PASTURE SEED PRODUCTION IN COLOMBIA

J.E. Ferguson[1/]

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1/ Pasture Agronomist, Tropical Pasture Program, International Centre for Tropical Agriculture (CIAT), Apartado Aéreo 67-13, Cali - Colombia

2/ Mrs. J. Rodwell, Co-ordinating Secretary, I.H.S.P.R.G., Department of Agriculture and Horticulture, University of Nottingham, Sutton Bonington, Loughborough, Leics, United Kingdom

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SUMMARY

Within Colombia significant amounts of seed are produced and exported of the perennial tropical grasses; - *Brachiaria decumbens*, *Cenchrus ciliaris*, *Dichanthium aristatum*, *Hyparrhenia rufa*, *Melinis minutiflora*, and *Panicum maximum*. Small amounts of the perennial legume *Pueraria phaseoloides* are produced.

There are very few seed producers in Colombia in the conventional sense. This apparent anomaly is explained by the fact that seed is a natural by-product in some grazing regions which is harvested from pastures by manual contract labour and then traded between merchants, generally without any mechanical processing.

While at present production of seed is a secondary, opportunistic, low technology, highly manual enterprise, the seed industry is changing rapidly. In recent years, a few specialist producers and processors have had dramatic effects in improving species range, production and seed quality. Future prospects appear to be favourable.

SPECIES.

The species of which seed is produced in Colombia are listed in Table 1. The grasses constitute perennials of African origin, both naturalized and recently introduced. The legume *Pueraria phaseoloides* is of southeast Asian origin and was introduced as an associate to African Oil Palm in plantation agriculture. There have been sporadic attempts at seed production of other legumes, but without commercial success.

Seed has been produced of other species under experimental conditions. The Colombian Agricultural Research Institute (ICA) and the International Centre for Tropical Agriculture (CIAT) have both produced seed of materials of *Centrosema pubescens*, *Desmodium* spp., *Glycine wightii*, *Stylosanthes* spp., *Zornia* spp., *Paspalum* spp., *Andropogon* sp., for evaluation and demonstrative purposes. In time, these efforts should contribute not only to the development of new cultivars but to the growth of a seed industry.

PRODUCTIVITY.

Statistics of production are difficult to come by but suffice to say that production of crude seed of each Guinea, Puntero and Molasses would be at least 200 tons or more. A significant proportion of total production is exported to Venezuela, where seed commands higher prices.

Seed yields are difficult to define because of: - a high proportion of 'chaffy' grass species; the common phenomena of dormancy; a very traditional production and marketing system; an absence of seed quality service facilities. Rough estimates are provided in Table 1. The most commonly mentioned quality component is germination, when emphasis should be given first to purity and then the viability - germination - dormancy complex.

REGIONS.

The geographic regions where grass seed is produced are those where the species are established and perform well as pastures. In the case of kudzu, seed is derived from some of the regions favourable for Palm Oil production. Overall, there are three main production regions:

(a) Northern, lowland Atlantic Coast, e.g. in the states of Cesar and Cordoba, around Valledupar and Montería, respectively. This general are combines production of beef, milk, cotton, rice and is a traditional major source of seed of Guinea, Angleton, Puntero, Buffel and some Kudzu. Some climatic descriptors are:

Latitude 8-11°N; Altitude 10-200 m.; Mean monthly temperature range, 25-28°C; Annual precipitation, 800-1,400 mm., with a 4-5 mo. wet season and an abrupt change to a strong dry season.

(b) Inter-mountain Valleys and sub-coastal extensions, e.g. the Tolima Valley including parts of the states of Tolima and Huila, and coastward extensions drained by the Magdalena River. To a lesser extent, subcoastal parts of the Cauca River. The area produces rice (irrigated), cotton, sorghum, beef, milk and is a traditional source of seed of Guinea, Puntero, Angleton and Buffel. Some climatic descriptors are: Latitude 3-8°N; Altitude, 400-800 m.; Mean monthly temperature range, 23-25°C; Annual precipitation, 800-1,400 mm., with a bimodal distribution and marked growing seasons of approximately three months.

(c) Eastern Andean foothills, e.g. state of Meta, around Villavicencio. An expanding agricultural and pasture frontier region, producing beef, rice, milk and in recent years, seed of Brachiaria and some Kudzu. Some climatic descriptors are: Latitude 3-5°N; Altitude, 300-600 m.; Mean monthly temperature range, 26-27°C; Annual precipitation, 2,500-3,500 mm., with a 8-9 month wet season.

SYSTEMS.

Seed is produced in Colombia by three general production systems,

(a) Traditional for grasses.
(b) Brachiaria as pasture and crop.
(c) Kudzu from Oil Palm Plantations.

The traditional grass system relates to all seed produced of Guinea, Puntero, Angleton and Buffel. The production areas involved are portions of established pastures within the northern, lowland Atlantic coast and the inter-mountain valleys and their sub-coastal extensions. Seasons are

consistently favourable for flowering, seed set and recovery of these naturalized grasses. Applied management is nil, apart from restriction of grazing. Harvesting is conducted by contract labour, organized as often by purchasing merchants as by the grazier. Harvesting consists of manually cutting the flowering stems (except in the case of Buffel) and their orderly stacking in heaps in the field, followed by hand threshing, then removal of the crude spikelet mass from the field. Some harvesting is done by collection of fallen spikelets from the soil surface. Processing includes a natural drying phase and some manual removal of trash before bagging and marketing. All these phases are conducted with varying degrees of skill. Huge volumes of seed are produced in this manner and this system is the most productive in terms of number of species and gross tonnages. Obviously, purity and viability of different lots of the one species can vary tremendously. Purity is generally low and germination unknown. Recommended planting rates range from 15-30 kg/ha. Current retail prices range from US$1-3/kg. for 'crude' seed. Recent modifications to this system include: (a) some contract production associated with some technical assistance in management and (b) mechanical seed processing. There is now limited availability of lots of Guinea and Angleton of higher genetic and physical purity. Such material is also favoured for export.

Brachiaria has been planted as pasture, by vegetative means, in the Andean foothills and eastern savannas (Llanos) since about 1970. Commercial seed production began about 1974 and has concentrated around Villavicencio, because of the continuing availability of new pasture plantings for initial exploitation as short term seed crops. Applied management may include high density plantings, fertilizer application including nitrogen top dressing, timed slashing or grazing. Harvesting is conducted in various ways, the manual cut-stack and thresh, direct combining and custom made strippers. One producer uses some artificial drying and sells a machine cleaned, acid scarified high purity product. Spittle bug (Aeneolamia varia and Zulia sp.) can cause serious damages and seed yields and quality may be affected by seasonal variations in precipitation and radiation during the June - September flowering period. Crude seed presently sells

for approximately US$8-12/kg. High purity (> 90%), acid scarified seed presently retails for approximately US$30/kg. and is recommended for planting at 1 - 1.5 kg/ha.

Kudzu is produced in various regions of Colombia where it is associated with African Oil Palm as a ground cover for weed and erosion control. Flowering, seed set and seed yields vary widely between geographic regions, year and plantation sub-areas, reflecting effects of latitude, rainfall distribution, soil fertility, moisture stress, and radiation. When seed prices, and/or seed yields are attractive to the plantation manager, seed is hand harvested generally by the wives and children of plantation workers. Seed supply to the market is therefore erratic between years and regions but this system has a large latent production potential for Kudzu and other species. Small volumes of seed presently retail for approximately US$12/kg..

FUTURE.

Future production trends of tropical pasture seed will be related to:

(a) Basic demand forces from the grazing industry to fulfill pasture improvement objectives. Graziers have numerous alternatives for investment and will only purchase seed for pasture improvement when assured of favourable relative economic returns or during periods of high industry prosperity.

(b) Wider availability of adapted, productive cultivars of legumes and grasses. This refers to the fundamental genetic pre-requisite for pasture improvement and seed production. Current experimental programs by ICA, CIAT, and other institutions provide prospects for new germplasm offering wider adaptability, higher productivity and/or increased diversity. Such new varieties will provide a focal point for new attitudes towards both

pasture improvement and seed production.

(c) An increase in the number of seed growers, processors and involved merchants (as opposed to the disassociated traders). The industry is growing and organizing nationally and seeks to present its viewpoint. The successful commercialization of Brachiaria has dramatically illustrated that, once demand is sufficiently strong, specialist growers will be attracted and their expertise soon overcomes many issues regarded as problematic at the outset.

(d) The Andean Pact Countries (Colombia, Venezuela, Ecuador, Bolivia and Peru) are moving towards freer movement of seed between member countries. Colombia is very well placed to exploit its position as being a leading grass seed producer.

(e) An increase in technical support and service personnel and their expertise. Seed technology requirements include: profiles of the reproductive biology of new species; basic management methods; some definition of the most appropriate geographic regions for production; and improvement in all aspects of seed quality control.

Table 1. TROPICAL PASTURE SPECIES AND ESTIMATED SEED YIELDS IN COLOMBIA.

S P E C I E S	HARVESTS no./yr	SEED YIELDS Crude[1/] kg/ha/har.	Pure[2/] kg/ha/yr
Brachiaria decumbens Brachiaria	1-2	30-150	20-75
Cenchrus ciliaris Buffel	1	75-200	75-150
Dichanthium aristatum Angleton	1-3	200-600	75-200
Hyparrhenia rufa Puntero	1	150-300	75-175
Melinis minutiflora Molasses	1	100-250	50-150
Panicum maximum Guinea grass	1-2	30-100	20-50
Pueraria phaseoloides Kudzu	1	10-100	10-100

1/ Unrefined product of variable purity.

2/ International Definition.