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breeding population. A stiff-stem line was crossed with the varieties "Alfred" and "Minica". The stiff-stem recombinants showed a 20% shorter plant height, excellent lodging resistance, higher harvest index and a promise of 30% yield increase. The monogenic inheritance of the mutant trait is an advantage for further breeding work. We propose the symbol st for the new allele.

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Quantitative analysis of the productivity of an indeterminate and a determinate genotype of Vicia faba

Experiments were carried out with the indeterminate faba bean cv. "Herz Freya" and the determinate cv. "Ticol". Total and reproductive dry matter were greater in "Herz Freya" than in "Ticol". However, light interception tended to be higher in "Ticol", therefore the conversion of light into dry matter was less efficient. The two cultivars differed apparently in their light utilisation efficiency. It appears that a large part of the differences between "Ticol" and "Herz Freya" are the result of differences in primary productivity, not necessarily related to the indeterminate or determinate growth habit.

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Influence of different plant types on harvestability and yield of faba beans, Vicia faba L.

The tall and indeterminate growth habit of the faba bean has often been considered to be the major reason for its relatively poor yield stability. In particular, under wet and cold weather conditions indeterminate plants show an excessive vegetative growth but fail to produce an adequate grain yield. Three genetically modified plant types were tested for their suitability in breeding for improved harvestability and yield of faba beans. One breeding line each of "topless" tl, "semi-topless" Ti_s and "stiff-strawed" st, was crossed with the high yielding and indeterminate varieties "Alfred" and "Minica". In the F₂, analysis of segregation confirmed that all three modified plant types showed a monogenic recessive inheritance. "Topless" plants showed a good combination of earliness, short plant length and improved standing ability. Yield performance seemed to be lower compared with the conventional types when crops were standing upright until harvest.

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Mutant genes in pea breeding

Mutations of genes Dpo (dehiscing pods) and A (anthocyanin synthesis) played a role in pea domestication. A number of other genes were important in cultivar development for 3 types of usage (dry seeds, green vegetable types, fodder), e.g. fn, fna, le, p, v, fas and af. New genes (induced and spontaneous), are important for present ideotypes and are registered by the Pisum Genetics Association (PGA). Comparison of a pea variety ideotype with the variation available in gene banks shows that breeders need "new" features. In mutation induction experiments, genotype, mutagen and method of treatment (e.g. combined or fractionated doses) are varied for broadening the mutation spectrum and selecting more genes of agronomic value. New genes are genetically analysed. In Poland,



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some mutant varieties with the gene afila were registered, controlling lodging by a shorter stem and a higher number of internodes. Really non-lodging pea varieties could strongly increase seed yield. But the probability of detecting a major gene for lodging resistance is low. Therefore, mutant genes with smaller influence on plant architecture are sought, to combine their effect by crossing. Promising seem to be the genes rouge, reductus and arthritic as well as a number of mutant genes not yet genetically identified. The gene det for terminal inflorescence - similarly to Vicia faba - changes plant development. Utilisation of assimilates and ripening should be better. Improvement of harvest index should give higher seed yield. A number of genes controlling disease resistance are well known (eg. Fw, Fnw, En, mo and sbm). Important in mass screening of resistance are closely linked gene markers. Pea gene banks collect respective lines, but mutants induced in highly productive cultivars would be better. Inducing gene markers sometimes seems to be easier than transfer by crossing. Mutation induction in pea breeding is probably more important because a high number of monogenic features are desirable for variety ideotypes.

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Determinate genotypes of lupins (Lupinus sp.)

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Seed yields of lupins are unstable and not very high because vegetative growth is dominating over generative development. Therefore, radical changes in plant architecture and elements of yield structure are needed. A good example may be a spontaneous mutant of yellow lupin (Lupinus luteus), found by SVAB in 1959. This mutant has no secondary branches but instead of them flowers and pods are developed.

In our investigations on induced mutations in Lupinus albus and Lupinus angustifolius similar, self-completing and unbranched types were selected. In both species these changes are monogenic and recessive. In the Agricultural Institute at Zodino, Byelorussia, a self-completing mutant was selected, controlled by a dominant gene. This mutant, besides flowers and pods on the main stem, had also single flowers and pods on the upper edge of leaves. More information about these mutants was presented at the 5th International Lupin Conference, Poznan, Poland, July 1988. By including the above mentioned mutants in our crossing programmes, new strains have been obtained. They have a shorter vegetation period as well as higher and more stable yield of seeds and seem to be more resistant to virus diseases. The self-completing strain of yellow lupin "WTD 585" gave in state trials in 1986-1987 a yield of seeds 10% higher than the standard variety. In northern Poland its yield of seeds was even 29% over the standard.

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Breeding of Euphorbia lagascae Spreng., a possible new oil crop for industrial uses

Euphorbia lagascae Spreng., a winter annual herbaceous crop native to south eastern Spain, produces seeds containing up to 50% oil. The main fatty acid is vernolic acid, an epoxy acid which can be used in plastic fabrication (polyurethane foams, -dispersions and -casting resins), protective coatings (paintings, varnishes etc.), and other industrial fields. The main drawbacks for agricultural production are a severe seed shattering of the capsules upon ripening and indeterminate growth. Seed



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