DIVERSITY AND SUSTAINABILITY OF THE PEK SAVANNAS OF THE LAO PDR

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ABSTRACT

The pek savannas of the Lao PDR occur in the southern half of the country and are relatively undeveloped. They are disjunct upland communities characterised by an understorey dominated by three species of *Arundinaria*, known locally as pek. The canopy varies from open forest to woodland. In relatively undisturbed communities, pek grows to c. 1.5 m tall, and is generally 99% pure, with tall growing grasses occurring infrequently. Higher levels of disturbance lead to invasion of shrub species and ingress of some lower-growing grasses and occasional legumes, some of which are palatable to livestock. Pek is palatable to livestock when young. Clearing of trees results in reduced yield and eventual death of pek. Some attempts have been made to introduce the exotic legume Caribbean stylo to degraded pek savannas, and it has persisted for some years. It is recommended that management of pek savannas should be at a sufficiently low level to maintain the pek as a productive source of fodder.

KEYWORDS

Arundinaria, bamboo, savannas, biodiversity

INTRODUCTION

Southeast Asia is a region with a rapidly expanding population. The Lao PDR has a comparatively small population compared to its neighbours, but there is increasing pressure on its natural resources. Although rice is the staple food crop, smallholders generally keep cattle, which are an important source of cash income to themselves and to the country as a whole. There is a deficiency in quality forage for livestock in the region, which has led to the Australian-funded "Forages for Smallholders" project, which aims to introduce quality grasses and legumes adapted to the generally acid soils and monsoonal climate of the country (Horne and Stür, 1996).

In the southern part of the country, extensive areas of uplands are savannas which are locally termed "pek". As a component of the Forages for Smallholders Project, the Lao Department of Livestock and Veterinary Services requested that a survey of the herbaceous flora of pek savannas be carried out, in consideration of their potential as a grazing resource for livestock. The present paper provides a brief overview of our findings.

METHODS

The southern part of the Lao PDR, covering the known distribution within the country of pek savannas, was surveyed over the period 12-21 November, 1995. Most of the significant roads within the region were covered and stops were made at intervals where pek savannas were evident. At each site an area of c. 1 ha was investigated, and duplicate grass specimens collected or identified on-site. Percentage of grass herbage on offer was estimated at each site, and proximity to habitation noted. The most frequent tree species at each site were identified by their Lao common name and identified to species (S. Midgley, pers. comm.). Grasses were identified by the authors or, in most cases, by grass taxonomists. Presence of herbaceous and shrub legumes was noted, and herbarium specimens collected for identification. Information on palatability of legumes to livestock is based on information supplied by smallholders or from observation; comparable information on grasses is largely based on Bor (1960) and Lazarides (1980).

RESULTS AND DISCUSSION

Twenty-one sites were investigated. Excluding site 2, which was dominated by a tall-growing bamboo, all had a high proportion of pek (>80%) in the grass flora and all were open forests to woodlands, in areas which were not prone to flooding (Fig. 1). Soils were sandy to loams, pH 5.0-7.0. The most frequent dominant tree species were "koung" (*Dipterocarpus tuberculatus*) and "chik" (*Shorea obtusa*), although several other species were also present. At higher altitudes (site 9), "paek" (*Pinus merkusii*) was the dominant tree species. Pek was not seen in full sunlight and is locally considered to require some shade to survive in the longer term. No flowering plants were seen, and most locals considered that it does not flower, although one remembered a flowering event in the 1980s.

Two types of pek are recognised locally, the shorter "pek noi" and the more robust "chawd". Their botanical identities are uncertain, as three species occur in Lao PDR - *Arundinaria ciliata, A. falcata* and *A. pusilla* (S. Midgley pers. comm.), and we have not been able to obtain identification for the non-reproductive herbarium specimens collected. They are considered to be palatable to livestock in early growth, but less palatable as they age, the leaves falling during the dry season. Milking cows grazing *Arundinaria* spp. in Nepal are locally believed to produce "thick' milk, with a high ghee content (D.H. Walker, pers. comm. 1996). It is also considered in Nepal to be good for calves and to decrease incidence of gastro-intestinal worms. "Pek noi" is a strongly rhizomatous species whereas "chawd" has clustered stems from a restricted basal crown. Both species may be eradicated by cultivation, but are tolerant of fire, although not of flooding.

Several sites (sites 10, 15, 18) had a low proportion of pek in the lower vegetation strata, but a high proportion of shrubs. We believe that this was generally associated with increased grazing pressure, although sometimes with shallow soils. In contrast, some remote sites (e.g. 12, 13, 19, 20, 21) had negligible shrub growth and near 100% pek in the lower strata.

Very few grass species were able to co-exist with pek in well-developed pek savannas (Table 1). A much larger range occurred where pek was not so strongly dominant. Several species are considered to be useful forages, although they were never separately observed to comprise >5% of the herbage on offer, except in glades. Several are noted as weeds of cultivation (*e.g. Rottboellia cochinchinensis*); only *Chionachne koenigii* is considered deleterious to cattle, owing to its irritating hairs (which were, however, lacking in the material collected).

Legume species were only seen in the absence of strong competition from pek. The most frequent was the palatable *Vigna dalzelliana*. The shrub *Dendrolobium lanceolatum* was found at several sites, and was observed to have been sparingly grazed. Other species which could be palatable to livestock include *Alysicarpus vaginalis, Desmodium heterocarpon, D. reticulatum, D. styracifolium, Pueraria longicarpa, P. phaseoloides* and *Tadehagi triquetrum*. These were invariabily very minor components of any community where they occurred. comprising <1% of herbage on offer.

At two degraded pek savanna sites, Verano (*Stylosanthes hamata*)

had been broadcast by the senior author in 1987. Populations had established and continued to improve, except where the shade from trees was moderate to heavy.

It was concluded that the most valuable grazing resource of pek savannas is the *Arundinaria* species which dominate the understorey. Management should aim towards conserving the grazing resource through avoiding overstocking. This could best be achieved through establishment of improved forages, such as *Andropogon gayanus*, *Brachiaria* spp. and *Stylosanthes* spp. Around villages, thus reducing pressure on the pek. These species have been shown to be broadly adapted to acid soils in the Southeast Asian region (Horne and Stür, 1996). Where pek is degraded, and where light levels are moderate to high, there are opportunities for improving livestock production with *Stylosanthes* species.

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Figure 1
Southern Lao PDR; Sites where grasslands were assessed

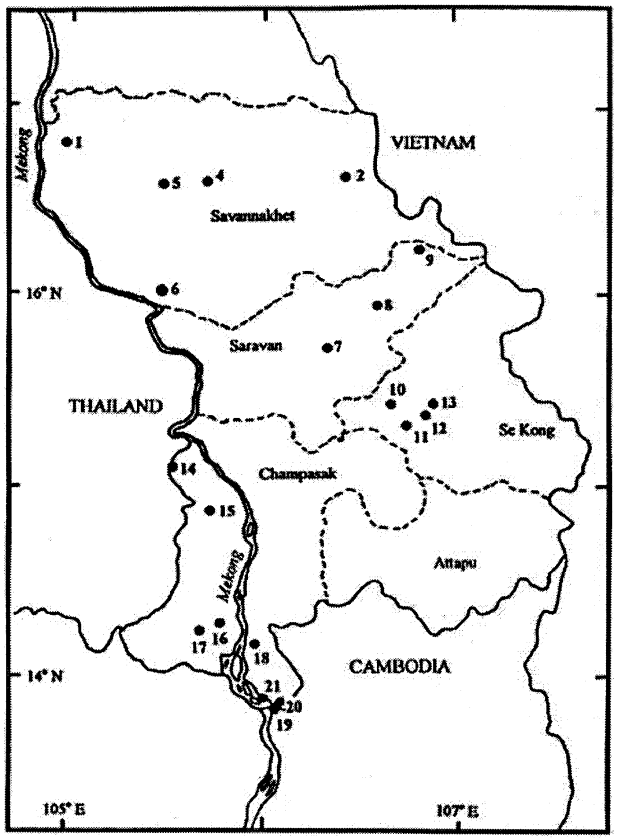

Table 1
Grass species found in pek savannas in the Lao PDR.

Strong competition from pek
*Heteropogon triticeus****
*Sorghum nitidum***
Schizachyrium sanguineum ***
Chionachne ?koenigii
*Themeda arundinacea**#*

Moderate competition from pek
*Andropogon ascinodis****
Apocopis courtallumensis
Capillipedium cinctum
*Centotheca lappacea***#*
Chrysopogon schmidianus
*Diectomis fastigiata***
Eremochloa ciliaris
E. ciliatifolia
Eulalia monostachya
*E. trispicata***
E. sp. aff. *E. milsumi*
*Heteropogon contortus****
Imperata cylindrica
*Isachne globosa**\#*
Ischaemum spp*
Mnisethea laevis
Panicum curviflorum#
*Pseudopogonatherum contortum***
*Rottboellia cochinchinesis****
Sacciolepis myosuroides#
*Sehima nervosum****
Themeda triandra ***

Glades
*Chrysopogon aciculatus*** (heavy grazing)
Germainia capitata#
G. ?khasyana #
*Paspalum scrobiculatum**\#*

Tracks and bare areas
Aristida cumingiana
Gymnopogon delicatulus
Eragrostis brownii
E. tremula
E. unioloides.
Sacciolepis indica
Setaria parviflora
Schizachyrium brevifolium

* palatable when young, or of limited value to livestock
** generally considered a useful species for grazing
# rarely found in pek savannas