

Syntaxonomy of Mantle Communities in South Korea

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남한 임연군락의 군락분류

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ABSTRACT

Forest-edge communities dominated by heliophytic scrambling species were first studied using the Zürich-Montpellier school's method in South Korea. *Mallotetum japonicae*, *Clerodendretum trichotomae*, *Akebietum quinatae*, *Lonicero-Puerarietum lobatae*, *Spiraetum salicifoliae*, *Dioscoreo-Actinidietum argutae*, *Sorbarietum stellipilae*, *Tripterygietum regelii* were distinguished and described. Most syntaxa are suggested as new. The order *Dioscoreo-Puerarietalia lobatae* of the *Rosetea multiflorae* is representative of the Korean mantle vegetation, which subordinates the *Lonicero-Puerarion lobatae* and the *Dioscoreo-Actinidion argutae*. Synecological characteristics of all syntaxa were briefly noted.

Key words: *Dioscoreo-Puerarietalia*, Mantle community, *Rosetea multiflorae*, South Korea, Syntaxonomy, Zürich-Montpellier school's method.

INTRODUCTION

Mantle communities (forest-edge community; Mantelgesellschaften; *sensu* Miyawaki 1967, Tüxen 1972) which are consisted of summergreen scrambling shrubs and thorny plants develop mainly at the forest-edge adjacent to open spaces such as grasslands, streams and croplands. Such a phytocoenosis contains several characteristic heliophytes showing optimal growth under full sunlight condition of sites derived from anthropogenic interference or natural disturbance (Miyawaki *et al.* 1968). Some mantle communities contribute as a fence community to intercept strong influx of winds and sunlights ahead of forests (Jakucs

1970). Scrambling kudzu (*Pueraria lobata* Ohwi) and thorny rose (*Rosa multiflora* Thunb.) dominate such habitat in Korea.

Syntaxonomical research about mantle community in Northeast Asia at the highest level of class was first carried out along the coastal line in Japan (Ohba *et al.* 1973). Since then, there have been extensive phytosociological studies about mantle communities throughout the whole Japanese archipelago by the Yokohama Phytosociological School. A lot of syntaxa and their hierarchical system were described and achieved (*cit.* Miyawaki *et al.* 1994). Mantle communities in Japan were defined as the *Rosetea multiflorae* which subordinates largely 2 orders such as the *Dioscoreo-Puerarietalia lobatae* of inland-type

and the *Rosetalia rugosae* of seaside-type (Ohba *et al.* 1973). In South Korea, syntaxonomical system and synecological distribution about mantle communities is first accomplished.

MATERIALS AND METHODS

The field study was carried out throughout the whole southern part of the Korean Peninsula. The climate of South Korea is greatly influenced by east Siberia in winter and northern Pacific Ocean in summer and characterized as a transitional type between C_w and D_w in terms of Köppen's climatic province. Generally, cool-temperate vegetation region in Korean peninsula is syntaxonomically matched by the *Rhododendro-Quercetalia mongolicae* in the *Quercio-Fagetea crenatae* representing temperate forests of Northeast Asia (Miyawaki *et al.* 1968, Kim 1990, Kim 1992). Most sites of mantle communities are often found within the southern-submontane zone of the *Calliarpo-Quercenion serratae* in *Rhododendro-Quercetalia*.

326 relevés from the most typical and homogeneous sites were made according to the Zürich-Montpellier School's method (Braun-Blanquet 1964) during summer seasons from 1991 to 1993. These relevé sites were selected under the prudent consideration of species dynamics of pioneer and scrambling species in mantle communities (Moravec 1971). The size of relevé is about $4\text{ m} \times 7\text{ m} \pm 2\text{ m} \times 3\text{ m}$ ($\chi \pm \text{s.d.}$) in ribbon shape. Plant communities were distinguished by the classical block-structure seeking and hand-sorting method (Becking 1957) in cooperation with program [TWINSPAN] for preliminarily clustering relevés. Species contribution ranking to a classified unit was determined by using the net contribution degree (after NCD). The NCD value was a species performance degree combining both coverage and frequency for the unit (*cit.* Kim and Manyko 1994): $\text{NCD} = n/N \times \Sigma(X_i)/N$ ($i \rightarrow n$, $C_{\min} \leq \text{NCD} \leq C_{\max}$, X_i : the coverage of species i , n : the number of relevés with the species i , N : the total number of relevés in a unit). For describing geographical distribution pat-

tern of determined syntaxa in South Korea, we use synegeographical terms such as warm-temperate, cool-temperate southern-submontane (after SOSU), cool-temperate central-montane (after CEMO), and cool-temperate northern-altimontane (after NOAL) (*sensu* Kim 1993). Edaphical characteristics of habitats are described as a five series such as wet, semiwet, moderate, semidry and dry along moisture gradient of habitats. Light conditions of habitats are also noted as shade, half-shade and open. The vegetation unit was named in consideration of the International Code of Nomenclature (Barkman *et al.* 1986). In the present study, only a nomenclatural type relevé of each association was presented instead of completely structured vegetation tables of all associations. A full account of structured vegetation tables is prepared in Jung (1995). Species names follow Lee (1979).

RESULTS

The mantle communities in South Korea are included into the *Dioscoreo-Puerarietalia lobatae* Ohba 1973 in the *Rosetea multiflorae* Ohba, Miyawaki *et al.* 1973 representing mantle communities of Northeast Asia (Ohba *et al.* 1973). This order is characterized by *Pueraria lobata*, *Dioscorea japonica* and *Smilax china* (Table 1). The *Dioscoreo-Puerarietalia* further subordinates the *Lonicero-Puerarion lobatae* and the *Dioscoreo-Actinidion argutae*. Both alliances were simultaneously validated by indicating nomenclatural types and rearranging the hierarchical ranks. The *Lonicero-Puerarion* (Nomenclatural type: the *Lonicero-Puerarion lobatae*) was matched to the SOSU- and CEMO-type of mantle communities in South Korea. The alliance is characterized by *Lonicera japonica*, *Rubus parvifolius*, *Cocculus trilobus* and *Humulus japonicus*. This alliance is divided into 5 associations; the *Mallotetum japonicae*, the *Clerodendretum trichotomae*, the *Akebietum quinatae*, type association and the *Spiraetum salicifoliae*. The *Dioscoreo-Actinidion argutae* (Nomenclatural type: the *Dioscoreo-Actinidietum argutae*) was defined as the NOAL-type of mantle communities in South Ko-

Table 1. Synoptic table of mantle community in South Korea

	1	2	3	4	5	6	7	8
1: Mallotetum japonicae, 2: Clerodendretum trichotomae, 3: Akebietum quinatae, 4: Lonicero-Puerarietum lobatae, 5: Spiraeum salicifoliae, 6: Dioscoreo-Actinidietum argutae, 7: Sorbarietum stellipilae, 8: Tripterygietum regelii								
Vegetation units :	1	2	3	4	5	6	7	8
No. of relevés :	18	39	58	88	17	71	11	24
Mean no. of species in a relevé :	37	30	39	36	31	41	38	32
Mallotetum japonicae								
<i>Mallotus japonicus</i> (Ch)	V	II						
<i>Trachelospermum asiaticum</i> var. <i>intermedium</i> (D)	V	I	i	i	.	.	.	.
<i>Vitis thunbergii</i> var. <i>sinuata</i> (D)	V	I	I	I	.	I	.	.
<i>Cayratia japonica</i> (D)	V	I	I	I	.	I	.	.
Clerodendretum trichotomae								
<i>Clerodendron trichotomum</i> (Ch)	II	V	.	.	I	I	I	I
Akebietum quinatae								
<i>Akebia quinata</i> (Ch)	II	II	V	.	I	II	I	
Spiraeum salicifoliae								
<i>Spiraea salicifolia</i> (Ch)					V		I	
<i>Clematis terniflora</i> (Ch)	i	i	i	i	III	II	I	i
<i>Acer ginnata</i> (D)	I	I	I	I	III	II	I	I
Lonicero-Puerarion lobatae								
<i>Lonicera japonica</i> (Ch)	V	II	IV	IV	III	II	.	.
<i>Rubus parvifolius</i> (Ch)	IV	III	III	IV	III	II	.	.
<i>Cocculus trilobus</i> (Ch)	IV	II	III	IV	II	I	.	i
<i>Humulus japonicus</i> (D)	IV	IV	III	III	III	II	i	I
Sorbarietum stellipilae								
<i>Sorbaria sorbifolia</i> var. <i>stellipila</i> (Ch)	.	.	.	.	I	.	V	I
<i>Clematis heracleifolia</i> (Ch)	.	.	.	.	.	i	III	I
Dioscoreo-Actinidion argutae								
<i>Actinidia arguta</i> (Ch)	.	I	I	.	I	V	V	III
<i>Dioscorea nipponica</i> (Ch)	II	II	II	i	I	III	V	III
<i>Staphyllea bumalda</i> (D)	.	I	I	i	I	IV	V	II
<i>Aralia elata</i> (Ch)	.	I	I	I	I	III	IV	II
<i>Schizandra chinensis</i> (D)	.	.	I	.	I	II	III	I
Dioscoreo-Puerarietalia lobatae								
<i>Pueraria lobata</i> (Ch)	III	III	IV	V	III	IV	II	I
<i>Dioscorea japonica</i> (Ch)	IV	III	III	III	III	III	II	I
<i>Smilax china</i> (Ch)	III	II	IV	III	III	III	II	I
Tripterygietum regelii								
<i>Tripterygium regelii</i> (Ch)	.	.	.	.	.	I	I	V
Rosetea multiflorae								
<i>Rosa multiflora</i> (Ch)	V	IV	V	V	IV	III	II	II
<i>Clematis apiifolia</i> (Ch)	V	III	V	IV	III	IV	II	II
<i>Ampelopsis brevipedunculata</i> var. <i>heterophylla</i> (Ch)	V	III	IV	II	II	IV	III	III
<i>Celastrus orbiculatus</i> (Ch)	III	III	III	IV	IV	IV	IV	III
<i>Rhus chinensis</i> (Ch)	IV	IV	II	II	II	IV	III	II
<i>Rubus crataegifolius</i> (Ch)	I	III	II	III	IV	IV	III	III
Species of the Lindero-Quercion mongolicae								
<i>Stephanandra incisa</i>	II	II	II	II	II	IV	IV	IV
<i>Philadelphus schrenckii</i>	I	I	I	I	I	IV	V	II
<i>Securinega suffruticosa</i>	I	III	III	II	II	III	III	III
<i>Ulmus davidiana</i> for. <i>suberosa</i>	I	I	II	II	II	III	IV	II
<i>Zanthoxylum schinifolium</i>	II	II	II	III	II	III	I	IV
<i>Weigela subsessilis</i>	I	I	I	I	II	III	IV	II
<i>Rhus trichocarpa</i>	III	I	II	II	I	II	II	II
<i>Euonymus alatus</i> for. <i>ciliato-dentatus</i>	I	I	II	II	I	II	II	I
<i>Carex siderosticta</i>	.	I	I	I	I	I	IV	II
<i>Quercus serrata</i>	.	I	I	I	I	I	I	.
<i>Lespedeza x tomentella</i>	I	I	I	I	.	I	.	i
<i>Callicarpa japonica</i>	.	I	I	I	I	II	.	I
<i>Fraxinus rhynchophylla</i>	.	I	I	I	.	II	III	II
<i>Quercus mongolica</i>	.	I	I	I	.	I	III	II
<i>Symplocos chinensis</i> for. <i>pilosa</i>	I	I	I	.	i	I	.	II
<i>Fraxinus sieboldiana</i>	I	I	.	i	.	I	.	I
<i>Lindera obtusiloba</i>	.	I	.	.	.	II	II	II
<i>Maackia amurensis</i>	.	.	.	.	I	I	II	I
<i>Acer pseudosieboldianum</i>	.	.	i	.	.	I	I	II
Companions:								
<i>Amphicarpaea edgeworthii</i> var. <i>trisperma</i>	III	II	III	III	III	III	III	I
<i>Isodon japonicus</i>	II	I	II	I	I	II	II	II
<i>Parthenocissus tricuspidata</i>	II	II	II	II	I	II	I	II
<i>Rubia akane</i>	I	III	IV	IV	II	IV	III	II
<i>Commelina communis</i>	IV	V	III	IV	IV	IV	III	II
<i>Artemisia princeps</i> var. <i>orientalis</i>	II	IV	III	IV	V	IV	II	II
<i>Equisetum arvense</i>	I	II	II	II	III	I	I	I
<i>Oplismenus undulatifolius</i>	III	II	II	II	I	II	I	I
<i>Persicaria thunbergii</i>	I	II	I	II	II	I	I	I

Note: A complete table is in Jung (1995). Roman figures indicate Braun-Blanquet's constancy class, (Ch) - character species, (D) - differential species.

rea. This alliance is characterized by *Actinidia arguta*, *Dioscorea nipponica*, *Staphylea bumalda*, *Aralia elata* and *Schizandra chinensis*. The Dioscoreo-Actinidion is divided into 2 associations; type association and the Sorbarietum stellipilae.

Mallotetum japonicae ass. nov. hoc loco

The association was classified by the character species of *Mallotus japonicus* and the differential species of *Vitis thunbergii* var. *sinuata*, *Trachelospermum asiaticum* var. *intermedium* and *Cayratia japonica*. Some character species for the higher syntaxa show high constancy and NCD. They are *Rosa multiflora*, *Clematis apiifolia*, *Lonicera japonica*, *Ampelopsis brevipedunculata* var. *heterophylla*, *Rubus parvifolius*, and *Pueraria lobata*. *Cayratia japonica*, a differential species of this association, was very frequently observed at the front-mantle communities in warm-temperate evergreen region of South Korea. An evergreen climber *Trachelospermum asiaticum* var. *intermedium* occurring very often in the warm-temperate region contributes to another differential species of this association. Such characteristic species combination represents that *Mallotetum japonicae* is also a southernmost type of mantle communities in South Korea. The association occurs at gentle slopes of metamorphic soils with moderate moisture condition. Two- or three-layered structure reaches up to 7 m in height. The species richness was relatively high (37.5 ± 6.9 species per relevé). The distribution of this association is very restricted to warm places above 12

°C in annual mean temperature, above -9 °C in the lowest temperature, and below 260 m a.s.l. in Chöllanam-do which is located at the most southwestern part of South Korea.

Clerodendretum trichotomae ass. nov. hoc loco

The association is characterized by highly dominant and frequent *Clerodendron trichotomum*. The character species of higher syntaxa such as *Rhus chinensis*, *Pueraria lobata*, *Rosa multiflora*, *Clematis apiifolia* and *Rubus crataegifolius* appeared with high constancy value and NCD in the association. Especially *Rhus chinensis* in this association showed significantly high NCD in contradiction to the *Mallotetum japonicae*. Occurrence of some nitrophilous species showing generally the higher NCD in garbage deposit sites is also characteristic. They are semelparous annuals such as *Humulus japonicus* and *Commelina communis* growing generally at new soils. This association occurs at the uneven slope of semiwet metamorphic soils with gentle inclination between farmland and forest, and often at the hedges near afforestation in the SO-SU-region. The community structure is rather simple, which shows one- or two-layers reaching to 3 m in height and the lowest species richness (30.7 ± 12.2 species per relevé). The association is widespread toward relatively warm places along the coastal areas in central region of South Korea. Annual mean temperature of 10 °C and the lowest temperature of -16 °C act as limiting factors of its geographical distribution.

Table 2. A type relevé of the *Mallotetum japonicae*

Site No.: 82, Elevation: 75 m, Exposition: SE, Slope: 5°, Quadrat dimension: 3 × 4 m, T2-Height: 4.5 m, Coverage: 50 %, S-Height: 2 m, Coverage: 75 %, H-Height: 0.6 m, Coverage: 50 %, No. of species: 33.

Mallotus japonicus (Ch) 3.3, *Vitis thunbergii* v. *sinuata* (D) +, *Cayratia japonica* (D) -, *Trachelospermum asiaticum* v. *intermedium* (D) +, *Rubus parvifolius* 2.2, *Cocculus trilobus* 1.1, *Humulus japonicus* +, *Dioscorea japonica* +, *Rosa multiflora* +, *Clematis apiifolia* 3.3, *Ampelopsis brevipedunculata* v. *heterophylla* +, *Celastrus orbiculatus* 2.2, *Ligustrum obtusifolium* 1.1, *Paederia scandens* +, *Artemisia lavandulaefolia* +, *Oplismenus undulatifolius* +, *Miscanthus sinensis* v. *purpurascens* +, *Hedera rhombea* +, *Akebia quinata* 1.1, *Albizia julibrissin* -, *Stephanandra incisa* 1.1, *Wistaria floribunda* 1.1, *Styrax japonica* 2.2, *Asparagus cochinchinensis* +, *Cyrtomium fortunei* -, *Broussonetia kazinoki* 1.1, *Elsholtzia splendens* -, *Osmorhiza aristata* -, *Camellia japonica* 1.1, *Kadsura japonica* 1.1, *Dryopteris lacera* -, *Dryopteris bissetiana* -, *Arundinella hirta* -.

Locality of relevé & Date of survey: Unrimsanbang, Chindo-gun, Chöllanam-do, Korea, 1992. 6. 16.

Table 3. A type relevé of the *Clerodendretum trichotomae* and typical subassociation

Site No.: 328, Elevation: 140 m, Exposition: SE, Slope: 10°, Quadrat dimension: 3 × 5 m, H-Height: 2 m, Coverage: 100 %, No. of species: 23.

Clerodendron trichotomum (Ch) 5.5, *Commelina communis* (D) +, *Artemisia princeps* v. *orientalis* (D) +, *Humulus japonicus* -, *Rubus parvifolius* +, *Dioscorea japonica* +, *Smilax china* -, *Rhus chinensis* 1.1, *Rubus crataegifolius* +, *Miscanthus sinensis* v. *purpurascens* +, *Microstegium vimineum* -, *Euonymus alatus* 1.1, *Corylus heterophylla* 1.1, *Isodon japonicus* +, *Arundinella hirta* +, *Quercus aliena* 1.1, *Amorpha fruticosa* +, *Pteridium aquilinum* v. *latiusculum* +, *Potentilla fragarioides* v. *major* -, *Smilax nipponica* -, *Sanguisorba officinalis* -, *Rhamnus davurica* +, *Hypericum ascyron* -.

Locality of relevé & Date of survey: Toma, Kwangju-gun, Kyōnggi-do, Korea, 1993. 8. 12.

Table 4. A type relevé of the *Clerodendretum puerarietosum lobatae*

Site No.: 164, Elevation: 395 m, Exposition: SW, Slope: 15°, Quadrat dimension: 3 × 5 m, S-Height: 3.5 m, Coverage: 70 %, H-Height: 0.7 m, Coverage: 95 %, No. of species: 44.

Clerodendron trichotomum (Ch) 3.3, *Commelina communis* (D) +, *Artemisia princeps* v. *orientalis* (D) -, *Morus bombycis* (D) 2.2, *Securinega suffruticosa* (D) 2.2, *Humulus japonicus* +, *Rubus parvifolius* 2.2, *Cocculus trilobus* +, *Dioscorea japonica* 1.1, *Pueraria lobata* 4.4, *Smilax china* +, *Rhus chinensis* 2.2, *Rosa multiflora* 2.2, *Rubus crataegifolius* 1.1, *Clematis apiifolia* 1.1, *Celastrus orbiculatus* +, *Miscanthus sinensis* v. *purpurascens* -, *Rubia akane* +, *Zanthoxylum schinifolium* 1.1, *Parthenocissus tricuspidata* 2.2, *Stephanandra incisa* 1.1, *Ligustrum obtusifolium* 1.1, *Amphicarpaea edgeworthii* v. *trisperma* +, *Phryma leptostachya* v. *asiatica* 1.1, *Persicaria senticosa* -, *Rubus oldhami* 2.2, *Euonymus alatus* 1.1, *Artemisia iwayomogi* +, *Ulmus davidiana* f. *suberosa* 2.2, *Vicia unijuga* +, *Pinus densiflora* 1.1, *Quercus aliena* 1.1, *Rubus coreanus* 1.1, *Artemisia stolonifera* +, *Pteridium aquilinum* v. *latiusculum* +, *Asparagus schoberioides* -, *Plantycarya strobilacea* 2.2, *Ostericum grosseserrata* +, *Artemisia lavandulaefolia* +, *Carex humilis* +, *Lespedeza cyrtobotrya* 1.1, *Aconitum longecassidatum* -, *Geum japonicum* -, *Vicia nipponica* +, *Sonchus asper* +.

Locality of relevé & Date of survey: Ihwaryōng, Chungwon-gun, Ch'ungch'ōngbuk-do, Korea, 1992. 7. 29.

Clerodendretum trichotomae subordinates into two subunits such as typical subassociation and *puerarietosum lobatae*. The typical subassociation was differentiated by sharing common diagnostic species of the association *Clerodendretum*. The stands are totally canopied by *Clerodendron trichotomum* in shrub-layer and by *Commelina communis* and *Artemisia princeps* var. *orientalis* in the ground. This subassociation develops at projected sites of relatively warm and favorable moisture condition of soil in northward slopes below 450m a.s.l. in the SOSU- and CEMO-region. On the other hand, *Clerodendretum puerarietosum lobatae* subass. nov. *hoc loco* (holotypus: Table 4) is identified by the mixture of pioneer shrubs and scrambling species such as *Pueraria lobata*, *Smilax china*, *Morus bombycis* and *Securinega suffruticosa*. Human activities in the stands of typical subassociation facilitate to develop this *puerarietosum*. The *Clerodendretum puerarietosum* is more multi-layered than typical subassociation and its stands are mainly found at hedge of *Pinus densiflora* afforestation in southern slopes with metamorphic soils

showing somewhat dry condition. Geographical distribution of this subassociation concentrates at 25 m~570 m a.s.l. in SOSU- and CEMO-region.

***Akebietum quinatae* ass. nov. hoc loco**

The *Akebietum quinatae* is classified by co-occurrence of scramblers such as *Akebia quinata* and *Rubia akane*. Character species of higher syntaxa such as *Rosa multiflora*, *Clematis apiifolia*, *Pueraria lobata*, *Smilax china*, *Lonicera japonica* and *Celastrus orbiculatus* contribute to syndynamics with high constancy and NCD. The habitat conditions are summarized as half-shade beside well-developed canopy, gentle slopes with metamorphic soils, and moderate to semi-wet moisture condition in the air and soil. The community is structured two- or three-layered, and rarely reached up to 8 m in height. Species richness is remarkable in ca. 40 species per a relevé, but the size of vegetation cover area is smaller than that of other communities. The association is found mostly below 400 m a.s.l. and at southward part of the CEMO-re-

Table 5. A type relevé of the *Akebietum quinatae*

Site No.: 222, Elevation: 310 m, Exposition: SE, Slope: 10°, Quadrat dimension: 5 × 9 m, T2-Height: 9 m, Coverage: 10 %, S-Height: 3.5 m, Coverage: 75 %, H-Height: 0.7 m, Coverage: 60 %, No. of species: 50.

Akebia quinata (Ch) 4.4, *Rubia akane* (D) +, *Lonicera japonica* +, *Rubus parvifolius* +, *Cocculus trilobus* +, *Pueraria lobata* 2.2, *Smilax china* +, *Dioscorea japonica* 1.1, *Rosa multiflora* +, *Clematis apiifolia* 3.3, *Ampelopsis brevipedunculata* v. *heterophylla* +, *Celastrus orbiculatus* +, *Securinega suffruticosa* +, *Persicaria senticosa* 1.1, *Amphicarpaea edgeworthii* v. *trisperma* +, *Artemisia princeps* v. *orientalis* +, *Quercus aliena* 2.2, *Miscanthus sinensis* v. *purpurascens* +, *Euonymus alatus* f. *ciliato-dentatus* +, *Spiraea prunifolia* v. *simpliciflora* 1.1, *Agrimonia pilosa* +, *Duchesnea chrysantha* +, *Ulmus davidiana* f. *suberosa* +, *Phryma leptostachya* v. *asiatica* +, *Chrysanthemum boreale* +, *Euonymus alatus* 1.1, *Thalictrum aquilegifolium* -, *Asparagus schoberioides* -, *Smilax nipponica* +, *Acer ginnala* 2.2, *Vitis amurensis* 2.2, *Carex humilis* +, *Potentilla fragarioides* v. *major* +, *Fraxinus rhynchophylla* 3.3, *Clematis terniflora* +, *Metaplexis japonica* 1.1, *Artemisia iwayomogi* +, *Galium verum* v. *asiaticum* +, *Sanguisorba officinalis* -, *Pinus densiflora* 1.1, *Pyrus ussuriensis* 1.1, *Desmodium podocarpum* +, *Valeriana fauriei* -, *Rhamnus davurica* 2.2, *Viburnum carlesii* +, *Smilax sieboldii* +, *Viola manshurica* -, *Stachys riederi* v. *japonica* +, *Leonurus macranthus* -, *Lindera obtusiloba* -.

Locality of relevé & Date of survey: Yöngwol, Yöngwol-gun, Kangwon-do, Korea, 1992. 8. 11.

gion in South Korea. This syng geographical information corresponds into specific thermo-values such as bellow 11 °C in annual mean temperature and above -17 °C in the lowest temperature.

Lonicero-Puerarietum lobatae ass. nov. hoc loco

The Lonicero-Puerarietum lobatae is a type unit of the alliance Lonicero-Puerarion lobatae. Diagnostic species are mostly identical to the alliance. Character species for the Dioscoreo-Puerarietalia lobatae, *Pueraria lobata*, *Rosa multiflora*, *Clematis apiifolia* and *Celastrus orbiculatus* contribute in dynamics of the association with high constancy and NCD. Kudzu (*Pueraria lobata*) from surroundings invades quickly into fully-opened areas such as recently and severely disturbed areas after logging, forest fire and road constructions. Kudzu changes habitat conditions in soil and microclimate by dominating quickly and completely in ground surface or canopy. The association occurred at the semidry to dry condition of metamorphic soils with sufficient sunlight. The community is mostly structured two layers. The vegetation height reaches at 7~8 m in three-layered community. The species composition is comparatively rich ca. 37 species per a relevé. Among all mantle communities, this association shows the most wide-spread distribution from CEMO- to SOSU-region in South Korea.

Spiraetum salicifoliae ass. nov. hoc loco

The Spiraetum salicifoliae is identified by the character and differential species of *Spiraea salicifolia*, *Clematis terniflora*, and *Acer ginnala*. The vegetation structure is rather simple like one- or two-layered 3 m high and 31 species per a relevés. The association builds up hedges along streams, farmlands and roads. The habitats are of moist and semi-wet condition, but sufficient sunlight. Easily waterlogged sites are favorable to this association. The association distributes geographically at northward of the CEMO-region in South Korea, and its provincial distribution pattern is recognized from 36° N to 38° N in latitude. This association subordinates into two new subassociations such as typicum and puerarietosum lobatae. Diagnostic species of the typical subassociation is identical to those of Spiraetum salicifoliae. Relatively simple species composition of this subassociation is notable (see Table 7). Typical hedge form dominating totally by *Spiraea salicifolia* is characteristic to this subassociation. Habitats are mainly found at the forest-edge adjacent to roads in the cultivated lands below 680 m a.s.l. of CEMO-region in South Korea, especially somewhat cooler sites than that of next subassociation. The Spiraetum puerarietosum lobatae subass. nov. hoc loco (holotypus: Table 8) is differentiated by a mixture of *Pueraria lobata*, *Clema-*

Table 6. A type relevé of the *Lonicero-Puerarietum lobatae*

Site No.: 191, Elevation: 50 m, Exposition: NE, Slope: 25°, Quadrat dimension: 6 × 7 m, T2-Height: 7 m, Coverage: 20 %, S-Height: 3 m, Coverage: 65 %, H-Height: 0.7 m, Coverage: 95 %, No. of species: 40.

Pueraria lobata (Ch) 5.5, *Smilax china* (Ch) +, *Lonicera japonica* (Ch) 1.1, *Cocculus trilobus* (Ch) +, *Rubus parvifolius* (Ch) 2.2, *Humulus japonicus* (D) +, *Rosa multiflora* 2.2, *Celastrus orbiculatus* +, *Clematis apiifolia* 1.1, *Ampelopsis brevipedunculata* v. *heterophylla* +, *Commelina communis* 1.1, *Artemisia princeps* v. *orientalis* +, *Miscanthus sinensis* v. *purpurascens* +, *Persicaria senticosa* +, *Morus bombycis* 2.2, *Lactuca indica* v. *laciniata* +, *Equisetum arvense* +, *Rubia cordifolia* v. *pratensis* -, *Chrysanthemum boreale* +, *Ligustrum obtusifolium* 1.1, *Parthenocissus tricuspidata* +, *Agrimonia pilosa* -, *Oxalis corniculata* +, *Stellaria aquatica* +, *Oplismenus undulatifolius* +, *Athyrium vidalii* +, *Rosa wichuraitana* +, *Rubus oldhami* 4.4, *Metaplexis japonica* -, *Artemisia iwayomogi* 1.1, *Persicaria blumei* 1.1, *Pinus thunbergii* 1.1, *Vicia unijuga* +, *Smilax sieboldii* +, *Bilderdykia dentato-alata* +, *Solanum lyratum* +, *Asparagus schoberioides* -, *Populus tomentiglandulosa* 2.2, *Cynanchum atratum* -, *Geranium sibiricum* -.

Locality of relevé & Date of survey: Sadong, Uljin-gun, Kyöngsangbuk-do, Korea, 1992. 8. 6.

Table 7. A type relevé of the *Spiraeetum salicifoliae* and its typical subassociation

Site No.: 214, Elevation: 655 m, Exposition: W, Slope: 15°, Quadrat dimension: 1 × 5 m, S-Height: 2 m, Coverage: 95 %, H-Height: 0.7 m, Coverage: 55 %, No. of species: 20.

Spiraea salicifolia (Ch) 5.5, *Clematis terniflora* (Ch) +, *Acer ginnala* (D) +, *Rosa multiflora* 1.1, *Rubus crataegifolius* +, *Celastrus orbiculatus* +, *Artemisia princeps* v. *orientalis* +, *Amphicarpaea edgeworthii* v. *trisperma* -, *Impatiens textori* +, *Microstegium vimineum* +, *Weigela subsessilis* 1.1, *Philadelphus schrenckii* 1.1, *Erigeron bonariensis* +, *Duchesnea chrysantha* +, *Amorpha fruticosa* 3.3, *Solidago virgo-aurea* v. *asiatica* +, *Carex humilis* +, *Erigeron canadensis* +, *Ranunculus japonicus* -, *Viola manshurica* -, *Ixeris chinensis* v. *strigosa* -.

Locality of relevé & Date of survey: Chaun, Hongch'ön-gun, Kangwon-do, Korea, 1992. 8. 10.

Table 8. A type relevé of the *Spiraeetum puerarietosum lobatae*

Site No.: 323, Elevation: 160 m, Exposition: SE, Slope: 10°, Quadrat dimension: 4 × 12 m, S-Height: 3.5 m, Coverage: 85 %, H-Height: 1.2 m, Coverage: 70 %, No. of species: 34.

Spiraea salicifolia (Ch) 1.1, *Acer ginnala* (D) +, *Clematis terniflora* (Ch) -, *Spiraea prunifolia* v. *simpliciflora* (D) +, *Securinega suffruticosa* (D) 2.2, *Morus bombycis* (D) 1.1, *Zanthoxylum schinifolium* (D) -, *Humulus japonicus* +, *Lonicera japonica* +, *Rubus parvifolius* -, *Cocculus trilobus* -, *Clematis apiifolia* 2.2, *Pueraria lobata* 3.3, *Smilax china* +, *Rosa multiflora* 1.1, *Rubus crataegifolius* +, *Celastrus orbiculatus* 1.1, *Dioscorea japonica* +, *Rhus chinensis* 4.4, *Artemisia princeps* v. *orientalis* +, *Commelina communis* +, *Miscanthus sinensis* v. *purpurascens* -, *Equisetum arvense* -, *Persicaria senticosa* +, *Menispermum dauricum* +, *Rubia cordifolia* v. *pratensis* +, *Ulmus davidiana* f. *suberosa* 1.1, *Euonymus alatus* +, *Artemisia iwayomogi* +, *Chrysanthemum boreale* +, *Amorpha fruticosa* -, *Bilderdykia dumetora* -, *Pinellia ternata* -, *Achyranthes japonica* -, *Lamium album* v. *barbatum* -, *Liriope spicata* -.

Locality of relevé & Date of survey: Saengri, Ümsöng-gun, Ch'ungch'öngbuk-do, Korea, 1993. 8. 6.

tis apiifolia, *Smilax china*, *Spiraea prunifolia* var. *simpliciflora*, *Securinega suffruticosa*, *Rhus chinensis*, *Morus bombycis* and *Zanthoxylum schinifolium*. These diagnostic species group is characterized by only subtrees and semi-woody species. This subassociation develops at relatively warm places below 280 m a.s.l.

Dioscoreo-Actinidietum argutae ass. nov. *hoc loco*

Present association is a typical association of the alliance Dioscoreo-Actinidion *argutae*. Diagnostic spe-

cies are identical to those of the alliance, i.e. *Actinidia arguta*, *Dioscorea nipponica*, *Staphylea bumalda*, *Aralia elata* and *Schizandra chinensis*. The plant community is structured as three-layered 9~12 m high. An important aspect of the community structure is the highest species richness of 42 species per relevé. The habitats are often found at cool and fresh sites at mountain valley-side in the NOAL-region which are characterized by gentle slopes, moderate and semi-wet conditions, and brown forest soils. Due to its locations remote from human interference in the

Table 9. A type relevé of the *Dioscoreo-Actinidietum argutae* and its typical subassociation

Site No.: 226, Elevation: 640 m, Exposition: NW, Slope: 10°, Quadrat dimension: 5 × 6 m, T2-Height: 12 m, Coverage: 30 %, S-Height: 3 m, Coverage: 100 %, H-Height: 0.7 m, Coverage: 60 %, No. of species: 56.

Actinidia arguta (Ch) 5.5, *Aralia elata* (Ch) +, *Dioscorea nipponica* (Ch) +, *Schizandra chinensis* (D) 2.2, *Staphyllea bumalda* (D) 1.1, *Humulus japonicus* (D) 1.1, *Rubus crataegifolius* +, *Celastrus orbiculatus* 1.1, *Rosa multiflora* +, *Morus bombycis* 3.3, *Stephanandra incisa* 1.1, *Securinega suffruticosa* 2.2, *Rubia akane* -, *Artemisia princeps* v. *orientalis* +, *Amphicarpaea edgeworthii* v. *trisperma* -, *Commelina communis* +, *Ulmus davidiana* f. *suberosa* 1.1, *Zanthoxylum schinifolium* 2.2, *Weigela subsessilis* 1.1, *Phryma leptostachya* v. *asiatica* +, *Euonymus alatus* 1.1, *Rubus oldhami* +, *Agrimonia pilosa* +, *Fraxinus rhynchophylla* 1.1, *Impatiens textori* +, *Corydalis ochotensis* +, *Acer mono* 1.1, *Aster scaber* -, *Corylus heterophylla* v. *thunbergii* 1.1, *Carex siderosticta* +, *Hydrangea serrata* f. *acuminata* 1.1, *Dennstaedtia wilfordii* -, *Viola acuminata* +, *Boehmeria tricuspis* v. *unicuspis* +, *Arisaema ringens* -, *Deutzia parviflora* 1.1, *Erigeron canadensis* -, *Acer pseudo-sieboldianum* 1.1, *Impatiens noli-tangere* +, *Athyrium nipponicum* -, *Equisetum arvense* -, *Valeriana fauriei* +, *Symplocos chinensis* f. *pilosa* 1.1, *Thalictrum aquilegifolium* -, *Duchesnea chrysantha* +, *Viola albida* +, *Styrax obassia* 1.1, *Astilbe koreana* +, *Magnolia sieboldii* 1.1, *Trigonotis incumae* 2.2, *Lespedeza cyrtobotrya* 1.1, *Calamagrostis epigeios* -, *Robinia pseudo-acacia* 1.1, *Larix leptolepis* 2.2, *Achudemia japonica* +, *Persicaria blumei* -, *Aconitum longecassidatum* +.

Locality of relevé & Date of survey: Chukryong, Ch'ungch'ongbuk-do, Korea, 1992. 8. 12.

Table 10. A type relevé of the *Dioscoreo-Actinidietum puerarietosum lobatae*

Site No.: 225, Elevation: 410 m, Exposition: NE, Slope: 15°, Quadrat dimension: 8 x 10 m, S-Height: 3.5 m, Coverage: 85 %, H-Height: 0.7 m, Coverage: 90 %, No. of species: 64.

Actinidia arguta (Ch) 2.2, *Aralia elata* (Ch) 1.1, *Dioscorea nipponica* (Ch) 1.1, *Staphyllea bumalda* (D) 2.2, *Schizandra chinensis* (D) +, *Miscanthus sinensis* v. *purpurascens* (D) -, *Humulus japonicus* (D) 1.1, *Pueraria lobata* 3.3, *Smilax china* +, *Dioscorea japonica* -, *Ampelopsis brevipedunculata* v. *heterophylla* +, *Clematis apiifolia* 2.2, *Rubus crataegifolius* +, *Celastrus orbiculatus* 1.1, *Rosa multiflora* 1.1, *Morus bombycis* 1.1, *Stephanandra incisa* 1.1, *Securinega suffruticosa* 1.1, *Rubia akane* +, *Artemisia princeps* v. *orientalis* +, *Amphicarpaea edgeworthii* v. *trisperma* +, *Parthenocissus tricuspidata* +, *Ulmus davidiana* f. *suberosa* 1.1, *Philadelphus schrenckii* +, *Spiraea prunifolia* v. *simpliciflora* +, *Phryma leptostachya* v. *asiatica* +, *Acer ginnala* 1.1, *Euonymus alatus* 1.1, *Rubus oldhami* 1.1, *Artemisia iwayomogi* +, *Agrimonia pilosa* -, *Persicaria senticosa* +, *Bilderdykia dumetora* +, *Menispermum dauricum* +, *Lindera obtusiloba* 1.1, *Corydalis ochotensis* -, *Youngia denticulata* -, *Lactuca indica* v. *laciniata* -, *Rhus trichocarpa* 1.1, *Akebia quinata* 3.3, *Lonicera japonica* 1.1, *Clematis terniflora* 1.1, *Rubus parvifolius* +, *Carex siderosticta* -, *Isodon inflexus* +, *Metaplexis japonica* 1.1, *Elaeagnus umbellata* 2.2, *Athyrium vidalii* +, *Aristolochia contorta* 2.2, *Rubus coreanus* 1.1, *Vicia amurensis* 1.1, *Deutzia parviflora* +, *Lastrea thelypteris* -, *Cardamine leucantha* +, *Impatiens noli-tangere* +, *Viola collina* +, *Cocculus trilobus* +, *Rhamnus davurica* +, *Clematis florida* +, *Cornus controversa* 1.1, *Smilax riparia* v. *ussuriensis* +, *Viburnum carlesii* +, *Erigeron bonariensis* +, *Lathyrus davidii* +, *Lonicera chrysantha* +, *Cirsium japonicum* v. *ussuriensis* -.

Locality of relevé & Date of survey: Tökpyöng, Tanyang-gun, Kyöngsangbuk-do, Korea, 1992. 8. 11.

mountainous areas, the stands could have been left as stable and natural site condition and species composition. In the warmer sites of micro-topographical condition, even though the association locates geographically in high latitudes and altitudes, is specialized by mixture of SOSU elements such as *Pueraria lobata*, *Rhus chinensis*, *Clematis apiifolia*, *Dioscorea japonica*, *Smilax china*, and *Celastrus orbiculatus*, *Morus bombycis*. The geographical distribution is restricted to above 36° N and higher altitude in NOAL-region of South Korea. Such geographical ranges are coincided into the isolines 12 °C of annual mean temperature and -11 °C of the low-

est temperature. The *Dioscoreo-Actinidietum argutae* is divided into two subassociations such as *typicum* and *puerarietosum lobatae*. Nomenclatural type and diagnostic species of the typical subassociation are identical to those of the association, respectively. This subassociation was dominated by *Actinidia arguta* scrambling up *Philadelphus schrenckii* and *Ulmus davidiana* for. *suberosa* in upper story, and by *Dioscorea nipponica* and *Aralia elata* in undergrowth. The *Dioscoreo-Actinidietum puerarietosum lobatae subass. nov. hoc loco* (*holotypus*: Table 10) is identified by the differential species of *Smilax china*, *Dioscorea japonica*, and *Miscanthus sinensis* var. *purpurascens*.

Sorbarietum stellipilae *ass. nov. hoc loco*

The association is characterized by *Sorbaria sorbifolia* var. *stellipila* and *Clematis heracleifolia*. Other diagnostic aspect in species combination is a co-occurrence of forest elements such as *Aralia elata*, *Philadelphus schrenckii*, and *Ulmus davidiana* for. *suberosa*. The habitats locate mainly at gentle slopes in the valley which shows sufficient aerial and edaphic moist condition. Such site is unsuitable for pioneer species being favorable warmer site like Kudzu. The vegetation is 7~8 m high. 39 species per relevé were estimated from 11 relevés. The distribution of this association is very restricted to above 37° N latitude, below 10 °C in annual mean temperature, and below -16 °C in the lowest temperature. It is an important aspect that this distribution range is within NOAL-region of South Korea.

Tripterygium regelii *ass. nov. hoc loco*

The *Tripterygium regelii* is classified by monodomination of *Tripterygium regelii* of character species and *Stephanandra incisa* of differential species. Other important species showing high constancy and NCD value are *Celastrus orbiculatus*, *Rubus crataegifolius* and *Ampelopsis brevipedunculata* var. *heterophylla* characterizing the Rosetea multiflorae, *Actinidia arguta* and *Staphylea bumalda* characterizing the Dioscoreo-Actinidion argutae. This association is found only adjacent to the forests in the mountain ranges. The association is widespread at fresh areas in CEMO- and NOAL-region of South Korea, and its distribution is mainly restricted to above 400 m in altitude and below 11 °C in the annual mean temperature. The higher units of *Tripterygium regelii* is unclear due to peculiar species combination. This association had high affinity in species composition with the character species of the class Rosetea multiflorae and that of the alliance Dioscoreo-Actinidion argutae. But the association did not share any affinity with that of the order Dioscoreo-Puerarietalia

Table 11. A type relevé of the *Sorbarietum stellipilae*

Site No.: 352, Elevation: 700 m, Exposition: SW, Slope: 15°, Quadrat dimension: 7 x 12 m, S-Height: 5 m, Coverage: 75 %, H-Height: 1.5 m, Coverage: 70 %, No. of species: 36.

Sorbaria sorbifolia v. *stellipila* (Ch) 4.4, *Clematis heracleifolia* (Ch) +, *Actinidia arguta* 3.3, *Staphylea bumalda* 3.3, *Dioscorea nipponica* +, *Aralia elata* +, *Schizandra chinensis* 3.3, *Smilax china* +, *Celastrus orbiculatus* +, *Rhus chinensis* +, *Ampelopsis brevipedunculata* v. *heterophylla* 1.1, *Rubus crataegifolius* -, *Philadelphus schrenckii* 2.2, *Morus bombycis* 1, *Ulmus davidiana* f. *suberosa* 3.3, *Stephanandra incisa* -, *Acer mono* 1.1, *Rubia akane* -, *Corylus heterophylla* +, *Commelina communis* -, *Tilia amurensis* 2.2, *Isodon excisus* +, *Viola acuminata* -, *Corydalis ochotensis* -, *Isodon japonicus* +, *Maackia amurensis* +, *Impatiens noli-tangere* +, *Artemisia princeps* v. *orientalis* +, *Urtica angustifolia* +, *Tripterygium regelii* +, *Euonymus alatus* +, *Bilderdykia dumetora* -, *Chrysanthemum boreale* -, *Brachybotrys paridiformis* -, *Syringa wolffi* 1.1, *Agastache rugosa* +, *Cimicifuga heracleifolia* +.

Locality of relevé & Date of survey: Samsan, Odaesan, Kangwon-do, Korea, 1992. 8. 8.

Table 12. A type relevé of the *Tripterygium regelii*

Site No. : 316, Elevation: 1,080 m, Exposition: NE, Slope: 10°, Quadrat dimension: 5 x 9 m, S-Height: 3.5 m, Coverage: 90 %, H-Height: 1.2 m, Coverage: 70 %, No. of species: 32.

Tripterygium regelii (Ch) 4.4, *Stephanandra incisa* (D) +, *Actinidia arguta* 1.1, *Aralia elata* 1.1, *Schizandra chinensis* 1, *Celastrus orbiculatus* +, *Weigela subsessilis* 1.1, *Rubus crataegifolius* +, *Pseudostellaria palibiniana* +, *Lysimachia clethroides* -, *Astilbe chinensis* v. *dauidii* +, *Philadelphus schrenckii* 1.1, *Corylus heterophylla* v. *thunbergii* 2.2, *Boehmeria spicata* +, *Athyrium nipponicum* -, *Meehania urticifolia* +, *Artemisia princeps* v. *orientalis* +, *Agrimonia pilosa* -, *Rubus oldhami* +, *Sambucus williamsii* v. *coreana* +, *Dryopteris crassirhizoma* +, *Maackia amurensis* 1.1, *Viburnum sargentii* +, *Cimicifuga heracleifolia* +, *Ribes fasciculatum* v. *chinense* +, *Salix hulteni* +, *Rubus phoenicolasius* +, *Lactuca raddeana* -, *Euonymus macroptera* 1.1, *Acer tschonoskii* v. *rubripes* 2.2, *Sorbaria sorbifolia* v. *stellipila* 2.2, *Epilobium pyrricholophum* -.

Locality of relevé & Date of survey: Tumundong, Chõngsõn-gun, Kangwon-do, Korea, 1993. 8. 5.

lobatae (Table 1). From these results, the probability of another order (or alliance) of mantle communities in northern part of Korean peninsula was strongly raised. Consequently, syntaxonomical position of this association can be accurately defined through the supplementary study about northern-type mantle vegetation from North Korea and northeast China.

CONCLUSIONS AND DISCUSSION

The research about mantle community in Northeast Asia at the level of class had first been carried out along the coastal line in Japan (Ohba *et al.* 1973). Since then, there have been extensive phytosociological studies about mantle communities throughout the whole Japanese archipelago by Yokohama school's phytosociologists. A lot of syntaxa were published from the results of regional researches and the hierarchical system of mantle communities was also achieved (Miyawaki *et al.* 1994). Mantle communities in Japan were defined to the Rosetea multiflorae Ohba, Miyawaki *et al.* 1973 (Ohba *et al.* 1973). The class was divided into 2 orders and 5 alliances as follows: the Dioscoreo-Puerarietalia lobatae (inland) and the Rosetalia rugosae (seaside); the Clerodendro-Mallotion japonicae, the Lonicero japonicae-Paederion mairei, the Viti ficifoliae-Clemati-

dion terniflorae, the Clematido apiifoliae-Rubion palmati and the Actinidio-Vition coignetiae. Mantle communities in South Korea were also defined to the Dioscoreo-Puerarietalia lobatae of the Rosetea multiflorae Ohba, Miyawaki *et al.* 1973 (Ohba *et al.* 1973). This order comprises 2 alliances and another association of the Tripterygietum regelii (Table 13). But in Japan, this order is described by 5 alliances. Such aspect of diversified mantle communities in Japan is due to far wide range of horizontal distribution in the Japanese archipelago (Jung and Kim 1998) And otherwise, a slight difference on community structures such as deficiency of major diagnostic species group and inclusion of their own geographical elements between Japanese archipelago and Korean peninsula may be noted. On the other hand, the Rosetalia rugosae which is widely distributed to northern coast of Japan has not been studied yet in South Korea, although there is a brief description of *Rosa rugosa* community in Rosetea multiflorae (Kim and Nam 1996).

The distributional characteristics of mantle community in South Korea appeared from South to North in the order of the Mallotetum japonicae, the Clerodendretum trichotomae, the Akebietum quinatae, the Lonicero-Puerarietum lobatae, the Spiraetum salicifoliae, the Dioscoreo-Actinidietum argutae, the

Table 13. Diagnostic species group of each syntaxon

Syntaxa	Diagnostic species group
Rosetea multiflorae	<i>Rosa multiflora</i> ***, <i>Clematis apiifolia</i> *, <i>Ampelopsis brevipedunculata</i> var. <i>heterophylla</i> *, <i>Celastrus orbiculatus</i> *, <i>Rhus chinensis</i> , <i>Rubus crataegifolius</i> **
Dioscoreo-Puerarietalia lobatae	<i>Pueraria lobata</i> *, <i>Dioscorea japonica</i> *, <i>Smilax china</i> **
Lonicero-Puerarion lobatae	<i>Lonicera japonica</i> *, <i>Rubus parvifolius</i> **, <i>Cocculus trilobus</i> *, <i>Humulus japonicus</i> **
Mallotetum japonicae	<i>Mallotus japonicus</i> , <i>Trachelospermum asiaticum</i> var. <i>intermedium</i> *, <i>Vitis thunbergii</i> var. <i>sinuata</i> *, <i>Cayratia japonica</i> *
Clerodendretum trichotomae	<i>Clerodendron trichotomum</i> .
Akebietum quinatae	<i>Akebia quinata</i> *, <i>Rubia akane</i> **
Spiraetum salicifoliae	<i>Spiraea salicifolia</i> , <i>Clematis terniflora</i> *, <i>Acer ginnala</i>
Dioscoreo-Actinidion argutae	<i>Actinidia arguta</i> *, <i>Dioscorea nipponica</i> *, <i>Staphylea bumalda</i> , <i>Aralia elata</i> **
Dioscoreo-Actinidietum argutae	<i>Schizandra chinensis</i> *
Sorbarietum stellipilae	<i>Sorbaria sorbifolia</i> var. <i>stellipila</i> , <i>Clematis heracleifolia</i>
Tripterygietum regelii	<i>Tripterygium regelii</i> *, <i>Stephanandra incisa</i>

Note: Species marked with a asterisk are of scramblers or climbers, and with two asterisk of thorn-like plants.

Table 14. Distributional characteristics of the mantle communities in South Korea

Association	Habitat					Distribution range	
	dry	semidry	moderate	semiwet	wet	Geography	Vegetation zones*
Mallotetum japonicae		▶	◀			34~35°N	SOSU
Clerodendretum trichotomae		▶			◀	34~37°N	SOSU
Lonicero-Puerarietum lobatae	▶		◀			34~38°N	SOSU, CEMO
Akebietum quinatae			▶		◀	34~37°N	CEMO
Spiraetum salicifoliae			▶		◀	36~38°N	CEMO
Tripterygiatum regelii		▶			◀	35~38°N	CEMO, NOAL
Dioscoreo-Actinidietum argutae		▶			◀	34~38°N	NOAL
Sorbarietum stellipilae				▶	◀	37~38°N	NOAL

* Vegetation zones (*sensu* Kim 1993): SOSU - cool-temperate southern · submontane zone; CEMO - cool-temperate central · montane zone; NOAL - cool-temperate northern · altimontane zone.

Sorbarietum stellipilae and the Tripterygiatum regelii (Table 14). Such distributional characteristics in South Korea can be further clarified from syntaxonomical informations of Japan, North Korea and China.

적 요

Z.-M. 학파의 연구방법에 의하여 남한의 호광성 덩굴 식물군락에 대한 군락분류학적 연구가 처음으로 이루어졌다. 예덕나무군집, 누리장나무군집, 으름군집, 칙-인동군집, 꼬리조팝나무군집, 다래-부채마군집, 쉬땅나무군집, 미역줄나무군집 등의 새로운 식생단위가 구분되고 기재되었다. 남한의 임연군락은 철레꽃군강에 귀속되는 칙-참마군목으로 대표되며, 칙-인동군단 및 다래-부채마군단으로 이루어져 있었으며, 본 연구에서 구분되어 명명된 모든 식생단위에 대하여 군락생태학적 특성들을 규정하였다.

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