

# Validation of names of some syntaxa of the Crimean vegetation

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**Abstract:** Didukh, Y.P. & Ladislav Mucina, L. *Validation of the name of some syntaxa of Crimean vegetation. Lazaroa 35: 181-190 (2014).*

We validate concepts and names of three alliances (*Androsaco tauricae-Caricion humilis*, *Adonido vernalis-Stipion tirsae*, *Veronico multifidae-Stipion ponticae*) of steppe vegetation (*Festuco-Brometea*) of Crimea as well as two other alliances of sub-mediterranean character (*Diantho humilis-Velezion rigidae*, *Elytrigio nodosae-Rhuion coriariae*). We also validate a number of associations, most of them to serve as the holotypes of the alliances.

**Keywords:** *Festuco-Brometea*, nomenclature of plant communities, *Rhamno-Prunetea*, *Stipo-Trachynietea*, syntaxonomy, Ukraine, yaila.

**Resumen:** Didukh, Y.P. & Ladislav Mucina, L. *Validación de los nombres de algunos sintaxones de la vegetación de Crimea. Lazaroa 35: 181-190 (2014).*

Se validan los conceptos y nombres de tres alianzas (*Androsaco tauricae-Caricion humilis*, *Adonido vernalis-Stipion tirsae*, *Veronico multifidae-Stipion ponticae*) de vegetación estépica (*Festuco-Brometea*) de Crimea, así como dos alianzas de carácter submediterráneo (*Diantho humilis-Velezion rigidae*, *Elytrigio nodosae-Rhuion coriariae*). También se validan asociaciones, la mayoría de las cuales sirven como holotipos de dichas alianzas.

**Palabras clave:** *Festuco-Brometea*, nomenclatura sintaxonómica, *Rhamno-Prunetea*, *Stipo-Trachynietea*, Ucrania, Yaila.

## INTRODUCTION

The Crimean Mountains attain the altitude of 1545 m asl and are stretching about 150 km along the coast of the Black Sea on the Crimean Peninsula. The mountain range straddles the limits of steppe and mediterranean biomes (ISACHENKO & LAVRENKO, 1980; DIDUKH & SHELYAG-SOSONKO, 2003).

The steppes of the *Festuco-Brometea* occupy a sizable area of more than 150000 ha in Crimea. They are common on foothills of the northern macroslope of the Crimean Mts from an altitude of about 600 m asl to about 1500 m asl; the steppes

are almost absent on the southern macroslope that is occupied prevalently by sub-mediterranean vegetation. Floristically these communities contain a number of Pontic and Pontic-Pannonian elements such as *Agropyron cristatum* subsp. *pectinatum*, *Alyssum rostratum*, *Gypsophila glomerata*, *Iris pumila* and *Linum pallasianum*. The majority of these species is found at lower altitudes in the Crimea. The Mediterranean and Submediterranean elements, such as *Asphodeline lutea*, *A. taurica*, *Fumana procumbens*, *Onosma rigida* and *Paronychia cephalotes* also play a significant role in the Crimean steppe vegetation. Nearly 10% of the species pool of the Crimean steppe is formed

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by regional/local endemics (e.g. *Centaurea sterilis*, *Cephalaria coriacea*, *Elytrigia reflexiaristatus* subsp. *strigosus*, *Euphorbia petrophila*, *Seseli lehmannii*) showing evolutionary relationships with either Pontic or Mediterranean flora. With the increase of altitude, number of endemic species increases while the number of Pontic elements decreases. At these altitudes one can find even some (sub)boreal elements (*Antennaria dioica*) and species typical of high-altitudes (*Hypericum linarioides*, *Linum jaiilicola*, *Ranunculus oreophilus*, *Veronica gentianoides*, *Viola oreades*), as well as Crimean endemics such as *Androsace villosa* subsp. *taurica*, *Draba cuspidata*, *Pulsatilla halleri* subsp. *taurica*, *Tephroses integrifolia* subsp. *jaiilicola*.

According to the data published by DIDUKH (1983) the Crimean dry grasslands contain, across the whole spectrum of so far described vegetation units, *Bromopsis cappadocica* in role of a subdominant and locally also dominant. It is therefore that SAITOV & MIRKIN (1991) suggested classifying the Crimean steppes as a unique order – the ‘*Bromopsietalia cappadocicae*’. The ecological and biogeographical uniqueness of this syntaxonomic solution is pending further enquiry, however at this stage it does not appear that this step has been justified considering Europe-wide variability of the *Festuco–Brometea*. The invalidly published concept of the *Bromopsietalia cappadocicae* Saitov et Mirkin 1996 (ICPN Arts. 2b & 5) should be rather considered as synonyms partly of the *Stipo pulcherrimae–Festucetalia pallentis* Pop 1968 and partly of the *Festucetalia valesiacae* Soó 1947 (MUCINA & al., unpubl. data). It also appears that the taxonomic concept of ‘*Bromopsis cappadocica*’ in Crimea has been misapplied and that in fact the taxon is actually *Bromopsis taurica* Slyusarenko, currently recognised as valid by the Euro+Med PlantBase (www.emplantbase.org).

The steppes of the Crimea are differentiated into three alliances (DIDUKH, 1983): (1) The ‘*Carici humilis–Androsacion*’ comprises the primary rocky meadow steppes of the yailas (mountain pastures) in the western and central parts of the Crimean Mts at altitudes of 300–1500 m asl (see Figure 1); (2) The yailas of the eastern Crimean

Mts (at altitudes of spanning 600–800 m) support communities of the *Adonidio–Stipion tirsae* occur (DIDUKH, 1983; DIDUKH & VAKARENKO, 1984; VAKARENKO 1987). (3) The steppes of the *Veronicio multifidae–Stipion ponticae* (Fig. 1) occur on rich chernozems and stony eroded soils characteristic of the piedmonts of the Crimean Mts.

All three alliances have been well characterised (DIDUKH, 1983). However, because of nomenclature inconsistencies, they remain invalidly described. This paper is aimed at rectifying this situation and present validations of these alliances as well as they type associations.

As an addendum, we also validate some other (herb-rich and scrub) syntaxa from Ukraine.

#### VALIDATION OF THE CRIMEAN STEPPE ALLIANCES

The validation procedures follow the principles of the International Code of Phytosociological Nomenclature (ICPN; WEBER & al., 2000). The nomenclature of plant taxa follows Euro+Med PlantBase (www.emplantbase.org) in most cases. In order to facilitate the nomenclatural understanding, we also included an Appendix 1 featuring a crosswalk between traditional Ukrainian taxonomic usage and the current Euro+Med nomenclature and taxonomy.

We present here type relevés of those associations that serve as the type associations of the validated alliances. In the relevés the numerical values are in %, except for the category 1, which means that the projected cover was less than 1%, and category r which indicates that one specimen of the species was recorded in the plot.

#### *Androsaco tauricae–Caricion humilis* Didukh *all. nov. hoc loco*

(*Stipo pulcherrimae–Festucetalia pallentis*, *Festuco–Brometea*)

Synonym: *Carici humilis–Androsacion* Didukh 1983 (ICPN Arts. 2b & 5)

*Holotypus hoc loco*: *Genisto albidae–Stipetum lithophilae* Didukh et Mucina 2014 (see below).

Diagnostic taxa: *Androsace villosa* subsp. *taurica*, *Asperula supina*, *Carex humilis*, *Cytisus hir-*

*sutus* subsp. *polytrichus*, *Draba cuspidata*, *Festuca callieri*, *Genista albida*, *Hypericum linarioides*, *Potentilla taurica*, *Sideritis taurica*, *Teucrium montanum* subsp. *montanum*, *Thymus cherlerioides*, *Veronica orientalis*.

These are typical Crimean subxeric steppes, dominated by graminoids and low shrubs. They are found at low altitudes and seldom also at mid-altitudes (900-1400 m asl) on plateau-like yaylas. *Carex humilis*, *Festuca callieri*, *Stipa pennata*



Figure 1. – Selected images of the Crimea steppes: A: *Salvia nemorosa*, *Galium verum* and *Stipa zalesskii* subsp. *pontica* dominated steppe of the *Veronica multifidae*–*Stipion ponticae* on the Kerch Peninsula. B: Rocky steppe stands of the *Androsaco tauricae*–*Caricion humilis* on South Demerdzhi (alt. 950 m) near Alushta. The aspect is dominated by *Stipa pennata* subsp. *lithophila* and *Filipendula vulgaris*. C: A stand of the *Bromopsido tauricae*–*Asphodelinetum tauricae* (*Veronicio multifidae*–*Stipion ponticae*) near Sudak, with prominent formed by *Asphodeline taurica*. All photos: Y.P. Didukh.

subsp. *lithophila* are the dominating graminoids while *Thymus cherlerioides*, *T. roegneri* and *Helianthemum canum* subsp. *stevernii* are frequent sub-shrubs (DIDUKH, 1993). Soils are rocky rendzina, often much eroded, as well as carbonate chernozem-like soils with high carbonate (7–10%) and humus status (6–10%; DRAGAN, 2004).

***Potentillo tauricae-Caricetum humilis* ass. nov. hoc loco**

Synonym: *Potentilletum depressae* Didukh 1983 (ICPN Arts. 2b & 5).

*Holotypus hoc loco*: Ukraine: Crimean, Yalta City Council, Yalta Mountain-Forest Natural Reserve, Yaila Ai-Petri. Lat. 44.4813 N, 34.0397 E; Altitude: 1215 m asl. Substrate: skeletal, mountain black soil with outcrops of limestone (20 %); Vegetation cover: 75 %; Vegetation height: 60 cm (max), 20 cm (average); Sampled by Y.P. Didukh (75018) on 9 June 1975.

*Carex humilis* 30, *Festuca callieri* 20, *Filipendula vulgaris* 10, *Medicago falcata* 10, *Thymus cherlerioides* 10, *Teucrium chamaedrys* 5, *Trifolium ambiguum* 5, *Bromopsis taurica* 3, *Alopecurus vaginatus* 3, *Thymus roegneri* 3, *Hypericum linarioides* 2, *Allium rupestre* 1, *Alyssum repens* subsp. *trichostachyum* 1, *Asperula supina* 1, *Bupleurum falcatum* subsp. *cernuum* 1, *Cruciata taurica* 1, *Euphorbia petrophila* 1, *Helichrysum graveolens* 1, *Hieracium tephrocephalum* 1, *Klasea radiata* 1, *Koeleria macrantha* 1, *Phlomis herba-venti* subsp. *pungens* 1, *Pilosella bauhini* 1, *Plantago lanceolata* 1, *Potentilla taurica* 1, *Teucrium montanum* subsp. *montanum* 1, *Thalictrum minus* 1, *Veronica orientalis* 1, *Ajuga orientalis* r, *Draba cuspidata* r, *Carex otrubae* r, *Minuartia setacea* r, *Ranunculus oreophilus* r, *Thesium brachyphyllum* r, *Trinia glauca* r.

***Genisto albidae-Stipetum lithophilae* ass. nov. hoc loco**

Synonym: *Stipetum lithophilae* Didukh 1983 (ICPN Arts. 2b & 5)

*Holotypus hoc loco*: Ukraine: Crimea, Yalta City Council, Yalta Mountain Forest Natural Reserve, Yaila Ai-Petri. Lat. 44.4472 N, 34.0474 E; Altitude: 1130 m asl; Substrate: heavily eroded soil, with outcrops of carbonates (30–40 cm); Ve-

getation cover: 70 %; Vegetation height: 1 m (max), 60 cm (average); Sampled by Y.P. Didukh (rel. 80236) on 22 June 1980.

*Stipa pennata* subsp. *lithophila* 30, *Genista albidata* 30, *Carex humilis* 20, *Thymus roegneri* 30, *Helianthemum canum* subsp. *stevernii* 5, *Thymus cherlerioides* 5, *Alopecurus vaginatus* 3, *Bromopsis taurica* 3, *Paronychia cephalotes* 3, *Scorzoneria crispa* 3, *Sideritis taurica* 3, *Thalictrum minus* 3, *Teucrium chamaedrys* 3, *Asperula supina* 2, *Elymus reflexiaristatus* subsp. *strigosus* 2, *Potentilla taurica* 2, *Alyssum repens* subsp. *trichostachyum* 1, *A. tortuosum* 1, *Androsace villosa* subsp. *taurica* 1, *Anthyllis vulneraria* subsp. *pulchella* 1, *Cephalaria coriacea* 1, *Convolvulus calverti* 1, *Cytisus hirsutus* subsp. *polytrichus* 1, *Erysimum cuspidatum* 1, *Euphorbia petrophila* 1, *Festuca callieri* 1, *Filipendula vulgaris* 1, *Galium album* 1, *Koeleria macrantha* 1, *Linum tenuifolium* 1, *Pedicularis sibthorpii* 1, *Pulsatilla halleri* subsp. *taurica* 1, *Teucrium montanum* subsp. *montanum* 1, *Viola ambigua* 1, *Campanula sibirica* r, *Draba cuspidata* r, *Iberis saxatilis* r, *Seseli lehmannii* r.

***Adonido vernalis-Stipion tirsae* Didukh all. nov. hoc loco**

(*Festucetalia valesiaca*, *Festuco-Brometea*)

Synonym: *Adonido vernalis-Stipion tirsae* Didukh 1983 (ICPN Arts. 2b & 5).

*Holotypus hoc loco*: *Adonido-Stipetum tirsae* Didukh in Didukh et Mucina 2014 (see below)

Diagnostic taxa: *Adonis vernalis*, *Cerastium biebersteinii*, *Elytrigia intermedia* subsp. *trichophora*, *Paeonia tenuifolia*, *Phlomis herba-venti* subsp. *pungens*, *Poa angustifolia*, *Stipa tirsae*, *Trinia glauca*.

The *Adonido vernalis-Stipion tirsae* includes the Crimean meadow-steppe communities of the plateau-like eastern yailas at the altitudes spanning 700–1000 m. These are communities dominated by tussock-forming grasses such as *Festuca valesiaca* and *Stipa tirsae*, short-rhizome grasses (*Bromopsis taurica* and *Poa angustifolia*), and low-grown shrubs such as *Genista albidata*, *Helianthemum stevernii* and *Thymus roegneri*.

The relief of the yailas is characterised by high level of karst formation with deep mesic soils in depressions. The mean annual temperature at these altitudes spans 6.3–6.5° C (the average temp. in January and July is 3.4° C and 16° C, resp.) and the mean annual precipitation attains 550–600 mm of which most falls during the period March–October (VED, 2000). Because of high level of karst relief surface water drains quickly. These conditions lead to formation of chernozem-like soils and calcareous chernozem-like rendzinas, characterised by the high levels of soil humus (6–20%; DRAGAN, 2004).

***Adonido vernalis-Stipetum tirsae* ass. nov. hoc loco**

Synonym: *Adonido-Stipetum tirsae* Didukh 1983 (ICPN Arts. 2b & 5)

*Holotypus hoc loco*: Ukraine: Crimea, Belogorsky District, Karabi Yaila. 44.8898249 N 34.570713 E; Altitude: 850 m asl; Aspect: E; Slope: 10°; Substrate: mountain black soil; Vegetation cover: 100 %; Vegetation height: 1 m (max), 50 cm (average); Sampled by Y.P. Didukh (rel. 80244) on 25 June 1980.

*Stipa tirsae* 50, *Festuca stricta* subsp. *sulcata* 40, *Thymus kosteleckyanus* 10, *Galium album* 5, *Filipendula vulgaris* 5, *Koeleria macrantha* 5, *Helianthemum canum* subsp. *stevanii* 3, *Poa angustifolia* 3, *Achillea setacea* 1, *Adonis vernalis* 1, *Anthyllis vulneraria* subsp. *pulchella* 1, *Cerastium biebersteinii* 1, *Carex caryophyllea* 1, *Securigera varia* 1, *Euphorbia agraria* 1, *E. nicaeensis* subsp. *stepposa* 1, *Fragaria viridis* 1, *Geranium sanguineum* 1, *Helianthemum nummularium* subsp. *ovatum* 1, *Hieracium* sp. 1, *Hypericum linarioides* 1, *Inula ensifolia* 1, *Inula oculus-christi* 1, *Paeonia tenuifolia* 1, *Phlomis herba-venti* subsp. *pungens* 1, *Plantago lanceolata* 1, *Potentilla recta* 1, *Sanguisorba minor* subsp. *balearica* 1, *Prunella laciniata* 1, *Pulsatilla halleri* subsp. *taurica* 1, *Ranunculus illyricus* 1, *Teucrium chamaedrys* 1, *Teucrium capitatum* 1, *Trifolium medium* 1, *T. montanum* 1, *Veronica incana* 1, *Allium rotundum* r, *Arenaria serpyllifolia* r, *Clinopodium acinos* r, *Helictochloa compressa* r, *Lathyrus pannonicus* r.

***Veronico multifidae-Stipion ponticae* Didukh all. nov. hoc loco**

(*Festucetalia valesiaca*, *Festuco-Brometea*)

Synonym: *Veronico multifidae-Stipion ponticae* Didukh 1983 (ICPN Arts. 2b & 5)

*Holotypus hoc loco*: *Bromopsido tauricae-Stipetum ponticae* Didukh in Didukh et Mucina 2014 (see below).

Diagnostic taxa: *Aegilops triuncialis*, *Agropyron cristatum* subsp. *ponticum*, *Asperula tenella*, *Asphodeline taurica*, *Centaurea orientalis*, *Convolvulus cantabrica*, *Crupina vulgaris*, *Galium biebersteinii*, *Onobrychis arenaria* subsp. *miniata*, *Onosma rigida*, *Polygala major*, *Stipa zalesskii* subsp. *pontica*, *Veronica multifida* subsp. *capsellicarpa*.

These are the typical Crimean xeric steppes, dominated by grasses) and low shrubs. They are found in the low-altitude (seldom also in the middle-altitude) mountain belts, at altitudes up to 450 m (seldom up to 600 m) on the north-facing macroslope. Occasionally (in fragments) they are also found on the south-facing macroslope. Most these steppes are found on plateaus (*Bromopsido tauricae-Stipetum ponticae*) or on moderate slopes (not more than 30°) with shallow, erosion-disturbed soils (*Bromopsido tauricae-Asphodelinetum tauricae*).

The climate of the region of the *Veronico multifidae-Stipion ponticae* is having submediterranean features (warm summers and mild winters) as well as continental temperate climate. The mean annual temperature is between 10°C and 11.7°C and the mean temperatures in July spans 22–24°C. The annual precipitation spans 300–550 mm, most of which falls in autumn and spring. Summers are markedly dry (VED, 2000). Chernozem soils supporting these steppes on the northern macroslope have a high carbonate (7–10%) and humus status (3–15%). The brown soils on the south-facing have lower humus content (1.5–6%; DRAGAN, 2004). Floristically, the communities of this alliance are similar to the *Stipa lessingiana* communities that are common to the northern plains of the Crimea (DIDUKH, 1992).

***Bromopsido tauricae-Stipetum ponticae* ass. nov. hoc loco**

Synonym: *Elytrigio-Stipetum ponticae* Didukh 1983 (ICPN Arts. 2b & 5).

*Holotypus hoc loco*: Ukraine: Crimea, Symferopilsky District, Donskoe. 45.0375655 N, 34.2062759

E; Altitude: 300 m asl; Relief: flap top of low ridge; Substrate: black soil, 20 cm deep with outcrops of limestone rocks; Vegetation cover: 80%; Vegetation height: 1 m (max), 60 cm (average); Sampled by Y.P. Didukh (rel. 80076) on 3 June 1980.

*Stipa zaleskii* subsp. *pontica* 60, *Poa sterilis* 30 *Festuca valesiaca* 10, *Bromopsis taurica* 3, *Filipendula vulgaris* 3, *Salvia nutans* 3, *Thymus roegneri* 1, *Adonis vernalis* 1, *Prunus tenella* 1, *Asperula tenella* 1, *Bellevalia speciosa* 1, *Centaurea scabiosa* subsp. *adpressa* 1, *Cleistogenes serotina* 1, *Convolvulus cantabrica* 1, *Eryngium campestre* 1, *Euphorbia nicaeensis* subsp. *stepposa* 1, *Falcaria vulgaris* 1, *Ferulago campestris* 1, *Galium album* 1, *G. biebersteinii* 1, *Helichrysum arenarium* 1, *Koeleria macrantha* 1, *Leontodon biscutellifolius* 1, *Onobrychis arenaria* 1, *Onosma cinerea* 1, *Pimpinella peregrina* 1, *Polygala major* 1, *Potentilla recta* 1, *Sanguisorba minor* subsp. *balearica* 1, *Stachys recta* 1, *Teucrium capitatum* 1, *T. chamaedrys* 1, *Thalictrum minus* 1, *Vinca herbacea* 1, *Viola ambigua* 1, *Cerinthe minor* r, *Gypsophila glomerata* r, *Jurinea roegneri* r, *Medicago minima* r, *Scabiosa taurica* r, *Trinia glauca* r.

***Bromopsido tauricae-Asphodelinetum tauricae* ass. nov. hoc loco**

Synonym: *Asphodelinetum tauricae* Didukh 1983 (ICPN Arts. 2b & 5).

*Holotypus hoc loco*: Ukraine: Crimea, Kirov District, Sary Krym, Agarmysh Mt. 45.03416 N, 35.05076 E; Altitude: 540 m asl; Aspect: 180°; Slope: 25°; Substrate: black soil, eroded in places and exposing limestone outcrops; Vegetation cover: 60%; Vegetation height: 1 m (max), 30 cm (average). Sampled by Y.P. Didukh (rel. 78707) on 16 June 1978.

*Asphodeline taurica* 25, *Artemisia alpina* 20, *Bromopsis taurica* 3, *Festuca stricta* subsp. *sulcata* 3, *Helianthemum canum* subsp. *stevanii* 3, *Thymus roegneri* 3, *Alyssum repens* subsp. *trichostachyum* 2, *Pimpinella tragium* subsp. *lithophila* 2, *Agropyron cristatum* subsp. *ponticum* 1, *Anthyllis vulneraria* subsp. *boissieri* 1, *Asperula tenella* 1, *Bunium ferulaceum* 1, *Carex caryophylla* 1, *Centaurea orientalis* 1, *Cephalaria coriacea* 1, *Cleistogenes serotina* 1, *Cota tinctoria* 1, *Di-*

*chanthium ischaemum* 1, *Erysimum cuspidatum* 1, *Eryngium campestre* 1, *Euphorbia petrophila* 1, *Fumana procumbens* 1, *Galium glaucum* 1, *Geranium sanguineum* 1, *Jurinea roegneri* 1, *Koeleria macrantha* 1, *Leontodon biscutellifolius* 1, *Linum hirsutum* L. subsp. *hirsutum* 1, *L. tenuifolium* 1, *Medicago falcata* 1, *Muscari neglectum* 1, *Paronychia cephalotes* 1, *Phlomis herba-venti* subsp. *pungens* 1, *Poa bulbosa* 1, *Prunus tenella* 1, *Salvia scabiosifolia* 1, *Sideritis taurica* 1, *Silene densiflora* 1, *Stipa pulcherrima* 1, *Teucrium chamaedrys* 1, *Veronica multifida* subsp. *capsellicarpa* 1, *Allium* sp. r, *Alyssum alyssoides* r, *Arenaria serpyllifolia* r, *Crupina vulgaris* r, *Ferulago campestris* r, *Iris pumila* r, *Potentilla recta* r, *Scorzonera crispa* r, *Sedum acre* r, *S. hispanicum* r, *Thesium brachyphyllum* r, *Vinca herbacea* r.

***Melico tauricae-Helianthemum stevenii* ass. nov. hoc loco**

Synonym: *Melico tauricae-Paeonietum tenuifoliae* Didukh 1983 (ICPN Arts. 2b & 5).

*Holotypus hoc loco*: Ukraine: Crimea, Sevastopol City Council, Shyroke-Peredove, Samnalyk Mt. Lat. 44.4838 N, Long. 33.7740 E; Altitude: 450 m asl; Habitat: open grassland glade among woodland of *Juniperus excelsa*; Substrate: brown soil, locally eroded and exposing outcrops of limestone; Aspect: 180°; Slope: 15°; Vegetation cover: 50%; Lichen cover: 20%; Cover of surface rocks: 25%; Vegetation height: 60 cm (max), 30 cm (average); Sampled by Y.P. Didukh (rel. 80197) on 19 June 1980.

*Thymus roegneri* 30, *Helianthemum canum* subsp. *stevanii* 20, *Poa sterilis* 5, *Teucrium chamaedrys* 5, *Bromopsis taurica* 3, *Fumana procumbens* 3, *Melica taurica* 2, *Teucrium capitatum* 2, *Potentilla pedata* 1, *Anthyllis vulneraria* subsp. *boissieri* 1, *Carex caryophylla* 1, *Convolvulus cantabrica* 1, *Elytrigia caespitosa* subsp. *nodosa* 1, *Eryngium campestre* 1, *Euphorbia petrophila* 1, *Festuca stricta* subsp. *sulcata* 1, *Galium album* 1, *Inula oculus-christi* 1, *Iris pumila* 1, *Koeleria lobata* 1, *Muscari racemosum* 1, *Paeonia tenuifolia* 1, *Phlomis herba-venti* subsp. *pungens* 1, *Pimpinella tragium* subsp. *lithophila* 1, *Tanacetum corymbosum* 1, *Scorzonera crispa* 1, *Veronica multifida* subsp. *capsellicarpa* 1, *Asperula creta-*

*cea* r, *Campanula sibirica* r, *Centaurea sterilis* r, *Euphorbia myrsinites* r, *Linum austriacum* r, *Mediticago minima* r, *Ornithogalum pyrenaicum* r. Lichens: *Cladonia rangiferina* 10, *Cladonia* sp. 3.

## VALIDATION OF OTHER SUBMEDITERRANEAN CRIMEAN SYNTAXA

### ***'Diantho humilis-Velesion rigidae'***

The '*Diantho humilis-Velesion*' of KORZHENEVSKII (1990) and KORZHENEVSKII & KLYUKIN (1990) was not validly described because there was no validly described association assigned to the alliance in the protologue. The authors selected nomenclature types for all four subassociations of the '*Diantho humilis-Velesietum*' (see fine printed text below the table on page 96), however, they failed to assign unequivocally the nomenclatural type of the association. Their suggestion that the "subassociation D.-V. *elytrigietosum* should be considered the type of the association" (note: 'D.-V.' means '*Diantho humilis-Velesietum*') is not admissible from the nomenclatural point of view. It is therefore I assign here a relevé to become the holotypus and hence validate the name *Diantho humilis-Velezietum rigidae* whole the latter then become the holotypus of the *Diantho humilis-Velezion rigidae*:

### ***Diantho humilis-Velezietum rigidae* Korzhenevskii et Klyukin ex Didukh et Mucina ass. nova hoc loco**

Synonyms: '*Diantho humilis-Velesietum rigidae*' Korzhenevskii 1990 (ICPN Art. 2b); '*Diantho humilis-Velesietum rigidae*' Korzhenevskii et Klyukin 1990 (ICPN 2b & 5).

*Holotypus hoc loco*: KORZHENEVSKII & KLYUKIN (1990: rel. 15, Table pags. 92-96).

### ***Diantho humilis-Velezion rigidae* Korzhenevskii et Klyukin ex Didukh et Mucina all. nov. hoc loco**

(order uncertain, *Stipo-Trachynietea distachyae*)

Synonyms: '*Diantho humilis-Velesion rigidae*' Korzhenevskii 1990 (ICPN Art. 8); '*Diantho humilis-Velesion rigidae*' Korzhenevskii et Klyukin 1990 (ICPN Art. 5).

*Holotypus hoc loco*: *Diantho humilis-Velezietum rigidae* Korzhenevskii et Klyukin ex Didukh et Mucina 2014 (this paper)

### ***'Elytrigio nodosae-Rhoion coriariae'***

The '*Elytrigio nodosae-Rhoion coriariae*' (recte: *Elytrigio nodosae-Rhuion coriariae*') was described by KORZHENEVSKII & RIFF (2002) who assigned two associations to this alliance: the *Rapistro rugosi-Melicetum tauricae* Korzhenevskii et Riff 2002 and the *Meliloto taurici-Seselietum dichotomi* Korzhenevskii et Riff 2002. The names of these both association as well as of the alliance were, however, invalidly described because the authors failed to identify the holotypes of these syntaxa in *expressis verbis* – a requirement of the Article 5 of the ICPN (3<sup>rd</sup> ed.).

The names of the associations are also illegitimate according to ICPN Art. 29b since the despite both associations (see above) are actually scrub vegetation (hence two-layered at least) and none of the eponymous species is a shrub.

Here we validate these syntaxa as follows:

### ***Melico tauricae-Rhuetum coriariae* ass. nov. hoc loco**

*Holotypus hoc loco*: KORZHENEVSKII & RIFF (2002: Table 3, rel. 1).

Synonym: *Rapistro rugosi-Melicetum tauricae* Korzhenevskii et Riff 2002 (ICPN Art. 3k, 5 & 29b)

### ***Seseli dichotomi-Rhuetum coriariae* ass. nov. hoc loco**

*Holotypus hoc loco*: KORZHENEVSKII & RIFF (2002: Table 4, rel. 3)

Synonym: *Rapistro rugosi-Melicetum tauricae* Korzhenevsky et Ryff 2002 (ICPN Arts. 3k, 5 & 29b).

### ***Elytrigio nodosae-Rhuion coriariae* Korzhenevskii et Riff ex Didukh et Mucina all. nov. hoc loco**

(*Paliuretalia, Rhamno-Prunetea*)

Synonym: '*Elytrigio nodosae-Rhoion coriariae*' Korzhenevskii et Riff 2002 (ICPN Art. 5)

*Holotypus hoc loco*: *Melico tauricae-Rhuetum coriariae* Didukh et Mucina 2014 (this paper, see above)

Diagnostic species: *Elymus nodosus*, *Melica taurica*, *Melilotus tauricus*, *Rhus coriaria*.

*Paliuretalia* Trinajstić 1978 (*Rhamno-Prunetea* Rivas Goday et Borja Carbonell ex Tx. 1962).

This alliance accommodates low submediterranean scrub on marl slopes of Crimea and should be classified not within the *Onosmo polyphyllae-Ptilostemonetea* Korzhenevskii 1990 (recte: *Drypideatea spinosae* Quézel 1964), but rather within the

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## APPENDIX 1

Nomenclatural (and taxonomic) crosswalk between the traditional Ukrainian usage and the nomenclature as currently featured in Euro+med PlantBase.

Ukrainian nomenclatural tradition	Euro+Med PlantBase (www.emplantbase.org)
<i>Acinos arvensis</i> (Lam.) Dandy	<i>Clinopodium acinos</i> (L.) Kuntze
<i>Agropyron ponticum</i> (Nevski) Tzvelev	<i>Agropyron cristatum</i> (L.) Gaertner
<i>Allium jailae</i> Vved.	<i>Allium scorodoprasum</i> subsp. <i>jailae</i> (Vved.) Stearn.
<i>Alyssum trichostachyum</i> Rupr.	<i>Alyssum repens</i> subsp. <i>trichostachyum</i> (Rupr.) Hayek
<i>Amygdalus nana</i> L.	<i>Prunus tenella</i> Batsch
<i>Androsace taurica</i> Ovcz.	<i>Androsace villosa</i> subsp. <i>taurica</i> (Ovcz.) Fed.
<i>Anthemis tinctoria</i> L.	<i>Cota tinctoria</i> (L.) J. Gay
<i>Anthyllis biebersteinii</i> Popl.	<i>Anthyllis vulneraria</i> subsp. <i>pulchella</i> (Vis.) Bornm.
<i>Anthyllis taurica</i> Juz.	<i>Anthyllis vulneraria</i> subsp. <i>boissieri</i> (Sagorski) Bornm.
<i>Artemisia caucasica</i> Willd.	<i>Artemisia alpina</i> Willd.
<i>Artemisia repens</i> Pall. ex Willd.	<i>Artemisia austriaca</i> Jacq.
<i>Asperula caespitans</i> Juz.	<i>Asperula supina</i> subsp. <i>caespitans</i> (Juz.) S. Pyatunina
<i>Asperula galioides</i> M. Bieb.	<i>Galium glaucum</i> L.
<i>Asperula vestita</i> V. I. Krecz.	<i>Asperula cretacea</i> Willd.
<i>Asperula stevenii</i> V. I. Krecz.	<i>Asperula tenella</i> Degen
<i>Bellevalia sarmatica</i> (Pall. ex Georgi) Woronow	<i>Bellevalia speciosa</i> Woronow ex Grossh.
<i>Botriochloa ischaemum</i> (L.) Keng	<i>Dichanthium ischaemum</i> (L.) Roberty
<i>Bupleurum exaltatum</i> M. Bieb.	<i>Bupleurum falcatum</i> subsp. <i>cernuum</i> (Ten.) Arcang.
<i>Campanula taurica</i> Juz.	<i>Campanula sibirica</i> L.
<i>Centaurea adpressa</i> Ledeb.	<i>Centaurea scabiosa</i> subsp. <i>adpressa</i> (Ledeb.) Gugler
<i>Cephalaria coriacea</i> (Willd.) Steud.	<i>Cephalaria coriacea</i> (Willd.) Roem. & Schult. ex Steud.
<i>Chamaecytisus polytrichus</i> (M. Bieb.) Rothm.	<i>Cytisus hirsutus</i> subsp. <i>polytrichus</i> (M. Bieb.) Hayek
<i>Convolvulus bracteosus</i> Juz.	<i>Convolvulus calvertii</i> Boiss.
<i>Coronilla varia</i> L.	<i>Securigera varia</i> (L.) Lassen
<i>Crinitaria villosa</i> (L.) Cass.	<i>Galatella villosa</i> (L.) Rchb. f.
<i>Elytrigia nodosa</i> (Nevski) Nevski	<i>Elymus nodosus</i> (Nevski) Melderis
<i>Elytrigia strigosa</i> (M. Bieb.) Nevski	<i>Elymus reflexiaristatus</i> subsp. <i>strigosus</i> (M. Bieb.) Melderis
<i>Elytrigia triochophora</i> (Link) Nevski	<i>Elymus hispidus</i> subsp. <i>barbulatus</i> (Schur) Melderis
<i>Euphorbia stepposa</i> Zoz ex Prokh.	<i>Euphorbia nicaeensis</i> subsp. <i>stepposa</i> (Zoz) Greuter & Burdet
<i>Ferulago taurica</i> Schischk.	<i>Ferulago campestris</i> (Besser) Grec.
<i>Festuca rupicola</i> Heuff.	<i>Festuca stricta</i> subsp. <i>sulcata</i> (Hack.) Patzke ex Joch. Müll.
<i>Helianthemum stevenii</i> Rupr. ex Juz. & Pozdeeva	<i>Helianthemum canum</i> subsp. <i>stevenii</i> (Rupr. ex Juz. & Pozd.) M. Proctor
<i>Helictotrichon tauricum</i> Prokud.	<i>Helictochloa compressa</i> (Heuff.) Romero Zarco
<i>Hieracium bauhinii</i> Besser	<i>Pilosella piloselloides</i> subsp. <i>bauhinii</i> (Schult.) S. Bräut. & Greuter
<i>Hieracium tephropodum</i> (Zahn) Üksip	<i>Hieracium tephrocephalum</i> Vuk. ex Nyman
<i>Hypericum tauricum</i> R. Keller	<i>Hypericum linarioides</i> Bosse
<i>Inula aspera</i> Poir.	<i>Inula salicina</i> subsp. <i>aspera</i> (Poir.) Hayek
<i>Jurinea sordida</i> Steven	<i>Jurinea roegneri</i> K. Koch.
<i>Kengia serotina</i> (L.) Packer	<i>Cleistogenes serotina</i> (L.) Keng.
<i>Koeleria cristata</i> (L.) Pers.	<i>Koeleria macrantha</i> (Ledeb.) Schult.
<i>Leontodon asper</i> (Waldst. & Kit.) Poir.	<i>Leontodon biscutellifolius</i> DC.

## Ukrainian nomenclatural tradition

## Euro+Med PlantBase (www.emplantbase.org)

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<i>Linum lanuginosum</i> Juz.	<i>Linum hirsutum</i> L. subsp. <i>hirsutum</i>
<i>Onosma taurica</i> Pall.	<i>Onosma cinerea</i> Schreb.
<i>Ornithogalum flavescens</i> Lam.	<i>Ornithogalum pyrenaicum</i> L.
<i>Otites densiflora</i> (d'Urv.) Grossh.	<i>Silene densiflora</i> d'Urv.
<i>Phlomis taurica</i> Hartwiss ex Bunge	<i>Phlomis herba-venti</i> subsp. <i>pungens</i> (Willd.) Maire ex DeFilipps
<i>Pimpinella lithophila</i> Schischk.	<i>Pimpinella tragium</i> subsp. <i>lithophila</i> (Schischk.) Tutin
<i>Pimpinella taurica</i> (Ledeb.) Steud.	<i>Pimpinella peregrina</i> L.
<i>Potentilla depressa</i> Will. ex Schlecht.	<i>Potentilla microphylla</i> var. <i>depressa</i> Wall. ex Lehm.
<i>Poterium polygamum</i> Waldst. & Kit.	<i>Sanguisorba minor</i> subsp. <i>balearica</i> (Nyman) Muñoz Garm. & C. Navarro
<i>Pulsatilla taurica</i> Juz.	<i>Pulsatilla halleri</i> subsp. <i>taurica</i> (Juz.) K. Krause
<i>Pyrethrum corymbosum</i> (L.) Scop.	<i>Tanacetum corymbosum</i> (L.) Sch. Bip.
<i>Rumia crithmifolia</i> (Willd.) Koso-Pol.	<i>Trinia crithmifolia</i> (Willd.) H. Wolff
<i>Senecio jailicola</i> Juz.	<i>Tephrosia integrifolia</i> subsp. <i>jailicola</i> (Juz.) Greuter
<i>Serratula radiata</i> (Waldst. & Kit.) M. Bieb.	<i>Klasea radiata</i> (Waldst. & Kit.) Á. Löve & D. Löve
<i>Sideritis comosa</i> (Rochel ex Benth.) Stank.	<i>Sideritis montana</i> var. <i>comosa</i> Rochel ex Benth.
<i>Sideritis taurica</i> Steph. ex Willd.	<i>Sideritis syriaca</i> L.
<i>Stipa pontica</i> P. Smirn.	<i>Stipa zalesskii</i> subsp. <i>pontica</i> (P.A. Smirn.) Tzvelev
<i>Stipa lithophila</i> P. Smirn.	<i>Stipa pennata</i> subsp. <i>lithophila</i> (P. Smirn.) Martinovský
<i>Teucrium jailae</i> Juz.	<i>Teucrium montanum</i> L. subsp. <i>montanum</i>
<i>Teucrium polium</i> sensu auct. ucrain., non L.	<i>Teucrium capitatum</i> L.
<i>Thymus callieri</i> Bord. ex Velen.	<i>Thymus roegneri</i> K. Koch
<i>Thymus dzevanovskyi</i> Klokov & Des.-Shost.	<i>Thymus kosteleckyanus</i> Opiz
<i>Thymus hirsutus</i> M. Bieb.	<i>Thymus cherlerioides</i> Vis.
<i>Thymus tauricus</i> Klokov & Des.-Shost.	<i>Thymus cherlerioides</i> Vis.
<i>Veronica capsellcarpa</i> Dubovik	<i>Veronica multifida</i> subsp. <i>capsellcarpa</i> (Dubovik) Elen.
<i>Veronica taurica</i> Willd.	<i>Veronica orientalis</i> Mill.

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