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BULLETIN No. 23

Production of Legume Seed

ABERYSTWYTH, SEPTEMBER, 1937.

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BULLETIN 23

PRODUCTION OF SEED OF HERBAGE AND FORAGE LEGUMES

**An international exchange of opinions and experiences on the technique
of producing seed of leguminous herbage and forage plants**

**Edited by
R. O. WHYTE**



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As indicated by Kirk and Stevenson, the production of sweet clover seed is more common in the west than in the east. In the United States, however, rather large quantities are produced as far east as Ohio. Considerable quantities are also harvested, especially in years when the seed is relatively high, upon the banks of irrigation ditches throughout the irrigated sections of the west. In such sections sweet clover has become established as a weed and the seed is, of course, taken as an incidental crop. In Illinois and certain other sections, many farmers harvest seed with beaters which knock the seed off from the standing plants and leave the plants on the field. In any event, there is a very heavy loss of seed, but harvesting by means of a beater is believed to be more economical and results in a smaller cost per pound for the harvesting operation. These beaters are commonly made by the farmers themselves out of material of old binders readjusted with arms which serve to beat the seed from the plants. The practice of sowing unhulled and unscarified seed in autumn and winter appears to be upon the increase. It has been found that reasonable stands can be secured in this way and the extra expense of hulling and scarifying is avoided.

Diseases of sweet clover appear to be perhaps more prominent in the eastern United States than they are in Canada. Several diseases, especially mosaic, stem and crown rots and others, often make heavy inroads into the stands of plants or materially reduce the vigour. In the Willamette Valley of Oregon a form of stem-rot, possibly due to *Sclerotinia trifoliorum*, is extremely serious. A sweet clover strain has been selected which is highly resistant to this disease and seed of this strain is now being harvested in Oregon.

Lupins (*Lupinus* species)

R. von SENGBUSCH

Germany

The lupin species most commonly grown in Germany are *Lupinus luteus* and *L. angustifolius*; the cultivation of *Lupinus albus* has not become established until quite recently. Until a few years ago, only bitter forms of these three lupins were in existence. After the discovery of alkaloid-free mutants in the three species mentioned, and with the increasing reproduction of the alkaloid-free "sweet lupin" material, a displacement of bitter lupin cultivation in favour of that of sweet lupins has taken place. It is probable that by 1938 the whole lupin area in Germany will be planted with sweet lupins.

Hitherto lupins in their natural state were used exclusively for feeding sheep. When they had been steeped, that is, freed of the alkaloids, they could be used for other animals also. To-day the lupin in its alkaloid-free form represents a valuable protein fodder for all kinds of domestic animals.

Lupins are grown in Germany on the light, sandy soils, their arrangement, in order of increasing requirements as regards soil composition, being as follows: *Lupinus albus*, *L. angustifolius* and *L. luteus*. *L. albus*, the least exacting, tolerates a slightly acid to slightly alkaline soil (pH 6 to 7.5); *L. luteus* prefers acid soils with pH 5 to 7, while *L. angustifolius* occupies an intermediate position. Sensitivity to lime is a characteristic of all lupin species, and of *L. luteus* in particular.

The moisture requirements of lupins are relatively low, but they respond very well to large doses of water and will then give correspondingly abundant yields. Rainfall in the principal lupin areas in Germany varies from 400 to 600 mm.

Lupins grown for seed do not as a rule occupy any definite position in the cropping system. They are interpolated as a summer crop. The rotation in the lupin growing districts is: roots or tubers (potatoes), summer crop, winter crop (rye). Lupins are sometimes grown as the summer crop instead of oats or barley.

The seed is either sown alone or in a mixture with oats or summer rye. Cultivation with oats has proved very satisfactory in Germany within the last few years; the lupin seed crop, above all, is made more reliable thereby, the oats preventing the bursting of the pods in dry weather to a certain extent. The proportion of oats to lupin seed varies in accordance with soil and moisture conditions. The better these conditions, the smaller the proportion of oats required. Seed rate under favourable conditions is approximately 10 kg. oats and 160 kg. lupins per hectare; under unfavourable conditions 20 kg. oats and 160 kg. lupins per hectare. For pure sowing the seed rate is approximately 160 kg. per hectare in the case of *Lupinus luteus* and *L. angustifolius*, and 200 kg. per hectare in that of *L. albus*.

The seed is usually drilled in rows approximately 20 to 25 cm. apart, a distance chosen to facilitate machine-hoeing during early growth. Hoeing has proved especially valuable in the case of sweet lupins. The fields, which are normally very liable to become overgrown with weeds on account of the lupin's slow early development, may thus be kept clean.

Lupins are sown from the end of March to the beginning of April. The time of sowing appears to have a definite effect upon yield. Experiments at Müncheberg indicate that early sowing produces the highest yields.

Lupins are not exacting in regard to nutrient requirements. The application of nitrogen is unnecessary as lupins are "self-providers" of this nutrient. As they also have only a slight reaction to doses of potassium and phosphoric acid, these two nutrients are not absolutely necessary. Normally, however, dressings of approximately 80 kg. potassium and 50 kg. phosphoric acid per hectare are applied. Cultivation is limited to hoeing once or twice.

Harvesting is done in August or at the beginning of September. When there is abundant rainfall or a considerable amount of soil moisture, it may be postponed until the end of September, especially in the case of *L. luteus* and *L. albus*. It is advisable to mow *L. luteus* and *L. angustifolius* before full maturity as these species have a very marked tendency to shatter. In very dry harvest weather the lupins are mown either at night or in the morning dew. Self-binders or side-delivery reapers are used.

There is considerably less difficulty in the harvesting of *Lupinus albus*, the pods of which do not burst. With this species mowing can be delayed until every part of the field and every part of the individual plants are fully ripe.

After mowing, the lupin sheaves are arranged in stooks in rows or allowed to lie in windrows. It is advisable to cover the tops of the stooks with straw in order to prevent the bursting of the pods.

Carrying should not be done until the lupins are fully ripe, when they should be stored in barns or in stacks. The plants may easily become mouldy if the crop is carried while still moist; to prevent this, layers of straw are placed between the lupin layers.

Lupins are not threshed until the early spring, in order to prevent the seed becoming hard-coated. Within the last few years progress has also been made in the matter of hard-coated seed. We have succeeded in finding soft-coated lupins both in *L. luteus* and in *L. angustifolius*. As within a measurable space of time all sweet lupins will be soft-coated, threshing may be done in the autumn. The obtaining of good, germinable seed offers a considerable amount of difficulty. In Germany the "Schule" cleaning plant has proved satisfactory.

In breeding establishments seed may be scratched in order to improve swelling capacity and germination capacity.

When the cultivation of lupins is newly adopted in a district, inoculation of the soil or of the seed with nodule bacteria is advisable.