



Effects of past burning frequency on plant species structure and composition in dry dipterocarp forest

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Anthropogenic burning in dry dipterocarp forests (DDF) has become a common phenomenon throughout Thailand. It is feared that too frequent fires may affect vegetation structure and composition and thus impact on ecosystem productivity. The aim of this study was to quantify the effects of prescribed fires on sites with different past burning regimes on vegetation structure and composition in the Huay Kha Khaeng Wildlife Sanctuary (HKK), Thailand. Fire frequency was determined from satellite images and ranged from frequent, infrequent, rare and unburned with fire occurrences of 7, 2, 1 and 0 out of the past 10 years, respectively. The pre-burn fuel loads, the overstorey and understorey vegetation structure and composition were determined to investigate the effects of the contrasting past burning regimes. The burning experiment was carried out, applying a three-strip head-fire burning technique. The vegetation structure and composition were sampled again one year after the fire to assess the fire impacts. Aboveground fine fuel loads increased with the length of fire-free interval. The woody plant structures of the frequently burned stand differed from those of the other less frequently burned stands. The species composition of the overstorey on the frequently burned site, in particular that of small sized trees (4.5-10 cm dbh), also differed significantly from that of the other sites. Whilst the ground vegetation including shrubs and herbs did not differ between the past burning regimes, frequent burning obviously promoted the proliferation of graminoid vegetation. There was no clear evidence showing that the prescribed fires affected the mortality of trees (dbh > 4.5 cm) on the sites of the different past burning regimes. The effects of prescribed burning on the understorey vegetation structures varied between the past burning regimes and the understorey vegetation type. Therefore, it is recommended that the DDF at HKK should be subjected to a prescribed fire frequency not shorter than every 6-7 years, or 1-2 fires per decade, to maintain ecosystem structure and function. Variation in time and space in this way, the biodiversity of the landscape may be maintained for the long-term.

Keywords: Prescribed burning, burning history, burning frequency, plant species, vegetation structure, dry dipterocarp forest, Huay Kha Khaeng wildlife Sanctuary