

## The Secondary Vegetation of the Burned Area of a Mountain in Dangji-Dong

Kim, Woen

(Dept. of Biology, College of Natural Sciences, Kyungpook National University)

### 唐池洞의 山火跡地의 二次植生

金 源

(慶北大學校 自然科學大學 生物學科)

#### ABSTRACT

This report is a series of the investigation of the secondary vegetation and succession at the forest fire area in Dangji-Dong of Kyungsang-pookdo province. The forest fires occurred on April 8, 1982. This investigation was carried out from June 18, 1982 to May 29, 1983 once in each season. Before to fires, the *Pinus densiflora* was dominant and the woody plants of understory were mainly composed of the *Quercus serrata*, *Q. dentata*, *Lespedeza maritima* and *L. maximowiczii*. Compared with the floristic composition between the unburned and burned areas after the fires, the floristic composition of unburned area comprises: 79 families, 194 genera, 223 species, 26 varieties and 6 formae (255 kinds of vascular plants), and that of burned area: 62 families, 146 genera, 168 species, 16 varieties, 6 formae and 1 subsp. (191 kinds of vascular plants). The index of similarity shows 0.77 (Sørensen: 1948) in this area. The analyses of the life-form compositions in the unburned and burned area show 32.9 % and 29.3 % in dormancy form (H), 42.4 % and 37.7 % in disseminule form (D<sub>1</sub>), 80.8 % and 82.2 % in radicaid form (R<sub>5</sub>), and 57.7 % and 61.8 % in erect form (e) respectively. The biological type shows H-D<sub>1</sub>-R<sub>5</sub>-e, which is common in both areas, and erect form is generally prevailing in these communities.

#### INTRODUCTION

The secondary vegetation occurs after the logging, abandoned field, land clearing and forest fires. Ingram (1931), Isaac(1940), Dyrness(1965, 1973), Bailey(1966) and Steen(1966) reported on the secondary vegetation and succession after the forest fires. In Korea, Hirao (1941), Kim(1978), Lee and Lee(1979), Kim(1980), Lee (1980), Kim *et al.*(1981), Park and Kim(1981), Kang and Lee(1982), and Cho and Kim(1983) reported on the secondary vegetation, succession and recovery after the forest fires.

This is the first report of a series of the investigations of the secondary vegetation and succession in the forest fire area. The forest fires occurred on April 8, 1982 and

approximately seventy-five hectares of the forest was burned by the fires. The forests were composed of the *Pinus densiflora* and the woody plants of the understory were mainly composed of the *Quercus serrata*, *Q. dentata*, *Lespedeza maritima*, and *L. maximowiczii*. The forests and its floor vegetations were entirely burned down by the severe crown fires. This survey was carried out from June 18, 1982 to May 29, 1983 once in each season. This is a report on the secondary vegetation at the year of fires.

#### TOPOGRAPHY

The investigated area is located in Dangji-dong, Hwasan-Myun, Yeongchun-Gun, Kyungsang-pookdo province in Korea(Fig. 1). The elevation in this area is

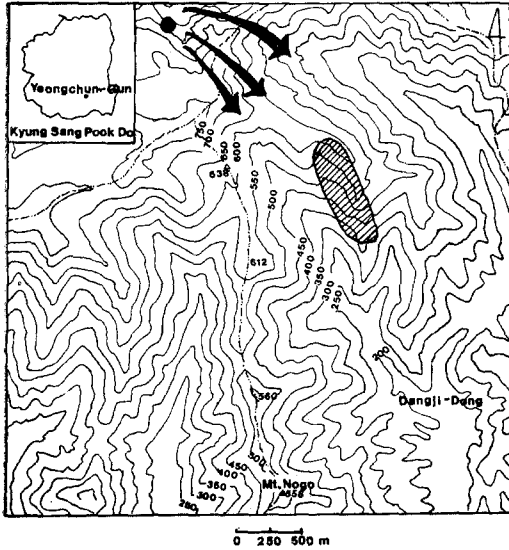


Fig. 1. A map of investigated area (marked) in mountains of Dangji-dong area, Hwasan-myun, Yeongchun-gun of Kyung-sang-pookdo province.

approximately 500 meters, with west-facing slope angles of 30°. The bedrocks are composed of Hwasan-Formation, which consists of mainly black to dark gray shale. The litter and humified layer did not develop, and then the soil conditions are generally infertile in this area. But the vegetations are comparatively diverse and flourishing after the fires.

## RESULTS AND DISCUSSION

The vegetation of the early stage after fires at the year of fires, floristic composition and life-form composition were shown in Table 1.

The floristic composition of the unburned area comprises: 79 families, 194 genera, 223 species, 26 varieties and 6 formae (225 kinds of vascular plants), and that of the early stage in the burned area comprises: 62 families, 146 genera, 168 species, 16 varieties, 6 formae and 1 subsp. (191 kinds of vascular plants). The index of similarity shows 0.77 (Sørensen) in this area, the value of

Table 1. Floristic composition and life-form composition of unburned (U) and burned area (B), CS: common species in both areas

| Scientific name  | U | B | CS | Life form | D | R | G |
|--|---|---|----|-----------|---|---|---|
| <b>Selaginellaceae</b>                                   |   |   |    |           |   |   |   |
| <i>Selaginella tamariscina</i> Spring                    | 0 | 0 | 0  | H         | 1 | 5 | r |
| <b>Equisetaceae</b>                                      |   |   |    |           |   |   |   |
| <i>Equisetum arvense</i> L.                              | 0 | 0 | 0  | G         | 1 | 3 | e |
| <b>Pteridaceae</b>                                       |   |   |    |           |   |   |   |
| <i>Asplenium sarelii</i> Hooker                          | 0 | 0 | 0  | G         | 1 | 3 | e |
| <i>Pteridium aquilinum</i> Kuhn                          | 0 | 0 | 0  | H         | 1 | 3 | e |
| <b>Aspidiaceae</b>                                       |   |   |    |           |   |   |   |
| <i>Athyrium nipponicum</i> Hance                         | 0 | 0 | 0  | H         | 1 | 3 | e |
| <b>Pinaceae</b>  |   |   |    |           |   |   |   |
| <i>Pinus densiflora</i> Sieb. et Zucc.                   | 0 | — | —  | M         | 1 | 5 | e |
| <b>Cupressaceae</b>                                      |   |   |    |           |   |   |   |
| <i>Juniperus rigida</i> Sieb. et Zucc.                   | 0 | 0 | 0  | M         | 1 | 5 | e |
| <b>Gramineae</b>   |   |   |    |           |   |   |   |
| <i>Achnatherum pekinensis</i> Ohwi                       | 0 | 0 | 0  | H         | 1 | 5 | t |
| <i>Agropyron tsukusinense</i> var. <i>transiens</i> Ohwi | 0 | — | —  | Th        | 1 | 5 | t |
| <i>Alopecurus aequalis</i> Sobol.                        | 0 | — | —  | Th        | 1 | 5 | t |
| <i>Andropogon brevifolius</i> Swartz                     | 0 | — | —  | Th        | 1 | 5 | t |
| <i>Arthraxon hispidus</i> Makino                         | 0 | 0 | 0  | Th        | 1 | 5 | t |
| <i>Arundinella hirta</i> C. Tanaka                       | 0 | 0 | 0  | H         | 1 | 3 | t |

|  |   |   |   |    |   |   |   |
|--|---|---|---|----|---|---|---|
| <i>Bothriochloa parviflora</i> Ohwi                              | 0 | 0 | 0 | H  | 1 | 5 | t |
| <i>Bromus japonicus</i> Thunb.                                   | 0 | — | — | Th | 1 | 5 | t |
| <i>Calamagrostis epigeios</i> Roth                               | 0 | — | — | H  | 1 | 5 | t |
| <i>Cymbopogon tortilis</i> Hitchc.                               | 0 | — | — | H  | 1 | 3 | t |
| <i>Digitaria sanguinalis</i> Scopoli                             | 0 | 0 | 0 | Th | 1 | 5 | t |
| <i>Eragrostis ferruginea</i> Beauvois                            | 0 | — | — | H  | 1 | 3 | t |
| <i>Eriochloa villosa</i> Kunth                                   | 0 | 0 | 0 | Th | 1 | 5 | t |
| <i>Festuca ovina</i> L.  | 0 | 0 | 0 | H  | 1 | 4 | t |
| <i>Festuca ovina</i> var. <i>koreanoalpine</i> Ohwi              | 0 | — | — | H  | 1 | 4 | t |
| <i>Imperata cylindrica</i> var. <i>koenigii</i> Durand et Schinz | 0 | — | — | H  | 1 | 3 | t |
| <i>Miscanthus sinensis</i> var. <i>purpurascens</i> Rendle       | 0 | 0 | 0 | H  | 1 | 3 | t |
| <i>Olismenus undulatifolius</i> P. De Beauv.                     | 0 | — | — | H  | 1 | 4 | t |
| <i>Pennisetum alopecuroides</i> Spreng.                          | 0 | 0 | 0 | H  | 1 | 5 | t |
| <i>Phragmites japonica</i> Steud.                                | 0 | 0 | 0 | G  | 1 | 3 | t |
| <i>Poa sphondylodes</i> Trin.                                    | 0 | 0 | 0 | H  | 1 | 5 | t |
| <i>Setaria pumila</i> Roem. et Schult.                           | 0 | — | — | Th | 1 | 5 | t |
| <i>Setaria viridis</i> P. De Beauv.                              | 0 | 0 | 0 | Th | 1 | 5 | t |
| <i>Spodiopogon sibiricus</i> Trin.                               | 0 | 0 | 0 | H  | 1 | 3 | t |
| <i>Themeda japonica</i> Tanaka                                   | 0 | 0 | 0 | H  | 1 | 5 | e |
| <b>Cyperaceae</b>  |   |   |   |    |   |   |   |
| <i>Carex breviculmis</i> R. Br.                                  | 0 | — | — | H  | 1 | 3 | t |
| <i>Carex dispalata</i> Boott                                     | 0 | — | — | H  | 1 | 3 | t |
| <i>Carex humilis</i> var. <i>nana</i> Ohwi                       | 0 | 0 | 0 | H  | 1 | 5 | t |
| <i>Carex neurocarpa</i> Maxim.                                   | 0 | — | — | H  | 1 | 5 | t |
| <i>Carex siderostica</i> Hance                                   | 0 | 0 | 0 | H  | 1 | 3 | r |
| <i>Cyperus iria</i> L.   | 0 | — | — | Th | 1 | 5 | t |
| <i>Cyperus microiria</i> Steud.                                  | 0 | — | — | Th | 1 | 5 | t |
| <i>Scirpus karuizawensis</i> Makino                              | 0 | — | — | H  | 1 | 5 | e |
| <b>Commelinaceae</b>   |   |   |   |    |   |   |   |
| <i>Commelina communis</i> L.                                     | 0 | 0 | 0 | Th | 4 | 5 | e |
| <b>Juncaceae</b>   |   |   |   |    |   |   |   |
| <i>Juncus effusus</i> var. <i>decipiens</i> Buchen.              | 0 | — | — | H  | 4 | 3 | t |
| <b>Liliaceae</b>   |   |   |   |    |   |   |   |
| <i>Asparagus oligoclonos</i> Maxim.                              | 0 | — | — | G  | 4 | 5 | e |
| <i>Hemerocallis aurantiaca</i> Baker                             | 0 | 0 | 0 | G  | 3 | 5 | r |
| <i>Lilium amabile</i> Palibin                                    | 0 | 0 | 0 | G  | 3 | 5 | e |
| <i>Lilium lancifolium</i> Thunb.                                 | 0 | 0 | 0 | G  | 3 | 5 | e |
| <i>Polygonatum odoratum</i> Druce                                | 0 | 0 | 0 | G  | 4 | 3 | e |
| <i>Smilax china</i> L.   | 0 | 0 | 0 | N  | 2 | 5 | 1 |
| <i>Smilax nipponica</i> Miq.                                     | 0 | 0 | 0 | G  | 4 | 5 | e |
| <i>Smilax sieboldii</i> Miq.                                     | — | 0 | — | N  | 2 | 5 | 1 |
| <i>Smilax sieboldii</i> var. <i>inermis</i> Nakai                | — | 0 | — | N  | 2 | 5 | 1 |
| <b>Dioscoreaceae</b>   |   |   |   |    |   |   |   |
| <i>Dioscorea batatas</i> Decisne                                 | 0 | 0 | 0 | G  | 1 | 5 | 1 |
| <i>Dioscorea quinqueloba</i> Thunb.                              | 0 | 0 | 0 | G  | 1 | 5 | 1 |
| <b>Iridaceae</b>   |   |   |   |    |   |   |   |

|   |   |   |   |    |   |   |   |
|---|---|---|---|----|---|---|---|
| <i>Iris rossii</i> Baker                                  | 0 | 0 | 0 | G  | 3 | 3 | e |
| <b>Orchidaceae</b>  |   |   |   |    |   |   |   |
| <i>Spiranthes sinensis</i> Ames                           | — | 0 | — | G  | 4 | 5 | e |
| <b>Saliaceae</b>  |   |   |   |    |   |   |   |
| <i>Salix gracilistyla</i> Miq.                            | 0 | — | — | N  | 1 | 5 | e |
| <i>Salix hulteni</i> Floderus                             | 0 | — | — | M  | 1 | 5 | e |
| <b>Juglandaceae</b>                                       |   |   |   |    |   |   |   |
| <i>Platycarya strobilacea</i> Sieb. et Zucc.              | — | 0 | — | M  | 1 | 5 | e |
| <b>Betulaceae</b>   |   |   |   |    |   |   |   |
| <i>Alnus hirsta</i> var. <i>sibirica</i> C. K. Schneider  | 0 | 0 | 0 | M  | 1 | 5 | e |
| <i>Corylus heterophylla</i> var. <i>thunbergii</i> Blume  | 0 | 0 | 0 | M  | 1 | 5 | e |
| <b>Fagaceae</b>   |   |   |   |    |   |   |   |
| <i>Quercus dentata</i> Thunb.                             | 0 | 0 | 0 | M  | 4 | 5 | e |
| <i>Quercus mongolica</i> Fischer                          | 0 | 0 | 0 | M  | 4 | 5 | e |
| <i>Quercus serrata</i> Thunb.                             | 0 | 0 | 0 | M  | 4 | 5 | e |
| <i>Quercus varibilis</i> Blume                            | 0 | 0 | 0 | M  | 4 | 5 | e |
| <b>Moraceae</b>   |   |   |   |    |   |   |   |
| <i>Broussonetia kazinoki</i> Sieb.                        | 0 | — | — | M  | 2 | 5 | e |
| <i>Morus bombycis</i> f. <i>dissecta</i> Nakai            | 0 | — | — | M  | 2 | 5 | e |
| <b>Ulmaceae</b>   |   |   |   |    |   |   |   |
| <i>Celtis sinensis</i> var. <i>japonica</i> Nakai         | 0 | 0 | 0 | M  | 2 | 5 | e |
| <i>Ulmus davidiana</i> var. <i>japonica</i> Nakai         | 0 | 0 | 0 | M  | 1 | 5 | e |
| <i>Ulmus davidiana</i> f. <i>suberosa</i> Nakai           | — | 0 | — | M  | 1 | 5 | e |
| <i>Zelkova serrata</i> Makino                             | 0 | 0 | 0 | M  | 1 | 5 | e |
| <b>Cannabinaceae</b>                                      |   |   |   |    |   |   |   |
| <i>Humulus japonica</i> Sieb. et Zucc.                    | 0 | 0 | 0 | Th | 4 | 5 | l |
| <b>Urticaceae</b>   |   |   |   |    |   |   |   |
| <i>Boehmeria holoserisea</i> Blume                        | 0 | — | — | H  | 4 | 5 | e |
| <i>Boehmeria japonica</i> Miq.                            | 0 | 0 | 0 | H  | 4 | 5 | e |
| <b>Aristolochiaceae</b>                                   |   |   |   |    |   |   |   |
| <i>Aristolochia contorta</i> Bunge                        | 0 | — | — | H  | 1 | 5 | l |
| <b>Poligonaceae</b>                                       |   |   |   |    |   |   |   |
| <i>Polygonum aviculare</i> L.                             | 0 | 0 | 0 | Th | 4 | 5 | b |
| <i>Polygonum caespitosum</i> Blume                        | 0 | — | — | Th | 4 | 5 | b |
| <i>Polygonum senticosum</i> Fr. et Sav.                   | 0 | 0 | 0 | Th | 1 | 5 | l |
| <i>Polygonum sieboldi</i> Maxim.                          | 0 | — | — | Th | 4 | 5 | p |
| <i>Polygonum thunbergii</i> Sieb. et Zucc.                | 0 | — | — | Th | 4 | 5 | p |
| <i>Polygonum thunbergii</i> var. <i>stolonifera</i> Nakai | 0 | — | — | Th | 4 | 5 | p |
| <b>Chenopodiaceae</b>                                     |   |   |   |    |   |   |   |
| <i>Chenopodium album</i> var. <i>centrorubrum</i> Makino  | 0 | — | — | Th | 4 | 5 | e |
| <b>Amaranthaceae</b>                                      |   |   |   |    |   |   |   |
| <i>Achyranthes japonica</i> Nakai                         | 0 | — | — | H  | 4 | 5 | e |
| <i>Amaranthus retroflexus</i> L.                          | 0 | — | — | Th | 4 | 5 | e |
| <b>Portulacaceae</b>                                      |   |   |   |    |   |   |   |
| <i>Portulaca oleracea</i> L.                              | 0 | — | — | Th | 4 | 5 | b |
| <b>Caryophyllaceae</b>                                    |   |   |   |    |   |   |   |

|  |   |   |   |    |   |   |    |
|--|---|---|---|----|---|---|----|
| <i>Dianthus chinensis</i> L.                                 | 0 | 0 | 0 | H  | 1 | 5 | e  |
| <i>Dianthus superbus</i> var. <i>longicalycinus</i> Williams | 0 | — | — | H  | 1 | 5 | e  |
| <i>Melandryum firmum</i> Rohrbach                            | 0 | 0 | 0 | Th | 1 | 5 | e  |
| <i>Stellaria aquatica</i> Scopoli                            | 0 | — | — | H  | 1 | 5 | b  |
| <b>Ranunculaceae</b>   |   |   |   |    |   |   |    |
| <i>Clematis apiifolia</i> DC.                                | 0 | 0 | 0 | N  | 1 | 5 | 1  |
| <i>Clematis mandshurica</i> Maxim.                           | 0 | 0 | 0 | N  | 1 | 5 | 1  |
| <i>Pulsatilla koreana</i> Nakai ex Mori                      | 0 | 0 | 0 | G  | 1 | 5 | e  |
| <i>Ranunculus tachiroei</i> Fr. et Sav.                      | 0 | — | — | Th | 1 | 5 | e  |
| <i>Thalictrum aquilegifolium</i> L.                          | 0 | 0 | 0 | G  | 1 | 5 | e  |
| <b>Lardizabalaceae</b>                                       |   |   |   |    |   |   |    |
| <i>Akebia quinata</i> Decne.                                 | 0 | 0 | 0 | N  | 2 | 5 | 1  |
| <b>Menispermaceae</b>  |   |   |   |    |   |   |    |
| <i>Cocculus trilobus</i> DC.                                 | 0 | 0 | 0 | N  | 2 | 5 | 1  |
| <b>Lauraceae</b>   |   |   |   |    |   |   |    |
| <i>Benzoin obtusiloba</i> Blume                              | 0 | 0 | 0 | M  | 2 | 5 | e  |
| <i>Lindera erythrocarpa</i> Maxim.                           | 0 | 0 | 0 | M  | 2 | 5 | e  |
| <i>Lindera glauca</i> Blume                                  | 0 | 0 | 0 | M  | 2 | 5 | e  |
| <b>Papaveraceae</b>  |   |   |   |    |   |   |    |
| <i>Chelidonium majus</i> L.                                  | 0 | — | — | Th | 4 | 5 | pr |
| <b>Fumariaceae</b>   |   |   |   |    |   |   |    |
| <i>Corydalis speciosa</i> Maxim.                             | 0 | — | — | Th | 3 | 5 | e  |
| <b>Cruciferae</b>  |   |   |   |    |   |   |    |
| <i>Arabis glabra</i> Bernh.                                  | 0 | — | — | Th | 3 | 5 | e  |
| <i>Capsella brusa-pastoris</i> Medik.                        | 0 | — | — | Th | 3 | 5 | pr |
| <i>Drabra nemorosa</i> var. <i>hebecarpa</i> Lindbl.         | 0 | — | — | Th | 3 | 5 | pr |
| <i>Lepidium micranthum</i> Ledebour.                         | 0 | 0 | 0 | Th | 3 | 5 | e  |
| <i>Rorippa atrovirens</i> Ohwi et Hara                       | 0 | — | — | H  | 4 | 5 | pr |
| <i>Rorippa islandica</i> Borbas                              | 0 | — | — | H  | 4 | 5 | pr |
| <i>Thlaspi arvense</i> L.                                    | 0 | — | — | Th | 1 | 5 | e  |
| <b>Crassulaceae</b>  |   |   |   |    |   |   |    |
| <i>Sedum kamtschaticum</i> Fisch.                            | 0 | 0 | 0 | H  | 4 | 3 | e  |
| <i>Sedum sarmentosum</i> Bunge                               | 0 | — | — | H  | 4 | 4 | e  |
| <b>Saxifragaceae</b>   |   |   |   |    |   |   |    |
| <i>Astilbe chinensis</i> Fr.                                 | 0 | 0 | 0 | H  | 4 | 3 | e  |
| <i>Deutzia parviflora</i> Bunge                              | 0 | 0 | 0 | N  | 4 | 5 | e  |
| <i>Philadelphus tenuifolius</i> Ruprecht                     | 0 | 0 | 0 | N  | 4 | 5 | e  |
| <b>Rosaceae</b>  |   |   |   |    |   |   |    |
| <i>Agrimonia pillosa</i> Ledebour                            | 0 | 0 | 0 | H  | 2 | 3 | e  |
| <i>Duchesnea indica</i> Focke                                | 0 | 0 | 0 | H  | 2 | 4 | p  |
| <i>Geum aleppicum</i> Jacquin                                | 0 | 0 | 0 | H  | 2 | 5 | pr |
| <i>Potentilla chinensis</i> Seringe                          | 0 | 0 | 0 | H  | 4 | 5 | e  |
| <i>Potentilla discolor</i> Bunge                             | 0 | 0 | 0 | H  | 4 | 5 | e  |
| <i>Rosa multiflora</i> Thunb.                                | 0 | 0 | 0 | N  | 2 | 5 | e  |
| <i>Rosa wichurata</i> Crep.                                  | 0 | 0 | 0 | N  | 2 | 5 | 1  |
| <i>Rubus corenus</i> Miq.                                    | 0 | 0 | 0 | N  | 2 | 5 | e  |

|   |   |   |   |    |   |   |    |
|---|---|---|---|----|---|---|----|
| <i>Rubus crataegifolius</i> Bunge                           | 0 | 0 | 0 | N  | 2 | 5 | e  |
| <i>Rubus parvifolius</i> L.                                 | 0 | 0 | 0 | N  | 2 | 5 | 1  |
| <i>Rubus pungens</i> var. <i>oldhami</i> Maxim.             | 0 | 0 | 0 | N  | 2 | 5 | 1  |
| <i>Sanguisorba officinalis</i> L.                           | 0 | 0 | 0 | H  | 4 | 5 | pr |
| <i>Sorbus alnifolia</i> C. Koch                             | 0 | 0 | 0 | M  | 4 | 5 | e  |
| <i>Spiracea prunifolia</i> f. <i>simpliciflora</i> Nakai    | 0 | 0 | 0 | N  | 4 | 5 | e  |
| <i>Stephanandra incisa</i> Zabel                            | 0 | 0 | 0 | N  | 4 | 5 | e  |
| <b>Leguminosae</b>  |   |   |   |    |   |   |    |
| <i>Aeschynomene indica</i> L.                               | 0 | 0 | 0 | Th | 4 | 5 | e  |
| <i>Albizia julibrissin</i> Durazzini                        | 0 | 0 | 0 | M  | 3 | 5 | e  |
| <i>Amphicarpaea edgeworthii</i> var. <i>japonica</i> Oliver | 0 | 0 | 0 | Th | 3 | 5 | 1  |
| <i>Cassia nomame</i> Honda                                  | 0 | 0 | 0 | Th | 3 | 5 | e  |
| <i>Desmodium racemosum</i> DC.                              | — | 0 | — | G  | 2 | 5 | e  |
| <i>Indigofera kirilowii</i> Maxim.                          | 0 | 0 | 0 | N  | 3 | 5 | e  |
| <i>Kummerowia striata</i> Schindler                         | 0 | 0 | 0 | Th | 3 | 5 | e  |
| <i>Lespedeza cyrtobotrya</i> Miq.                           | 0 | 0 | 0 | N  | 3 | 5 | e  |
| <i>Lespedeza intermedia</i> var. <i>retusa</i> Nakai        | — | 0 | — | N  | 3 | 5 | e  |
| <i>Lespedeza juncea</i> Pers.                               | 0 | 0 | 0 | Ch | 3 | 5 | e  |
| <i>Lespedeza maritima</i> Nakai                             | — | 0 | — | N  | 3 | 5 | e  |
| <i>Lespedeza maximowiczii</i> C. K. Schneider               | 0 | 0 | 0 | N  | 3 | 5 | e  |
| <i>Lespedeza tomentosa</i> Sieb. et Maxim.                  | 0 | 0 | 0 | Ch | 3 | 5 | e  |
| <i>Lespedeza vigata</i> DC.                                 | 0 | 0 | 0 | N  | 3 | 5 | e  |
| <i>Maackia amurensis</i> Rupr. et Max.                      | 0 | 0 | 0 | M  | 3 | 5 | e  |
| <i>Medicago sativa</i> L.                                   | 0 | — | — | Th | 3 | 5 | e  |
| <i>Purearia lobata</i> Ohwi                                 | 0 | 0 | 0 | M  | 3 | 5 | 1  |
| <i>Robinia pseudo-acacia</i> L.                             | 0 | 0 | 0 | M  | 3 | 5 | e  |
| <i>Sophora flavescens</i> Aiton                             | 0 | 0 | 0 | H  | 3 | 5 | e  |
| <i>Trifolium repens</i> L.                                  | 0 | — | — | Ch | 3 | 5 | e  |
| <i>Vicia amoena</i> Fischer                                 | 0 | 0 | 0 | H  | 3 | 5 | 1  |
| <i>Vicia amurensis</i> Oettingen                            | — | 0 | — | G  | 3 | 5 | 1  |
| <i>Vicia japonica</i> A. Gray                               | — | 0 | — | G  | 3 | 5 | 1  |
| <b>Geraniaceae</b>  |   |   |   |    |   |   |    |
| <i>Geranium sibiricum</i> L.                                | 0 | — | — | H  | 3 | 5 | e  |
| <b>Oxalidaceae</b>  |   |   |   |    |   |   |    |
| <i>Oxalis corniculata</i> L.                                | 0 | 0 | 0 | G  | 3 | 5 | e  |
| <i>Oxalis corniculata</i> f. <i>erecta</i> Makino           | 0 | 0 | 0 | G  | 3 | 5 | e  |
| <b>Rutaceae</b>   |   |   |   |    |   |   |    |
| <i>Dictamnus albus</i> L.                                   | 0 | 0 | 0 | H  | 4 | 5 | e  |
| <i>Zanthoxylum schinifolium</i> Sieb. et Zucc.              | 0 | 0 | 0 | N  | 4 | 5 | e  |
| <b>Simaroubaceae</b>  |   |   |   |    |   |   |    |
| <i>Picrasma quassioides</i> Bennett                         | 0 | 0 | 0 | M  | 4 | 5 | e  |
| <b>Polygalaceae</b>   |   |   |   |    |   |   |    |
| <i>Polygala japonica</i> Houttuyn                           | 0 | 0 | 0 | G  | 1 | 5 | b  |
| <b>Euphorbiaceae</b>  |   |   |   |    |   |   |    |
| <i>Acalypha australis</i> L.                                | 0 | 0 | 0 | Th | 4 | 5 | b  |
| <i>Euphorbia sieboldiana</i> Morr. et DC.                   | 0 | — | — | G  | 3 | 5 | e  |

|  |   |   |   |    |   |   |    |
|--|---|---|---|----|---|---|----|
| <i>Phyllanthus ussuriensis</i> Rupr. et Maxim.                         | — | 0 | — | Th | 3 | 5 | e  |
| <i>Securinega suffruticosa</i> Rehder                                  | 0 | 0 | 0 | N  | 3 | 5 | e  |
| <b>Anacardiaceae</b>   |   |   |   |    |   |   |    |
| <i>Rhus javanica</i> Miller  | 0 | 0 | 0 | M  | 4 | 5 | e  |
| <i>Rhus trichocarpa</i> Miq.   | 0 | 0 | 0 | M  | 4 | 5 | e  |
| <b>Celastraceae</b>  |   |   |   |    |   |   |    |
| <i>Celastrus orbiculatus</i> Thunb.                                    | 0 | 0 | 0 | M  | 3 | 5 | l  |
| <i>Euonymus alatus</i> f. <i>subtriflorus</i> Ohwi                     | 0 | 0 | 0 | N  | 4 | 5 | e  |
| <b>Staphyleaceae</b>   |   |   |   |    |   |   |    |
| <i>Euscaphis japonica</i> Kanitz                                       | 0 | 0 | 0 | N  | 1 | 5 | e  |
| <b>Aceraceae</b>   |   |   |   |    |   |   |    |
| <i>Acer japonicum</i> Thunb.   | 0 | — | — | M  | 1 | 5 | e  |
| <i>Acer mono</i> Maxim.  | 0 | — | — | M  | 1 | 5 | e  |
| <b>Balsaminaceae</b>   |   |   |   |    |   |   |    |
| <i>Impatiens textori</i> Miq.  | 0 | — | — | Th | 3 | 5 | e  |
| <b>Rhamnaceae</b>  |   |   |   |    |   |   |    |
| <i>Rhamnus davurica</i> Pallas   | 0 | 0 | 0 | M  | 2 | 5 | e  |
| <b>Vitaceae</b>  |   |   |   |    |   |   |    |
| <i>Parthenocissus tricuspidata</i> Planch.                             | 0 | 0 | 0 | M  | 2 | 5 | l  |
| <i>Vitis brevipedunculata</i> Trautvetter                              | 0 | 0 | 0 | M  | 2 | 5 | l  |
| <i>Vitis flexuosa</i> Thunb.   | 0 | 0 | 0 | M  | 2 | 5 | l  |
| <i>Vitis thunbergii</i> var. <i>sinuata</i> Rehder                     | 0 | 0 | 0 | M  | 2 | 5 | l  |
| <b>Tiliaceae</b>   |   |   |   |    |   |   |    |
| <i>Corchoropsis psilocarpa</i> Harms et Loesner                        | 0 | 0 | 0 | Th | 3 | 5 | e  |
| <b>Malvaceae</b>   |   |   |   |    |   |   |    |
| <i>Hibiscus trionum</i> L.   | 0 | 0 | 0 | Th | 4 | 5 | e  |
| <b>Actinidiaceae</b>   |   |   |   |    |   |   |    |
| <i>Actinidia arguta</i> Planch. et Miq.                                | 0 | 0 | 0 | M  | 2 | 5 | l  |
| <b>Hypericaceae</b>  |   |   |   |    |   |   |    |
| <i>Hypericum ascyron</i> L.  | 0 | 0 | 0 | H  | 3 | 5 | e  |
| <b>Violaceae</b>   |   |   |   |    |   |   |    |
| <i>Viola chaerophylloides</i> W. Becker                                | — | 0 | — | H  | 3 | 5 | r  |
| <i>Viola mandshurica</i> W. Becker                                     | 0 | 0 | 0 | H  | 3 | 5 | r  |
| <b>Elaeagnaceae</b>  |   |   |   |    |   |   |    |
| <i>Elaeagnus umbellata</i> Thunb.                                      | 0 | 0 | 0 | N  | 2 | 5 | e  |
| <b>Araliaceae</b>  |   |   |   |    |   |   |    |
| <i>Aralia elata</i> Seeman   | 0 | 0 | 0 | N  | 2 | 5 | e  |
| <b>Onagraceae</b>  |   |   |   |    |   |   |    |
| <i>Circaea mollis</i> Sieb. et Zucc.                                   | 0 | — | — | H  | 2 | 5 | e  |
| <i>Epilobium pyrriholophum</i> var. <i>pyrriholophum</i> Fr. et Savat. | 0 | — | — | H  | 1 | 5 | e  |
| <i>Oenothera odorata</i> Jaquin  | 0 | — | — | H  | 1 | 5 | pr |
| <b>Umbelliferaceae</b>   |   |   |   |    |   |   |    |
| <i>Angelica decursiva</i> Fr. et Savat.                                | 0 | 0 | 0 | H  | 1 | 5 | e  |
| <i>Bupleurum falcatum</i> L.   | — | 0 | — | H  | 4 | 5 | e  |
| <i>Peucedanum terebinthaceum</i> Fisch. ex Turz.                       | 0 | 0 | 0 | H  | 1 | 5 | b  |

|   |   |   |   |    |   |   |   |
|---|---|---|---|----|---|---|---|
| <b>Cornaceae</b>  |   |   |   |    |   |   |   |
| <i>Cornus coreana</i> Wangerin                              | 0 | — | — | M  | 2 | 5 | e |
| <b>Pyrolaceae</b>   |   |   |   |    |   |   |   |
| <i>Pyrola japonica</i> Klenze                               | — | 0 | — | H  | 1 | 5 | r |
| <b>Ericaceae</b>  |   |   |   |    |   |   |   |
| <i>Rhododendron mucronulatum</i> var. <i>ciliatum</i> Nakai | 0 | 0 | 0 | N  | 3 | 5 | b |
| <i>Rhododendron schlippenbachii</i> Maxim.                  | 0 | 0 | 0 | N  | 3 | 5 | b |
| <b>Primulaceae</b>  |   |   |   |    |   |   |   |
| <i>Lysimachia clethroides</i> Duby                          | 0 | 0 | 0 | G  | 4 | 3 | e |
| <b>Symplocaceae</b>   |   |   |   |    |   |   |   |
| <i>Symplocos chinensis</i> f. <i>pilosa</i> Ohwi            | 0 | 0 | 0 | N  | 4 | 5 | e |
| <b>Oleaceae</b>   |   |   |   |    |   |   |   |
| <i>Fraxinus rhynchophylla</i> Hance                         | 0 | 0 | 0 | M  | 1 | 5 | e |
| <i>Fraxinus sieboldiana</i> Blume                           | 0 | 0 | 0 | M  | 1 | 5 | e |
| <i>Ligustrum obtusifolium</i> Sieb. et Zucc.                | 0 | 0 | 0 | N  | 2 | 5 | e |
| <b>Gentianaceae</b>   |   |   |   |    |   |   |   |
| <i>Gentiana scabra</i> var. <i>buergeri</i> Maxim.          | 0 | 0 | 0 | G  | 4 | 5 | e |
| <b>Asclepiadaceae</b>                                       |   |   |   |    |   |   |   |
| <i>Cynanchum paniculatum</i> Kitakawa                       | 0 | 0 | 0 | G  | 1 | 5 | e |
| <i>Metaplexis japonica</i> Makino                           | 0 | 0 | 0 | G  | 1 | 3 | 1 |
| <b>Verbenaceae</b>  |   |   |   |    |   |   |   |
| <i>Callicarpa japonica</i> Thunb.                           | 0 | 0 | 0 | N  | 2 | 5 | e |
| <i>Caryopteris divaricata</i> Maxim.                        | 0 | 0 | 0 | H  | 4 | 5 | e |
| <i>Clerodendron trichotomum</i> Thunb.                      | 0 | 0 | 0 | M  | 2 | 5 | e |
| <b>Convolvulaceae</b>                                       |   |   |   |    |   |   |   |
| <i>Calystegia japonica</i> Choisy                           | 0 | — | — | G  | 5 | 3 | 1 |
| <i>Cuscuta japonica</i> Choisy                              | — | 0 | — | Th | 4 | 5 | 1 |
| <b>Labiatae</b>   |   |   |   |    |   |   |   |
| <i>Clinopodium chinense</i> O. Kuntze                       | 0 | 0 | 0 | H  | 4 | 5 | e |
| <i>Elscholtzia ciliata</i> Hylander                         | 0 | — | — | Th | 1 | 5 | b |
| <i>Isodon inflexus</i> var. <i>macrophyllus</i> Kudo        | 0 | 0 | 0 | G  | 4 | 3 | e |
| <i>Lamium album</i> var. <i>barbatum</i> Fr. et Savat.      | 0 | — | — | H  | 4 | 5 | e |
| <i>Lamium amplexicaule</i> L.                               | 0 | — | — | Th | 4 | 5 | e |
| <i>Prunella vulgaris</i> var. <i>lilacina</i> Nakai         | 0 | 0 | 0 | H  | 4 | 5 | e |
| <i>Orthodon punctulatum</i> Ohwi                            | 0 | — | — | Th | 4 | 5 | e |
| <i>Salvia plebeia</i> R. Brown                              | 0 | — | — | H  | 4 | 5 | e |
| <i>Scutellaria indica</i> L.                                | 0 | 0 | 0 | Th | 4 | 5 | e |
| <b>Solanaceae</b>   |   |   |   |    |   |   |   |
| <i>Solanum lyranthum</i> Thunb.                             | 0 | — | — | N  | 2 | 5 | 1 |
| <i>Solanum nigrum</i> L.                                    | 0 | 0 | 0 | Th | 2 | 5 | e |
| <b>Scrophulariaceae</b>                                     |   |   |   |    |   |   |   |
| <i>Melampyrum roseum</i> Maxim.                             | 0 | 0 | 0 | Th | 1 | 5 | b |
| <i>Phtheirospermum japonicum</i> Kanitz.                    | 0 | 0 | 0 | H  | 3 | 5 | e |
| <b>Phrymaceae</b>   |   |   |   |    |   |   |   |
| <i>Phryma leptostachys</i> var. <i>asiatica</i> Hara        | 0 | 0 | 0 | G  | 2 | 3 | e |
| <b>Plantaginaceae</b>                                       |   |   |   |    |   |   |   |



|  |   |   |   |    |   |   |    |
|--|---|---|---|----|---|---|----|
| <i>Plantago asiatica</i> L.                                    | 0 | 0 | 0 | H  | 3 | 3 | r  |
| <i>Plantago camtchatica</i> Cham.                              | 0 | — | — | H  | 3 | 3 | r  |
| <b>Rubiaceae</b>   |   |   |   |    |   |   |    |
| <i>Galium spurium</i> var. <i>echinospermon</i> Hayek          | 0 | 0 | 0 | Th | 4 | 5 | l  |
| <i>Galium verum</i> var. <i>asiaticum</i> Nakai                | 0 | 0 | 0 | H  | 4 | 5 | e  |
| <i>Rubia akane</i> Nakai                                       | 0 | 0 | 0 | G  | 4 | 5 | l  |
| <b>Caprifoliaceae</b>  |   |   |   |    |   |   |    |
| <i>Lonicera japonica</i> Thunb.                                | 0 | 0 | 0 | N  | 2 | 3 | l  |
| <i>Weigela subsessilis</i> L. H. Bailey                        | 0 | — | — | N  | 3 | 5 | e  |
| <b>Valerianaceae</b>   |   |   |   |    |   |   |    |
| <i>Patrinia scabiosaefolia</i> Fisch.                          | 0 | 0 | 0 | H  | 4 | 3 | pr |
| <i>Patrinia villosa</i> Jussieu                                | 0 | 0 | 0 | H  | 1 | 5 | pr |
| <b>Cucurbitaceae</b>   |   |   |   |    |   |   |    |
| <i>Trichosanthes kirilowii</i> Maxim.                          | 0 | — | — | H  | 2 | 5 | l  |
| <b>Campanulaceae</b>   |   |   |   |    |   |   |    |
| <i>Adenophora radiatifolia</i> Fisch.                          | 0 | 0 | 0 | G  | 4 | 5 | e  |
| <i>Platycodon grandiflorum</i> A. DC.                          | 0 | 0 | 0 | G  | 3 | 5 | e  |
| <b>Compositae</b>  |   |   |   |    |   |   |    |
| <i>Ambrosia artemisiaefolia</i> var. <i>elatior</i> Descourtis | 0 | — | — | Th | 2 | 5 | e  |
| <i>Artemisia annua</i> L.                                      | 0 | 0 | 0 | Th | 1 | 5 | e  |
| <i>Artemisia capillaris</i> Thunb.                             | 0 | 0 | 0 | H  | 1 | 3 | e  |
| <i>Artemisia iwayomogi</i> Kitam.                              | 0 | 0 | 0 | N  | 1 | 3 | e  |
| <i>Artemisia japonica</i> Thunb.                               | 0 | 0 | 0 | H  | 1 | 5 | pr |
| <i>Artemisia keiskeana</i> Miq.                                | 0 | 0 | 0 | H  | 1 | 5 | e  |
| <i>Artemisia montana</i> Pampan.                               | 0 | 0 | 0 | H  | 1 | 3 | e  |
| <i>Artemisia princeps</i> Pampan.                              | 0 | 0 | 0 | H  | 1 | 3 | e  |
| <i>Artemisia stolonifera</i> Komarov                           | 0 | 0 | 0 | H  | 1 | 3 | e  |
| <i>Aster incisus</i> DC.                                       | 0 | 0 | 0 | G  | 1 | 3 | e  |
| <i>Aster scaber</i> Thunb.                                     | 0 | 0 | 0 | G  | 1 | 3 | e  |
| <i>Atractylodes japonica</i> Koidz. et Kitam.                  | 0 | 0 | 0 | G  | 1 | 3 | e  |
| <i>Bidens biternata</i> Merr. et Sherff                        | 0 | — | — | Th | 2 | 5 | e  |
| <i>Bidens parviflora</i> Willd.                                | — | 0 | — | Th | 2 | 5 | e  |
| <i>Bidens tripartita</i> L.                                    | 0 | — | — | Th | 2 | 5 | e  |
| <i>Carpesium divaricatum</i> Sieb. et Zucc.                    | 0 | — | — | G  | 2 | 3 | e  |
| <i>Carpesium macrocephalum</i> Fr. et Sav.                     | 0 | 0 | 0 | G  | 2 | 5 | e  |
| <i>Cephalanoplos segetum</i> Kitam.                            | 0 | — | — | Th | 1 | 3 | e  |
| <i>Chrysanthemum indicum</i> L.                                | 0 | 0 | 0 | H  | 1 | 5 | e  |
| <i>Chrysanthemum zawadskii</i> Herbich                         | 0 | 0 | 0 | H  | 1 | 5 | pr |
| <i>Cirsium maackii</i> Maxim.                                  | 0 | 0 | 0 | H  | 1 | 5 | pr |
| <i>Erigeron annuus</i> Pers.                                   | 0 | 0 | 0 | Th | 1 | 5 | pr |
| <i>Erigeron canadensis</i> L.                                  | 0 | — | — | Th | 1 | 5 | pr |
| <i>Eupatorium chinense</i> f. <i>tripartitum</i> Hara          | 0 | — | — | G  | 1 | 3 | e  |
| <i>Eupatorium lindleyanum</i> DC.                              | 0 | 0 | 0 | G  | 1 | 3 | e  |
| <i>Gnaphalium affine</i> D. Don                                | 0 | 0 | 0 | Th | 1 | 5 | b  |
| <i>Hemistepta lyrata</i> Bunge                                 | 0 | 0 | 0 | H  | 1 | 5 | pr |
| <i>Hieracium umbellatum</i> var. <i>japonica</i> Hara          | 0 | — | — | H  | 1 | 3 | e  |

|  |     |     |     |    |   |   |    |
|--|-----|-----|-----|----|---|---|----|
| <i>Ixeris chinensis</i> Nakai                            | 0   | 0   | 0   | H  | 1 | 3 | pr |
| <i>Ixeris sonchifolia</i> Hance                          | 0   | 0   | 0   | H  | 1 | 5 | pr |
| <i>Lactuca indica</i> var. <i>laciniata</i> Hara         | 0   | —   | —   | Th | 1 | 5 | pr |
| <i>Leibnitzia anandria</i> Nakai                         | 0   | 0   | 0   | H  | 1 | 5 | r  |
| <i>Paraixeris denticulata</i> Nakai                      | 0   | 0   | 0   | Th | 1 | 5 | e  |
| <i>Rhapontica uniflora</i> DC.                           | 0   | —   | —   | H  | 1 | 5 | e  |
| <i>Senecio pteriti</i> Miq.                              | 0   | —   | —   | H  | 1 | 5 | pr |
| <i>Serratula coronata</i> subsp. <i>insularis</i> Kitam. | —   | 0   | —   | H  | 1 | 5 | e  |
| <i>Solidago japonica</i> Kitam.                          | 0   | 0   | 0   | G  | 1 | 3 | pr |
| <i>Sonchus asper</i> Hill                                | 0   | —   | —   | Th | 1 | 5 | pr |
| <i>Sonchus oleraceus</i> L.                              | 0   | —   | —   | Th | 1 | 5 | pr |
| <i>Syneilesis palmata</i> Maxim.                         | —   | 0   | —   | Th | 1 | 5 | e  |
| <i>Taraxacum platycarpum</i> Dahlst.                     | 0   | —   | —   | H  | 1 | 5 | r  |
| <i>Xanthium strumarium</i> L.                            | 0   | —   | —   | Th | 2 | 5 | e  |
| <i>Youngia japonica</i> DC.                              | 0   | —   | —   | H  | 1 | 5 | pr |
| Total 274  | 255 | 191 | 172 |    |   |   |    |

which is similar to that of the fire area in Mt. Palgong. The analysis of the life-form composition in the unburned and burned area shows 32.9 % and 29.3 % in dormancy form(Hemicryptophyte: H), 42.4 % and 37.7 % in disseminule form(D<sub>1</sub>), 80.8 % and 82.2% in radicoid form(R<sub>3</sub>), and 57.7 % and 61.8 % in erect form (e), respectively. The biological spectra in the both area show H-D<sub>1</sub>-R<sub>3</sub>-e type, which is common in two areas, and erect form is generally prevailing in this area(Table 2,3), which is commonly similar to other areas(Mt. San-Seung and Mt. Palgong in Taegu, Chunchon area and the fire areas of Chung Buk area). After the fires, the woody plants of the early stage are mainly composed of: *Platycarpa strobilacea*, *Quercus dentata*, *Q. serrata*, *Lindera glauca*, *Rosa wichuraiana*, *Albizia juribrissin*,

*Lespedeza maritima*, *L. maximowiczii*, *Maackia amurensis*, *Robinia pseudo-acacia*, *Rhus javanica*, *Rhododendron mucronulatum* var. *ciliatum*, *R. schlippenbachii*, *Fraxinus rhynchophylla* and *F. sieboldiana*.

Except for the pine tree(*Pinus densiflora*), the other kinds could be again sprouted from both the root and the bole after some time, even though the severe crown fires went through. It seems that these kinds are the fire resistant species. The *Quercus serrata* and *Lespedeza maximowiczii* are dominant and generally prevailing in this area. The herbaceous plants are mainly composed of the *Spodiopogon sibiricus*, *Carex humilis* var. *nana*, *Miscanthus sinensis* var. *purpurascens* and *Themeda japonica*, where *Spodiopogon sibiricus* and *Carex humilis* var. *nana* are dominant.

Table 2. Life-form composition in the unburned (U) and burned area (B)

|   |                | Dormancy form |      |     |      |      |      | Migrule form     |                |                |                |                |                | Biological type |                |                                     |
|---|----------------|---------------|------|-----|------|------|------|------------------|----------------|----------------|----------------|----------------|----------------|-----------------|----------------|-------------------------------------|
|   |                | N             | M    | Ch  | H    | G    | Th   | Disseminule form |                |                |                |                | Radicoid form  |                 |                |                                     |
|   |                |               |      |     |      |      |      | D <sub>1</sub>   | D <sub>2</sub> | D <sub>3</sub> | D <sub>4</sub> | D <sub>5</sub> | R <sub>3</sub> |                 | R <sub>4</sub> | R <sub>5</sub>                      |
| U | No. of species | 35            | 38   | 3   | 84   | 35   | 60   | 108              | 42             | 43             | 61             | 1              | 44             | 5               | 206            | H-D <sub>1</sub> -R <sub>3</sub> -e |
|   | %              | 13.7          | 14.9 | 1.2 | 32.9 | 13.7 | 23.6 | 42.4             | 16.5           | 16.8           | 23.9           | 0.4            | 17.2           | 2.0             | 80.8           |                                     |
| B | No. of species | 36            | 33   | 2   | 56   | 35   | 29   | 72               | 35             | 38             | 46             |                | 32             | 2               | 157            | H-D <sub>1</sub> -R <sub>3</sub> -e |
|   | %              | 18.8          | 17.3 | 1.1 | 29.3 | 18.3 | 15.2 | 37.7             | 18.3           | 20.0           | 24.0           |                | 16.8           | 1.0             | 82.2           |                                     |

Notes: M: Mege- & Mesophanerophyte, N: Nanophanerophyte, Ch: Chamaephyte, H: Hemicryptophyte, G: Geophyte, Th: Therophyte.

Table 3. Growth form spectra in the unburned (U) and burned area(B)

|   | Growth form    | t    | b   | e    | r   | pr  | p   | l    |
|---|----------------|------|-----|------|-----|-----|-----|------|
| U | No. of species | 31   | 12  | 147  | 8   | 24  | 4   | 29   |
|   | %              | 12.2 | 4.7 | 57.7 | 3.1 | 9.4 | 1.5 | 11.4 |
| B | No. of species | 14   | 8   | 118  | 8   | 12  | 1   | 30   |
|   | %              | 7.3  | 4.2 | 61.8 | 4.2 | 6.3 | 0.5 | 15.7 |

Notes: t: tufted growth, b: branched, e: erect form, r: rosettes, pr: partial rosettes, p: prostrate forms, l: liane forms.

### 摘 要

山火地の 二次 植生과 遷移의 初期 段階를 調査하기 위하여 1982年 4月 8日에 慶北 軍威郡 古老面에서 일어난 산불이 永川郡 花山面으로 擴散되어 標高 約 500 m를 중심으로 約 75 ha의 소나무 樹林과 林床 植生이 완전히 파괴된 이후 一次로 그 일부 지점을 調査地域으로 선정하여 1982年 6月부터 1983年 5月까지 季節別로 山火地の 初期 段階의 植生과 인접한 非山火地の 植生을 調査한 結果는 다음과 같다. ① 非山火地の 植生の 種類組成은 79科, 194屬, 223種, 26變種, 6品種(255種類)이며, 山火地는 62科, 146屬, 168種, 16變種, 1亞種(191種類)이었고 共通으로 出現된 植物은 172種類이었다. ② 또한 類似度指數는 0.77(Sørensen)로 八公山 내학동 일대의 指數(0.74)와 유사한 값을 보였다. ③ 非山火地와 山火地의 生活型組成을 分析한 結果 休眠型을 半地中植物(H)이 각각 32.9%, 29.3%, 風散布, 水散布型(D<sub>1</sub>)이 각각 42.4%, 37.7%, 單位植物(R<sub>5</sub>)이 각각 80.8%, 82.2%, 直立型(e)이 각각 57.7%, 61.8%이었으며, 生活型 spectrum은 다같이 H-D<sub>1</sub>-R<sub>5</sub>-e이었다. ④ 山火地의 初期 段階의 林床은 草種으로는 주로 큰기름새, 산겨울, 억새, 솔새와, 木本으로는 조록싸리, 졸참나무, 떡갈나무 등이 전반적으로 우세하게 出現되었다.

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