Geocarpa Groundnut (*Kerstingiella geocarpa*) in Ghana[1]

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The geocarpa groundnut, Kerstingiella geocarpa *Harms, is grown only in the northern and upper regions of Ghana. The seeds of this crop are produced in 1- or 2- or rarely 3-loculed pods which mature on or under the soil surface. The fresh mature or dry seeds are used for food, and they serve as a source of protein supplement in the local diet. The seeds are also said to have medicinal and emetic properties. Among the Sisalas in Ghana the boiled seeds are the only food served to surviving children during the final funeral rites of their mothers.*

The geocarpa groundnut, *Kerstingiella geocarpa* Harms, has been reported as early as 1933 (Anonymous), to be grown in northern Ghana. It has recently been proposed that the name of this plant be changed to *Macrotyloma geocarpum* (Wright & Arn.) Verdc. (Maréchal and Baudet, 1977; Verdcourt, 1978). Plant exploration trips by the author to the northern and upper regions of Ghana in 1977 and 1978 indicated that the crop is rapidly going out of production, evidenced by the fact that except for some limited areas, geocarpa is now solely cultivated by elderly people. The crop is normally grown for home consumption and the surplus is sold in local markets. Cultivation is confined to the northern savanna zones of Ghana.

GROWTH HABIT

Geocarpa is an herbaceous annual. Seed germination takes about 24 hr, and the seeds exhibit epigeal type of germination with light green cotyledons which shrivel and drop off about 2–3 days after seedling emergence. There is a pair of lanceolate primary leaves and in some plants a third primary leaf develops before the first trifoliate leaf is formed; the primary leaves persist until maturity. The trifoliate leaves consist of long petioles with ovate leaflets (Fig. 1). There are epicauline stipules on the stem as well as epipetiolar stipules attached to the petioles of the leaflets. The plant has either the bunched or open growth habit, and there is rooting at every node. The roots form nodules easily and do not require innoculation, probably because the soil already has the inductive *Rhizobium* species.

One or two pairs of flowers are borne on short peduncles in the leaf axils. The first flowers open when the plant is 4½–6 wk old. The standard petal opens fully during the early hours of the morning. The open flower is light greenish-yellow in color in white-seeded cultivars and purplish in other colored cultivars. So far, no insect pollinators have been observed to visit the geocarpa flower; thus it is considered to be self-pollinated.

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Fig. 1. Geocarpa groundnut plant showing the lanceolate primary leaves and trifoliate adult leaves.

FRUIT DEVELOPMENT

Two days after the flower has opened, a peg carrying the ovary (in which fertilization has taken place) elongates and grows down toward the soil surface. When the peg is about 2–4 cm long, the "fertilized" ovary begins to develop as a protrusion to one side of the peg. This develops into a 1-, 2- or rarely 3-loculed pod. The pod develops either on the soil surface or about 1–2 cm under the surface (Fig. 2). The pods that develop on the soil surface and their immature seeds are green in color, the ones which develop in the soil are white. As the pod matures, its wall becomes thinner and at maturity the dry pericarp is very thin and papery. Seed development accompanies pod development. The fruit matures about 6–9 wk after flower opening.

Color development in the seed coat starts around the hilum when the seeds have attained full size, and is complete before the drying phase of seed maturation. The dry seed coat is smooth and fits tightly around the seed. The seeds are small, kidney-shaped with a 100-seed weight ranging from 5–15 g. The seed coat varies in color from white, brown, mottled (speckled), to black. There is a triangular colored patch around the white hilum, the apex of which points away from the embryonic end. This patch around the hilum is either black, brown or yellow in color. Irvine (1969) reported that the seed is of high nutritional value and has a high nitrogen content.

In Ghana, farmers extract seeds from the pods by gently pounding the dried fruit in a mortar with a pestle. This is followed by winnowing to separate the seeds from the husks. Whole seeds are then separated from the broken ones. The seeds are sometimes mixed with wood ash and kept in storage. Seeds preserved this way keep over 2 yr.

Fig. 2. Mature geocarpa groundnut; soil has been removed to reveal white pods.

Though geocarpa is an endemic west African crop, it is considered to be of minor importance (Verdcourt, 1978). In northern Ghana, however, geocarpa seeds are said to have medicinal properties. The water in which the seeds are boiled is taken as a remedy for diarrhoea. Powdered dry seed mixed with water or "pito" (the local beer) is said to be used as an emetic in cases of poisoning. Among the Sisalas of northern Ghana the boiled seeds are the only food served to surviving children during the final funeral rites of their mothers. The seed is also used for food at other times, and serves as a source of protein supplement in the diets of the indigenous population of the dry savanna zone where the crop is well adapted for growth. Mature fresh or dry seeds are boiled and mixed with condiments and eaten as a stew. Dry seed is ground into flour which is used in making cakes and other dishes. Geocarpa is preferred to bambarra groundnut (*Voandzeia subterranea*) and cowpea (*Vigna unguiculata*) by some people.

The crop is grown in the rainy season, either in pure stand on the flat, or mixed with yams (*Dioscorea* spp.) by planting on the yam mounds. Total production is low due to the small acreage cultivated. Among the Sisalas in the Funsi area of northern Ghana, geocarpa is grown on family farms and the "headman" of the family is the sole custodian of the produce.

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Book Review

Medicinal Plants of East and Southeast Asia: Attributed Properties. Lily M. Perry (assisted by Judith Metzger). 620 pp. Massachusetts Institute of Technology Press, Cambridge, Massachusetts, 1980. $45.00.

In recent years, there has been a realization that much remains to be done in a search of the Plant Kingdom—comprising perhaps half a million species—for biodynamic principles of potential use in modern medicine. Several avenues of investigation have been followed. One of the most promising—and that followed in this volume—has been the garnering of data found in the responsible literature and written on labels of herbarium sheets in the vast collections of plants in the world's herbaria.

Dr. Perry has produced a truly monumental work that will be consulted as a guide for many decades in the relentless research for new medicinal agents. She is admirably qualified for such a project: an acknowledged expert on the flora of the area in question (Papua New Guinea, Indonesia, and north to the Philippines, China, and Korea) and linguistically competent in several of the languages of the region. Furthermore, she had at her disposal the unexcelled library facilities of the Arnold Arboretum of Harvard University and its herbarium, one of the richest in material of the flora of southeast Asia.

For the convenience of non-botanical readers, the families are arranged alphabetically and the genera and species are alphabetical under the family. A brief geographical range of each species is followed by the native uses; whenever available, data on the chemical composition of the plant are offered. The bibliographical or herbarium source of the information is presented in the body of the discussion. A bibliography of 909 references is appended. Forty-five pages are devoted to a comprehensive index of plants arranged in 94 categories of attributed therapeutic properties. Two pages constitute a special section where diverse disorders are mentioned, followed by an index to suggested plant remedies according to various disorders arranged in 86 categories and occupying 43 pages. The final index enumerates the scientific names used throughout the volume: more than 6400 entries (including synonyms) in 34 pages. While these figures may offer an indication of the extent of the volume's coverage, they fail to reveal the thoroughness of the treatment in the 445 pages of the body of the book.

The audience for such an encyclopedic publication is wide, including research workers in anthropology, botany, ethnobotany, chemistry, folk-medicine, and pharmacology and allied fields. It should be of vital interest to most herbaria and to many botanical gardens. Even horticulturally and agriculturally oriented readers who are not in these scientific fields of research will find much information of interest and use in these closely packed pages.

The Massachusetts Institute of Technology Press is to be congratulated for its willingness to publish such an extensive and complex encyclopedia. The high quality of the production and its modest price as compared with the present cost of such books constitute a real contribution to the sciences touched by *Medicinal Plants of East and Southeast Asia: Attributed Properties*.

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