

Certification and production of sulla seed in Central and Southern Italy

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Summary - Most of seed production of sulla is restricted in specific areas of Central and Southern Italy: Tuscany, Abruzzo and Sicily regions. Sulla seed productions are obtained, above all, with not-certified seed of local varieties or ecotypes and "commercial" seed without varietal certification. Certified seed production, in order to obtain "basic" or "certificated" seed of varieties registered on National Catalogue, is very limited (600 hectares). Seed production system is variable depending on the areas, climate and socio-economic aspects. The paper gives information concerning different cropping systems, seed rates and seed conditioning.

Key-words: sulla, seed production, certificated seed, seed conditioning, hulled seed

Résumé - La production des semences de sulla est limitée à la région central et au Sud de l'Italie. En particulier nous avons une bonne production des semences dans trois régions: Toscane, Abruzzes et Sicilie. La production des semences est surtout obtenue avec semences pas certifiées des variétés locales et écotypes en conséquence nous avons les "semences commerciales" pas identifiées pour la variété. La production des "semences certifiées" pour obtenir la "semence de base" ou la "semence certifiée" des variétés inscrites au Catalogue National est vraiment limitée (600 hectares). Le système de production est très variable parce qu'il dépend par la région, par le climat et par la tradition locale.

Mots-clés: sulla, production des semences, semences certifiées, semences conditionnés, semences vetûes

Introduction

Sulla forage crops have an important role in clay and calcareous soils of semi-arid environments of Central and Southern Italy. There is a renewed interest for this species because of its potential role in low-input hill cropping systems (Talamucci *et al.*, 1998). This trend is confirmed by a stabilization of national sulla crop areas and a constant increasing of certificated seed production in the last years (tab 1, 2). Sulla crop areas concern seven regions and are estimated to be nearly 100,000 hectares, while seed crops are some 6,500 hectares. Certified seed production to obtain "basic" or "certified" seeds of registered varieties in the Italian Catalogue is very limited (less than 10% of seed supply) but it has achieved 600 hectares in 1999. Six varieties are registered in the Italian Catalogue but only three varieties are reproduced and officially certified: Carmen, Grimaldi and S. Omero (tab 3). Nevertheless a part of certified seed production is classified in the "commercial" category which refers to certification of botanical species but not to a varietal certification. Most common seed in use is not-certified seed of local varieties or ecotypes that farmers exchange and re-employ in the farms. Most seed crops of sulla can be considered flexible seed/forage systems depending on regions, climatic conditions and market prices. Very often seed is not produced in specialized crops, but is a by-product of forage production. Specialized seed crops of sulla varieties are restricted to limited geographical areas of Tuscany and Abruzzo. Sulla seed is produced partly in the same area where it is planted for forage production (Sicily and Sardinia), but a large part of the seed is produced outside its major area of use (Tuscany, Abruzzo) and marketed in the southern regions. Each area has a different cropping system, different

harvesting methods and seed rates regarding traditions, socio-economic conditions and environment.

Table 1 Sulla forage crop areas of Italian regions in 1996 (*).

Region	Hectares
Toscana	5,085
Abruzzo	4,870
Molise	12,050
Campania	17,000
Calabria	17,115
Sicilia	53,430
Sardegna	1,700
Other regions	789
Total	112,039

(*) ISTAT source

Table 2 Sulla seed certification in Italy: areas and yields certified in 1994-1998.

Year	1994		1995		1996		1997		1998	
	Ha	Tons	Ha	Tons	Ha	Tons	Ha	Tons	Ha	Tons
Sulla varieties	134	30.3	54	8.0	48	6.8	402	198.6	571	341.0
Sulla "commercial" seed	-	147.9	-	108.2	-	50.2	-	53.0	-	109.6
Total		178.2		116.2		57.0		251.6		450.6

Tuscany

An estimated sulla seed crops surface of 2,000 hectares can be found in the internal hilly areas of Pisa province near province of Livorno in Tuscany. Only 199 hectares of such surface are devoted to officially certified seed (tab 4). Because of the reduction in pasture and land forage utilization and due to the good adaptation to clayey soils of sulla, nearly all sulla crops of this area are specialized in seed production. Seed fields are usually established in rows and seeding rates vary from 15 to 20 Kg/ha (de-hulled seed). Suitable crop and soil management (tillage, surface preparation, time and method of sowing, weed control) are frequently employed. In Tuscany environments, sulla is traditionally used as an annual species in rotation with durum wheat. Sowing time is in August and September and harvesting time is at the end of July and beginning of August. Sometimes an early forage cutting is carried out to protect from agro-climatic damages. Seed yields are on the average 0.5 tons/ha. This area is traditionally famous for a high quality seed, specially for germination and clear colour seed, due to the favorable climatic conditions and to the threshing and conditioning techniques. Harvesting is done by a first direct threshing with current combine machine obtaining sulla disarticulated laments yield, stocking hulled seed harvested in heaps or farm cart directly in the field and finally, always in open air, de-hulling operations by special modified threshing machines. The yield in weight of de-hulled seed varies from 20 to

25%. Seed multiplication is connected to the local seed industry which provides seed cleaning and marketing.

Abruzzo

Sulla cultivation areas are located in the southern part of the province of Chieti on the border of Molise region. Usually, sulla seed crops are annual in biennial rotation with durum wheat, since such species are the unique growing in these calcareous and clayey soils. Sulla is seldom cultivated as a biennial forage crop. The sulla seed production area is estimated in 1,000 hectares and only 370 have been certified in 1999 (tab 4). Seeding methods are still spreading with a fertilizer spreader because hulled seed is often used. Hulled seed rate is 80-120 Kg/ha; seeding time is in fall while harvesting time is in July. Sod-seeding and no-tillage systems are frequently used. De-hulled seed utilization has been recently increasing in more specialized farms of seed growers to allow the adoption of more evolved cropping systems suited to quality seed production (tillage, row seeding, weed control). Certified seed crops are established with 18-25 Kg/ha of de-hulled seed while hulled seed yields are 1-1.8 tons/ha with high harvesting losses. After sulla laments threshing, de-hulling seed operations are completed in cleaning and seed conditioning plants specialized in removing sulla laments. Local seed companies collect hulled seed productions for subsequent conditioning and marketing. Most common varieties are Tuscan, Sicilian, Tunisian and local ecotypes.

Table 3 Sulla varieties certified in Italy in 1999 (hectares).

Varieties	Basic	Certified	Total	Disapproved	General total
Carmen	25.97	375.88	401.85	22.70	424.55
Grimaldi	---	94.07	94.07	7.25	101.32
S. Omero	36.73	67.09	103.82	12.57	116.39
Total	62.70	537.04	599.74	42.52	642.26

Table 4 Geographical distribution of seed areas officially certified in 1999.

Region	(ha)
Toscana	199
Abruzzo	370
Molise	25
Campania	6
Total	!Error de sintaxis, (

Sicily

Sulla is the most cultivated forage legume under rotation in Sicily. Cultivations are located in internal areas of Sicily, prevalently, in the province of Palermo in Corleone and Madonie zones. Seed production areas are estimated in 3,000 hectares but any seed production has not been certified in the last years. There are not specialized seed productions therefore seed yields are generally low and variable between 0.2 and 0.3 tons/ha. Seed production is always a by-product of sulla forage production of second year meadows; in fact, after grazing or haymaking, a part of sulla crop is devoted to seed production depending on climatic

conditions and weed level in the second year. Seeding of hulled seed by spreading methods (rarely de-hulled) is preceded by soft tillage or no-tillage. Hulled seed use assures a better germination and allow seeding time at the end of summer. Seed rates of hulled seed are 150-200 Kg/ha and even more when a very low quality seed is used. Not-certified hulled seed has a poor technological quality (analytical purity and germination) for the presence of other seeds, hard seeds, weevilled seeds, impurities and empty seeds. The incidence on germination and purity seed could be more than 50%. All Sicilian seed crops are of local varieties or ecotypes. In the past many local populations adapted to different environments of the Sicilian region were widespread. Today, seed is multiplied outside the area of adaptation. The lack of a developed local seed industry encourage the introduction of an extra-regional seed of other local varieties, and also does not promote a qualified seed production.

Conclusions

Although, in the last year, it has been registered an increase in Italian sulla seed production, most of the sulla production is of unimproved not-certified ecotypes and it is not produced in specialized crops but it is a by-product of forage crops. The lack of a qualified seed demand and of seed multiplication facilities are the major limitations in the development of sulla production. The implementation of a qualified seed market and of an adequate sulla seed industry requires efficiency of the agricultural systems and skilled farmers capable of correct land preparation, seeding, weed control, special harvest machinery. A more consciousness of genetic and technological quality seed is necessary to achieve a more qualified seed production and to meet EU seed standards requisities for official seed certification and for EU marketing.

References

- Baldoni, R., Kokeney, B., Lovato, A. (1974). *Le piante foraggere*. R.E.D.A. ed.,150-152.
- ISTAT. *Statistiche dell'agricoltura. Annuario 1996*. (1999). Istituto nazionale di statistica.
- Lorenzetti, F. and Rosellini, D. (1999). Forage seed production and use with particular reference to Mediterranean Europe. *Proceedings Fourth international Herbage seed conference*. Perugia. Italy.1-12.
- Roggero, P.P. and Sargenti, P. (1999). Effect of a spring forage cut on the reproductive development and seed production of sulla (*Hedysarum coronarium*). *Proceeding Fourth International Herbage Seed Conference*. Perugia, Italy. May 23-27-1999,111-115.
- Talamucci P., Staglianò N. and Sabatini S. (1998). La sulla: possibili ruoli nella foraggicoltura mediterranea. *I Georgofili. Quaderni 1998-I*.