Gliricidia sepium (Jacq.) Steud
A selected bibliography

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ABBREVIATIONS USED

CATIE: Centro Agronomico Tropical de Investigacion y Ensenanza.
FAO: Food and Agriculture Organization.
ILCA: International Livestock Centre for Africa.
USDA: United States Department of Agriculture.
**INTRODUCTION**

*Gliricidia sepium* (Jacq.) Steud. (syn. *Gliricidia maculata* H.B. & K.) is a tropical leguminous tree which has been widely used for plantation shade, green manure, living fence posts, firewood and livestock fodder. *Gliricidia* is native to Central and South America, and has been used most extensively in India, Sri Lanka, Southeast Asia and Central America.

Over the last decade there has been a strong interest in the use of fast-growing leguminous trees—*including Gliricidia*—in the tropics. There is now active research on *Gliricidia* throughout the humid and sub-humid tropics: the species is considered to have significant potential for use in intensified small-holder farming systems.

This bibliography should make the literature concerning *Gliricidia* more easily accessible. References to *Gliricidia* are scattered throughout journals of several disciplines. Since the use of *Gliricidia* has most often been an adjunct to other agricultural activities—as a cocoa shade or green manure of rice, for example—it is often referred to in the literature in passing, as a component of a larger production activity. Thus, the traditional uses of *Gliricidia* have tended to obscure the accumulated knowledge and experience concerning its biology, use and management.

There are 143 citations in the bibliography, covering the years 1928–1984; over 55% of these were published after 1975. Approximately 55% of the articles cited were published in the Indian sub-continent and southeast Asia. The remainder were published in Europe (25%), North America (13%), and South/Central America (12%).

This bibliography is not meant to be exhaustive; rather it is intended as a tool which can be used to gain access quickly to the major writings about *Gliricidia*. The library of the International Livestock Centre for Africa, P.O. Box 5689, Addis Ababa, Ethiopia, would be grateful to receive notification of articles that have been omitted, as well as new articles that should be included in future editions.
ACKNOWLEDGEMENTS

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### GENERAL ARTICLES


General review article focused largely on the use of *Gliricidia* as livestock fodder. Thirty literature citations, French and Spanish summaries.


Brief description of *Gliricidia* included in catalogue of browse plants.


A popular article describing the use of *Gliricidia* as a green manure, a support for pepper plants and as a tea shade.

### BOTANICAL DESCRIPTION AND DISTRIBUTION


### VEGETATIVE PROPAGATION


Responses of hardwood and softwood cuttings to treatment with four levels of 2,4-D are discussed. Data on rooting and leaf production after 30 days are presented.

Results of treating *Gliricidia* cuttings with three concentrations of ANAA are reported. Response to treatment measured as number of sprouted and dead cuttings.


Rooting responses of soft, medium and hardwood *Gliricidia* cuttings to various concentrations of IAA, IBA, NAA and cows' urine are reported. Percentage of cuttings that rooted and observations on the nature of root formation after 32 days are given.

Air laying of soft, medium and hardwood *Gliricidia* branches using the hormones NAA and IBA is reported. Percentage of cuttings rooted after 28 days is given.

FLOWERING AND SEED PRODUCTION


Reports a study to determine the effect of defoliation of 10 *Gliricidia* trees on the number and weight of fruits produced. Results are discussed in relation to herbivore feeding and the plant’s reproductive fitness.


Flowering and seed production of *Gliricidia* are described. Flowering patterns, number of flowers, percentage pod set, seeds/pod and seed yield/tree are reported for a sample of 20 trees.

Producing seed of *Gliricidia sepium*. ILCA, Addis Ababa, Ethiopia.

This booklet, based on 12 photographs, describes the steps in *Gliricidia* seed production.

AGROFORESTRY


The use of *Gliricidia* to support yam vines and in short-term fallows in the vicinity of Ibadan, Nigeria is described. Analysis of 14 soil samples taken from farmers' fields is purported to show the beneficial effects of *Gliricidia* on soil fertility.


Preliminary survey of agroforestry practices near Turrialba, Costa Rica. *Gliricidia* is briefly mentioned as a common living fence post; the role of these posts in controlling erosion near roads is considered.


LIVESTOCK FEED


Results of feeding dwarf sheep and goats a diet of 100% *Gliricidia* for 21 weeks are reported. Feed composition, feed intake and weight changes are given.

The value of Gliricidia as fodder is cited; estimates of fodder yields are given; and results of feeding trials with cattle are briefly mentioned.


Preliminary report of feeding trials with dairy heifers. Gliricidia was offered as two-thirds of the diet in varying combinations with grass, paddy straw, rice bran and dairy mix. Daily liveweight gains for four rations are cited.


Gliricidia is evaluated as a livestock fodder for Sri Lanka. Chemical composition, amino acid profile, nutritional value, methods of establishment and management, effects of stake size and frequency of cutting are discussed.


Results of feeding varying proportions of Gliricidia and Brachiaria brizantha to lactating dairy cows over four weeks are reported. Milk yield and milk composition are cited.


More detailed account of experiment reported in 036. Another trial feeding Gliricidia in combination with grass and one of two concentrates is cited. Milk yields and composition are cited.


Results of an experiment feeding Gliricidia in combination with paddy straw, fresh grass and rice polishings to cross-bred heifers over 11.5 months are presented. Feed composition, feed intake, weight gain and the component feed costs are given.


Gliricidia is recommended as a fodder tree for use in dairy farming based on grazing under coconut trees.

Devendra, C. 1983. Physical treatment of rice straw for goats and sheep and the response to substitution with variable levels of cassava (Manihot esculenta), leucaena (Leucaena leucocephala) and gliricidia (Gliricidia maculata) forages. MARDI Res. Bull. 11: 272–290.


This paper deals with by-products of tropical crops used as concentrates. In a section on forage tree crops the use of *Gliricidia* and the integration of animals with plantation tree crops is discussed.

Results of a feeding trial with varying levels of *Gliricidia* and *Brachiaria miliformis* fed to sows over a six-month period are presented. Feed composition, feed intake, weight gains, lambing percentage and yield and quality of wool are discussed.

Total feed intake of laying hens on concentrate rations with 2% alfalfa or 2% *Brachiaria miliformis* is reported. Use of *Gliricidia* as a source of carotene in poultry rations is discussed.

Feed composition, feed intake, weight gains, mortality, blood and histopathological characteristics are reported for chicks fed rations containing 0, 5, 10 and 15% *Gliricidia* leaf meal.

Results of a feeding trial with varying levels of *Gliricidia* and *Brachiaria miliformis* fed to sows over a six-month period are presented. Feed composition, feed intake, weight gains, lambing percentage and yield and quality of wool are discussed.

The selection behaviour of dwarf sheep and goats stall-fed varying amounts of intact *Gliricidia* branches is described. Nitrogen, ADF, lignin and other characteristics of *Gliricidia* leaves, petioles and bark are given.

Rumen degradation of *Gliricidia* leaves and leaf nitrogen is compared with that of other leaves and concentrate feeds.
Zebu bulls were used to evaluate the effects of protein-rich forages from perennial trees— including *Gliricidia*— on the voluntary intake and digestibility of derinded cane stalk.


Reports result of an experiment with sheep fed rice straw and *Gliricidia*, *Leucaena* or combinations of the two legumes. Feed composition, feed intake, digestibility and animal weight changes are given.

**FIREWOOD**


**GREEN MANURE**


The cultivation of *Gliricidia* along field bunds and its use as green manure is advocated for Madras, India. Instructions are given for establishment of trees with transplanted seedlings and vegetative stakes. Cutting management and expected yields of green manure are briefly discussed.


Results from three cutting treatments with *Gliricidia* grown along field bunds are compared relative to green manure needs of paddy rice in Madras, India. It is concluded that 180 (445) trees yielding 13.4 kg fresh green matter each with one or two harvests per year will be sufficient to fulfill the green manure requirements of one acre (1 hectare) of rice.


General discussion of shade trees and green manure in tea plantations in Ceylon. Nutrient cycling and competition for moisture, particularly under drought conditions, are considered.

The effects of adding the equivalent of 20 tonnes of fresh Gliricidia leaves and 5 tonnes of chopped rice straw on the electrochemical properties of three flooded soils were investigated in a pot experiment. A period of 3-4 weeks is advocated between green manure application and planting.


Experimental data on the use of Gliricidia as a green manure for lowland rice cultivation in Sri Lanka is presented.


The effects of the equivalent of 5000 lbs/acre (5.6 t/ha) of Gliricidia on phosphorus fluctuations in paddy soils in a complex pot experiment are reported.


Farmer’s testimonial on the value of Gliricidia as green manure for rice.


The effects of combinations of Gliricidia green manure and inorganic P and K fertilizer on yields of irrigated IR20 rice are reported. A regression equation is presented to predict the optimum dose of green manure.


Results are reported from a three-year experiment measuring the effects of four green manures on rice yields in Gujarat, India.


In this laboratory experiment, patterns of release of ammonium and nitrate nitrogen during decomposition of Gliricidia and other green manures over seven weeks are reported.

LIVING FENCE


Reports a survey of farmers’ knowledge and use of Gliricidia for living fence posts in five life zones of Costa Rica. Chemical composition of leaves and tree biomass production are reported. An experiment concerning rooting, survival and growth of Gliricidia stakes is also reported.


Gliricidia and two other species are evaluated for use as living fence posts near Turrialba, Costa Rica. Percentages of rooting with different size stakes, planting dates and hormone treatments are reported.

SHADE


Reports the use of Gliricidia for shade in a vanilla plantation as part of a complex shade, fertilizer and irrigation experiment. Concludes that Gliricidia is an adequate support tree; the fact that it sheds its leaves during the dry season helps induce flowering of the vanilla vines.


Reports yield of cocoa planted at different distances from Gliricidia and other shade trees in Ghana. Competitive interaction of cocoa and shade trees is discussed.


Describes the establishment and management of Gliricidia as a cocoa shade in Malaysia.

WEED CONTROL


CHEMICAL COMPOSITION


As part of a survey of 219 species representing 109 genera, Gliricidia seeds are reported to contain the free amino acid canavanine. The taxonomic significance of canavanine is discussed.


Based on paper chromatography a revised glycoside structure is proposed. The possible significance of this glycoside is not discussed.


Chemical constituents of Gliricidia heartwood are presented with reference to its moderate resistance to attack by marine organisms.


Three new flavanoid constituents of Gliricidia heartwood are described. The authors state that these flavanoids are not related to the marine borer resistance of Gliricidia.


Presence of the flavanoids quercetin and kaempferol in fresh Gliricidia flowers is reported.

Characteristics of oil extracted from *Gliricidia* seeds are given. *Gliricidia* seeds contain 22% fixed oil, which has characteristics similar to groundnut oil.


Briefly reports a detailed chemical examination of extracts from *Gliricidia* leaves.


Characteristics of extracted *Gliricidia* leaf protein, including amino acid profile, are given and discussed in relation to the possible use of *Gliricidia* as a source of protein for human consumption.


Presence of robinetin in *Gliricidia* heartwood is reported.

**TOXICITY**


Conditions of poisoning with *Gliricidia* are briefly mentioned. Six literature citations.


The presence of *Gliricidia* is noted in a pasture in relation to a case of poisoned dairy cows. Further studies revealed the cows probably died of HCN poisoning from *Cynodon* spp.

**PLANT CHARACTERISTICS**


Reports technique for replicating and studying the surface of plant tissue. *Gliricidia* used as source material. Photograph of cork cambium and derivatives of *Gliricidia* included.


Effects of supplementation of a growth medium with a crude extract of *Gliricidia* leaves on growth and differentiation of *Cattleya* protocorms are reported. Results are briefly discussed in relation to effects of plant hormones on growth and differentiation.

The cation exchange capacity of *Gliricidia* roots from one-year old and well-grown plants are reported in relation to the root hemiparasite, *Santalum album*.

**NITROGEN FIXATION**


Characteristics of nodule formation in eleven genera of Leguminosae, including *Gliricidia macrorcarpa*, are reported. Mean nodule weight and haemoglobin contents are given.

**CHROMOSOMES AND EMBRYOLOGY**


Anthers, ovules, fertilization and related processes are described.

121 Dasgupta, Aparna; Bhatt, R.P. 1976. IOPB Chromosome Number Reports LIII. *Taxon* 25(1): 495.

Reports chromosome number of *Gliricidia* as $n = 10$.


Reports chromosome number of *Gliricidia* as $n = 11$, and presence of a supernumerary isofragment chromosome. Neither uniform nor significant effects of the SIF were noticed on meiosis nor did it produce any discernable morphological effects.


This review covers the botany, propagation, management and utilization of *Gliricidia*. A preliminary survey of phenotypic variability in *Gliricidia* is reported, and recommendations made for germplasm collection.


Report of collection of 47 *Gliricidia* seed samples largely from Guanacasta region of Costa Rica. Results of initial evaluation of these materials in Nigeria are discussed.

**FORAGE YIELD**


Results of a trial comparing forage yield and protein contents of *Gliricidia* and four other species over five years are reported.


A regression equation for predicting the weight of fresh foliage on whole *Gliricidia* branches is given.

**INSECTS**


The influence of *Gliricidia* shade on the insect fauna of cocoa in Ghana is reported.

Aphids feeding on *Gliricidia* are shown to have a marked detrimental effect on the survival and development of predatory coccinellids.


Results of a study of insect pollination of yellow passion fruit grown on living *Gliricidia* trees are reported. Observations are made on the mode of *Gliricidia* pollen disposition and on the acceptability of *Gliricidia* pollen to bees of the species *Xylocopa monax*.


Transmission of the disease through aphids collected from healthy *Gliricidia* plants is investigated.


Reports results of a survey of termite damage in tea plantations in Sri Lanka. Termite incidence was relatively low in fields with *Gliricidia* shade trees. *Gliricidia* appears to function as a diversonary host.


This paper reports observations on population fluctuations of three species of thrips within the flowers of *Gliricidia* in relation to their predator population.


Aggregation patterns of adult cicadas on *Gliricidia* and other trees in Costa Rica are reported. The ecological significance of these patterns is discussed.
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