

EEC Forage Legume Seed Production

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ABSTRACT

A brief overview of EEC forage legume seed production is presented. Production data, farming systems and climate are contrasted and discussed.

Additional index words: lucerne, white clover, climate, seed yield.

PRODUCTION

EEC certified forage legume seed production totalled 27,200 tonnes in 1986 (Table 1), and of this total, 65% was lucerne (*Medicago sativa* L.). In 1988 the EEC was self-sufficient for lucerne and red clover (*Trifolium pratense* L.) production but not for other species (Table 1). White clover (*T. repens* L.) self sufficiency is usually around 50% but was lower than normal in 1988 because of a very poor production season in 1987.

France is the EEC's biggest producer of forage legume seed (Table 2), both in terms of area and tonnes of seed produced. Belgium, Eire, Luxembourg, The Netherlands and Portugal either did not produce herbage legume seed in 1986, or produced negligible quantities. Lucerne is mainly grown south of the 48th parallel, where temperature and sunshine allow adequate flowering and pollination; red clover is produced north of the 45th parallel under oceanic climates which avoid moisture stress; white clover is traditionally found north of the 51st parallel for 'Hollandicum' and 'wild' types, and south of the 46th parallel for 'Ladino' types, even though recent experiments have produced good yields from 'Hollandicum' types in mediterranean climates with irrigation.

FARMING SYSTEMS

Forage legume seed production farming systems are usually linked with stock to utilize valuable by-products, e.g. forage or hay from spring grazing or cutting of white clover and lucerne; straw baled after harvest. Cropping systems range from the 'sophisticated' white clover system in Denmark, to the 'very simple' lucerne system in some parts of France.

(i) White clover (Denmark)

White clover plus Kentucky blue grass (*Poa pratensis* L.) is generally undersown in spring barley. In the first year the grower accepts a 10-20% barley yield reduction

compared to that of a pure barley crop. The white clover is managed for seed production in the second year, and yields of up to 900 kg ha⁻¹ can be obtained. In subsequent years, blue grass yields around 1,000 kg ha⁻¹. This system requires much expertise, particularly for sowing and establishment, fertilizer use, weed control, harvesting and cleaning, and maintaining cultivar purity.

(ii) Lucerne (France)

Lucerne is often spring sown under sunflower (*Helianthus annuus* L.), and with this system, sunflower yields are reduced by 10-15%. Lucerne is harvested in the following years, with yields ranging from 200-1200 kg ha⁻¹ depending on climate and management. In western France, a spring cut for hay or silage is taken, but the time of cutting must allow for reproductive development when rainfall is adequate and pollinators are active.

In mediterranean areas, lucerne is spring sown without a cover crop, and proper management of irrigation water can produce seed yields of 600-700 kg ha⁻¹. Spring cutting in the following years is not advisable, because it delays flowering until temperatures are very high.

CLIMATE

The EEC climate varies from the temperate (moderate evenly distributed rainfall, warm summers, mild to cold winters, e.g. Denmark) to the mediterranean (high summer and winter temperatures, unevenly distributed rainfall, e.g. southern France) to the oceanic (high rainfall, cool summers, mild winters, e.g. Eire).

The climate can have a major impact on legume seed production. For example in 1986 in Denmark, a mild summer and dry harvest period was good for white clover seed production, and the mean yield was 470 kg ha⁻¹. In 1987, wet weather prolonged vegetative growth, discouraged bee activity, caused lodging, and finally caused sprouting and rotting, resulting in a mean yield

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of 34 kg ha⁻¹. Similarly with lucerne in France. The good 1986 spring and summer allowed intense flowering, high pollination levels and a dry harvest, so that the mean seed yield was 400 kg ha⁻¹. However, 1988 was very wet and cool, so that excessive vegetative growth was produced, crops lodged and pollination was poor; the net result was a mean yield of only 280 kg ha⁻¹.

CONCLUSION

As well as climatic factors, there are well known genetic factors linked to seed production. However, as climate interferes strongly at certain stages, e.g. pollination, seed set and seed filling, it is often difficult to isolate the genetic factors, particularly in cultivar trials. One question that must be discussed though is how can we improve the poor seed harvest index of forage legume species? Perhaps this workshop can provide an answer.

TABLE 1.
EEC forage legume seed production, 1986.

Species	Area (ha)	Production (tonnes)	% self sufficiency ¹
lucerne	45,500	17,800	120
red clover	9,900	2,900	118
white clover	3,600	1,400	5
other	-	5,100	-

¹1988 data

TABLE 2.
Production of forage legume seed per country, 1986.

Species	Production ¹	Country						
		France	Italy	Greece	Denmark	Spain	UK	Germany
lucerne	ha	19,950	16,030	6,525		3,057		
	tonnes	7,984	5,624	1,838		2,831		
	kg ha ⁻¹	400	351	205		779		
red clover	ha	8,080	186		1,030		370	220
	tonnes	1,969	58		661		97	87
	kg ha ⁻¹	244	312		644		261	392
white clover	ha		236		2,870		490	
	tonnes		17		1,338		74	
	kg ha ⁻¹		72		466		150	
berseem clover	ha		226	270				
	tonnes		89	195				
	kg ha ⁻¹		392	723				

¹France also produced 158 t crimson clover (612 kg ha⁻¹) and 104 t lotus (550 kg ha⁻¹) while Denmark also produced 96 t black medic (750 kg ha⁻¹).