

FORAGE CROP SEED PRODUCTION IN NORTHEAST THAILAND

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INTRODUCTION

Northeast Thailand covers approximately one-third of the total areas of the country. It is situated between latitudes 14°N to 19°N. The general topography is rolling uplands with the elevation of 100-300 meters above sea level and average annual rainfall at 1,186 millimeters. The vegetation is mainly semi-arid tropical forest. The soil is infertile, characterized by being sandy with about 10% of the area being saline. A large portion of land is regarded less suitable for cash crop production and is thus being left fallow or used as communal grazing areas for cattle and buffalo. Consequently, the region has generally been recognized as the major cattle and buffalo production area of the country. Almost two-third (6 out of 10 million heads) of cattle and buffalo population is raised in this region.

In order to enhance livestock productivity in the region, the Department of Livestock Development (DOLD) launched the Northeast Livestock Improvement Project during 1976 to 1982. In the project, one of the ways to accomplish the objective was through the improvement of the existing 200,000 rai (32,000 hectares) of communal grazing ground by oversowing with large quantity of the improved legume seeds. That generated the initial requirement of the large quantity of forage seeds which has been sustained over the years up to the present.

PRESENT STATUS

At present, the major portion of forage crop seeds is domestically produced mainly by DOLD and private farmers in the Northeast and, to a lesser extent, by a task force of the Central National Security Committee and Department of Public Welfare. Only a minute portion of seeds are imported. Among the grass species of which seeds are produced, Ruzi (*Brachiaria ruziziensis*), Guinea (*Panicum maximum*) and Hamil (*P. maximum* cv. Hamil) are the most popular, whereas Verano styb (*Stylosanthes hamata* cv. Verano), Centrosema (*Centrosema pubescens*) and Siratro (*Macroptilium atropurpureum*) are the major legume species. DOLD specifically advocates the improvement of communal grazing ground, fallowed land, road side, unproductive forest and backyard by oversowing with Verano stylo.

The recent expansion of beef and dairy production in Thailand and awareness of the importance of good quality forages has resulted in a rapid expansion of improved pasture in the Northeast. This further increases the requirement for forage crop seeds. According to a survey, the annual requirement of forage seeds is 600 tons. In 1988, DOLD has produced up to 537 tons, thus leaving a small deficit in seed supply. It has been projected that demand for forage seeds will increase in the future because farmers increasingly prefer oversowing seeds compared to the more laborious task of vegetative propagation.

FORAGE CROP SPECIES

According to standard procedures, the improved forage crops germplasm have been introduced from overseas. After a series of tests to assess their suitability to local condition and acceptability as forage feeds, the most suitable species will be selected for further propagation and distribution to farmers. The following is a list of forage crop species which are considered most suitable and whose seeds are routinely produced at present

Grass species of which seeds are regularly produced

- Ruzi grass (*Brachiaria ruziziensis*)
- Guinea grass (*Panicum maximum*)
- Hamil grass (*Panicum maximum* cv. Hamil)
- Plicatum grass (*Paspalum plicatum*)

Grass species of which seeds are produced at a lesser extent

- Buffel grass (*Cenchrus ciliaris*)
- Rhode grass (*Chloris gayana*)
- Humidicola grass (*Brachiaria humidicola*)
- Sorghum grass (*Sorghum bicolor*)

Leguminous forages of which seeds are produced

- Verano or Hamata (*Stylosanthes hamata* cv. Verano)
- Centrosema (*Centrosema pubescens*)
- Siratiro (*Macroptilium atropurpureum*)
- Graham stylo (*S. guianensis* cv. Graham)
- Khon Kaen stylo (*S. humilis* CPI. 61674)

SEED PRODUCERS

As mentioned elsewhere, the main forage seed producers are various sections of the DOLD and private farmers and to a lesser extent the other governmental organizations. With respect to those sections of the DOLD, there are 23 animal nutrition stations/research centers scattered over the country. Out of these, 13 stations/canters are located in the Northeast and produce most of the required seeds. Table 1 shows the total areas being used for forage seed production in the crop year 1987/88.

SEED PRODUCTION IN THE NORTHEAST

The DOLD's animal nutrition stations/research centers emphasize the production of grass seeds rather than legume seeds. For legumes, seed production is mainly concentrated on Verano stylo and the main producers are the Northeast private farmers. Table 2 shows the quantity of seeds produced in the Northeast during 1986 to 1988.

Table 1 Total areas used for forage crop seed production in 1987/88.

Producers		Total areas (hectares)	
		Grasses	Legumes
DOLD's	Stations/Research centers		
	Northeastern region	1,182	245
	Southern region	140	16
	Northern region	141	18
	Central region	266	15
	Central National Security Committee's task force	-	-
	Private farmers	440	108
	Department of Public Welfare	-	-
Total		2,169	402

Table 2 Quantity of forage crop seeds produced in Northeast Thailand during 1986 to 1988.

Producers	1986		1987		1988	
	Grasses	Legumes	Grasses	Legumes	Grasses	Legumes
	(ton)		(ton)		(ton)	
DOLD's Stations/ Research Centers in NE	37.5	40.8	90.7	24.8	132.8	15.3
Private farmers	-	140.0	-	275.0	34.2	275.0
Total	37.5	180.8	90.7	299.8	167.0	290.4

PRODUCTION METHODS

Production practices adopted by the two main groups of producers, the DOLD and private farmers, differ slightly.

Production practices by DOLD comprises the following steps:

1. Land preparation. Due to the large plots, land preparation is mechanically done. Normally two ploughings are made before sowing.
2. Sowing rate. For Verano stylo, Ruxi, Guinea and Plicatum grasses the sowing rate is 12 kg seed per hectare.
3. Fertilizer application. Due to low soil fertility, higher rate of nitrogen fertilizer is normally applied. For grasses, approximately 300 kg of ammonium sulfate per hectare is used, whereas 100 kg of triple superphosphate per hectare is used for Verano stylo.

4. Pasture maintenance. Two months after sowing, forages are cut for feeding purpose. After cutting, the pasture is left to flower and produce seeds. This practice is aimed at maximising the utilization of the established pasture.
5. Seed harvesting. Manual harvesting has been considered the most appropriate practice in forage seed production in the Northeast. This is due to the availability of cheap labour and this practice gives a higher yield of better quality seeds when compared to mechanical harvesting. The latter is not flexible enough to overcome the problems concerned with the variation in flowering dates, seed maturity and seed shattering which thus tends to give lower quality seeds.

Manual harvesting may be done in one or more of following ways:

- S Shaking the panicle allowing the ripe seeds to fall in a receptacles. This is used with Ruzi, Hamil and Signal grasses and is suitable with small plots.
 - S Plucking of ripened panicle. This is used with Buffel and Rhode grasses.
 - S Picking of dry pods. Used for Siratro or Centrosema.
 - S Sweating of panicle and ripening it in the shade for 2-3 days after which the seeds are manually threshed. This is used for Ruzi, Guinea and Hamil grasses.
 - S Sweeping of fallen seeds from the ground after previously cutting of the dry stems. the collected seeds are subsequently cleaned by sieving through various sieves. This is used with Verano and Graham stylo.
 - S Harvesting with vacuum floor cleaner. By vacuum sucking of fallen seeds from the ground after stem cutting. This is suitable for a large plot of legume forages. It can yield up to 240 kg of seeds per hectare.
6. Seed cleaning and quality control: the harvested seeds are subject to final cleaning at the DOLD's seed processing plants. In the Northeast, there are two DOLD's seed processing plants, one is at Khon Kaen Animal Nutrition Research Center and the other is at Tungula Rong Hai Animal Nutrition Station. After the final cleaning, every batch of seeds is sampled for subsequent quality control tests. The tests involve determination of moisture content, germination, purity and viability rates. Division of Animal Nutrition has established minimum standards, based on these data, for each forage species as shown in Table 3.

Table 3 DOLD's minimum quality standard for forage crop seeds.

Name of seed	Minimum (%)		
	Germination	Purity	Moisture content
Grasses			
<i>Brachiaria ruziziensis</i>	30	70	10
<i>Brachiaria brizantha</i>	15	40	10
<i>Panicum maximum</i>	30	70	10
<i>Paspalum plicatulum</i>	70	60	10
<i>Sorghum almum</i>	70	90	10
<i>Chloris gayana</i>	40	70	10
<i>Urochtoa mosambicensis</i>	15	60	10
<i>Setana anceps</i>	20	60	10
Legumes			
<i>Stylocanthes hamata</i>	25	70	10
<i>Centrosema pubescens</i>	50	90	10
<i>Leucaena leucocephala</i>	50	95	10
<i>Macroptilium atropurpureum</i>	50	90	12
<i>Dolichos lablab</i>	75	97	12

Production practices by private farmers

The DOLD has initiated this idea since 1978. In order to produce enough quantity of the required seeds, the DOLD has contracted a number of farmers to produce seeds of given quality and the DOLD buys it back. The detailed steps are:

1. Farmer selection. The DOLD officers initially explain to the interested farmers the purposes and goals of the program. The selection of interested farmers with emphasis on grouping them together to facilitate further training and transport will be subsequently made.
2. Training and making contract: After selection, the farmers are trained on the basic knowledge on forage crop establishment, pasture maintenance, harvesting and cleaning of forage crop seeds by using family labour. After the training, the DOLD contracts to buy back forage seeds produced by each farmer in area of not over one-sixth of an hectare (1 rai).
3. Buying back of seeds: The DOLD officers are sent out to buy back the cleaned seeds from the contracted farmers after harvesting season. The prices are 30 Baht/kg for Verano stylo and 50 Baht / kg for Ruzi grass seeds. The purchased seeds are subject to final cleaning at the plants for further distribution. On the average, a private farmer is able to produce for 600 kg of hamata seed or about 300 kg of Ruzi grass seed per hectare.

SEED DISTRIBUTION

Apart from distributing seeds for various DOLD's development projects, such as Low Land Pasture Project, NE Livestock Improvement Project and others, DOLD has also provided the seeds to

the interested farmers for their personal use. For an interested farmer, he can get a maximum of 1 kg seed of each forage species free of charge. Any farmer who need a larger quantity of seeds, may buy it at the price set by Division of Animal Nutrition (Table 4). For any other governmental programs which need large quantity of seeds, an advance request should be made to Division allowing a bag enough time to prepare the required quantity. The seeds are normally available at Division and at all Animal Nutrition Research Centers and Stations.

RESEARCH WORK

Division of Animal Production conducts a number of research programs aimed at increasing production and quality of forage seeds. Some examples of these include studies on fertilizer level for seed production, seed production plot management, harvesting methods and period, seed curing, threshing, drying and storing that can yield the high quality seeds. All of these research work have been conducted with ruzi grass.

SUMMARY

DOLD started to produce seeds of the forage crops since 1976. Up to the present, the total volume of seeds produced is 1,832 tons. Among the forage species, seed of Verano stylo, Ruzi and Hamil grasses are mainly produced. DOLD's 23 Animal Nutrition Research Centers and Stations are the main seed producers and to some extent, the Northeastern farmers help produced Verano stylo seeds.

Table 4. DOLD's price of various forage crop seeds.

Species	Price (Baht / kg)
Grass seeds	
Ruxi	60
Hamil	60
Guinea	60
Plicatulum	60
Sabi	60
Rhodes	60
Setaria	80
Buffel	80
Sorghum	6
Legume seeds	
Verano stylo	50
Siratro	40
Centrosema	30
Leucaena	20
Lablab	5

REFERENCES

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