Flora associated with sweetpotato on Leyte island, Philippines

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ABSTRACT

To characterize the flora associated with sweetpotato on Leyte island, Philippines, investigations were done in 14 sweetpotato fields and 9 fallows bordering the studied fields. The fallows were chosen to find out whether the bordering vegetation influenced the flora in sweetpotato fields.

The studied sweetpotato fields and fallows were localized in three different sites which were mainly characterized by diverse vegetation types. Comparisons between the observed plant species and the three sites were done.

Altogether, 215 different plant species were found in both the studied sweet potato fields and the fallows. In the sweet potato fields; 138 weed species could be identified, and 161 plant species (including 18 crop plants) were found in the fallows.

To characterize the plant communities in the three sites, the registered plant species were summarized to diverse groups of vegetation.

Keywords: Leyte island, Philippines, sweetpotato, weeds, fallow, vegetation

INTRODUCTION

The research on the flora associated with sweet potato (*Ipomoea batatas* (L.) Poir.) was done between September 1991 and January 1992 in the vicinity of the Visayas State College of Agriculture (ViSCA), which is located in the western part of Leyte island near the town of Baybay (Fig. 1). The investigations were done in three different sites which were mainly characterized by different vegetation types surrounding the studied sweetpotato fields. The first site in this study (named as "site A") is an area where the forest vegetation type is dominant near the cultivated fields (primary forest and forest influenced by man). The second site ("site B") is characterized by the dominance of cultivated land and secondary vegetation near the studied sweetpotato fields. The third site (named "site C") is located in a typical farming area. The location of the three research sites is shown in Fig. 2. Three different sites were selected whether the vegetation type surrounding the sweetpotato fields influences the number and the kind of weed species in the sweet potato fields.

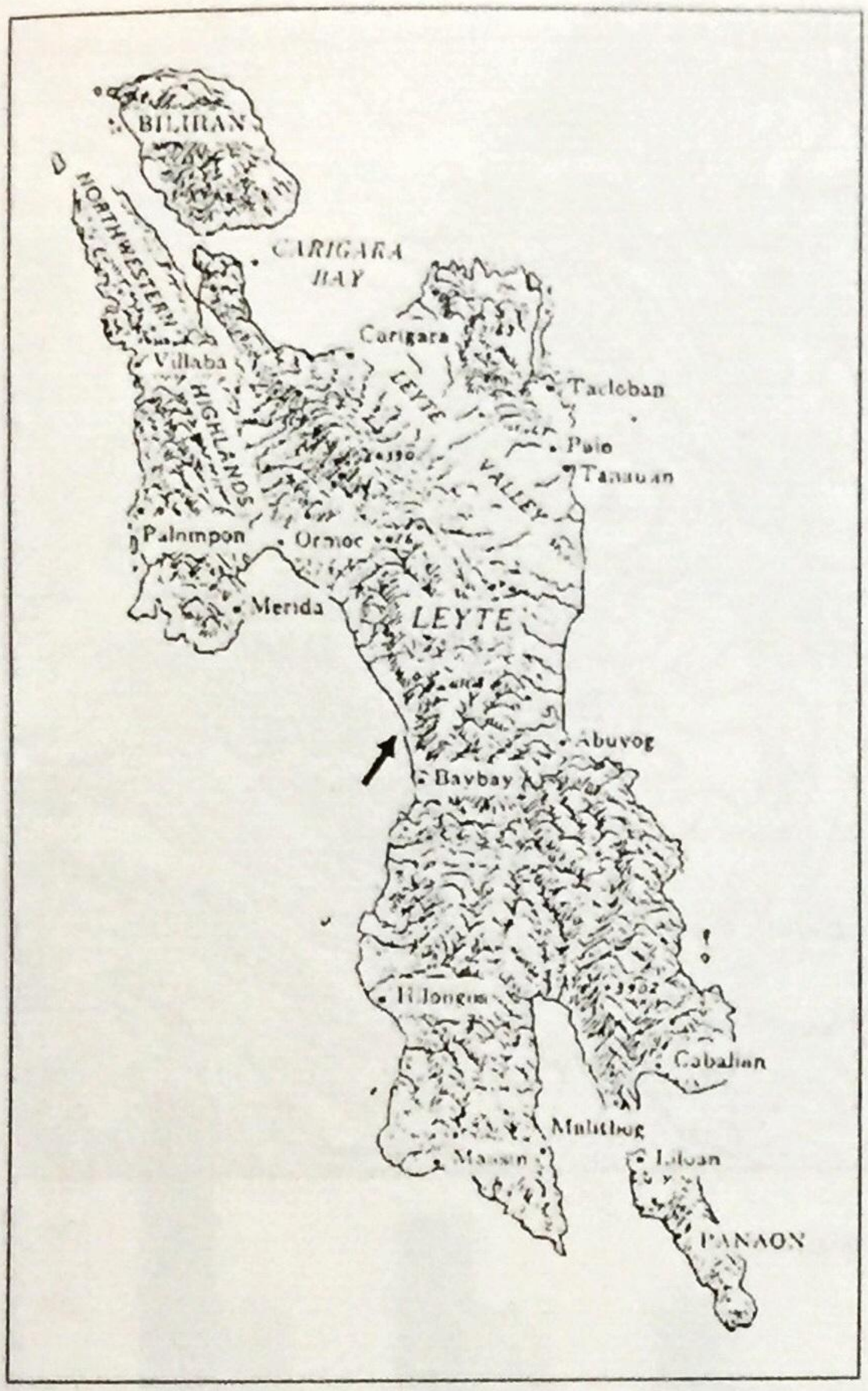

Figure 1. Relief map of Eastern Visayas. The location of ViSCA is marked by an arrow (modified by Wernstedt, 1967).

All studied fields were planted with the sweetpotato variety *Taguimtim,* which is often cultivated by farmers in the area of ViSCA. This variety has lobed leaves which are red to violet in the juvenile stage and mostly green in the mature stage. Their tubers have orange color and oval shape.

In addition to the research on the flora of 14 sweetpotato fields in the three above mentioned sites, studies were done in 9 fallows bordering the studied fields to find out whether the bordering vegetation influences the flora in sweetpotato fields. Observations were done in sweetpotato fields at 2 to 6 months after planting. The studied fallows had an age between 2 and 15 years.

The method by Braun-Blanquet (1965) with slight modification (Reichelt and Wilmanns, 1973; Walter, 1983) was used to characterize the plant population in sweetpotato fields and the bordering fallows. This method makes guessing the percentage of the area covered by the foliage of all individuals of one species possible (Table 1).

RESULTS

Altogether 215 different plant species were found in the studied sweetpotato fields and in the bordering fallows. From these 215 species, 180 were identified to the level of plant families. They belonged to 63 plant families. In the studied sweetpotato fields, 138 different weed species were found, while 161 plant species (including 18 crop plants) were identified in the examined fallows. One hundred and eight from all the discovered plant species were found in both sweetpotato fields and neighboring fallows. The plant species found were mainly identified using the following books: Burger (1972); Fröman et al. (1974); Guzman et al. (1986); Moody et al. (1984), Padua et al. (1977, 1978, 1981, 1989), Pancho et al. (1978, 1983), Pancho (1983), Santos et al. (1986), Zamora et al. (1986).

Figures 3 and 4 show the number of plant species found in sweetpotato fields and in fallows, respectively, of the three studied sites. Figure 3 reveals that the total number of registered plant species in the sweetpotato fields of sites A and B are about the same while in site C significantly less plant species were found. On the other hand, the maximum number of species was registered in the fallow of site A (Fig. 4), site B fallow had moderate number and site C had the fewest species. In Fig. 3, it can also be seen that the average number of species per sweetpotato field is about half of the total number of species in each site. The same relation exists for the examined fallows of site A (Fig. 4). However, the average number of species in the fallows of site B, is

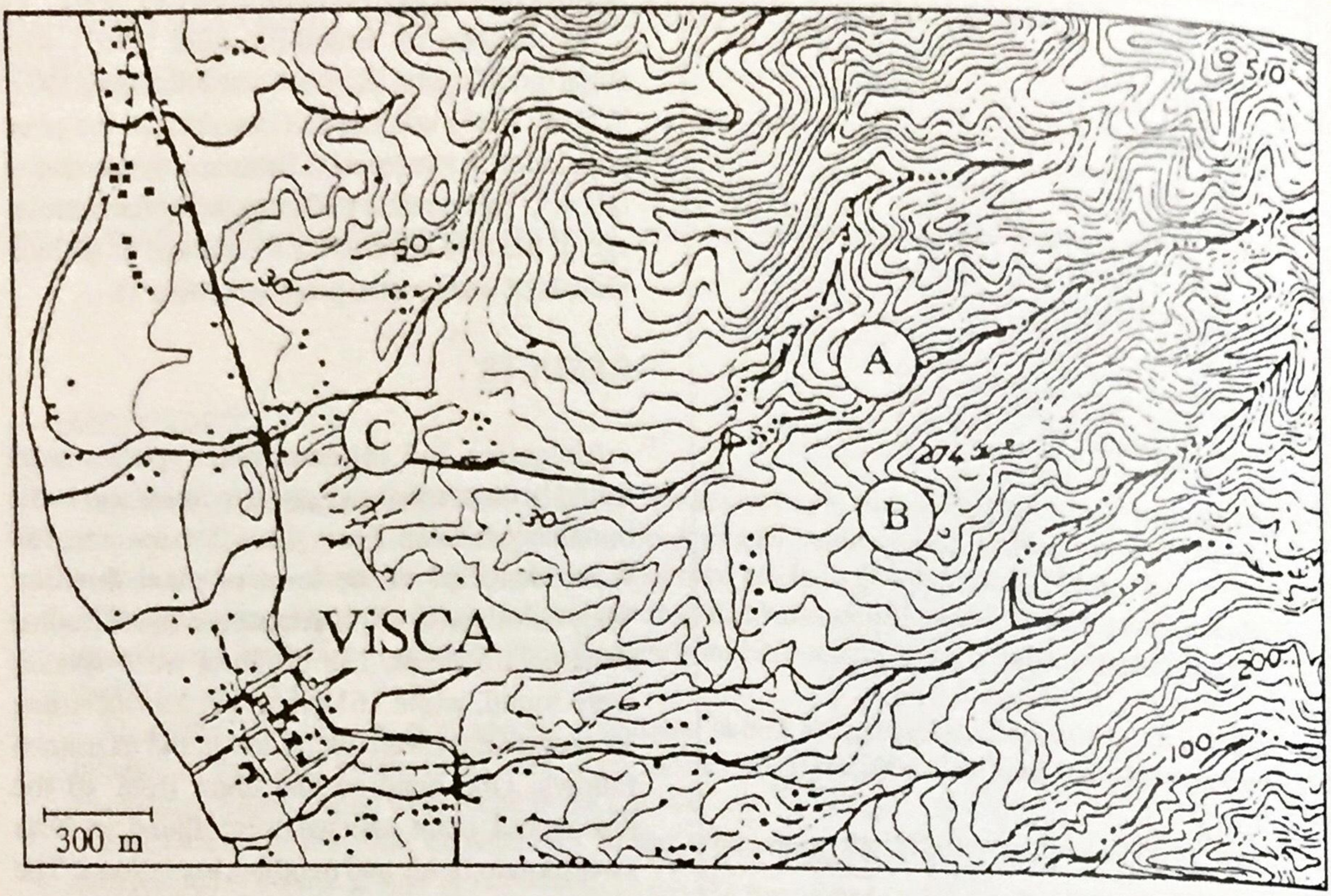

Figure 2. Location of the three sites where the research was done.

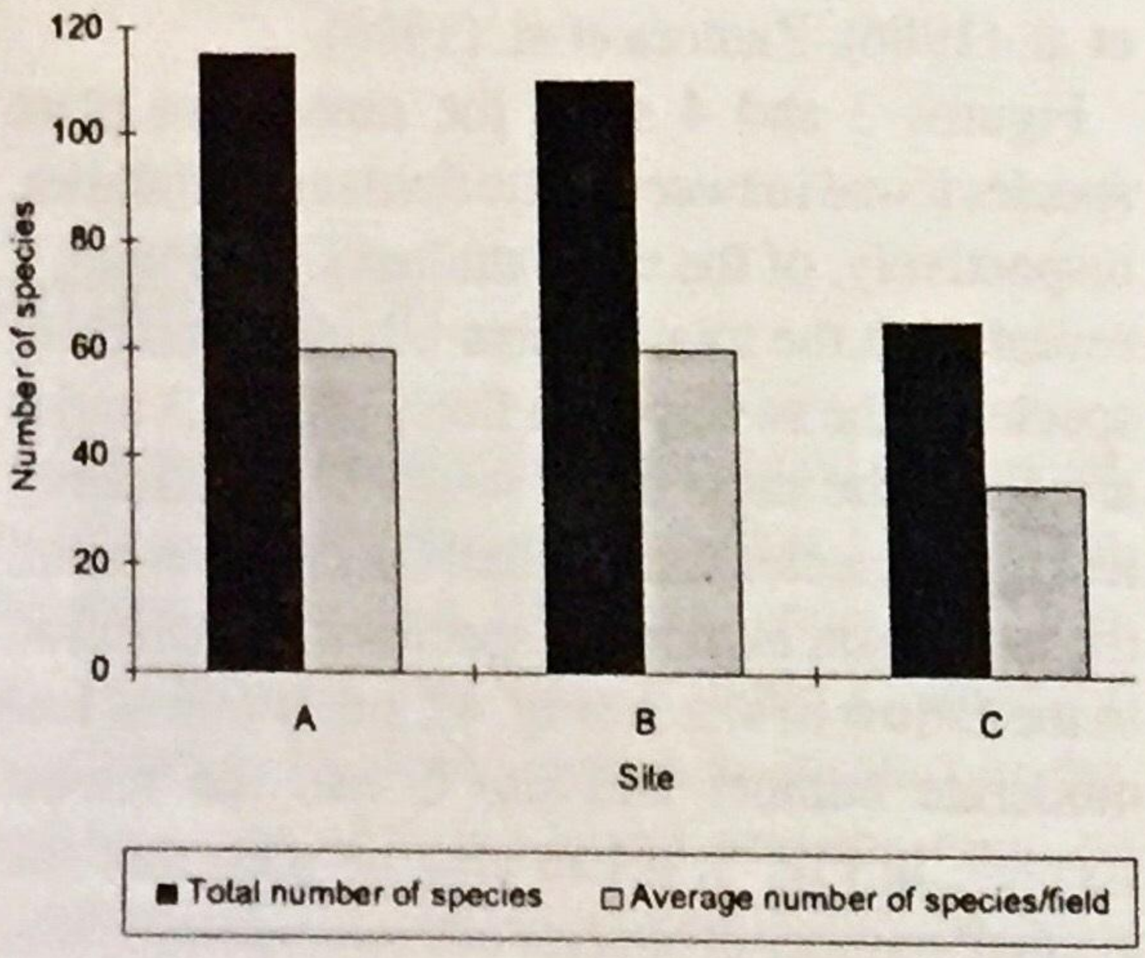

Figure 3. Number of species found in sweetpotato fields of the three sites studied.

about 70% of the total number of species of this site, and in site C about 60%.

Figure 5 shows the families with the most number species. Poaceae and Moraceae are the two families with the maximum number of species. Sixteen per cent of all registered plant species belonged to these two families. Fourteen other families were represented with at least four species. From the remaining 47 families, five are represented with three species, 11 with two species and 31 with only one species.

The plant species found were summarized to six different groups of vegetation to characterize the plant communities in the three sites. The findings are represented in Figs. 6 and 7. In sites B and C, the herbaceous plants comprise majority of all species. Numerous woody plant species were mainly found in sites A and B.

Table 1. Table used to estimate the area covered by the plant foliage. (Modified after the method of Braun-blanquet).

Symbol		Covered Area (%)
r	rare, with only few individuals	0.1
x	few individuals with sparsely covered area	0.5
1	numerous, but covered area less than 5%	2.5
2a	covered area 5 - 15%	10.0
2b	covered area 15-25%	20.0
3	covered area 25-50%	37.5
4	covered area 50-75%	62.5
5	covered area 75-100%	87.5

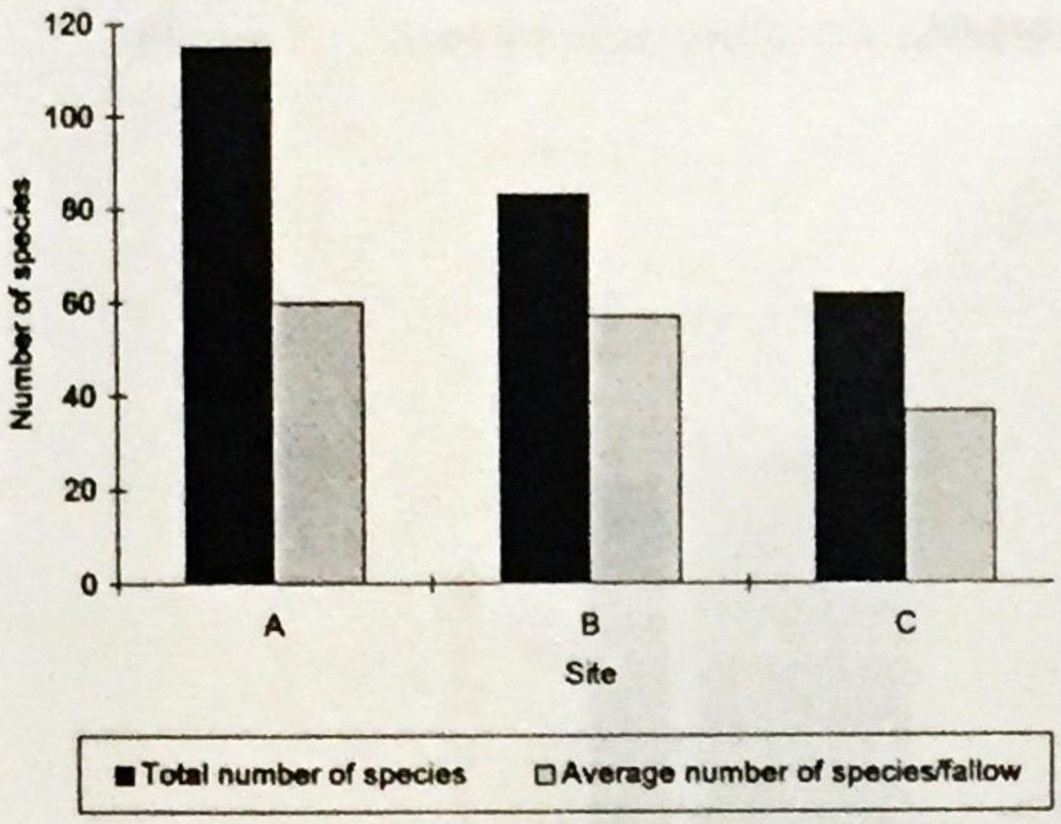

Figure 4. Number of plant species found in fallows of the three sites studied.

When the species were classified into monocots, dicots and pteridophytes, the dicots were dominant in all cases (Fig. 8 and 9).

Three different indices of similarity (Kreeb, 1983) were calculated for the species registered in sweetpotato fields (Fig. 2). Results of these calculations showed that sites A and B are the most similar. The fewest similarities between theplant communities of site A and C were calculated. The similarities between the plant communities of the three sites are also shown in Figure 10.

Figure 11 presents the similarities in plant communities of the fallows in the three sites. The highest number of common species was found in sites A and B. Due to this supposedly both these sites are the most similar. The least similarities was found in sites A and C. Comparison of sites B and C ranks in the middle.

Table 2 Comparison of indices of similarity for the species observed in three sites of sweetpotato fields.

Index of Similarity according to		Comparison of the three sites		
		A & B	A & C	B & C
Jaccard	Gp (%)	52.42	29.41	31.62
Gleason	Gm (%)	86.13	66.07	74.78
Spatz	Gs (%)	11.11	6.61	7.80

More than half of the species were noted in both sweetpotato fields and the bordering fallows (Fig. 12). In sites A and C, the number of species found in the sweetpotato fields is approximately the same as in the fallows. In site B, there are more species in the sweetpotato field than in the bordering fallows.

The most important species were *Ageratum conyzoides, Cyrtococcum acrrescens, Stachytarpheta jamaicensis, Elephantopus tomentosus, Lygodium flexuosum* and *Mikania cordata.* These species were observed in the sweetpotato fields of all three sites but their

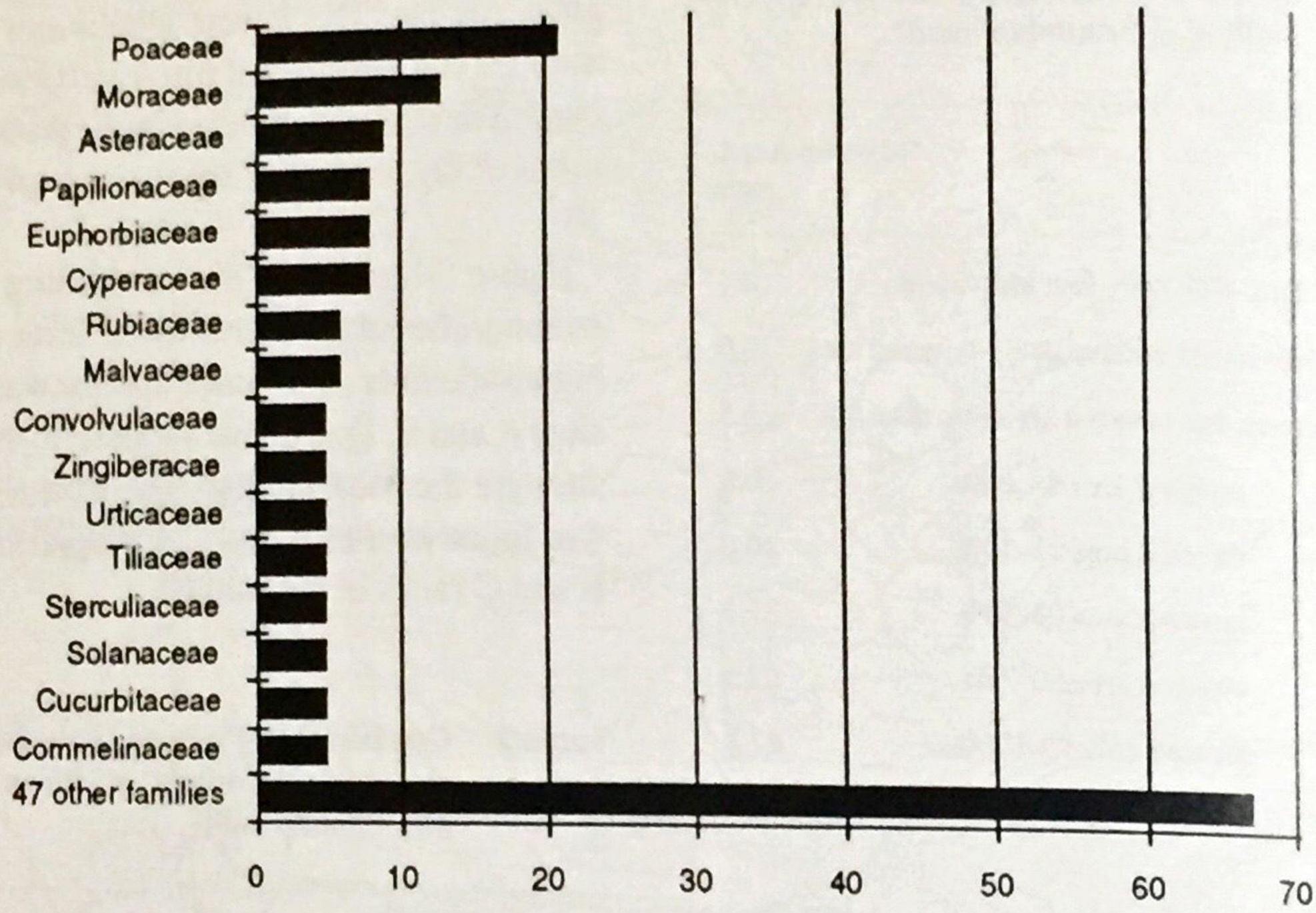

Figure 5. Families with the most number of species.

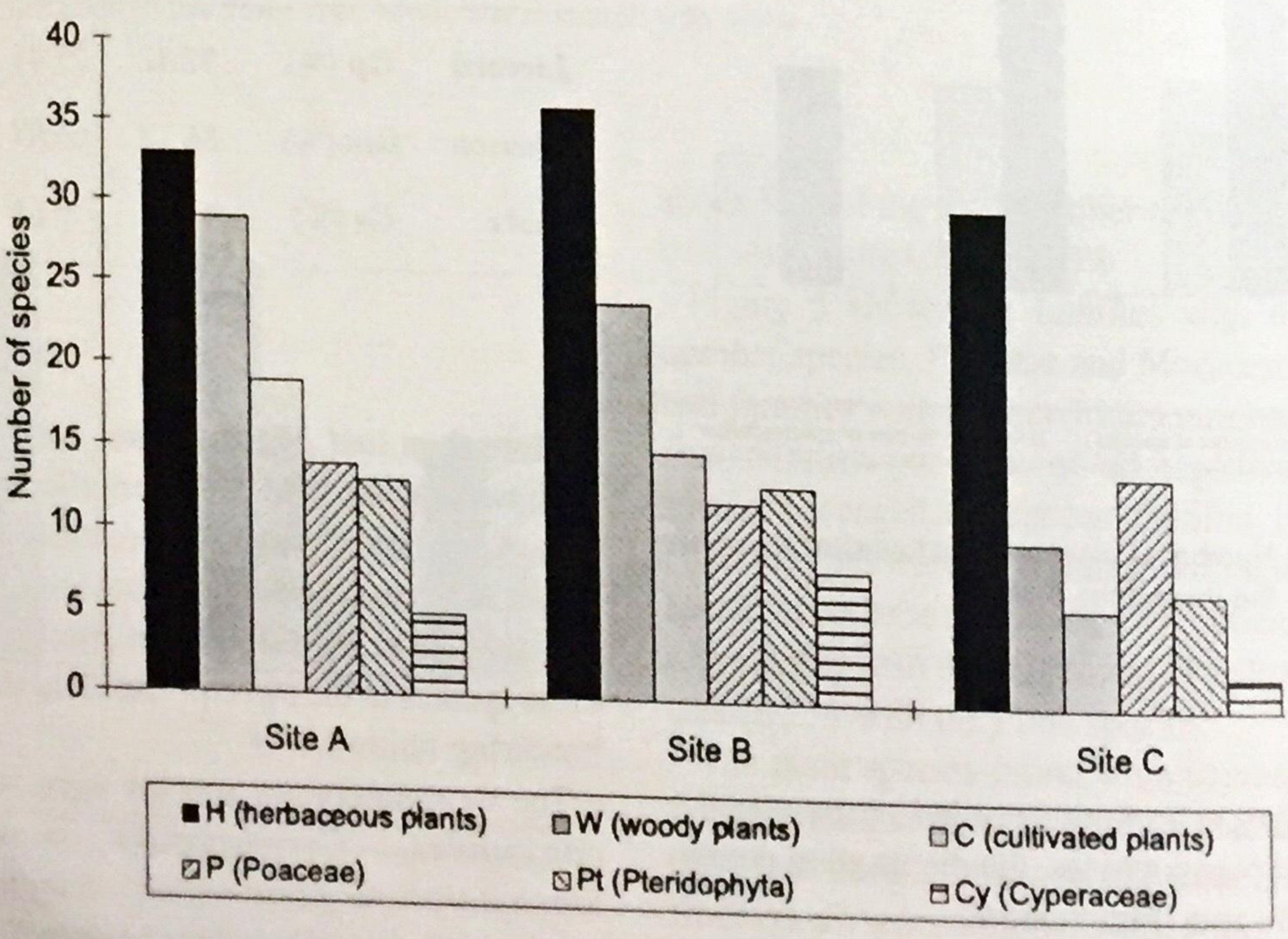

Figure 6. Species observed in sweetpotato fields classified into six different groups of vegetation.

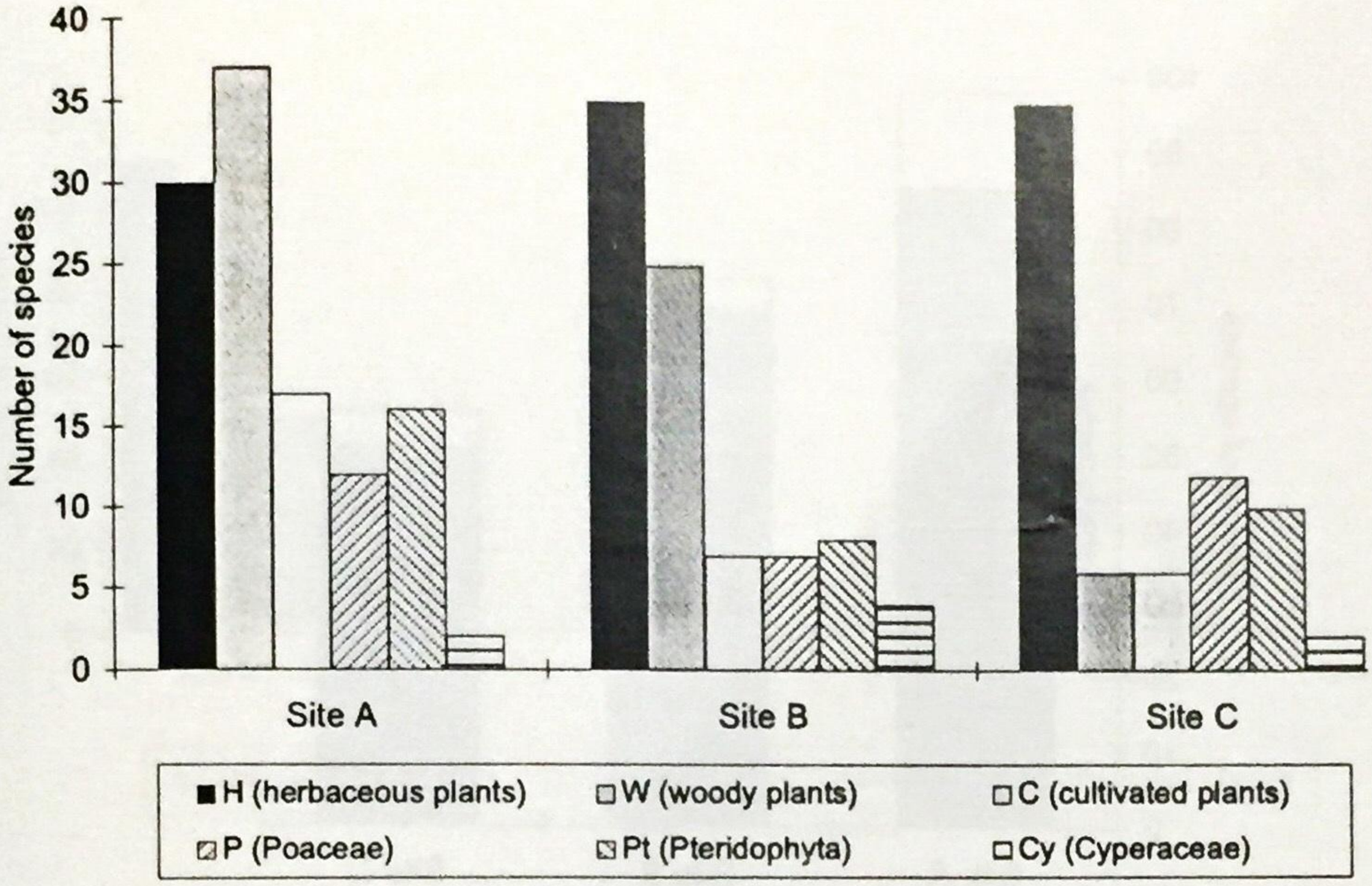

Figure 7. Species observed in fallows classified into six different groups of vegetation.

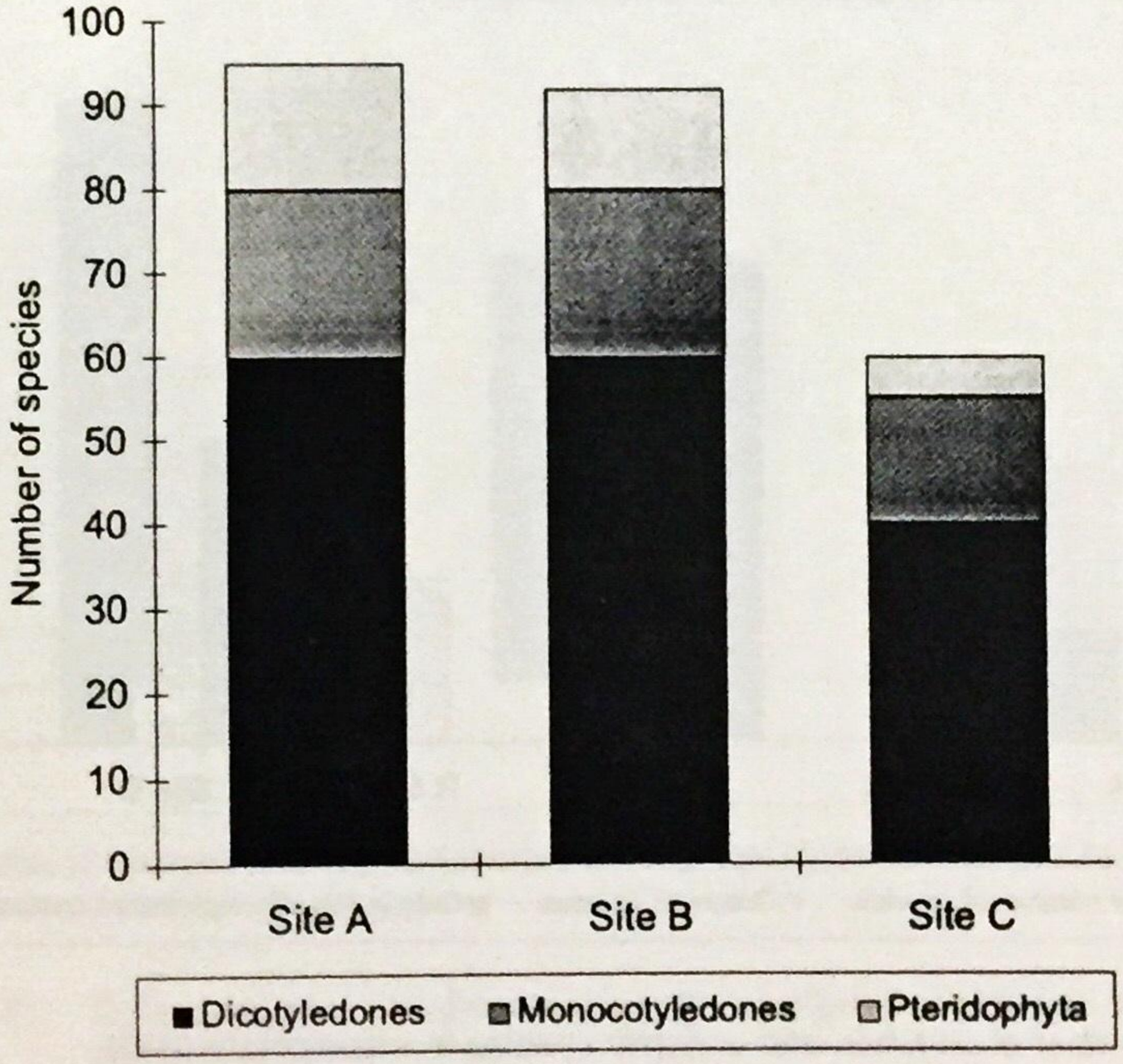

Figure 8. Species found in sweet potato fields classified in to monocotyledons, dicotyledons and pteridophytes.

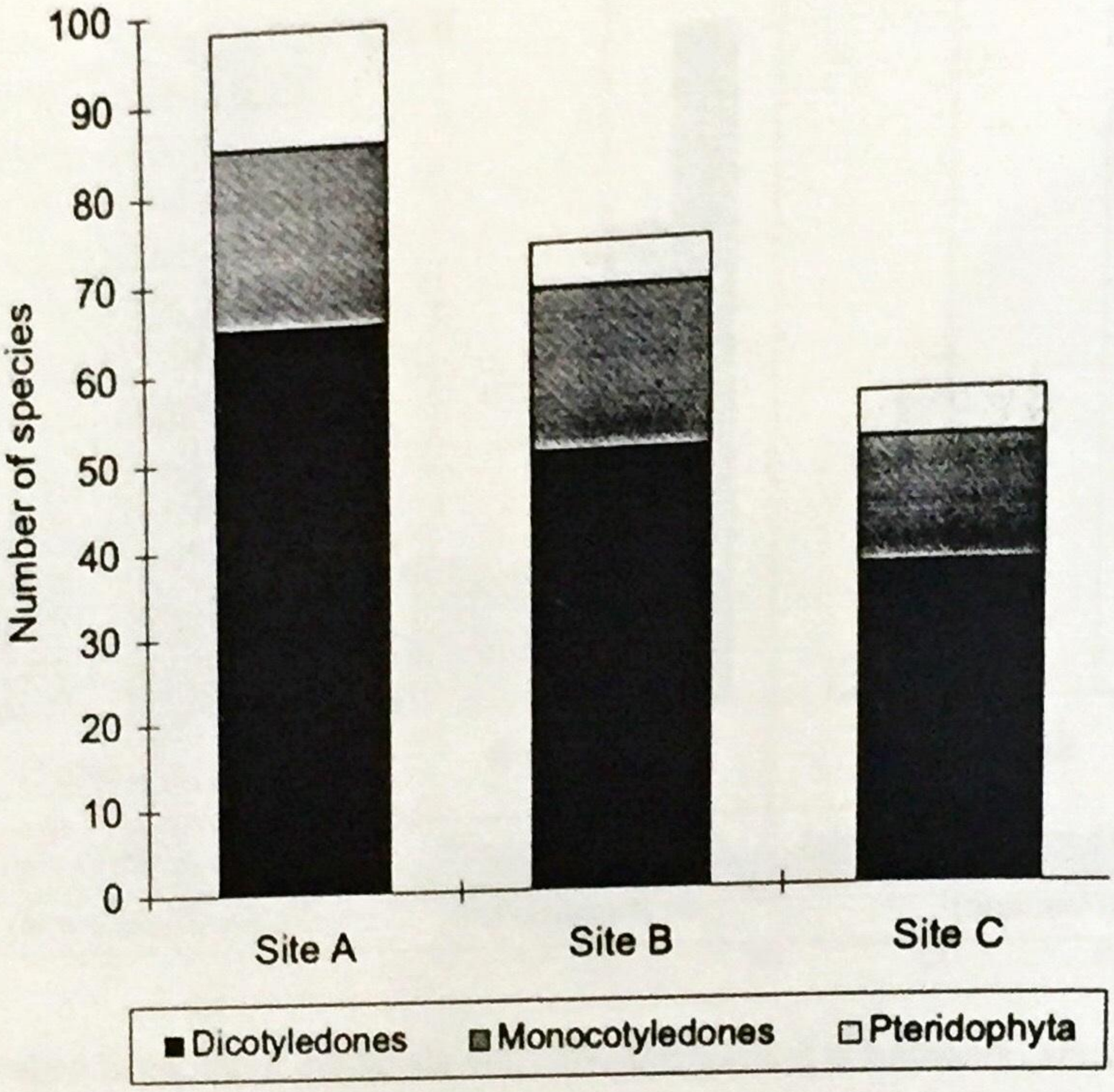

Figure 9. Species found in fallows classified into monocotyledons, dicotyledons and pteridophytes.

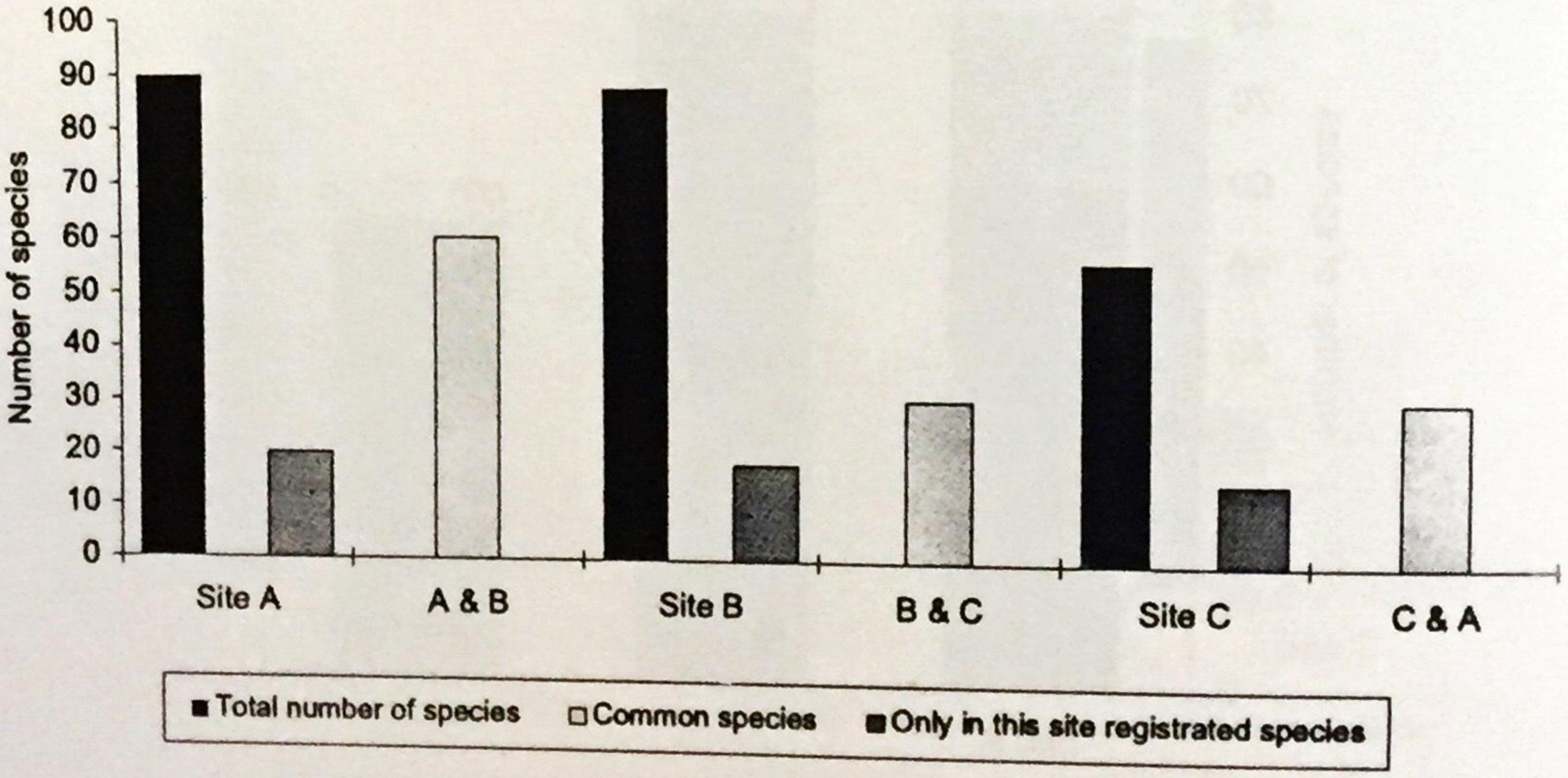

Figure 10. Number of common and endemic species in sweetpotato fields.

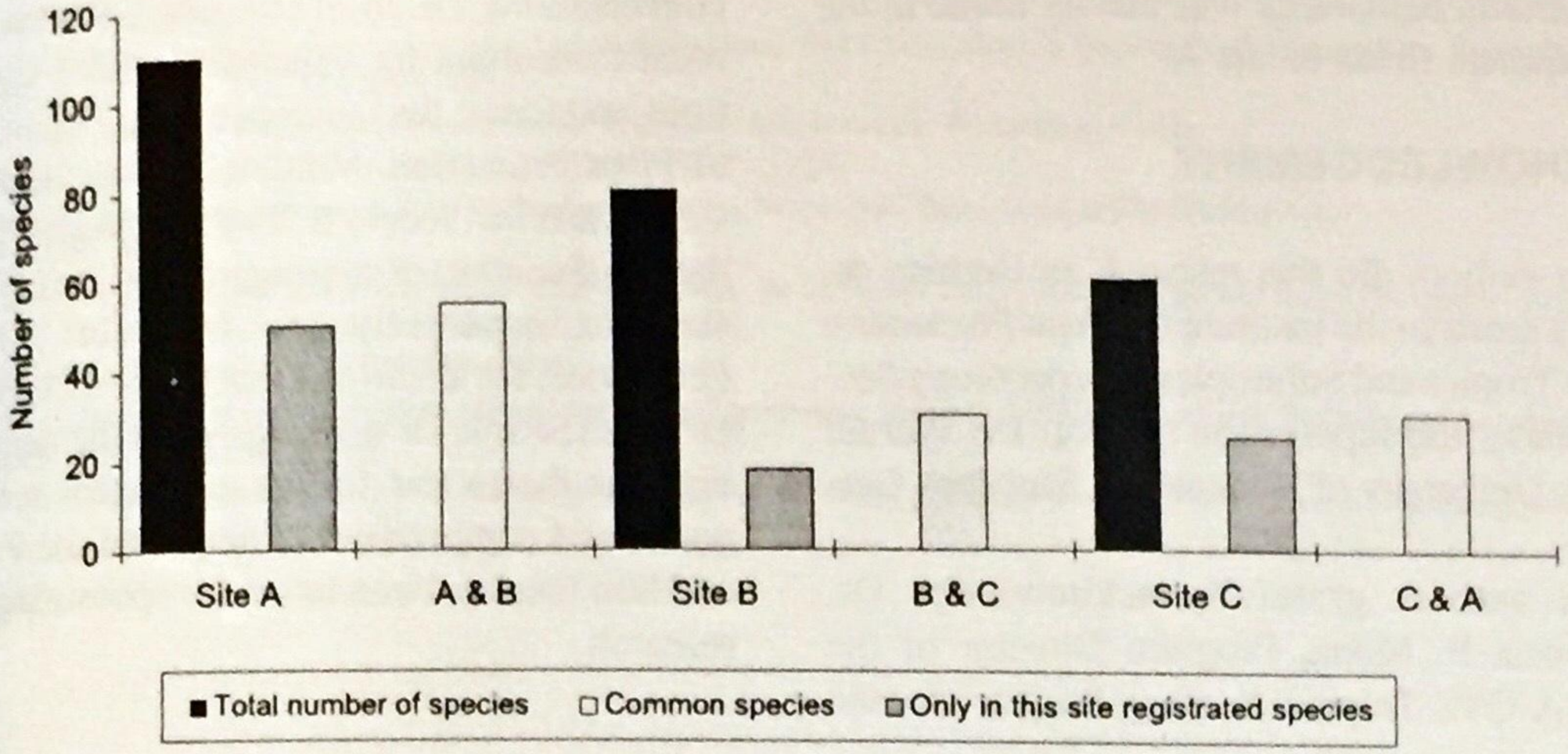

Figure 11. Number of common and endemic species in fallows.

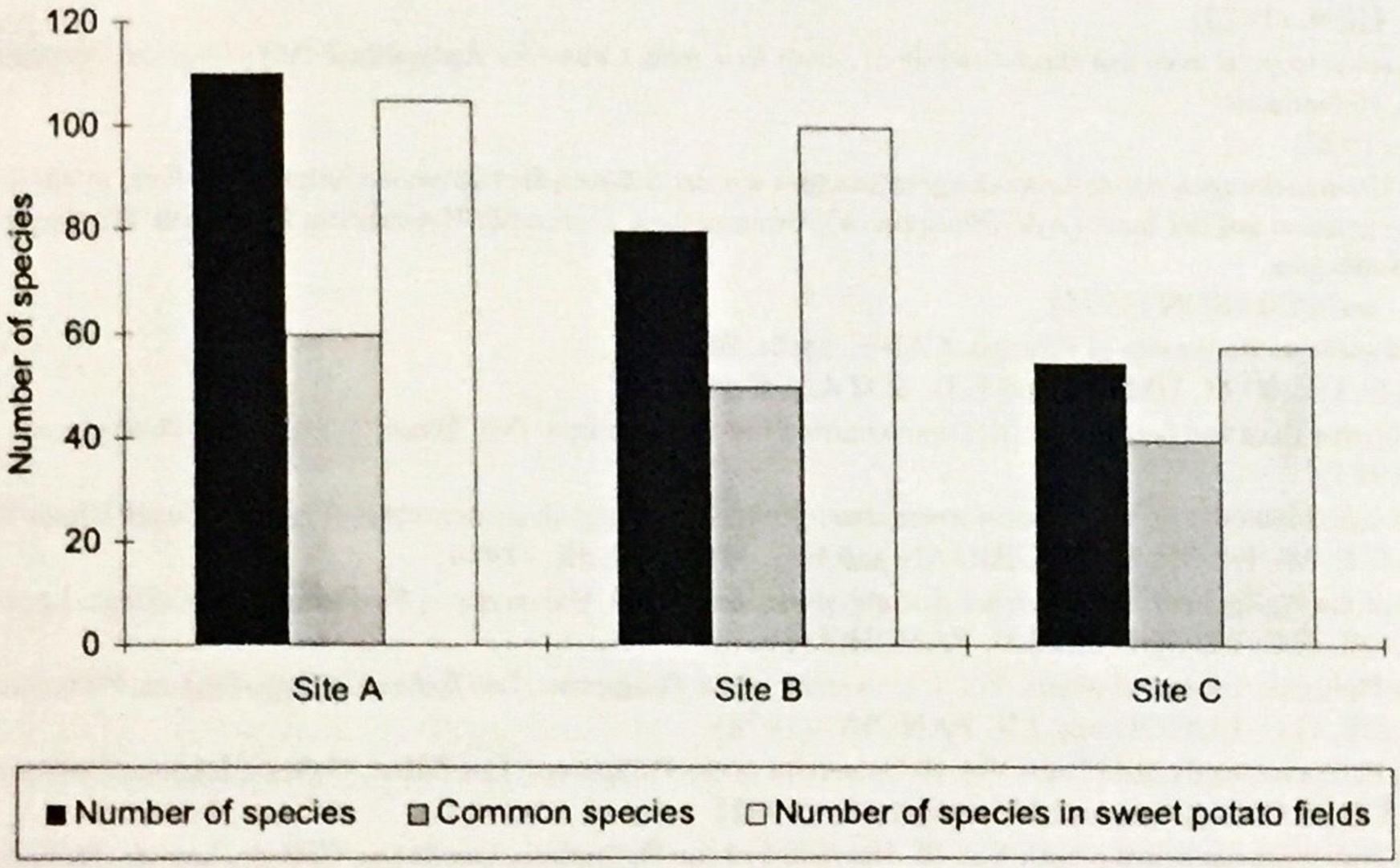

Figure 12. Species commonly observed in both sweetpotato fields and bordering fallows.

importance 2 (covered area and steadiness) were different in each site. Another important species (*Peperonia pellucida*), was mainly found in the sweetpotato fields of site A.

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