

WEEDS OF UPLAND CROPS IN CAMBODIA



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WEEDS OF UPLAND CROPS IN CAMBODIA

A weed identification guide for farmers and extension workers in the upland cropping systems of Cambodia. Sponsored by the Australian Centre for International Agricultural Research, the NSW Department of Primary Industries, and the Cambodian Agricultural Research and Development Institute.

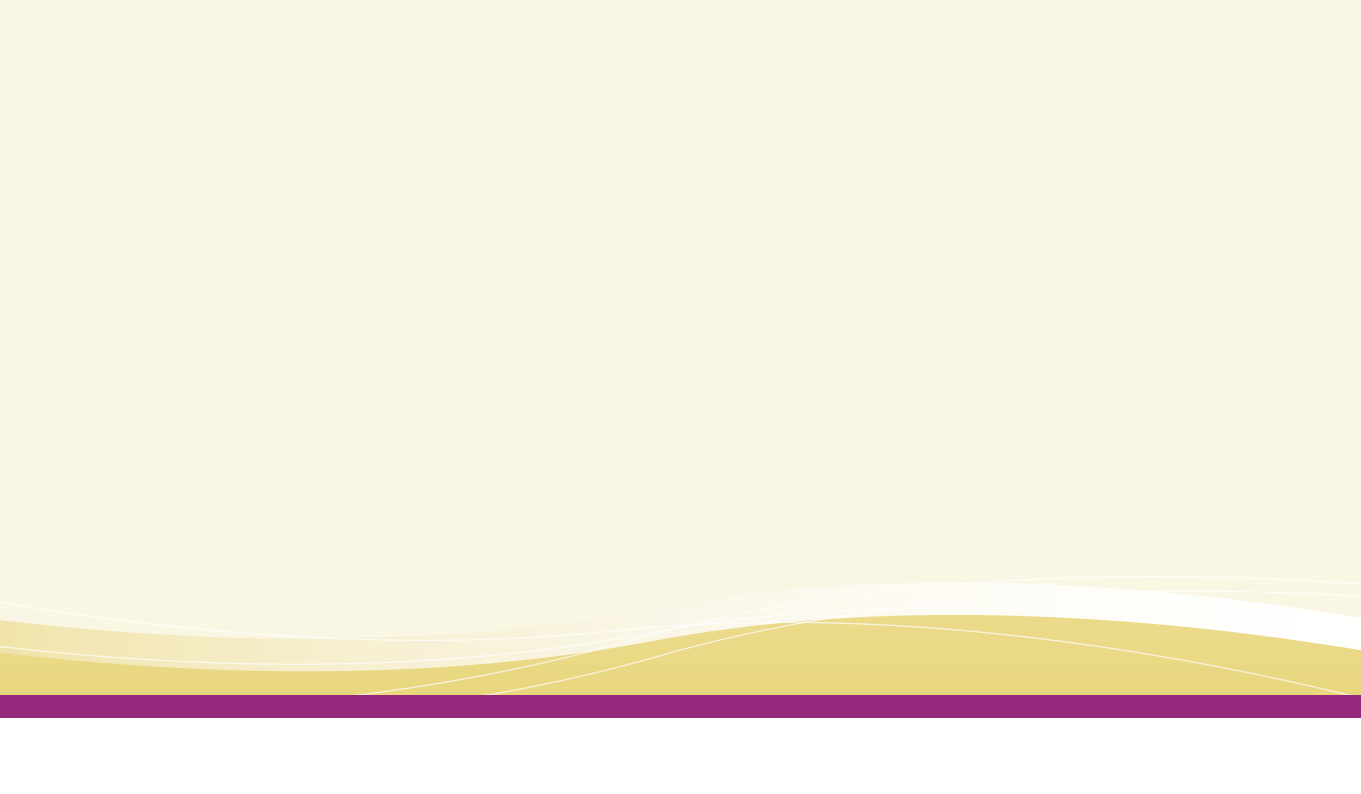


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ROBERT MARTIN & POL CHANTHY



FOREWORD

The Royal Cambodian Government's National Poverty Reduction Strategy (2003–2005) committed research centres and extension systems to focus on small-scale farmers and place emphasis on the use of improved tools and management practices for cropping systems. Priority was given to diversification and intensification of sustainable agricultural production with few external inputs as well as to cost-effective management practices.

The Australian Centre for International Agricultural Research (ACIAR) took on these challenges in 2003 with commencement of a project to develop sustainable farming systems for diversification crops (ASEM/2000/109). The focus was on maize, soybean, sesame, mungbean, peanut and cowpea in upland areas of Kampong Cham and Battambang provinces. The aim of the project was to help reduce poverty and contribute to food security at household and national levels in Cambodia through the development of technologies and opportunities for the production

of non-rice upland crops. The research process involved discussion with farmers, validation of local knowledge, documentation of case studies and identifying priorities for field experimentation.

The project team conducted a total of 153 on-farm experiments and demonstrations between 2004 and 2006. This research provided the basis for a demonstration package of new technologies and improved practices for upland crop production. The packages included improved varieties, fertiliser recommendations, *Rhizobium* inoculation, reduced tillage and crop-residue retention. Provincial Department of Agriculture staff and non-government organisations in Battambang and Kampong Cham were trained in the implementation of on-farm demonstrations of the new technologies and improved practices in 2007.

A new ACIAR project commenced in 2008 to enhance production and marketing of maize and soybean in

north-western Cambodia (ASEM/2006/130). The emphasis of the new project is on-farm adaptive trials to evaluate and improve the technologies and practices initially tested in 2007. The new project has also been expanded to integrate the production and marketing components of the system.

This book is part of a series of publications produced by ACIAR in support of the on-going rollout of on-farm demonstrations for upland crops in Cambodia.



Nick Austin
Chief Executive Officer
ACIAR

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PREFACE

The purpose of this book is to help extension workers and farmers to identify plants that are weeds or are considered to have the potential to become weeds in the upland cropping systems of Cambodia. Not all of the plants included are currently regarded as weeds, and many of them have useful purposes. However, with changing agricultural practices such as reduced or zero tillage, plant species currently controlled by ploughing could become weeds. These include perennial species and those with underground stems and rhizomes. Some important species known to be weeds of upland crops have not been included in this volume because of our inability to identify them or to obtain suitable photographic images.

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MANAGEMENT OF WEEDS

Weeds can be a problem in the production of upland crops because they reduce yield by competing for resources essential for growth, such as water, nutrients and light. Weeds can also make it difficult to harvest the crop, and seeds of some species can contaminate the grain and reduce its quality and price.

TRADITIONAL PRACTICES

Weeds have been a problem since the beginning of agriculture, and until the advent of herbicides during the 1940s, the traditional practices have been hand-weeding, cultivation and toleration (Holm et al. 1977). In Cambodia, weeds are still largely managed by traditional practices (Figure 1).

However, the increasing cost of labor, machinery and fuel may see a shift to greater use of herbicides and reduced tillage in the future.

INTEGRATED MANAGEMENT

In the upland situation in Cambodia, water is often the most critical factor reducing potential crop yield. Crops can fail because of drought, especially in the early wet season when rainfall is variable and unreliable. Good weed control is essential under these conditions, especially before sowing, to avoid the depletion of sub-soil moisture by competing weeds.

Farmers are encouraged to use an integrated weed management approach that combines all available options. The aim should be to keep the weed numbers low and prevent the weeds from producing seeds throughout the cropping cycle. However, many of the weeds in the upland situation have a useful purpose for animal fodder or for use as vegetables. Therefore, a balance may be required in weed management to provide for these uses without greatly reducing the profitability of the upland crop.



Figure 1. Traditional practice of ploughing

The farmer should be thinking about how to manage the weeds well before the crop is sown. This means preventing weeds from setting seeds in the previous crop and controlling weeds around the edge of the field, along waterways and in adjacent non-cropped areas. Special attention needs to be given to weeds such as nut grass (kravanh chruk) that grow from underground tubers or rhizomes. This weed is difficult to control by cultivation, and plants regrow from underground parts after the crop is sown. Some of the practices that can be used in an integrated weed management program are described below.

FEEDING TO LIVESTOCK

Weeds, especially annual grasses, can be grazed or hand harvested to feed to livestock (Figure 2).

However, it is important that the weeds are prevented from producing seeds. Note that there may be a trade-off to consider between the amount of soil water used by the weeds and the soil water required by the crop. This is

important in the early wet season, when the presence of stored soil water pre-sowing could prevent crop failure from drought.

GOOD AGRONOMIC PRACTICE

Good agronomic practice includes making sure the crop seed for sowing is clean and free of weed seeds. Seed for sowing should have high germination percentage and seedling vigour. Faster-growing vigorous seedlings are more competitive with weeds. The crop plant population must be optimal for the conditions. Recommended seeding rates are usually lower for rainfed than for irrigated situations—this is especially important for crops such as maize, which have a determinate growth habit.



Figure 2. Grass weeds harvested from a soybean crop (cut and carry) for livestock feeding. Late removal of grass weeds could reduce the yield potential of the crop.

TIMELY WEED CONTROL

Traditionally, cultivation has served the dual purpose of killing weeds and preparing a seedbed. However, cultivation can also reduce the amount of soil water available to the crop. Some upland soil types such as Labanseak and Kampong Siem are friable and self-mulching and may require little or no cultivation to prepare a seed bed. In this case, pre-sowing cultivation can be replaced by an application of a herbicide such as glyphosate, which controls the weeds without loss of soil moisture. Cultivation is also less effective in controlling weeds when the soil is wet, and herbicides could also be used as an alternative under these conditions. Keeping the residue from the previous crop can help suppress weeds (Figure 3).

GRAZING OR BURNING

Heavy grazing or burning is often used to control weeds and to make conditions easier for ploughing (Figure 4). These practices have the disadvantage of reducing the ground cover, increasing soil surface temperature and reducing soil moisture. Burning also reduces soil organic matter and causes soil degradation and erosion. Preserving soil residues and even adding mulch such as rice straw can reduce the emergence of weeds, conserve soil moisture, and reduce the soil temperature.



Figure 3. Weeds can be suppressed by planting the crop into a mulch. Here cotton has been planted into a mulch of Eleusine grass.



Figure 4. Crop residues should be spread back over the field rather than being burned. Ground cover preserves soil moisture and reduces weed emergence.

IMPORTANT WEEDS

In this book we have included 70 plant species that occur in upland crop areas. Not all of these are considered to be serious weeds in current upland cropping systems. However, some of these plants have the potential to become weeds under changed agricultural practices – for example, a change to reduced tillage or to plantation crops. The weeds listed in Table 1 are considered to be the most important in the current cropping system, which is based on cultivation and hand-weeding. These weeds are a problem because they are adapted to cultivated conditions and disturbed soil. These conditions provide a seedbed and mineralised nitrogen and favour rapid germination and growth of annual weeds. Species with underground rhizomes or tubers, such as *Cyperus rotundus*, are difficult to control because they can regrow rapidly after hoeing. Species with fleshy stems, such as *Commelina benghalensis*, are difficult to control because the chopped stems produce roots and rapidly regrow.

Table 1. Important weeds of current upland cropping systems in Cambodia

GRASSES, SEDGES	BROAD-LEAVED WEEDS
<i>Brachiaria reptans</i> , Smao Ko	<i>Amaranthus spp.</i> , Phti Banla, Phti Daung
<i>Cynodon dactylon</i> , Smao Chenh Chean	<i>Boerhavia diffusa</i> , Phti Thmar
<i>Cyperus rotundus</i> , Kravanh Chruk	<i>Cleome viscosa</i> , Momeanh Khmoch
<i>Dactyloctenium aegyptium</i> , Smao Cheung Kras	<i>Commelina benghalensis</i> , Slab Tea
<i>Digitaria adscendens</i> , Smao Sambok Mon	<i>Euphorbia heterophylla</i> , Tuk Das Khla Thom
<i>Echinochloa colona</i> , Smao Bek Kbal	<i>Physalis angulata</i> , Pang Pos Srom
<i>Eleusine indica</i> , Smao Samsorng	<i>Trianthema portulacastrum</i> , Chung Kong Proes

WEED DESCRIPTIONS

IDENTIFICATION OF WEEDS

Weed species differ in their responses to management practices because they have different life cycles and nutrient requirements and different modes of reproduction. They also vary in their responses to cultivation and susceptibility to herbicides. It is therefore important for the adviser and farmer to be able to recognize different weed species and to understand their weaknesses. This field guide for identification of weeds of upland crops in Cambodia has been produced for this purpose.

HOW TO USE THIS GUIDE

The order of presentation of plant species in this book is alphabetical according to family, genus and species. A plant family (e.g. Euphorbiaceae) contains a number of plants, all of which have one or more features in common. The family is split into a number of genera (e.g. *Chamaesyce*, *Euphorbia*, *Jatropha*), with the plants in these generic groups having further common characteristics. Each of the genera (genus) comprises one or more species, each with its own distinguishing or specific name (e.g. *Chamaesyce hirta*, *Euphorbia heterophylla*, *Jatropha gossypifolia*). These names are distinct from each other and from those of every other plant species. The guide also includes, where available, the Khmer name for the weed.

Ruellia tuberosa (Krab Bek)

DISTRIBUTION

Common along roadsides and wasteland in northwest Cambodia.

DESCRIPTION AND BIOLOGY

Herb with tuberous roots. Branched erect stems to 50 cm tall. Leaves mostly basal, finely hairy, ovate to oblong, 4–6 × 1.5–2.5 cm. Purple tubular flowers, 4–6 cm long, 12–15 mm wide. Reproduces from seed.

AGRICULTURAL IMPORTANCE

Does not appear to invade upland crop fields.

REFERENCE: 1



Trianthema portulacastrum (Chung Kong Proes)

DISTRIBUTION

Prefers dry conditions. Distributed in upland crop fields, on roadsides and in waste areas throughout Cambodia.

DESCRIPTION AND BIOLOGY

Prostrate, somewhat succulent annual or perennial herb with ovate green leaves and small white-pink flowers hidden among the leaves. Flowers for most of the year. Reproduces from seed.

AGRICULTURAL IMPORTANCE

This plant can be a serious weed in upland crops

REFERENCE: 2



Achryanthes aspera (Andat Kou)

DISTRIBUTION

Found in wastelands, along roadsides, and in pastures and upland crop fields.

DESCRIPTION AND BIOLOGY

Erect herb from 0.5–2 m tall. Flowers small and green. Fruit is a prickly burr 2.5–2.8 mm long, easily detached. Bracts around seed are turned down and stick to animals and clothing. Reproduces by seed.

AGRICULTURAL IMPORTANCE

Occurs along roadsides, in waste areas, pastures and plantation crops, and occasionally in upland crops. Often infests the edges of fields. Can grow on a wide range of soil types.

REFERENCE: 3



Alternanthera sessilis (Choeung Bangkok)

DISTRIBUTION

Found mainly on the banks of streams and ponds, along the sides of paddies, and in shallow waterways. Also occurs in upland crops in the rainy season.

DESCRIPTION AND BIOLOGY

Creeping annual or short-lived perennial. Flower heads are 5–7 cm long, rounded or oblong, and borne in leaf axils. Spread by pieces in mud attached to machinery, and by flood.

AGRICULTURAL IMPORTANCE

Prefers places with high humidity and is often found in and near ponds, canals and reservoirs. May be found in swamps, shallow ditches, and fallow rice fields. Mainly a weed of paddy and upland rice but can also occur in upland crops.

REFERENCE: 2, 3



Amaranthus spinosus (Phti Banla)

DISTRIBUTION

Prefers dry conditions and is found along roadsides and in wastelands and upland crops.

DESCRIPTION AND BIOLOGY

Erect annual that has a pair of sharp spines at the base of each leaf. The plant has a striped reddish stem. Flower heads are green. Propagates with seeds that have a long life in the soil. Seeds are dispersed by wind and water.

AGRICULTURAL IMPORTANCE

Grows well in fields when soil moisture is low, and prefers soils high in organic matter and available nitrogen. The leaves are used as a vegetable in Cambodia.

REFERENCE: 2, 7



Amaranthus viridis (Phti Daung)

DISTRIBUTION

Prefers dry conditions and is found in wastelands, on roadsides and in upland crops.

DESCRIPTION AND BIOLOGY

Prostrate to erect branched annual herb, 30 to 80 cm tall. Stems are grooved and can be reddish. Flower spikes are green to purplish, 5–15 cm long. Reproduces by seed.

AGRICULTURAL IMPORTANCE

Competitive weed in upland crops. Occurs on a wide range of soil types and responds to high fertility. Germination is stimulated by application of nitrogenous fertiliser. Leaves are used as a vegetable.

REFERENCE: 2, 3



Celosia argentea (Semann Prey, Phty Phresh)

DISTRIBUTION

Occurs along roadsides and in wasteland, young rubber plantations and upland crop fields.

DESCRIPTION AND BIOLOGY

Annual herb. Stems erect, branched, smooth, strongly ribbed, and up to 150 cm tall. Leaves are long and slender with a sharp end, upper ones with a slight stalk. Flower heads are pink. Fruits are egg-shaped. Seeds are lens-shaped, black and 1.3–1.5 mm long. Propagated by seeds.

AGRICULTURAL IMPORTANCE

If left uncontrolled, this weed can compete strongly with the crop, particularly soybean and mungbean.

REFERENCE: 1



Centella asiatica (Voir Tracheak Khranh)

DISTRIBUTION

Occurs along roadsides and in wasteland and upland crop fields. Occasional to common in pasture and in sunny, disturbed places.

DESCRIPTION AND BIOLOGY

Creeping herb with stems commonly 1–15 cm long. Leaves orbicular-cordate or kidney shaped, with toothed margins, 2–5 cm long and usually broader than long. Flower 1–7 cm long, secondary umbels of 2–4 flowers. Petals pinkish-purple, 1 mm wide, stamens shorter, fruit 4–5 mm broad and 3 mm high.

AGRICULTURAL IMPORTANCE

Common in upland crop fields in Battambang but not a major competitive plant.

REFERENCE: 1



Ageratum conyzoides (Kantraing Kath)

DISTRIBUTION

Commonly found in upland crop lands throughout Cambodia.

DESCRIPTION AND BIOLOGY

Annual herb. Stems erect, branching up to 80 cm tall. Leaves opposite, hairy, soft, ovate, sub-cordate, with serrated margin. Flower heads terminal. Flowers white to violet. Propagated by seed.

AGRICULTURAL IMPORTANCE

Occurs in upland crop fields but is not a significant problem under cultivated conditions.

REFERENCE: 2, 7



Chromolaena odorata (Tuntrean Khet)

DISTRIBUTION

Prefers well drained soils. Found on roadsides and in wastelands, pastures, orchards and plantations.

DESCRIPTION AND BIOLOGY

Perennial shrub up to 3 m tall. Stems branched, hairy and round. Leaves, opposite, ovate-deltoid, hairy with serrate margin, 8 to 10 cm long. Flowers pale blue in clusters. Reproduces by seed.

AGRICULTURAL IMPORTANCE

Invades clearings but does not survive after the forest or plantation canopy closes in. Not an important weed of cultivation or annual upland crops.

REFERENCE: 2, 7



Eclipta alba (Mok Chhneang)

DISTRIBUTION

Prefers both wet and dry conditions. Found in paddies along waterways and in upland crop areas.

DESCRIPTION AND BIOLOGY

Annual herb. Stems erect or prostrate, up to 50 cm tall. Leaves simple, opposite, lanceolate to elliptic, sub-entire, hairy on both sides. Flower is axillary or terminal and about 1 cm in diameter, white with a tubular green calyx. Reproduces by seed.

AGRICULTURAL IMPORTANCE

Usually found in poorly drained areas. Not an important weed in upland crop areas.

REFERENCE: 2, 7



Spilanthes paniculata (Deum Cham Eh)

DISTRIBUTION

Occurs along roadsides and on wasteland in upland areas.

DESCRIPTION AND BIOLOGY

Low, spreading annual or perennial herb, 0.6–1.2 m tall, sometimes woody toward base, often purplish throughout; stems branched, sparsely hairy. Leaves often bluish or grayish when fresh, alternate or opposite, somewhat fleshy, oblong to elliptic or ovate, 2–9 cm long, 1.5–4 cm wide. Flower heads stout and stiff, 15–50 cm long, up to 7 mm in diameter. Flowers pale blue, 8–11 mm long.

AGRICULTURAL IMPORTANCE

Not observed as a weed in upland crops.

REFERENCE: 1



Synedrella nodiflora (Spey Kok)

DISTRIBUTION

Weed in upland fields and on roadsides and wastelands.

DESCRIPTION AND BIOLOGY

Annual herb. Stems erect, sub-angular, up to 90 cm tall. Leaves opposite, elliptic or ovate, acute apex, crenate-serrate. Flower head axillary and sessile, petals yellow. Propagates by seed.

AGRICULTURAL IMPORTANCE

This plant has the potential to compete with upland crops if it is not controlled.

REFERENCE: 1



Tridax procumbens

DISTRIBUTION

Prefers upland conditions. Distributed in upland crops and on roadsides and wastelands.

DESCRIPTION AND BIOLOGY

Semi-prostrate annual or short-lived perennial with stems up to 50 cm long. A weed of pastures and a wide range of annual and perennial crops. Seeds are carried by wind over a wide range. Reproduces from seed, stem spread and persistent roots.

AGRICULTURAL IMPORTANCE

The *Tridax* plants found in upland fields often survive the dry season. They are commonly seen in the early wet season but in annual cropping systems are usually controlled by ploughing.

REFERENCE: 2, 3



Vernonia cinerea (Smau Ruy)

DISTRIBUTION

Found in upland crop areas and wastelands and on roadsides.

DESCRIPTION AND BIOLOGY

Annual herb, stems erect, branched, hairy, up to 80 cm tall. Leaves ovate to obovate and hairy beneath, 1.0–2.5 cm wide and 2.0–4.0 cm long. Flower heads widely branched, flowers numerous, purple. Reproduces by seed.

AGRICULTURAL IMPORTANCE

Not a significant weed in upland cropping systems.

REFERENCE: 2



Heliotropium indicum (Pramoy Damrey)

DISTRIBUTION

Commonly found in wastelands and on roadsides. Does not appear to be common in upland crop fields.

DESCRIPTION AND BIOLOGY

Annual herb. Stems branched and sparsely hairy, 15 to 50 cm tall. Leaves ovate, 5 to 7 cm long. Flower is a curved terminal spike 5 to 15 cm long. Reproduces by seed.

AGRICULTURAL IMPORTANCE

Does not appear to be a threat to upland cropping systems.

REFERENCE: 2, 7



Cleome gynandra (Momeanh)

មមាញ់ស្រុក

DISTRIBUTION

Occurs in dry areas, especially along roadsides and in pastures. Present in upland crop fields.

DESCRIPTION AND BIOLOGY

Annual herb 0.5–1.5 m tall, stems unbranched to sparsely branched, glandular-hairy. Leaflets 3–7, oblanceolate to rhombic, 2–7.5 cm long, 1–3.8 cm wide, margins serrulate to denticulate, stems 3–9 cm long. Flowers in racemes, subtended by trifoliolate, sessile bracts; petals white with a long claw, 1–2 cm long. Capsules narrowly cylindrical, 3–11 cm long, 4–5 mm in diameter. Seeds numerous.

AGRICULTURAL IMPORTANCE

Occurs in upland crop fields but is not a major competitive weed.

REFERENCE: 1



Cleome rutidosperma (Momeanh Khmaoch, Phcar Kraharm)

DISTRIBUTION

Occurs in upland crop fields and on roadsides and wasteland.

DESCRIPTION AND BIOLOGY

Annual herb to 1 m high. Stems angular with scattered soft bristles. Leaves with 3 ovate to spear-shaped leaflets (2–5 cm long). Flowers are solitary in the leaf axils, with 4 petals 9 to 12 mm long on the upper side. The flowers are red, turning pink with age. Spread by seed, water, farm machinery, ants.

AGRICULTURAL IMPORTANCE

This species is a weed of upland crops and also an environmental weed. It is naturalised in South-East Asia. It grows rapidly and needs to be removed from upland crops. A range of soil and foliar applied herbicides are effective on *Cleome* spp.

REFERENCE: 6



Cleome viscosa (Momeanh Khmoch, Phcar Loeung)

DISTRIBUTION

Found in paddies as well as upland crop fields and wasteland.

DESCRIPTION AND BIOLOGY

Erect annual herb 20–140 cm tall, with 3 or 5 leaflets. Flowers are yellow with 4 petals. The fruit is pod-like, slender and 3–4 cm long. Propagation is by sticky seeds.

AGRICULTURAL IMPORTANCE

Occurs in cultivated fields and along roadsides. In Cambodia it is known as 'ghost vegetable' because it grows on graves.

REFERENCE: 11



Cyanotis axillaris (Champus Tea)

DISTRIBUTION

Prefers wet conditions. Found in paddies and along waterways.

DESCRIPTION AND BIOLOGY

Perennial herb. Stems succulent, creeping, ascending and rooting at the lower nodes. Leaves linear-lanceolate, with tubular sheath with hairs. Flowers solitary and axillary, with 3 petals, purple to violet. Reproduces vegetatively and by seed.

AGRICULTURAL IMPORTANCE

This is a small weed with a sprawling, creeping habit. It occurs in low-lying upland crop fields.

REFERENCE: 2



Commelina benghalensis (Slab Tea)

DISTRIBUTION

Prefers moist conditions and occurs in upland crops in Cambodia.

DESCRIPTION AND BIOLOGY

Fleshy, herbaceous, creeping annual or perennial plant. The stems, which grow along the ground, are fleshy, hairy and branched and 30–50 cm long, with roots at the nodes. The flowers are violet to blue.

AGRICULTURAL IMPORTANCE

This plant has a sprawling, creeping habit and has the ability to root readily at the nodes, thus making it an important weed of cultivated crops. It has a high moisture content, and although it has little value as a livestock feed it is fed to pigs in Cambodia.

REFERENCE: 2, 3, 7



Ipomoea cairica (Phcar Kaundeung Ko)

DISTRIBUTION

Found in thickets, roadsides, waste places, and cultivated areas.

DESCRIPTION AND BIOLOGY

Herbs perennial, twining, with a tuberous root. Stems to 5 m. Leaf blade palmately 5-parted to base. Inflorescences with 1 or several flowers. Corolla pink, purple, or reddish purple, with a darker center, rarely white. Reproduces by seed.

AGRICULTURAL IMPORTANCE

Not commonly found in upland fields.

REFERENCE: 8



Ipomoea obscura (Voir Mouy Lib)

DISTRIBUTION

Found in upland cultivated crops, grasslands, roadsides and waste places.

DESCRIPTION AND BIOLOGY

An annual or perennial herb with twining stems 1–3 m long. Stems around 3 mm thick, leaves heart-shaped and 4–8 cm long. Most species of *Ipomoea* produce seeds within globular capsules. Seed dispersal is by wind action and gravity.

AGRICULTURAL IMPORTANCE

This species is common on roadsides and along the edges of upland crop fields. However, it does not appear to be as serious a weed in upland crops as *I. triloba*.

REFERENCE: 8



Ipomoea triloba (Sandar Chhou)

DISTRIBUTION

Found in upland cultivated crops and grasslands and on roadsides and wasteland.

DESCRIPTION AND BIOLOGY

Annual herb with twining stems 1–3 m long. Stems around 3 mm thick, leaves 3-lobed and 4–11 cm long. The flower is five-lobed, funnel-shaped and pink or pale red. Flowers close after noon. Little is known about the biology of this plant. It reproduces by seed.

AGRICULTURAL IMPORTANCE

It can grow over other vegetation in farmers' fields and has the capacity to smother crops. It has been recorded as a weed in maize, peanuts, upland rice and sugarcane.

REFERENCE: 3, 8



Trichosanthes cucumerina (Sleuk Bash)

DISTRIBUTION

Occurs along roadsides, in wastelands, and on the margins of upland crop fields.

DESCRIPTION AND BIOLOGY

Climbing, herbaceous vine 5–6 m. Stems green, 4-angled, hairy. Leaves hairy on both surfaces, rounded, 7–14 cm long and broad, and 3–5-lobed; base is broadly heart-shaped. Male flower heads have 6 to 15 flowers. Petals white, about 1.3 cm long. Female flowers occur singly in the axils of the leaves. The fruit is ellipsoid, 3–4.5 cm long, 2.5–3 cm in diameter, green and mottled, with longitudinal gray stripes when young, and orange-red when mature.

AGRICULTURAL IMPORTANCE

Not a major weed of upland cropping systems.

REFERENCE: 12



Cyperus rotundus (Kravanh Chruk)

DISTRIBUTION

Prefers dry conditions; grows in wastelands and upland crop fields. Also tolerates moist soil conditions.

DESCRIPTION AND BIOLOGY

Herbaceous, perennial sedge with rhizomes and stolons. Grows to 30–70 cm tall. Leaves 5–20 cm long. Flower head has 3–8 unequal rays. Spikelets flattened without a stalk and 1–3 cm long. Rhizomes form chains of tuberous bulbs up to 25 mm that produce shoots and roots.

AGRICULTURAL IMPORTANCE

Although a relatively small plant, *C. rotundus* competes strongly with crop plants. However, it does not tolerate shading and its growth can be slowed by application of 2,4-D in a grass pasture or mulch crop (Stephanie Boulakia, Centre de Co-operation Internationale en Recherché pour de Development *pers. comm.*).



REFERENCE: 2, 7

Acalypha indica (Pokmaot Chhmar)

DISTRIBUTION

Found along roadsides and in upland crop fields.

DESCRIPTION AND BIOLOGY

Annual weedy herb up to 50 cm. Contact with the sap or latex of this member of the spurge family can cause an acute dermatitis.

AGRICULTURAL IMPORTANCE

Not seen as an important weed of upland cropping systems.

REFERENCE: 13



Chamaesyce hirta (Tuk Das Khla Touch)

DISTRIBUTION

Occurs along roadsides, on wasteland, and in upland crop fields.

DESCRIPTION AND BIOLOGY

Sometimes used in herbal medicine. Distinguishing features are the milky sap of the stem and the sometimes purple blotched leaves with toothed margins. Leaves are opposite, toothed, and 1–5 cm long and 0.5–2.5 cm wide. Seeds can be produced in a month or less, and dense stands can develop in a short time. The plant flowers year round.

AGRICULTURAL IMPORTANCE

An early coloniser of bare ground, especially under damp or irrigated conditions. The plant has slightly poisonous properties and is regarded as useless as livestock feed.

REFERENCE: 2, 3, 7



Euphorbia heterophylla (Tuk Das Khla Thom)

DISTRIBUTION

Found in upland crop fields and wastelands.

DESCRIPTION AND BIOLOGY

Annual weed with latex throughout. The stem is round and hollow and repeatedly forked towards the apex. Leaves are 5–10 cm long and whitish beneath. The fruit is a 3-lobed capsule 3.5–5.0 mm in diameter. This weed has a short life cycle and can complete up to 4 generations a year.

AGRICULTURAL IMPORTANCE

Grows on a wide range of soils, mainly during the rainy season. It frequently infests plantation crops, cotton, soybean and maize.

REFERENCE: 2, 3



Euphorbia thymifolia

DISTRIBUTION

Found on roadsides and wasteland and in upland crop fields.

DESCRIPTION AND BIOLOGY

Annual herb. Stems are branched, spreading, hairy and reddish. Leaves in 2 opposite rows. Flowers axillary, pink to purplish. Fruit is a capsule that is hairy, triangular and green. Has a milky sap. Reproduces by seed.

AGRICULTURAL IMPORTANCE

Occurs in upland crop fields but is unlikely to be a competitive weed.

REFERENCE: 2



Jatropha curcas (Lhong Kvarng)

DISTRIBUTION

Common along roadsides, fencelines and the edges of upland fields.

DESCRIPTION AND BIOLOGY

Small tree, to 5 m; deciduous leaves are wide-ovate to heart-like, to 25 × 15 cm, 3–5-angled or lobed; stalk to 15 cm. Flowers in terminal clusters; male calyx with 5 lobes to 4 mm, 5 petals, 6 mm, pale greenish to yellowish-white, 8–10 stamens; female calyx 5 lobes 6–9 mm, petals similar to male, stigma with two tips. Fruit ovoid, 4 × 3 cm, ripens yellowish then dries brown and splits. Three seeds, black, ovoid, 20 × 12 × 9 mm, surface hard and rough.

AGRICULTURAL IMPORTANCE

Planted as a 'living fence' to keep out animals and provide shade. Seeds have a pleasant taste but contain an oil that causes vomiting and purging. This species has potential for biofuel production in Cambodia.



REFERENCE: 10

Jatropha gossypifolia (Lhong Kvarng Kraham)

DISTRIBUTION

Occurs along roadsides and fencelines and in wasteland.

DESCRIPTION AND BIOLOGY

Shrub to about 1.5 m tall; leaves membranous, 3–5-lobed, purplish, slightly serrate, leaves about 10 cm long and wide or larger. Flowers dark red, ovary 1 cm broad, petals free, disc lobed. Fruit oblong, 2–3-lobed, brown when ripe, about 1.3 cm long. Propagates by seed.

AGRICULTURAL IMPORTANCE

Forms thickets. Adapted to a variety of habitats. Often cultivated as an ornamental. Seeds are toxic to humans. Can be a weed of degraded grazing land and disturbed river frontages.

REFERENCE: 9



Phyllanthus niruri (Brook Phlair)

DISTRIBUTION

Upland crop areas, wasteland and roadsides.

DESCRIPTION AND BIOLOGY

Small, erect, annual herb that grows to 30–40 cm high. Leaves are pinnate with leaflets oblong, entire and sessile. Flowers are on short stalks at the bases of leaves and are white or pale green. Fruit is a capsule, rounded and smooth. Reproduces by seed.

AGRICULTURAL IMPORTANCE

Although this species occurs in upland fields, it is not considered to be a major competitive weed of upland crops.

REFERENCE: 2, 3



Aeschynomene americana (Snao Ambosh)

DISTRIBUTION

Prefers dry conditions; found in upland crop fields, wastelands and pastures.

DESCRIPTION AND BIOLOGY

Perennial shrub. Stems erect, branched, hairy. Leaves pinnately compound, with oblong leaflets 7–10 mm long. Pink flowers with red centres on racemes. Pods oblong, curved, and 2–3 cm long. Reproduces by seed.

AGRICULTURAL IMPORTANCE

Not a significant weed of cultivated fields.

REFERENCE: 2



Alysicarpus monilifer (Deum Santeah Omal)

DISTRIBUTION

Along roadsides, on grazing land and in upland fields.

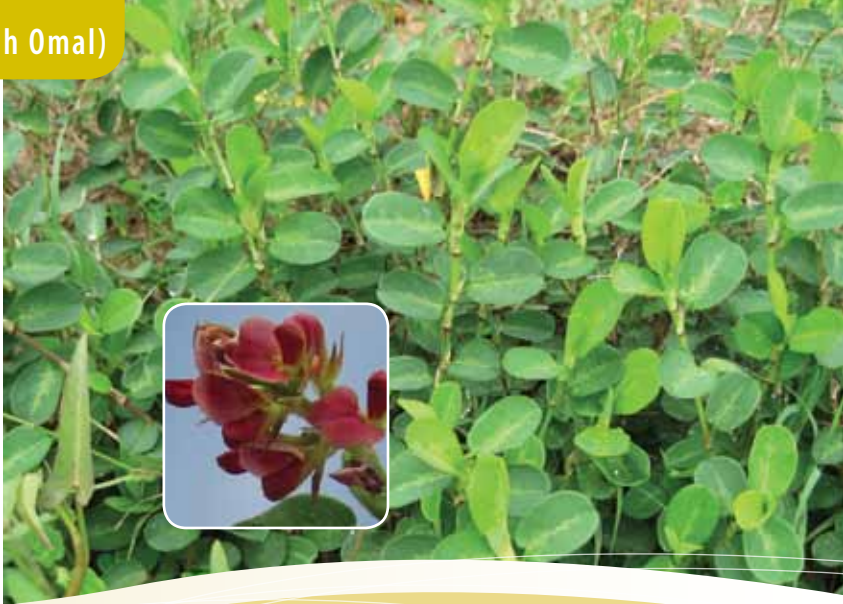
DESCRIPTION AND BIOLOGY

Low-growing, branched, annual or perennial herb, 5–15 cm tall. Leaves simple, ovate, elliptical or lanceolate, cordate at the base, 2.5–7.5 cm long, hairy beneath. Flower heads 1–15 cm long, flowers red. Pods 3–5-jointed, 1–2 cm long. Reproduces by seed.

AGRICULTURAL IMPORTANCE

Introduced forage plant. Could be a useful component of long-term and short-term pastures in low- to medium-rainfall areas, especially under heavy grazing.

REFERENCE: 4



Cassia occidentalis (Sandek Khmuoch)

DISTRIBUTION

Occurs along roadsides, on wasteland and grave sites, and in upland crop fields.

DESCRIPTION AND BIOLOGY

An erect annual herb with leathery compounded ovate-acuminate leaves growing up to 2 m tall. Flowers are yellow. The seed pods are dark brown and curve slightly upward. The seeds are olive-brown and flattened on both ends.

AGRICULTURAL IMPORTANCE

Occurs in upland areas but is not a serious weed of cultivated annual crops.

REFERENCE: 1



Cassia tora (Danghet Chhneng, Danget Khmuoch)

DISTRIBUTION

Occurs along roadsides, wasteland, grave sites and upland crop fields.

DESCRIPTION AND BIOLOGY

Erect semi-woody annual herb 0.5–1.5 m tall with a stout taproot. The leaves are compound and 8–12 cm long, with leaflets 2–4 cm long. Seeds germinate and survive under a wide range of conditions. As with other legumes, seed coats may stop water uptake and germination can be stimulated by scarification.

AGRICULTURAL IMPORTANCE

Occurs in pastures and on roadsides and wasteland as well as crop land. Grows in a wide range of soil types and rainfall conditions, with an optimum rainfall of around 1500 mm. Prefers heavier soil types.

REFERENCE: 3



Centrosema pubescens (Kantouy Youn)

DISTRIBUTION

Occurs along roadsides and in wasteland and upland crop fields.

DESCRIPTION AND BIOLOGY

Perennial climbing herb that roots at nodes. Leaves trifoliolate, leaflets ovate to orbicular, about 3 cm long and 1.3–2 cm broad, shortly acuminate and finely pubescent. Three to five lilac to bluish-violet flowers on axillary racemes. Pod 13 cm long and 5–6 mm broad, slightly bent and beaked, containing up to 15 seeds. Reproduces by seed.

AGRICULTURAL IMPORTANCE

Introduced pasture plant normally grown in a mixture with a grass for cut-and-carry. Potential also as soil cover. Minor potential as a weed in upland crops.

REFERENCE: 4



Clitoria ternatea (Anhchaon)

DISTRIBUTION

Along roadsides and on grazing lands and the edges of upland crop fields.

DESCRIPTION AND BIOLOGY

Vigorous, herbaceous perennial legume. Stems fine twining, sparsely pubescent, 0.5–3 m long. Leaves pinnate with 5–7 leaflets. Flowers axillary, single or paired, color ranges from white, mauve, light blue to dark blue. Pods linear-oblong, flattened, 4–13 cm long, 0.8–1.2 cm wide.

AGRICULTURAL IMPORTANCE

Used for short- and medium-term pastures and as green manure, cover crop. Can increase soil fertility to improve yields of subsequent crops when grown as green manure. Also used for cut-and-carry.

REFERENCE: 4



Crotalaria striata (Changkrang Svar)

DISTRIBUTION

Commonly found in wasteland and on roadsides.

DESCRIPTION AND BIOLOGY

Annual herb with erect branched stems, 80–100 cm high. Leaves trifoliolate, egg-shaped, rounded with long petiole. Flower stems are terminal, 10 to 20 cm long. Yellow flowers with purple veins. Pods hairy, bent downwards, 4 to 5 cm long. An annual plant, reproducing by seed.

AGRICULTURAL IMPORTANCE

Not a weed of significance in upland crops.

REFERENCE: 2



Mimosa invisa (Phreah Khlob Damrei, Banlar Saeth)

DISTRIBUTION

Prefers moist conditions. Distributed on wasteland and in plantation crop lands. Occurs along roadsides and on the margins of upland crop fields.

DESCRIPTION AND BIOLOGY

Perennial shrub. Stems erect and climbing, 1.0–2.0 m tall, characterized by sharp recurved spines, hairy. Leaves bipinnate, moderately sensitive to touch, 15–30 pairs. Flower head pink. Pods spiny. Reproduces by seed.

AGRICULTURAL IMPORTANCE

Occurs around the edges of upland fields and in live fences but does not usually occur in cultivated fields.

REFERENCE: 2, 7



Mimosa pigra (Phreah Khlob Yeak)

DISTRIBUTION

Prefers wet and swampy conditions. Widely distributed along the Mekong and Tonle Sap.

DESCRIPTION AND BIOLOGY

Perennial woody shrub, rapid growing. Stems strong, with spines, and 2–4 m tall. Leaves bipinnate, more than 20 cm long. Flowers pink. Pods hairy, slightly curved, 5–10 cm long. Reproduces by seed.

AGRICULTURAL IMPORTANCE

This is a major weed of lowland areas and is a significant constraint to agricultural development in these areas.

REFERENCE: 2



Mimosa pudica (Phreah Khlob)

DISTRIBUTION

Distributed mainly along roadsides and on wasteland. Also occurs in upland crop fields.

DESCRIPTION AND BIOLOGY

Much-branched perennial herb. Sometimes behaves as an annual. Upright to trailing growth, 20–100 cm high. Stems stiff with scattered prickles. Leaves are bipinnate with one or two compound leaflets. Herbaceous and woody. Reproduces by seeds, which can be transported on animals, clothing etc. Can stand considerable shading.

AGRICULTURAL IMPORTANCE

Common weed in upland crops, including some vegetable crops and plantation crops, and pastures. The thorny stems make grazing difficult. The thorns also present difficulties where hand-weeding of crops is practised.

REFERENCE: 2, 7



Macroptilium atropurpureum (Var Kuntuy Tunsai)

DISTRIBUTION

Roadsides, wasteland, grazing lands and upland crop fields.

DESCRIPTION AND BIOLOGY

Perennial herb with trailing and twining stems. Leaves trifoliolate, flower head a raceme with 6–12 flowers on a short rachis, stem 10–30 cm long. Flower deep purple with reddish tinge near base. Pods straight, beaked, hairy, 5–10 cm long, 3–5 mm in diameter. Pods shatter violently when ripe.

AGRICULTURAL IMPORTANCE

Legume introduced for grazing. Can also be used for cut-and-carry, although the twining habit can make harvesting difficult. Can be used as a forage crop sown with upland rice. Could also be used as a nitrogen-fixing mulch crop before maize. Because of the hard seeds, plants could emerge in subsequent upland crops.

REFERENCE: 4



Hyptis suaveolens (Moreck Tunsay)

DISTRIBUTION

Plantation crop areas, roadsides, wasteland and pastures.

DESCRIPTION AND BIOLOGY

Annual herb. Stems hairy, erect, branched and 50–150 cm tall. Leaves ovate, 4–9 cm long. Purplish-blue flowers in clusters of 3 or 4 at the bases of leaves. Reproduces by seed.

AGRICULTURAL IMPORTANCE

This plant has been observed along roadsides but not as a weed in upland crops.

REFERENCE: 1



Abelmoschus moschatus (Mchu Preuk Prey)

DISTRIBUTION

Occurs in open and disturbed areas and marshes. Naturalised in plantations, rice fields, and clearings, and also occurs along trails and on the edges of forests.

DESCRIPTION AND BIOLOGY

Herb or under-shrub to 1.5 m tall. Leaves variable in shape and size. Flowers axillary, solitary, mostly yellow and dark purple at base. Propagates by seed.

AGRICULTURAL IMPORTANCE

Not a major weed of cultivated annual upland crops.

REFERENCE: 1



Abutilon indicum (Tbal Ken)

DISTRIBUTION

Found on wasteland, along roadsides, and in upland crop fields.

DESCRIPTION AND BIOLOGY

Perennial herb with branched hairy stems. Leaves are heart-shaped, with toothed margins. Flowers are yellow with stem jointed above the middle. The fruit is a capsule and densely hairy with distinct ribs. Reproduces by seed.

AGRICULTURAL IMPORTANCE

Not a major weed of upland crop fields.

REFERENCE: 2



Pentapetes phoenicea (Krachib)

DISTRIBUTION

Found in floating rice areas, on roadsides and along waterways.

DESCRIPTION AND BIOLOGY

Annual aquatic herb. Stems erect, green, up to 2.0 m tall. Leaves linear-lanceolate and toothed. Flowers solitary at the bases of leaves. Reproduces by seed.

AGRICULTURAL IMPORTANCE

Not likely to be a weed of upland crop fields.

REFERENCE: 2



Sida acuta (Kantraing Bay Sar)

DISTRIBUTION

Prefers dry and sandy soil conditions. Distributed in upland crop areas, on roadsides, and in wasteland and pastures.

DESCRIPTION AND BIOLOGY

Small, erect, much-branched perennial shrub or herb 30–100 cm high. Strong taproot. Capsules split into 1-seeded segments; the awns on these can stick to animals and clothing and aid dispersal. Reproduces by seed.

AGRICULTURAL IMPORTANCE

Very competitive. Grows well in many soils, including heavy clays. Can tolerate wet as well as dry zones. Without cultivation or herbicides it is very difficult to control because of the tough fibrous stems and taproot. Continued ploughing can kill the weed, but the deep taproot makes cultivation difficult. Not palatable to livestock.

REFERENCE: 2, 7



Sida rhombifolia (Kantraing Bay Sar Nhi)

DISTRIBUTION

Prefers dry and sandy soil conditions. Distributed in upland crop areas, on roadsides, and in wasteland and pastures.

DESCRIPTION AND BIOLOGY

Small, erect, branched perennial herb 30–100 cm high. Leaves are brighter green, longer and narrower than in *S. acuta*. Capsules split into one-seeded segments. The awns on these can stick to animals and clothing and aid dispersal. Reproduces by seed.

AGRICULTURAL IMPORTANCE

Very competitive. Grows well in many soils, including heavy clays. Can tolerate wet as well as dry zones. Without cultivation or herbicides it is very difficult to control because of the tough fibrous stems and taproot. Continued ploughing can kill the weed, but the deep taproot makes cultivation difficult. Not palatable to livestock.

REFERENCE: 2, 7



Urena lobata (Ach Chruk)

DISTRIBUTION

Invades disturbed areas: a weed of wasteland, roadsides and pastures.

DESCRIPTION AND BIOLOGY

Erect shrub to 1 m tall. Leaves palmately lobed, 4–8 cm long, usually 5-lobed, or angled. Flowers pinkish-violet, about 1 cm broad. Fruit hairy and with hooked bristles.

AGRICULTURAL IMPORTANCE

A weed mainly in canefields, pastures, clearings and grassland.

REFERENCE: 1



Boerhavia diffusa (Phti Thmar)

DISTRIBUTION

Commonly found on wasteland and roadsides, and in pastures and upland crop fields.

DESCRIPTION AND BIOLOGY

Spreading, loosely branched annual or perennial herb. Prostrate initially, then upright from 40–150 cm. Stems red to purple, with few hairs. Leaves dark green to purple, 1–5 cm long, with wavy or lobed margins. Flowers white to pink, 1.5–2.5 mm long. Reproduces by seed.

AGRICULTURAL IMPORTANCE

A common weed in cultivated fields, perennial crops and pastures, and on roadsides and wastelands. The plant has a thickened taproot and can persist through the dry season. If left uncontrolled in maize or soybean fields, it can reduce yields by 70% to 80%.

REFERENCE: 3, 2



Passiflora foetida (Sav Mao Prey)

DISTRIBUTION

Found in upland cultivated areas, on roadsides and wasteland, and along fences.

DESCRIPTION AND BIOLOGY

Perennial herb. Stems hairy, climbing, trailing up to 6.0 m long. Leaves alternate, three-lobed. Solitary flowers, white with purple base, found at the bases of leaves. Fruit is enclosed in a netted green calyx. Reproduces by seed.

AGRICULTURAL IMPORTANCE

This plant is common in upland areas along roadsides, but because of its perennial nature it is not likely to be a serious weed in annual cropping systems.

REFERENCE: 2, 3



Brachiaria mutica (Smao Barang)

DISTRIBUTION

Prefers poorly drained soils. Found in paddies and along watercourses and does not tolerate extended dry conditions.

DESCRIPTION AND BIOLOGY

Creeping perennial grass with long, coarse stolons up to 5.0 m long, very hairy. Stems lie on the ground and have soft, moderately hairy leaves up to 20 mm wide and 30 cm long. Stolons and branches root readily at nodes.

AGRICULTURAL IMPORTANCE

Adapted to a wide range of soil types. Suited to poorly drained land, but will also grow on free-draining soils. Can become a problem in wetland areas that are not grazed: sugarcane fields, irrigation ditches and drains. Cut and fed to cattle in Cambodia.

REFERENCE: 2, 3, 7



Brachiaria reptans (Smao Ko, Smao Sambokmaen)

DISTRIBUTION

Prefers dry conditions. Found in wasteland and crop lands and is widely distributed in Cambodia.

DESCRIPTION AND BIOLOGY

A perennial grass, spreading by stolons that root at the nodes. The leaves are 2–5 cm long and 1.0–1.5 cm wide. Less hairy than *B. mutica*. The seed head is 2–6 cm long, with 5–15 branches. Flowers all year round and is propagated by runners and seeds.

AGRICULTURAL IMPORTANCE

Can survive through the dry season as well as reproduce from seed and can provide strong competition for upland crops. Cut and fed to cattle in Cambodia.

REFERENCE: 2



Cynodon dactylon (Smao Chenh Chean)

DISTRIBUTION

Perennial grass common along roadsides and in pastures, wastelands and upland crops in Cambodia.

DESCRIPTION AND BIOLOGY

Fine-leaved, prostrate perennial grass. It roots at the nodes and also has underground stolons that enable it to spread rapidly by vegetative means. Propagates mainly by vegetative means and is a sparse seed producer; therefore, control measures need to focus on preventing spread by animals, machinery etc.

AGRICULTURAL IMPORTANCE

A weed in many upland crops. However, it is also a useful pasture and can be used to prevent soil erosion. Adapted to a wide range of soil pH and moisture conditions but prefers medium to heavy soil types.

REFERENCE: 7



Dactyloctenium aegyptium (Smao Cheung Kras)

DISTRIBUTION

Prefers dry conditions and can survive the dry season in Cambodia. Found in upland crops and wasteland and is widely distributed in Cambodia.

DESCRIPTION AND BIOLOGY

Herbaceous annual grass 50 to 150 cm tall, with soft, slightly succulent leaves. May contain cyanide compounds and is therefore a danger to stock at certain times. One of the best grazing grasses in semi-arid areas, but it dries out with the onset of the dry season. Stems are round, erect or trailing, solid and hairless.

AGRICULTURAL IMPORTANCE

This plant is a troublesome weed of upland crops such as maize, cotton, sugarcane and peanuts. A range of herbicides are available for its control.

REFERENCE: 2, 7



Digitaria adscendens (Smao Sambok Mon)

DISTRIBUTION

Prefers upland conditions. Found in wasteland and crop lands and occurs throughout Cambodia.

DESCRIPTION AND BIOLOGY

Annual grass 30 to 50 cm high. Leaves linear-lanceolate, with hairs at the sheath and blade mouth. Seed head is a spike with 5 to 8 fingers, each about 10 cm long. Palatable when young. Flowers all year round. Often grows rapidly when other plants are under temperature or water stress. Tillers root at nodes.

AGRICULTURAL IMPORTANCE

Difficult to control by ploughing when established. Deceptively competitive for moisture and nutrients. The grass is collected to make nests for chickens.

REFERENCE: 2, 3



Echinochloa colona (Smao Bek Kbal, Khmean Kantuy)

DISTRIBUTION

Prefers both moist and dry lands. Found in direct-seeded rice and in upland crop fields. Widely distributed in Cambodia.

DESCRIPTION AND BIOLOGY

Annual grass. Tufted, erect and jointed, often flat on the ground, and 30–60 cm high. Reddish-purple or green. Leaves linear and 10–15 cm long. Seed head is a panicle with 3–10 branches 5–15 cm long. Propagates by seed. A single plant may produce as many as 40 000 seeds.

AGRICULTURAL IMPORTANCE

Grows in wet conditions. The source of infestation can be impure crop seed. Land preparation, planting date, planting method, crop grown, plant spacing, and fertiliser management can all be used for integrated management to control this weed.

REFERENCE: 2



Eleusine indica (Smao Samsorng)

DISTRIBUTION

Prefers soils of low moisture. Found on wasteland and roadsides and in upland crop fields. Tolerates traffic and compaction.

DESCRIPTION AND BIOLOGY

An annual tufted grass, stem erect or lying flat at the base, up to 80 cm tall. Leaf blade 10–30 cm long, sheath 6–9 cm long, flattened laterally, with a few long hairs at the junction with the blade. Grows well in hot areas as well as in dry conditions. Reproduces by seed.

AGRICULTURAL IMPORTANCE

Grows in a wide range of crops. Found in waste areas because of its tolerance to drought. Normally controlled by ploughing and land preparation. Is also well controlled by several selective herbicides, as well as by knockdown herbicides.

REFERENCE: 2, 7



Imperata cylindrica (Sbauv Klang)

DISTRIBUTION

Grows on both dry and wet soils. Distributed in wasteland and open forests and sometimes in upland crop fields.

DESCRIPTION AND BIOLOGY

An erect perennial grass. Robust, hairy at the nodes, and 0.5–1.0 m high. Reproduces by seed and rhizomes. Flowering is usually initiated by stress, such as burning, cutting or drought. Numerous seeds are produced and can be dispersed by wind over long distances. Tolerant of burning; rapid regrowth occurs from the rhizomes, which are protected by the soil.

AGRICULTURAL IMPORTANCE

Common weed of rubber and tree crops. Occurs in upland crop fields, especially during the dry season, but does not appear to tolerate ploughing.

REFERENCE: 2, 7



Sorghum halepense (Trengr)

DISTRIBUTION

Occurs on roadsides and occasionally in crops in Battambang. Appears to be spreading into Cambodia along roads in the north-west.

DESCRIPTION AND BIOLOGY

Erect perennial to 1.5 m tall, with strong rhizomes. Nodes have short hairs. Leaves usually 1–1.5 cm wide, the midrib prominent. Seed heads 15–25 cm long; spikelets 5 mm long. Plants develop long rhizomes bearing buds, which germinate readily. Seed production is variable and depends on environmental factors.

AGRICULTURAL IMPORTANCE

This species could be a serious weed of cultivation if it were to become established in upland crop fields.

REFERENCE: 1, 7



Portulaca oleracea (Kambet Chun)

DISTRIBUTION

Occurs in upland crop fields and vegetable crops and on wasteland.

DESCRIPTION AND BIOLOGY

Prostrate, fleshy, succulent annual plant that is able to tolerate poor, compacted soils and drought. Stems are usually purple-red and may root at the lower nodes. These many branched stems reach up to 60 cm long and grow in a prostrate fashion to form mats. Reproduces by seed.

AGRICULTURAL IMPORTANCE

Once established, it is drought tolerant. To control without herbicides, maintain a dense and healthy cover by using proper cultural practices. If mechanically removed, destroy the stems, as they may root in open soil. Several post-emergent herbicides give satisfactory control.

REFERENCE: 2



Borreria alata (Maam Phnom)

DISTRIBUTION

Initially a problem in plantation crops but is now a major weed in cultivated crops in the tropics and sub-tropics.

DESCRIPTION AND BIOLOGY

Prostrate, ascending or erect annual herb, 5–100 cm. Tends to be succulent and has square stems. Leaves are 2–7 cm long and vary in shape. Flowers are in dense clusters at the bases of leaves.

AGRICULTURAL IMPORTANCE

Because *Borreria* is still spreading it is seen as a new weed problem in some areas. It is a serious weed in plantation crops, as well as in cassava, maize, soybean and vegetable crops.

REFERENCE: 1



Hedyotis diffusa (Kampoy Chen)

DISTRIBUTION

Occurs on open land and roadsides and in upland crop fields.

DESCRIPTION AND BIOLOGY

Slender, spreading or ascending, more or less branched annual herb, reaching a length of 50 cm or less. Leaves linear and 1–3 cm long. Flowers white, 3 mm long and occurring singly in the axil of the leaf. Fruit is a capsule about 4 mm long.

AGRICULTURAL IMPORTANCE

Not a major weed of upland crop fields.

REFERENCE: 2



Richardia brasiliensis

DISTRIBUTION

Widespread in upland crops and pastures in north-west Cambodia.

DESCRIPTION AND BIOLOGY

Annual herb. Stems spreading on the ground, branched and hairy. Leaves opposite, ovate, thickened. Flowers terminal, white, funnel form. Reproduces by seed.

AGRICULTURAL IMPORTANCE

Prefers dry soil conditions.

REFERENCE: 2



Cardiospermum halicacabum (Ambeng Bek)

DISTRIBUTION

Occurs along roadsides and in upland fields, especially in Battambang.

DESCRIPTION AND BIOLOGY

Perennial, herbaceous climber, up to 8 m high. Leaves alternate, spiral, compound, bipinnate. Leaflet 28–62 mm long, 10–43 mm wide, margins serrate, dentate or deeply incised. Flowers white, 1.5–5 mm long, in racemes. Fruit, a capsule, non-fleshy, 12–41 mm long, inflated, 15–44 mm wide.

AGRICULTURAL IMPORTANCE

Forms dense but localised infestations. Can be controlled by both herbicides and mechanical means.

REFERENCE: 5



Physalis angulata (Pang Pos Srom)

DISTRIBUTION

Prefers well drained soils. Occurs on roadsides and wasteland and in upland crop fields.

DESCRIPTION AND BIOLOGY

Annual herb with hairy stems, erect, branched and 30 to 40 cm tall. Leaves are alternate and have slightly lobed margin. Flowers are bell-shaped, pale yellow and purple at the base. Fruit, which is edible, is a round berry enclosed in the papery sepals. Spread by seeds.

AGRICULTURAL IMPORTANCE

Occurs in upland fields and pastures, on roadsides and in open woodlands. It prefers disturbed sites. It is susceptible to several herbicides, and deep burial of the seeds prevents germination. As well as lowering crop yields, mature seeds can contaminate grain samples.



REFERENCE: 2, 3

Corchorus olitorius (Kro Chauv Prey)

DISTRIBUTION

Commonly found in cultivated areas, on wasteland and along roadsides.

DESCRIPTION AND BIOLOGY

Herbaceous annual growing from 30–100 cm, with hairless leaves. Leaves are 5–12 cm long and serrated, with the two lower teeth extended into auricles. Flowers, with 5 yellow petals 4–5 mm long, are opposite the leaves. The taproot is highly developed; this helps to provide drought resistance in the early stages of growth.

AGRICULTURAL IMPORTANCE

This plant has a long history as a food plant and is likely to have been used as a vegetable in South East Asia. The genus has also been used for production of jute. As a weed this species is very competitive with crops.

REFERENCE: 2, 3



Stachytarpheta indica (Smao Krab Sa-eth)

DISTRIBUTION

Occurs along roadsides and on wasteland in upland areas.

DESCRIPTION AND BIOLOGY

Low, spreading annual or perennial herb, 0.6–1.2 m tall, sometimes woody toward base, often purplish throughout; stems branched, sparsely hairy. Leaves often bluish or grayish when fresh, alternate or opposite, somewhat fleshy, oblong to elliptic or ovate, 2–9 cm long, 1.5 to 4 cm wide. Flower heads stout and stiff, 15–50 cm long, up to 7 mm in diameter. Flowers pale blue, 8–11 mm long.

AGRICULTURAL IMPORTANCE

Not observed as a weed in upland crops.

REFERENCE: 1



Cayratia trifolia (Voir Trardeth)

DISTRIBUTION

Occurs along roadsides, on wasteland, and in upland crop fields.

DESCRIPTION AND BIOLOGY

Vine with smooth, trifoliate leaves generally 3-8 cm long and 2-5 cm broad. The leaflets are ovate to deltoid and deeply toothed. Tendrils arise opposite from each leaf along the stem. The flower heads are 6-10 cm long corymbs or umbels, and the flowers are small and white to cream. The fruits are rounded berries, green turning black.

AGRICULTURAL IMPORTANCE

This plant occurs around and in upland crop fields but is unlikely to tolerate continuous cultivation.

REFERENCE: 14



GLOSSARY

Definitions of botanical terms were obtained from the Shorter Oxford Dictionary.

Acuminate

Pointed, tapering to a point.

Acute

Sharp at the end, coming to a point.

Angular

With sharp edges or corners.

Annual

Plant that grows for 1 year or less and reproduces by seed.

Apex

The tip, top or pointed end.

Awn

Spiny point or process that terminates the grain sheath of a grass.

Axil

The upper angle between a leaf or petiole and the stem from which it springs.

Axillary

Situated in, or growing from, the axil.

Berry

Any small globular or ovate juicy fruit.

Bipinnate

Doubly or subordinately pinnate.

Blade

The leaf of a herb, grass or plant.

Bract

A small modified leaf or scale growing below the calyx of a plant, or upon the peduncle of a flower.

Bristle

Any short, stiff, pointed or prickly hair.

Bulb

The underground spheroidal portion of the stem of an onion, lily or similar plant.

Burr

A fruit covered in spines.

Calyx

The whorl of leaves (sepals), usually green, forming the outer covering of a flower while in the bud.

Capsule

A dry dehiscent seed vessel containing 1 or more cells.

Compound leaf

Leaf divided into several leaflets.

Cordate

Heart-shaped.

Crenate

Having an edge that is notched or toothed with rounded teeth, or finely scalloped.

Cylindrical

Shaped like a cylinder or tube.

Dehiscent

Seed vessels that burst open when ripe.

Deltoid

In the shape of a triangle.

Dentate

Leaves with sharp teeth projecting outwards.

Denticulate

Having small tooth-like projections.

Ellipsoid

Oval-shaped.

Elliptic

Oval.

Erect

Upright.

Floret

One of the little flowers that make up the composite flower or spikelet of a grass.

Globular

In the shape of a sphere or ball.

Herb

A plant that does not have a woody stem and dies down to the ground after flowering.

Incised

Having notches or grooves at the edge.

Inflorescence

The collective arrangement of flowers on the plant; flower head.

Lanceolate

Like a spear-head, narrow and tapering to a point.

Latex

A milky liquid that is found in many plants, such as the Euphorbiaceae, and is exuded when the plant is wounded.

Lobe

A roundish projecting part.

Node

A knob on a root or branch; the point of the stem from which the leaves spring.

Oblanceolate

Opposite to lanceolate; tapering to the base of the leaf rather than the tip.

Oblong

Elongated in one direction.

Obovate

Opposite to ovate; tapering to the base and rounded at the tip.

GLOSSARY

Orbicular

Having a rounded or convex surface.

Ovate

Egg-shaped.

Palatable

Pleasant to the palate or taste.

Palmate

In the shape of a palm or hand.

Peduncle

The stalk of a flower or fruit.

Perennial

Remaining alive through a number of years.

Petiole

Leaf stalk.

Pinnate

Like a feather. A compound leaf with a series of leaflets on each side of a common petiole.

Propagate

To reproduce or multiply.

Prostrate

Lying flat on the ground.

Pubescent

Covered with short, soft hair.

Raceme

A simple inflorescence in which the flowers are arranged on short, nearly equal pedicels, at equal distances on an elongated axis.

Recurved

Bent backwards.

Rhizome

An underground root-like stem that produces roots and usually leaves at its apex.

Rhombic

Diamond-shaped.

Robust

Strong and stoutly built.

Sap

The vital juice that circulates in plants.

Sepal

Each of the divisions or leaves of the calyx of a flower.

Serrate

Saw-toothed.

Serrulate

Finely or minutely serrated or saw-like.

Sessile

Having no stalk, attached by the base.

Sheath

A tubular or enrolled part of the plant, such as the base of the leaf of a grass.

Solitary

Growing singly or separately, not forming clusters or masses.

Spheroid

Approaching the shape of a sphere or ball.

Spikelet

A small group of florets in grasses, forming part of the spike.

Stamen

The male part of the flower.

Stolon

Sucker of a plant. Stem running along the ground.

Succulent

Fleshy, full of juice.

Tendril

A slender thread-like part of the plant, often spiral in form, that stretches out and attaches to, or twines around, another body to support the plant.

Trifoliate

Three-leaved.

Tubular

Tube-shaped or hollow.

Twining

To grow in a twisted or spiral manner.

Umbel

Umbrella-shaped inflorescence that springs from a common centre.

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