

Utilization

Pigeonpea: A Potential Fodder Crop for Guangxi Province of China

Yang Shiyong¹, Pang Wen¹, Zong Xuxiao², Li Zhenghong³, Zhou Chaohong³, K B Saxena⁴, and Liang Hanchao¹ (1. Guangxi Academy of Agricultural Sciences, Nanning, China; 2. Institute of Crop Germplasm Resources, Chinese Academy of Agricultural Sciences, Beijing, China; 3. Institute of Insect Resources, Chinese Academy of Forestry, Kunming, China; 4. International Crops Research Institute for the Semi-Arid Tropics (ICRISAT), Patancheru 502 324, Andhra Pradesh, India)

Globally, pigeonpea (*Cajanus cajan*) is grown in about 20 countries on 5.4 million ha (Saxena 1999) and the entire production is consumed as food. Special efforts are being made in China to exploit the potential of pigeonpea as a fodder crop. This article reviews the progress and discusses the prospects of pigeonpea as a major fodder crop.

In China, Guangxi is the most important province for livestock since its rural economy heavily relies on animal husbandry. For a sustainable rural animal industry in the province, the availability of quality fodder and feed throughout the year is very critical. The provincial government, therefore, spends large amount of resources to import maize (*Zea mays*) and rice (*Oryza sativa*) from other provinces and international markets for feeding the livestock (Chengbin et al. 1999). On the other hand large areas of mountain slopes are lying fallow because they are unfit for the cultivation of food crops. To deal with the critical situation it has been decided to increase the population of fodder eating animals such as goat, cattle, and buffalo and reduce the emphasis on grain feeding animals. At present the population of cattle and buffalo in the province is about 8 million (Mucheng and Xinhua 1997). To further enhance the animal population, the provincial government has launched a special 'Million Goat Project' in Hechi prefecture for promoting export meat market. Under this project, the population of goat will be increased to one million within a target period of three years.

Pigeonpea has been identified to meet the growing needs of fresh quality fodder because it grows well in the eroded soils of hilly regions and can provide good quality fodder under dry conditions. Its ability to allow 3–5 fodder



Figure 1. Stall feeding of goats in China with pigeonpea fodder.

cuttings make it a very useful crop for stall feeding. Pigeonpea, a perennial drought tolerant crop, has shown high adaptation in a range of soil types of mountain regions of Du Au, Dahua, Huan Jiang, and Feng Shan counties of Guangxi Province. According to Fuji and Zhenghong (1995) the foliage of pigeonpea is a quality fodder and goats (Fig. 1), buffalo, cattle, and pig relish it.

A preliminary evaluation of ICRISAT pigeonpea varieties at Guangxi Academy of Agricultural Sciences, Nanning, China showed that ICPL 93047 produced 54 t ha⁻¹ of green fodder in five cuttings and 29 t ha⁻¹ of dry fodder (Shiyong et al. 1999). In an experiment at Langan County sown in June 1999, about 52 t ha⁻¹ fodder was harvested in five cuttings. This experiment also showed that pigeonpea can grow well during winter when normal fodder supply is limited. It is expected to meet the fodder needs in Guangxi Province for cooler season. It is observed that the goat and cattle like dry forage of pigeonpea better than green matter. The natural land resources of Guangxi Province is suitable for pigeonpea cultivation for both fodder production and soil conservation. It is estimated that about 6.5 million ha of waste mountain slopes are available for exploitation by crops like pigeonpea. It is likely that in near future pigeonpea fodder production may shape into a large agro-industry in the region, which can stimulate further commercial animal husbandry in Guangxi province for generating income.

References

Chengbin, C., Shiyong, Y., and Shichun, L. 1999. Economic value and its prospects for exploration and utilization of pigeonpea in Guangxi Province. *Guangxi Agricultural Science* 3:159–161.



Fuji, L., and Zhenghong, L. 1995. Research on feeding pigs by feeding pigeonpea dry grains. *Feed Industry* 7:29–31.

Mucheng, Y., and Xinhua, H. 1997. Difficulties and solutions for goat husbandry in Guangxi Province. *Guangxi Agricultural Science* 2:5–7.

Saxena, K.B. 1999. Pigeonpea in Sri Lanka. Patancheru 502 324, Andhra Pradesh, India: International Crops Research Institute for the Semi-Arid Tropics. 94 pp.

Shiyong, Y., Yuxi, L., Chengbin, C., Shichun, L., and Hunchao, L. 1999. Observations on introduced pigeonpea. *Guangxi Agricultural Science* 6:309–310.

Traditional and Alternative Uses of Pigeonpea in China

Zhou Chaohong¹, Li Zhenghong¹, K B Saxena², Zhang Jianyun¹, Gu Yong¹, Yang Shiyong³, and Zong Xuxiao⁴ (1. Institute of Crop Germplasm Resources, Chinese Academy of Forestry, Kunming, China; 2. International Crops Research Institute for the Semi-Arid Tropics (ICRISAT), Patancheru 502 324, Andhra Pradesh, India; 3. Institute of Crop Germplasm Resources, Guangxi Academy of Agricultural Sciences, Nanning, China; 4. Chinese Academy of Agricultural Sciences, Beijing, China)

Pigeonpea (*Cajanus cajan*) was introduced to China from the eastern parts of India about 1500 years ago (Zhoujie 1997). Traditionally, it has been used for lac production, fuel wood, soil conservation, fodder, food, and medicine. Its food uses are constrained by some prominent defects in the landraces. These include long-duration (more than 300 days), inherent low seed yield (750 kg ha⁻¹), small seed size, and high amount of trypsin inhibitor. To overcome these constraints, new varieties of pigeonpea have been introduced recently into China from ICRISAT. These varieties are showing good adaptation and have many useful traits (Shiyong et al. 1999). Therefore, new uses of this crop need to be identified. This paper reviews the traditional uses of pigeonpea in China and highlights the potential uses identified recently from the research work done in this area.

Lac Production

The most important purpose of pigeonpea cultivation in China is to inoculate the lac insect (*Kerria lacca* Kerr.)

on the shoots of one-year-old pigeonpea plants for production of lac. Pigeonpea is preferred for lac production because it has relatively faster growth rate that allows lac harvest at least one year ahead of other perennial hosts. According to Yude et al. (1993) pigeonpea not only produces high yields (750 kg ha⁻¹) of lac but the quality of lac is also superior which fetches better price in international market. A survey of Yunnan Province, China conducted in 1989, showed that pigeonpea occupied about 3500 ha land and majority of it was under lac cultivation. For over 40 years, pigeonpea was a major income generating source for the farmers in the southern provinces of China.

Fuel Wood

Pigeonpea produces a significant amount of biomass and after the primary use of the crop, its dry shoots are invariably used as fuel wood. In the lac-growing areas, after harvesting lac resin from the shoots the pigeonpea plants are chopped and dried for use as fuel. On average, 1 ha of pigeonpea crop produces about 6 t of fuel wood (Zhenghong and Fuji 1997). According to Yude et al. (1993) the quality of pigeonpea fuel wood has been estimated to be excellent, yielding energy at the rate of 4350 K cal kg⁻¹. In the low mountain ranges of China, where pigeonpea is not cultivated for lac production, the farmers grow pigeonpea on wastelands and field bunds. After harvesting seeds for feed purpose, the plants are cut and used for fuel. Pigeonpea, therefore, has contributed significantly in providing relief from the energy crises. In rural China, pigeonpea fulfils the needs of fuel wood and helps in arresting deforestation.

Soil Conservation

In the recent past, the ecology of arid-hot regions of southern China has been severely damaged, and scientists believe that its recovery is not easy due to prevailing climatic and soil conditions and high population pressure. Screening of suitable forest tree species for these harsh climates is also not meeting with desired success. This problem has bothered the forestry department for many years. Some shrub species such as *Emblia officinalis*, *Dodonaea viscosa*, and *Tephrosia candida* used for forestation, grow slowly and have low or no economic value. Pigeonpea not only grows well in these areas due to its better adaptability to degraded soils and drought tolerance but also grows relatively faster to cover the bare land. The crop can easily be adopted by local people due to its potential uses. Therefore, pigeonpea has been

