the temperature of the air as well as the moisture content of the grain.

An important part of the system is the microwave moisture meter, which is our invention.

Applicability Of Infratelevision For Detecting State Of Plants

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Hungarian Agriculture Engineering, Gödöllő (No 4 1991.) . . . 49

Applicability of infratelevision (enabling remote sensing of surface temperature without touch) for detecting infestant plant diseases and damages by pests has been studied. Based on our results, rises in temperature before manifestation of symptoms cannot be measured. Thus, neither microcolometry nor infratelevision can be applied for previsual detection of diseases. Remarkd symptoms are however accompanied with considerable spectral changes, enabling the use of thermovision in plant protection for:

- early diagnosis of infestations,
- exact detection of pathologic foci
- prediction of epidemics
- abrupt protection interventions.
- improvement of physiological state of plants.

Soil Conservation Tillage

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In Hungary the renewal of the tillage aspect and practice can be calculated from the middle of 1970's. The balance can be only made

in the knowledge of the effects. The mistakes made are: the burning of stubble residues at any price, the „over tillage”, the neglected soil conservation, the conservatism against the reversible plough, the loosener and heavy cultivator, The other side of the balance are the application of the rational management of organic matter, the improving physical-biological condition of the soil, the soil conservation equipment and methods. The paper summarizes the experimental results of one and half decade.

Laboratory Robot With Irrigation Adapter

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Hungarian Agriculture Engineering, Gödöllő (No 4 1991.) . . . 53

Several studies have been made about the possibility of agricultural application of the robot technique. The studies based on the demands found that the agriculture requires also special laboratory robots besides the farm robots.

In the paper the authors give account of their robot development work, made for agricultural and biotechnological laboratories. They make known the own designed BR-5 type laboratory irrigation robot which has been carried out at the Faculty of Agricultural Engineering.