ANNALES HISTORICO-NATURALES MUSEI NATIONALIS HUNGARICI
Tomus 56, PARS BOTANICA 1964.

Data to the Systematics of the Sectio Bulbosae of the Genus Koeleria IV.

By J. Ujhelyi, Budapest.

The present paper contains some results concerning my investigations on the Sectio *Bulbosae* Subsectio 4. *Splendentes*, as defined by Domin, of the genus *Koeleria*. Aside of the Subsections discussed previously, this group is maybe the most heterogeneous, and thus presents more than the usual amount of difficulties in the solution of the several problems. It is especially striking in this subsection that the species allocated to it by Domin do not as a rule belong here, the similarities as to habits being evoked by similar conditions (incrassate base, glabrous spikelets, whole leaf-sheaths).However, on the basis of my previous studies I may confidently assert that the taxonomical grouping of any other genus of the family Gramineae is just as arbitrary in general, and is just as far from reflecting phylogeny.

Even the area itself of Domin's subsection betrays the heterogenity of the taxa relegated to it. Aside of the Mediterranean, it has representatives in the Alps, in Transylvania, in the Northern Carpathians, and on the Ukrainian styepps. Domin and some succeeding authors hoarded, with some changes, all those species into this subsection which have bulbously incrassate bases, and whose withered leaf-sheaths remain whole (therefore the epiderm durable) and are of about equal length, hence not imbricate.

All the taxa are xerothermous, inhabiting the Mediterranean and the above listed areas, therefore their oecological requirements are nearly uniform. Their habits closely recall those of the Series *Caudatae* Ujh., and the Series *Setaceae* Ujh. The name of the subsection, *Splendentes*, is due to the shiny, glabrous spikelets.

In the present paper, I wish to submit the clarification of Domin's collective species, *Koeleria splendens* Presl. Aside of *Koeleria caudata* (Link) Steudel, relegated to this subsection, but taxonomically and systematically already revised (9), no other species shall be discussed.

The basis of also this revision is my investigations on living materials now studied for some years, as well as my views evolving during my taxonomical works on the genus *Sesleria*. The special stress made on this point is due to the fact that there were, in the present case, no examinations made on explicitly living materials; I became acquainted with most of the taxa merely from herbaria. Histological investigations, however, coupled with morphological ones, entitle me to draw relevant conclusions in the assessment of the taxa as to their satisfactory allocation.

As an example for justification, I refer to my latest paper (11), in which I implied that *Koeleria andreánszkyi* Ujh., and *Koeleria castellana* Boiss. & Reuter have, on the basis of investigations, a diploid grade, while *Koeleria pauneroi* Ujh., is a tetraploid plant. Cytological examinations made on duplicate specimens received from colleague Elena Paunero, Madrid, have proved that such indeed is the case.

Of the 15 varieties, relegated by Domin to this species „7. *K. splendens* Presl" some proved to be distinct species which are allies, or members of a higher level of the respective polyploid series, of certain taxa allocated to his Sectio *Caespitosae*. They had, in all probability, easily acclimatized themselves to changes in climate, while the original species have moved to other territories.

In the course of my work, I had detected a number of distinct series. Due to available space, however, I had to confine myself to the taxonomical working out of the Series containing also PRESL's *Koeleria splendens*, nomenclative of the original Subsection. I disregard those taxa whose original specimens, or at least authentic exemplars supplied with DOMIN's revisional label, I had no occasion to study.

In the listing of the herbarial data, I omit to indicate those which refer to plants deposited in the Botanical Department of the Hungarian Natural History Museum. The list of abbreviations used for other Collections is as follows: **Hb. U. Z.** = Herbarium of the Botanical Institution of the University of Zürich; **Hb. Tirana** = Herbarium of the Botanical Institution of the University of Sciences, Tirana, Albania; **Hb. Pénzes** = Herbarium of Dr. A. PÉNZES, Budapest; **Hb. Boros** = Herbarium of Dr. Á. BOROS, Budapest.

Epidermal preparations had been made, by my method, from the majority of the many hundreds of herbarial sheets of the research material. They have been made by colleague T. ASBÓTH, preparator of the Museum.

Series V. **Subcaudatae** UJHELYI

Ann. Hist.-nat. Mus. Nat. Hung. **54.** 1962, p. 210

Culmis glabris, foliis innovationum planis, vel convolutis, paniculis cylindricis, glumis et paleis acuminatis.

On the basis of the examined specimens, the area of the Series is confined to Sicily, the Apennine Peninsula, and the Western Balkan (Illyricum); it does not extend to Greece. All data published from the latter territory invariably refer to species of other series. Specimens collected in barren places of the macchia-zone are generally stunted as related to their specific sizes, while others, taken from deforestated areas or sites otherwise altered (due to anthropogeneous interventions), have ramifying spikes and larger statures than usual for their species. Even in undisturbed localities and where water supplies are more favourable, their rhizomes are larger, more elongate, hence their lawn looser; also the innovational leaves longer, the spikes bulkier. Specimens like these are easily confused with *Koeleria montana* (HAUSM.) DALLA-TORRE. This is the cause why a number of *Koeleria montana* (HAUSM.) DALLA-TORRE have been identified as *Koeleria splendens* PRESL, but the reverse case is also frequent. Thus the situation is the same as with the Series *Setaceae* UJH. (11).

Similarly to the preceding Series, all of the present species are highly variable. There are forms with elongate and squat, entirely glabrous and minutely hairy to punctulate or less shiny, spikelets, to the respectively more cylindrical or thickset panicles. No special systematical significance should be ascribed to them.

The Series is characterized by the glabrous, or only sparsely prickle-haired, underside of the leaves (these features generally merely vestigial). The culm is similarly glabrous, with only the panicular pedicels hairy. The panicle itself is invariably pale, mainly pale yellowish, usually greenish till flowering time. All these traits stand in conformity with the xerothermous habitats.

The Series contains three species. While the first one occurs in Italy as well as in the Illyricum, the second only in the latter area, while the third, a hexaploid, lives exclusively in Sicily, Italy, and Opatija (Abbazia). None of the specimens originating from the Balkan belongs to the hexaploid species.

Common for the three species are the gracile glumae and paleae, with at most the upper glume expanding apically. Their apices are not as elongate as those belonging to the alliance *Koeleria glaucovirens* DOM. Mainly the tetraploid exemplars (and especially if examined merely by external, habitual traits), are often hardly distinguishable from unscientifically collected specimens of *Koeleria mon-*

tana (HAUSM.) DALLA-TORRE or *Koeleria carniolica* KERNER. One is often perplexed by exemplars collected prior to flowering time, since, in this stage, the habits of the spikelet is still covered by the large upper glume characteristical of both the two former species and the Series *Subcaudatae*; the spikelets also lean towards each other, hence the panicle itself is seemingly more compact. In such cases, only the structure of the leaf epiderm can render orientation. A great number of histological surveys affords the eye with the ability to discern the structures, that is, their differences, of the two species. By this means, and the concurrent assessing of the several characteristics, even dubious cases can be correctly identified.

18. **Koeleria subcaudata** (ASCH. & GR.) UJHELYI sp. n. Ann. H'st.-nat. Mus. Nat. Hung., **54**, 1962, p. 210 (nomen nudum).

Syn.: *Koeleria splendens* PRESL, auct. plur. — *Koeleria splendens* PRESL B. *K. eu-splendens A. grandiflora* II. *subcaudata* A. & Gr. (Synopsis der Mitteleuropäischen Flora, **2**, 1900, p. 360). — *K. splendens* Spsp. *subcaudata* (ASCHERS. & GR.) DOMIN, Monographie der Gattung Koeleria (Bibl. Bot., Stuttgart, 1907. Heft 65, p. 97). — *Koeleria cristata* var. *bulbosa* BORB. (in Herb., 1883). — *K. splendens* PRESL *E. subcaudata* A. & GR. HAYEK, A. & MARKGRAF, FR. (Prodromus Florae Peninsulae Balcanicae, **3**, 1932, Rep. spec. nov. regni veget. Beihefte Bd. 30). — *K. splendens* PRESL var. *subcaudata* A. & GR., DEGEN, Á. (Flora Velebitica, **1**, 1936, p. 531).

Plantae dense caespitosae, innovationibus intravaginalibus, altitudine 30—35 cm. Vaginae foliorum glabrae, vel adpresse hirsutae, integrae. Rhizomata brevia. Folia senilia usque 6 cm longa, et 1,5 mm lata, glaucescentia, glabra, in parte inferiore ciliata, margine incrassata, scabriusculave; folia juvenilia usque 3 cm longa, et 0,5 mm lata, plerumque convoluta, glabra, vaginis 1 cm longis. Culmi plantarum evolutarum, ad dimidiam partem altitudini, foliosa, laminae foliorum culmeorum usque 3 cm longae, vaginis auriculatis, usque 7 cm longis, marginibus ciliatis. Ligulae 0,5 mm longae, paulo bivalvae. Caules basi bulboso-incrassati, ad 25 cm longi, et 0,5 mm crassi, graciles, glabri. Paniculae angustae, cylindricae, vel sublobatae, usque 6 cm longae, et 5 mm crassae. Spiculae 4—5 mm longae, biflorae, glabrae, punctulis emergentibus nitidae. Glumae inaequales, inferiores 3,5 mm longae, lanceolatae, superiores 4,5 mm longae, subovatae, lemmae usque 3,5 mm longae, angustae, acutae, paleae angustae, hyalinae, bicarinatae, 0,4 mm longae.

Cellulae epidermidis inferioris foliorum innovationum parvae. Series cellularum costalium 4—5. Floret Maio—Junio.

Habitat in Italia meridionali et in Istria, Croatia, Dalmatia, Montenegro, et in Albania.

Holotypus adest in Herbario Musei Nationalis Hungarici Budapestini.

Locus classicus: In valle Draga ad Flumen; Flora litoralis Hungariae, 31/7 1883, Dr. V. BORBÁS, *sub nomine* Koeleria cristata *var.* bulbosa BORB., *Schedula* DOMINI: Koeleria subcaudata (ASCHERS. & GR.) DOMIN,

Though ASCHERSON & GRAEBNER did not indicate any type of their subspecies, even failing to designate a locality except for a very short German text, I still use the name *subcaudata* to designate the new species in view of the fact that DOMIN, although interpreting it with various definitions of rank and not always accurate delimitations, invariably meant this species under the above name.

S p e c i m i n a e x a m i n a t a: Italia australis: Apulia: Gargano, in past. et rupibus mts. St. Angelo, mts. Calco etc., solo calcareo, 1500—2000', PORTA & RIGO, No 473, sub nomine *Koeleria splendens* PRESL, *Koeleria crassipes* LANGE; monte Gargano: Monte Calvo, Gipfelplateau, trockene Staudenflur, Kalkfels mit

etwas Rotlehm, 100 m, Monfalcone, St. Antonio Doberdo, A. PÉNZES (Hb. Pénzes); in apricis, solo calcareo, Alt. 4—500 m, Divaccia, versus S. Causiano, A. PÉNZES (Hb. Pénzes); sterile Abhänge Pa. Chermada (Südspitze von Istrien) Kalk, 15 m, J. FREYN (J. FREYN: Pflanzen aus Österreich—Ungarn, Nr. 765, sub nomine *Koeleria splendens* PRESL, *K. crassipes* A. KERN., an LANGE?).

In his „Monographie", DOMIN cites incorrectly *K. crassipes* FREYN as the synonym of 8. var. *subcaudata* (ASCHERS. & GR.) DOMIN, since in the cited paper of FREYN, on page 464, the designation is 994. *K. crassipes* LANGE & WILLK, l. c. 76. (4), the same as on the herbarial labels of the plants collected by him. On other sheets, and by the same name, also the tetraploid *Koeleria borbásii* UJHELYI can be found. In LANGE's time, authors regarded these plants with smaller, compacter and more cylindrical panicles as well as incrassate bases as LANGE's Spanish *Koeleria crassipes*, due to the similarity of habits of the two species. The smaller specimens of the Series, originating from the dry, hot macchia also resemble, as to habits, exemplars of a smaller stature of the Series *Caudatae* UJHELYI. V. BORBÁS, too, termed the plants *Koeleria cristata* var. *bulbosa* BORB. due to their very small-sized stature. His keen eye had discerned, even at that time, the specific character of the differences in size, since it was he who distinguished the diploid *Koeleria cristata* (L.) PERS. em BORBÁS from *Koeleria majoriflora* BORBÁS, of which it was found later that it is the tetraploid of the former (9). In the present case, — and because the incrassate base was quite striking — he named the variety after this very feature of the plant.

In his paper cited above, J. FREYN gives, by the way, a very detailed description, joined with a systematical assessment, showing that he considers the plant as equivalent with *Koeleria cristata* (L.) PERS. He identifies his plant with PORTA & RIGO's exsiccate specimen No 473, and notes that it is an ally of BERTOLINI's *Koeleria grandiflora*. From this it differs, he says, by its smaller flowers. The original exemplar of LANGE's *Koeleria crassipes* is in our collection. The plant, as regards external habits, is actually very near to J. FREYN's cited specimen (10).

Croatia: In apricis graminosis lapidosis ad Kostrena St. Barbara (Sercsica) et Buccari, L. SIMONKAI; in declibivus sterilibus p. Kostrena Sta. Barbara. Á. DEGEN; Schedula DOMINI: *Koeleria grandiflora* BERTOL. f. *humilior* m. DOMIN; in calcareis ad Kostrena Sveta Barbara, 10—100 m, Á. BOROS (Hb. Boros); Fiume in saxosis herbosis vallis Recina, G. LENGYEL; Quarnero, Susak, in saxosis pr. pag. Grobnik, S. JÁVORKA; Velebit, in rupestribus sinus Zavratnica pr. Jablanac, Á. DEGEN. The 6—8 cm tall specimens, taken from wholly sterile crevices of cliffs, had probably become quite stunted; Velebit, in summis jugis montis Visocica supra Pocitelj, 1500m, Á. DEGEN. Schedula DOMINI: *Koeleria splendens* PRESL v. *subcaudata* A. & G. subvar. *procellicola* m. subvar. n. DOMIN; Velebit, in lapidosis jughi Buljma supra Medak, 1400 m, Á. DEGEN, sub nomine *subcaudata* A. & GR. subvar. *procellicola* DOMIN. These plants, as well as some other collected materials of stunted aspect, had unmistakably grown in small crevices of karst lime cliffs, betrayed by the minute, pad-like, stature and the small leaves (not longer than 1—2 cm) of the specimens. In his great work on the Flora of the Velebit (2), Á. DEGEN mentions (Vol. I., p. 531) DOMIN's subvarietas *procellicola* DOMIN, presented only on the herbarial sheet cited above, with the following remark: „Auf hohen, eminent der Bora ausgesetzten Gräben, hier dicke, knollige Rasen bildend, welche ganz kurze Halme treiben. Süd—Velebit. Auf der Visoči bei Pocitelj; Buljma—Pass oder Medak (DEGEN)". The short citation also indicates the phenotypic possibilities arising from extreme habitat conditions.

Velebit: In lapidosis humosis inter Jablanac et Allan, Á. DEGEN. A specimen of extremely short leaf-sheaths, of 2 cm long culms. Schedula DOMINI: Durch die kleinere Aerchen etwas zu der var. *subcaudata* ASCHERS. & GR. vergens; in lapidosis prope Carlopago, A. SMOGUINA. Schedula DOMINI: *K. splendens* PRESL v. *pseudorigidula* DOM. Rev.: Dr. K. DOMIN. On two other specimens of the same collecting: Schedula DOMINI: *Koeleria grandiflora* BERTOL. ad *subcaudata* A. & GR. vergens DOMIN. This collecting contains mixed materials. One of the species is *Koeleria subcaudata* (ASCH. & GR.) UJH., with thin, short, convolute leaves; the other is *Koeleria montana* (HAUSM.) DALLA-TORRE, badly preserved and collected specimens of merely the flowering culms without bases. Velebit: in rupestribus calc. montis Badány ad Ostarija, V. BORBÁS (Hb. U. Z.); trocken Ort am Velebit bei Ostariae, TH. PICHLER. Schedula DOMINI: *Koeleria splendens* ad *K. subcaudata* ASCHERS. &

GR. vergens DOMIN; Velebith, in declivibus petrosis apricis montis Laginatz prope Ostarije, solo calc. 1500 m, PICHLER (Flora Exsiccata Austro—Hungarica, 695. *Koeleria gracilis* PERSOON); in monte Alaginac ad Ostarija, L. Rossi; in lapidosis montis Alaginac prope Ostarijam, Á. DEGEN, sub nomine *Koeleria splendens* PR. f. *colorata* DOMIN; in lapidosis inter Ostarijam et Ravni Dabar, Á. DEGEN; in Alancic supra Alan, 1600 m, G. LENGYEL; in pratis lapidosis siccis ad Sugarka Doliba, 1000 m, Á. DEGEN. Dalmatia: In m. Tulove Grada supra Podrag, 1000 m, G. LENGYEL. Schedula DOMINI: *K. splendens* PRESL var. *subcaudata* ASCHERS. & GR.; in lapidosis ad Bilisane, Á. DEGEN; in lapidosis sub cacumine „Viserujno" supra Starigrad, 1200 m. Á. DEGEN; in rupestribus alvei „Velika Paklenica" pr. Starigrad, B. J. KÜMMERLE; Starigrad, Á. DEGEN. Schedula DOMINI: *K. splendens* PRESL v. *subcaudata* A. & GR.; Rev.: Dr. K. DOMIN; Starigrad, G. LENGYEL; Gravosa Brgad, W. GUGLER; in reg. super montis Mossor pr. Spalato, Á. DEGEN. Schedula DOMINI: *K. splendens* PRESL var. *subcaudata* ASCHERS. & GR.: Narjan bei Split, 100 m, Macchie, Sandt, F. MARKGRAF, sub nomine *Koeleria glauca* DC. (Det. SUESSENGUTH), dupl. ex coll. Prof. MARKGRAF; in saxosis mt. Peklen, L. ADAMOVIC (Hb. U. Z.); in rupestribus ad cacumen „Troglav" montis Biokovo, ST. KOCSIS. Schedula DOMINI: *Koeleria splendens* PRESL v. *subcaudata* ASCHERS. & GR. Rev.: Dr. K. DOMIN; in rupestribus regionis superioris montis Biokovo ad Makarskam, St. Kocsis. Schedula DOMINI: *Koeleria splendens* PRESL; in lapidosis ad Libinje, Á. DEGEN. Herzegovina: Mostar, am serbischen Friedhofen, 200 m, C. BAENITZ (Dr. C. BAENITZ Herbarium Europaeum No, *Koeleria grandiflora* BERTOL. Dr. K. DOMIN [Hb. U. Z.]). Montenegro: Djanova Brda, BIERBACH; Orlov Rosch, BIERBACH; Pressekija, BIERBACH. Only a part of the sheet belongs there; Zamarski, J. ROHLENA. Albania: Distr. Klemeni. Steinige Weideplätze bei Grabom, I. DÖRFLER (Reise im albanisch—montenegrischen Grenzengebiete i. 1914, No. 171); Albania media, in saxosis ad pag. Kruja. In solo saxo arenaceo, S. JÁVORKA & UJHELYI; Zogaj, M. DEMIRI (Hb. Univ. Tirana).

Description of the leaf epiderm: on the abaxial side of the innovational leaves, the walls of the senile leaves are strongly sinuous, the costal zone 4—5-seriate. The cells of the basic tissue are relatively short, hence the silica bodies, single or rarely double, are spaced relatively densely, cubicoid or very shortly cross-shaped; the intercostal zone is 6—8-seriate, the walls of the relatively broad basic cells are punctulately incrassate; since the zone is concave in cross-section, its surface is foveolate, in the slides the walls usually push upon one another, the stomata in 1—3 rows medially of the zone. The stomata are small, narrow. The structure of the juvenile leaves resemble that of the senile ones, except for the rather straight walls of the epidermal cells, and the single cellular rows being narrower. The epidermal structure of *Koeleria subcaudata* (ASCH. & GR.) UJH. is similar to that of *Koeleria andreanszkyi* UJH. or *Koeleria pauneroi* UJH., with the exception that, due to the even more xerothermous habitat, the cells of the basic tissues are shorter, hence the silica bodies appear in greater numbers and their walls are still more sinuous (Plate II, figs 1,2; Plate III, fig. 1).

The plant is generally 30—35 cm high, of an explicitely gracile stature. This height is attained, in normal habitats, in the mature state. Flowering specimens are usually 20—25 cm high. Naturally, owing to partly the devastation of the soil substratum in the macchia or oak regions of the Mediterranean, differences as to size are great also in this species. While there had been collected 8—10 cm high exemplars in the crevices of the karstic, barren lime rocks, there grow specimens of ample innovation, differing from the characteristic habits of the plant, in less degraded sites of a deeper humus layer, and still more so in the disturbed, ruderal places.

Despite the fact that the plant lives partly in South Italy, partly in the Illyricum, its habits are rather uniform. The leafsheath is glabrous or of an entirely recumbent hirsuteness. The glabrous state is related to the hot, dry summer habi-

tats. Specimens grown in localities richer in humus show well the very tiny hairs, to be found also on the inner sheaths (protected by the outer ones) of the exemplars grown in the former habitat. Dissimilarly to the members of the Series *Caudatae* UJH., or the Series *Setaceae* UJH, whose senile leaves can usually be found no more on the majority of specimens, the short rhizomes are generally covered by the senile leaves. They are 1.5 mm wide, expanding or weakly convolute, glaucescent, with only seldom some few scattered prickle-hairs, or their vestigies, on the undersides. The senile leaves are ciliately margined usually toward their bases, the margins of the leaves being often cartilaginous or scabriusculous.

On the other hand, the juvenile leaves are convolute, setaceous. The culm-leaves usually extend to the middle of the culm, mostly expanding. Their sheaths are glabrous, 6—8 cm long, with long cilia along their margins. The culm is gracile, at most 0,5 mm thick; there are hardly any deviations: it might be thinner in KARL DOMIN's var. *procellicola*, but also 0.7 mm thick in robuster specimens. Since this is the species which grows in the most xerothermous sites, it is understandable that the bases are manifestly incrassate, bulbous. The panicle is less ramifying, the pedicelli extremely small, and the spikelets are also fewer than in its derivatives of a higher ploid level. Hence the panicle is thin, cylindrical. The spikelets are apically distending, characteristical of the entire Series. The lower glumes are awl-shaped, generally 3.5 mm long, the upper ones wider, acute. The lemmae are also narrow, often involutely margined, frequently with extremely tiny hairs, or punctulate due to the bases of the hairs (Plate I, fig. 1).

This most ancient, diploid species of the Series *Subcaudatae* USHELYI was not recognized for a long time. The first collectors identified it, due to its very xeromorphous nature, as *Koeleria crassipes* LANGE, described from Spain, or simply as *Koeleria cristata* (L.) PERS. Later, it was identified with the robust, hexaploid *Koeleria splendens* PRESL em. UJH., disregarding the conspicuous differences in size.

ASCHERSON & GRAEBNER, in their interminably subdivided Synopsis (1), mentioned it as a variety at the end of a long hierarchic list. In 1904, DOMIN elevated it to the rank of subspecies. In his conception, assuming transitions and based on habits, though modern at that time, the delimitation of the taxon is still indistinct. In his monography published in 1907 (4), the plant is treated as merely a variety, mixed up with other species in the subsequently enlargened research material. The variety accepts all the small-sized specimens which show more incrassate bases, low culms, and squatter panicles. The measurements and features of the spikelets had been disregarded. In this way, there were relegated either to var. *subcaudata* (ASCH. & GR.) DOMIN, or to tetraploid *Koeleria borbasii* UJHELYI specimens, or small-sized exemplars of *Koeleria carniolica* KERNER. The confusion was due mainly to the almost equal areas of the first two species of the Series, since, owing to the very degradation, the two species occur together in several places. In Hungary, the situation is quite similar with *Koeleria cristata* (L.) PERS, em. BORB. and its tetraploid derivation, *Koeleria majoriflora* BORB., growing side by side in secondary lawns following deforestations in many places, but which do not, of course, cross with each other owing to the cytological isolation.

The plant lives in the lower regions of its area, in the macchia and oak zones. Accordingly, it inhabits strictly xerothermous habitats. Hence, as related to the other species of the Series, its innovational leaves are the shortest, the juvenile leaves expressedly setaceous, the rhizom (contrary to that of the tetraploid level

Koeleria borbasii UJHELYI) invariably very short, the same as the leaf-sheath. I never saw a species of looser habit or longer rhizom.

19. **Koeleria borbasii** UJHELYI sp. n.

Syn.: *Koeleria splendens* PRESL, p. p. (Cyperaceae et Gramineae Siculae, Pragae, 1820, p. 34) — *Koeleria grandiflora* BERTOLINI, apud ROEMER, J. J. & SCHULTES A. (Mantissa, **2.** Stittgardia 1824, p. 345, p. p.) — *Koeleria splendens* PRESL 1. var. typica DOMIN, p. p. (Monographie der Gattung Koeleria, Bibl. Bot. Stuttgart, 1907, Heft 65, p. 91) — *Koeleria splendens* PRESL 3. var. *pyramidata* DOMIN p. p. (Monographie der Gattung Koeleria, Bibl. Bot. Stuttgart, 1907, Heft 65, p. 94) — *Koeleria splendens* PRESL 6. var. *pseudorigidula* DOMIN, p. p. (Monographie der Gattung Koeleria, Bibl. Bot. Stuttgart, 1907, Heft 65, p. 96) — *Koeleria splendens* PRESL 8. var. *subcaudata* (ASCHERS. & GR.) DOMIN (Monographie der Gattung Koeleria, Bibl. Bot., Stuttgart, 1907, Heft 65, p. 97) — *Koeleria gracilis* n. f. *subglabra* G. BECK, in BAENITZ (Herbarium Europaeum No 10102) — *Koeleria cristata* P. n. f. *argentea* G. BECK p. p. (in C. BAENITZ, Herbarium Europaeum).

Plantae dense caespitosae, innovationibus intravaginalibus, altitudine 45—50 cm. Vaginae foliorum pilis parvis hirsutae, vel glabriusculae, integrae. Rhizomata brevia. Folia senilia usque 13 cm longa, et 2 mm lata, viridula, glabra, margine ciliata, folia juvenilia basi ciliata, usque 16 cm longa, et 1 mm lata, convoluta, glabra, vaginis 2 cm longis. Culmi plantarum evolutarum ad duas partes tertias altitudinis foliosa, laminae foliorum culmeorum usque 6 cm longae, vaginis parum auriculatis, glabris. Ligulae 1 mm longae, paulo bivalvae. Caules basi parce bulboso-incrassati, ad 38 cm longi, et 1 mm crassi, glabri. Paniculae ovato-cylindricae, vel sublobatae usque 10 cm longae, et 1 mm crassae. Spiculae 6—7 mm longae, bi-, vel triflorae, glabrae. Glumae inaequales, inferiores 4 mm longae, lanceolatae, superiores 6 mm longae, subovatae; lemmae usque 5,2 mm longae, angustae, acutae; paleae 5 mm longae, angustae, hyalinae, bicarinatae, acutae. Lodiculae laciniatae, 0,7 mm longae.

Cellulae epidermidis inferioris foliorum innovationum majores, quam eae Koeleriae subcaudatae. *Series cellularum costalium 5—6. Floret Junio.*

Habitat in Illyrico: in Istria, Croatia, Dalmatia, Hercegovina, et Montenegro.

Holotypus: „Dalmatia. In saxosis maritimis prope Zelenika (Bocche di Cattaro) alt. 10 m. s. m., 6. Jun. 1906, legit Dr. DEGEN; *Herbarium* Dris Á. de DEGEN" *sub nomine* Koeleria splendens PRESL,

Holotypus adest in Herbario Musei Nationalis Hungarici Budapestini.

I dedicate this species to the genial explorer of the Hungarian flora and the Dalmatian karst, Dr. V. BORBÁS

Specimina examinata: Istria: Triest, Tomassini. Schedula DOMINI: *K. splendens* PRESL. Schedula JÁVORKAE: eriostachya—montana; Sterile Abhänge Pa Chermada (Südspitz von Istrien), 15 m, J. FREYN; Sonnige Hügel um Pola, 30 m, J. FREYN; Recina bei Fiume, EORDEGH; in apricis Montis-majoris, L. SIMONKAI; Stoja Mussil ad Polam, 10 m, NEUGEBAUER (Flora Exsiccata Austro—Hungarica, 6694. *Koeleria australis).* Croatia: Fiume, Noe; Rijeka, L. ROSSI; Fiume, inter p. Tersatto et Martinscica, 160 mm, Á. DEGEN (Gramina Hungarica Nr. 145); Fiume ad Cantridam, G. LENGYEL; Tersatto ad Fiume, G. LENGYEL; Recina Draga ad Zoskaly, L. ROSSI; Porto Ré, Á. DEGEN. Schedula DOMINI: *Koeleria grandiflora* BERTOL. f. spiculis minoribus DOMIN; Porto Ré, G. LENGYEL. Schedula DOMINI: *Koeleria splendens* PRESL var. *subcaudata* ASCHERS. & GR. (vel varietati hac proxime) Rev.: Dr. K. DOMIN; Zengg in m. Nehaj, Á. DEGEN. Schedula DOMINI: *Koeleria grandiflora* BERTOL. f. *atherophora;* Carlopago, G. LENGYEL. Schedula DOMINI: *Koeleria splendens* PRESL ad var. *subcaudata* ASCHERS. & GR. vergens LINK fast typisch. Rev.: Dr. K. DOMIN; inter Velinic et Brizovac, supra Carlopag, S. JÁVORKA. Vrbovsko, L. ROSSI; inter Podrag et Mali Halan ad confines Dalmatiae, Á. DEGEN; Schedula DOMINI: *Koeleria splendens* PRESL var. *subcaudata* ASCHERS. & GR. Rev.:

Dr. K. DOMIN; Mali Halan, G. LENGYEL, Smedorovo Polje inter jugum Begovac et Gracac, 600 m, Á. DEGEN. Schedula DOMINI: *Koeleria splendens* PRESL f. *verticillata* m. Rev.: Dr. K. DOMIN. Dalmatia: Inter Obrovak et Krupa, G. LENGYEL; insula Pago. Vale delle Saline? J. B. KÜMMERLE; Spalato, K. STUDNICZKA. Schedula DOMINI: *Koeleria grandiflora* BERTOL. f. *interrupta* DOMIN; Bocche di Cattaro. In rupestribus prope Camerani, Á. DEGEN. Schedula DOMINI: *Koeleria splendens* ad var. *pyramidata* DOM. vergens; in lapidosis peninsulae Lapad prope Ragusam, Á. DEGEN. Schedula DOMINI: *Koeleria splendens* PRESL ad f. *interruptam* DOM. vergens; in rupium fissuris prope Glavska inter Ragusam et Castelnuovo, Á. DEGEN. Schedula DOMINI: *Koeleria splendens* PRESL; Gravosa. An der Wasserleitung zwischen Geröll, 200 m C. BAENITZ, (Dr. C. BAENITZ Herbarium Europaeum No 10102. *Koeleria gracilis* PERS, n. f. *subglabra* G. BECK. Foliis subglabris vix ciliatis); in rupestribus mt. Sergy, ADAMOVIĆ (Hb. U. Z.). Hercegovina: Mostar, steinige Abhänge des Pos Velez (Plantae Hercegovinae Exsiccatae a 1895 a H. RAAP lectae, Carante; CALLIER, No 162, det. de HALÁCSY). Schedula DOMINI: *Koeleria splendens* PRESL var. *pyramidata* DOM. Rev.: Dr. K. DOMIN (Hb. U. Z.); Mostar am Stockenfelsen, 250 m, C. BAENITZ (Dr. C. BAENITZ, Herbarium Europaeum No). Schedula DOMINI: *K. splendens* PRESL *pseudorigidula* DOM. Rev. Dr. K. DOMIN.

Description of the leaf epiderm: On the abaxial side of the innovational leaves, the walls of the senile leaves are strongly sinuous, the costal zone 3—4-seriate. The cells of the basic tissue are elongate, hence the silica bodies not so densely spaced as in *Koeleria subcaudata* (ASCH. & GR.) UJH. The silica bodies are cubicoid, spaced single or double. The intercostal zone is 5—6-seriate, the basic cells are also much elongated, their walls also frequently rugose in the slides, the stomata 1 — 2-seriate. The stomata are slightly squatter than in the preceding species. The juvenile leaves differ from the senile ones by having less sinuous cellular walls, narrower cellular rows, the silica bodies cubic (since the leaves are also more elongate, these cells are also spaced more apart from each other) (Plate III, fig. 2).

Varieties:

1. **Koeleria borbasii** Ujh. var. **canescens** (VIS.) UJHELYI comb. n.

Syn.: *Koeleria cristata β canescens* VISIANI (Flora Dalmatica, 1. Lipsiae, 1842, p. 71) — *Koeleria australis* KERNER (Oesterr. Bot. Zeitschr., **17**, 1867, p. 8) — *Koeleria crassipes β velutina* FREYN (Zool. Bot. Ges. Wien, **27**, 1877, p. 465) — *K. eusplendens* B. *canescens* ASCHERS. & GR. (Synopsis der Mitteleropäischen Flora, **2**, Leipzig, 1900, p. 361) — *K. grandiflora* Spsp. *canescens* DOMIN (Magy. Bot. Lap, **3**, 1904, p. 280) — *K. splendens* PRESL 14 var. *canescens* (VIS.) G. BECK (Monographie der Gattung Koeleria, Bibl. Bot. Stuttgart, 1907, Heft 65, p. 100).

Panicula pro more cylindrica densiori, spiculis breviter pedunculatis cca 6 mm longis, glumis glumellisque undique hirsutis usque villosis (Plate I, fig. 3; Plate IV, fig. 1.).

Habitat in Istria, Dalmatia.

Specimina examinata: Istria: Mit Cistus, Oxycedrus, Helichrysum angustifol. bei Vale südlich von Rovigno auf rothem Lehmboden, Aug. 1864 A. KERNER! *Koeleria australis* KERN.! The two exclamation points and ANTON KERNER's own writing testify on the original specimen of *Koeleria australis* KERNER. Schedula DOMINI: *Koeleria grandiflora* BERTOL. var. *canescens* (VIS.) DOM.; Süd Istrien. Gegend von Pola. Hügel, J. FREYN (J. FREYN, Pflanzen aus Oesterreich—Ungarn, sub nomine *Koeleria splendens* PRESL, *Koeleria crassipes* LANGE); in collibus lapidosis apricis circa Pola, sol. calcar., 2—40 m, J. FREYN (HUTER, Florae Istriae); Istria australis. Stoja Mussil ad Polam; in terra argillosa rufa 10 m, NEUGEBAUER (Flora Exsiccata Austro—Hungarica, 694. *Köleria australis*, A. KERNER). Croatia: Croatia litoralis. Ad Lucovo Otocko, L. ROSSI. Dalmatia: Monte Marian supra Spalato, G. LENGYEL; in rupium fissuris prope Clissam, Á. DEGEN. Schedula

DOMINI: *Koeleria splendens* PRESL var. *canescens* (VIS.). REV.: Dr. K. DOMIN; in lapidosis peninsula Lapad prope Ragusam, Á. DEGEN. Schedula DOMINI: *Koeleria splendens* PRESL var. *canescens* VIS. (G. BECK); in collibus circa Ragusam, L. ADAMOVIĆ (Hb. U. Z.).

2. **Koeleria borbasii** var. **elata** UJHELYI var. n.

Syn.: *K. splendens* Spsp. *grandiflora* var. *pyramidata* DOMIN (Magy. Bot. Lap., **3**, 1904, p. 277 p.p.) — *Koeleria splendens* PRESL 3. var. *pyramidata* (DOMIN) DOMIN (Monographie der Gattung Koeleria, Bibl. Bot., Stuttgart, 1907, Heft 65, p. 94, p. p.).

Plantae robustae foliis latioribus saepaeque longioribus, culmis robustis striatis, paniculis magnis (usque 18 cm longis), multi-spiculatis, valde lobatis, ramis ramulisque longioribus, minus densis (Plate I, fig. 4; Plate IV. fig. 2.).

Habitat in Istria, Croatia, Dalmatia, et Montenegro.

Holotypus: In rupestribus ad Makarskam, St. Kocsis. Schedula DEGENI: Koeleria splendens PRESL *var.* pyramidata DOMIN. *Holotypus adest in Herbario Musei Nationalis Hungarici Budapestini.*

Specimina examinata: Istria: In lapidosis supra Veprinac, Á. DEGEN. Schedula DOMINI: *Koeleria grandiflora* BERTOL. var. *pyramidata m.* DOMIN. Croatia: Ad Jablanac, L. ROSSI. Schedula DOMINI: *Koeleria splendens* PR. var. *pyramidata* DOMIN. Dalmatia: In rupestribus inter Gravosam et Cannosam. Schedula DOMINI: *Koeleria splendens* PRESL var. *pyramidata* DOM. REV.: DOMIN; in lapidosis Montis Ostra Glanica ad Ragusam, alt. 600 m, sub nomine *Koeleria splendens* PRESL. Montenegro: In alpinis mt. Jastrebica, L. ADAMOVIC.

As is to be seen from the synonymic list, the specimens of this species caused much greater confusion than the former ones. As a tetraploid plant, its measurements stand nearer to the Italian hexaploid *Koeleria splendens* PRESL em. UJH., than to those of the preceding taxon. Hence the specimens were relegated primarily to this latter one. As an added difficulty, *Koeleria borbasii* UJH. var. *elata* UJH. is more robust than the nominate form. Hence there was a seeming "transition" between the two species, that is to say, differences as to habits became indistinct. The other complicating factor was that its area is more or less congruent with that of partly *Koeleria montana* (HAUSM.) DALLA-TORRE, partly other tetraploid and hexaploid species, similar as to stature but otherwise not allied to it.

I have not found a single exemplar from Italy in my research material. The species is indubitably the polyploid of *Koeleria subcaudata* (ASCH. & GR.) UJHELYI, as witnessed by both the external and the anatomical features. However, one cannot state this with all certainty for the Italian *Koeleria splendens* PRESL em. UJHELYI: its spikelets and leaves are invariably more or less minutely hirsute. Also the leaf epiderm testifies to this, though one can recognize the features common for both of them.

DOMIN never seemed to think of the specific distinctness, even for lower systematical categories, of this taxon. This is confirmed by his listing as *Koeleria splendens* l. var. *typica* DOMIN, the true specimens together with the Italian exemplars, and some Greek specimens belonging to other species. The clarification of the grave problem hinged on the histological examination of the leaf epiderm, since all other, foreign elements have dissimilar histological structures. Nearly three-fourth of the examined material, partly revided by DOMIN and identified as *Koeleria splendens* PRESL, does not belong to the Series *Subcaudatae* UJH. at all. Concerning stature, the majority of them resembles *Koeleria borbasii* UJH. After

their exclusion, *Koeleria borbasii* UJH. can be delimited as a uniform species, just as *Koeleria subcaudata* (ASCH. & GR.) UJHELYI.

The plant is mostly less cespitose than *Koeleria subcaudata* (ASCH. & GR.) UJH., only those originating from unfavourable localities are more compact, with short, rigid leaves. In general, they are higher, usually 45—50 cm high. Also the innovational leaves are longer, generally 15 cm long, and also wider. The senile leaves attain a width of 2—2.5 mm, and also the juvenile leaves are about 1 mm wide. The leaves, contrary to the grey ones of *Koeleria subcaudata* (ASCH. & GR.) UJH., are rather green. The culm-leaves are also greater and wider, the blades not as auriculate as in the preceding taxon. The culm is also longer and wider (1 mm thick), the panicle more ramifying, with more spikelets: hence not uniformly cylindrical but incrassate in its lower third, tending to be lobate. The spikelets are also larger (Plate I, fig. 2).

The histological structure of the leaf is in entire harmony with what was said on the external morphological features. The similarity is great, but the differences as to measurements are present.

Koeleria borbasii UJH. var. *canescens* (VIS.) UJH., was interpreted in several ways. The often villose, long hairs of the spikelets is striking, and thus easily overestimable. For my part, I can regard it as but a variety, with regard to the fact that it occurs together with the nominate form, and as no other difference but the stronger hirsuteness can be established between them. Nor does the structure of the leaf epiderm show any essential deviation from the nominate form (Plate I, fig. 3; Plate III, fig. 2.).

The clarification of *Koeleria borbasii* UJH. var. *elata* UJH. was also difficult. As for nomenclature, I could not retain DOMIN's term var. *pyramidata* DOMIN, since he relegated to this name forms with a lobate panicle of several species. A superficial survey of the large-sized specimens (as compared to the nominate form) would identify them as the hexaploid *Koeleria splendens* PRESL em. UJH. This impression is further enhanced by the larger spikelets of the robuster culms, as is the case in the nominate form. It is quite striking that there are herbarial sheets from the several areas listed above, which present plants (they are not segregated into single specimens) with culms occasionally covering the diagnosis of the variety. Their panicles are strongly lobate, sometimes with 3 cm long panicular branches; indeed, the spikelets are also larger, — but the other culms are congruent with the nominate form.

The structure of the epiderm betrays its tetraploidy as well as its alliance with *Koeleria borbasii* UJH, failing to show any essential differences. There is a possibility that the plants grew in disturbed sites, where the robust stature was caused by the higher nitrogen content of the soil due to grazing.

20. **Koeleria splendens** PRESL em. UJHELYI:

Cyperaceae et Gramineae Siculae, Pragae, 1820, p. 34.

Syn.: *Koeleria grandiflora* BERTOLINI (in ROEMER, M. D. & SCHULTES, A., Mantissa, 2, p. 345) — *Aira grandiflora* BERTOLINI (Flora Italica, **1**, Bononiae, 1833, p. 436) — *K. splendens* Spsp. *K. grandiflora* var. *genuina* DOMIN (Magy. Bot. Lap., **3**, 1904, p. 278 p. p.) — *K. splendens* PRESL 1. var. typica DOMIN p. p. (Monographie der Gattung Koeleria, Bibl. Bot., Stuttgart, 1907, Heft 65, p. 91) — *Koeleria cristata* PERS. ε *splendens* (PRESL) FIORI (Nuova Flora Analitica d'Italia, **1**, 1923—25, Firenze).

Koeleria splendens PRESL has the highest polyploidy in the Series. As far as demonstrated, it grows only in Sicily, Italy, and near Abbazia.

The plant is 40—65 cm high, definitely robust. In accordance with the xerothermous habitat, the base is strongly incrassate, the rhizome woody. The innovational leaves are partly glabrous partly micro-haired. The same holds for the whole leaf-sheath. The senile leaves are 6—8 cm long, 2.5—3 mm wide. The juvenile leaves might attain a length of 10 cm, they are 1.5—2 mm wide, frequently convolute. The culm is generally 40 cm high, but there are also shorter ones (10 cm). The thickness of the culm may reach even 1.5 mm; the culms are leafy to one-third or half their lengths. The bases are incrassate, and, due to the withering leaves, bulbous. The panicles are 6—10 cm long, 1.2 cm wide, compact or slightly lobate. The spikelets are large, attaining even 8—9 mm, sometimes squat, but usually slender. The lemmae are 7 mm long, frequently micro-haired, with involute margins, acute; the paleae slightly shorter (Plate I, fig. 5).

Specimina examinata: Istria: In lapidosis supra Abazziam, Á. DEGEN. Schedula DOMINI: *Koeleria grandiflora* BERTOL. var. *pyramidata* M. DOMIN. Italia: In monte Serrato prope Prato, ST. SOMMIER (Plantae in Etruriae lectae sub nomine *Koeleria grandiflora* BERTOL.); in aridis prope Voltera, comm. CASPAR AMIDII 1841, sub nomine *Koeleria grandiflora* BERTOL. Schedula DOMINI: *Koeleria grandiflora* BERTOL. DOMIN; in rupes Isnello, Herb. Pan; maj, sub nomine *Airochloa gracilis* LK. var. *cristata*. Schedula DOMINI: *K. splendens* PRESL v. typica DOM. Rev.: Dr. K. DOMIN. The plant is 12 cm long, with an elate panicle, the panicular branches pedunculate. In Apennin. umbro, Herbar. R. Musei Florentini, sub nomine *Koeleria grandiflora* BERT. (Scripta JANKAE). Schedula DOMINI: *Koeleria grandiflora* BERTOL. DOMIN. Aprutii. M. MORRONE. In pascuis glareosis, 1000—1200 m, sub nomine *Koeleria cristata* PERS., G. RIGO: Inter Italicum quintum anni 1899. curavit I. DÖRFLER. Schedula DOMINI: *Koeleria grandiflora* BERTOL. DOMIN; in pascuis subalpinis montis Morrone calc. m. 1200—800, G. RIGO. Iter in Aprutio anno 1905; Monserrato presso Prato, Erbario di CARLO COSTA-REGHINI, sub nomine *Koeleria grandiflora* BERT.; in monte „S. Angelo" prope Castellamare, solo calcareo, 1873, P. GABRIEL STROBL, sub nomine *Koeleria grandiflora* BERTOL. Sicilia: In pascuis siccis elatioribus Nebrodum Piano della Canna (1000—1200 m. s. m.), 1855, E. & A. HUET DU PAVILLON, sub nomine *Koeleria grandiflora* BERTOL.; in monte Scalone supra Polizzi solo calcareo, P. G. STROBL, sub nomine *Koeleria gracilis* GUSS. ex loc. cl.; in calcareis elatioribus montosis Madoni allo Carcera dei Daini, M. L. JACINO, sub nomine *Airochloa gracilis* LINK H. BERTOL.; in elatioribus montosis Busambra, TODARO. Schedula DOMINI: *Koeleria grandiflora* BERTOL. var. *pyramidata m.* DOMIN; Palermo, TODARO.

Description of the leaf epiderm: On the abaxial side of the innovational leaves, the walls of the senile blades are not as sinuous as those of the two preceding species. The costal zone is 4—5-seriate. The silica bodies are cubic, cubicoid, or elliptical, sometimes cross-shaped. Occasionally, silica bodies couple with cork cells; the intercostal zone is 4—6-seriate, the superior wall of the basic cells is often incrassate along the margins, hence darker in stained slides. The basic cells alternate with sporadic prickle-hairs. The stomata are generally biseriate within a zone. The stomata are large. The structure of the juvenile leaves are similar. The costal zone is 2—4-seriate, the cells narrower, the basic cells of the intercostal zone rugulose due to the immersed stomata, the zone is 3—6-seriate, the stomata lie in 2—3 cellular rows, the accessory cells often come below the epidermal cells due to the immersion (just as in the juvenile leaves of *Sesleria stenophylla* (BECK) UJH.). The basic cells alternate with micro-hairs in rows lacking stomata (Plate V, figs 1,2).

On the basis of the specimens examined up to now, *Koeleria splendens* PRESL em. UJHELYI differs also as regards habits from the two preceding taxa. The innovational leaves of the robust plant are generally short, and the senile leaves wide. The strongly developed, frequently woody rhizome, and the concurrenty

thick base surrounded by the vetuste leaves are very conspicuous. The underside of the blades, in contrast with that of the preceding two species, is always minutely hairy, the transversal walls of the epidermal cells much thinner. The panicle is not as compact, often attaining a length of 10—12 cm, and frequently lobate. The spikelets are often finely hairy. This hirsuteness refers especially to the lemmas. *Koeleria splendens* PRESL em. UJHELYI is a well delimitable, not varying species of uniform habits. In the past, however, this name was coupled with the concept variability, the same as in the case of *Koeleria gracilis* PERSOON. As is obvious from this short paper, this was due to the fact that many specimens belonging to several other species had been identified as *Koeleria splendens* PRESL.

In DOMIN's "Monographie", there are listed a north African (Algeria) occurrence of *Koeleria splendens* PRESL 6. var. *pseudorigidula* (DOMIN) DOMIN, as well as a datum from the Pyrenées for var. *pyrenaica* DOMIN. It is extremely dubious in both cases whether these taxa really belong to *Koeleria splendens* PRESL em. UJH. GROVES's two exemplars collected in Abruzzo resemble in habits *Koeleria splendens* PRESL em. UJH., but their glumae and paleae are quite narrow, smaller, strongly aciculate; nor does the epidermal structure cover that of the species in question. Its stomata are also smaller. However their allocation can be satisfactorily decided only on the basis of a greater material from Italy. DOMIN reported a datum (l. c.) also from the Crimean Peninsula, under the name *Koeleria splendens* PRESL var. *Callieri* DOM., referred to in literature as *Koeleria splendens* PRESL even today. The plant occuring there is nothing else but the highest polyploid nember of the Series *Glaucae* UJH. (9). I consider it as a new species, and submit the description as follows:

21. **Koeleria callieri** (DOM.) UJHELYI sp. n.

Syn.: *Koeleria cristata* PERS. var. *pseudoglauca* (SCHUR) HACKEL (in exsicc. A. CALLIER: Iter Tauricum tertium anni 1900. curavit I. Dörfler, No. 763) — *K. glaucovirens* var. *pseudoglauca* DOMIN (Magy. Bot. Lap., **3**, 1904, p. 274) — *K. splendens* PRESL 3. var. *Callieri* DOMIN (Monographie der Gattung Koeleria, Bibl. Bot., Stuttgart, Heft 65, p. 95) — *Koeleria splendens* PRESL, KOMAROV V. L. (Flora URSS, Leningrad, 1934, p. 325), et auct. plur..

Plantae dense caespitosae, innovationibus intravaginalibus, altitudine 40—48 cm. Vaginae foliorum dense hirsutae vel subglabrae, integrae, vaginae vetustae irregulariter laceratae. Rhizomata 2—3 cm longa, densa, crassa. Folia senilia usque 6—6,5 cm longa, et 2 mm lata, sparse hirsuta, plerumque laminis cito evanescentibus, folia juvenilia basi ciliata, usque 10 cm longa, et 1—2 mm lata, plana, vel convoluta, sparse hirsuta, vel subglabra, glauca, rigida, vaginis usque 2,5 cm longis. Culmi plantarum evolutarum, ad unam partem tertiam (vel dimidiam) altitudinis foliosa, laminae foliorum culmeorum usque 5 cm longae, setosulae, vaginis usque 12 cm longis, parce auriculatis. Ligulae 0,8—1 mm longae, dentibus desectis, et iterum denticulatis. Caules basi bulboso-incrassati, ad 40 cm longi, et 1,3 mm crassi, glabri. Paniculae ovato-cylindricae, densae, vel subdensae, usque 6 cm longae, et 1,3 cm crassae. Spiculae 7—7,5 mm longae, bi-, vel triflorae, glabrae, vel subglabrae. Glumae inaequales, inferiores 6,5 cm longae, lanceolatae, superiores 7 mm longae, subovatae, obtusae, superficie scabriusculae, vel brevissime pilosae, paleae 7 cm longae, angustae, hyalinae, bicarinatae, obtusiusculae.

Cellulae epidermidis inferioris foliorum innovationum similes illis Koeleriae rochelii Schur, *sed majores. Series cellularum costalium 3—6. Floret Junio—Julio.*

Habitat in Tauria (Crimea).

Holotypus: "Koeleria *sp. (cf.* splendens *auct. taur.) Krim, Ai-Petri, 1200 m. s.m, in cliff-lawns, on limestone, 25.7.60, leg.:* A. BORHIDI. *Holotypus adest in Herbario Musei Nationalis Hungarici Budapestini.*

The holotype specimen had been collected by Dr. A. BORHIDI, lecturer of the University, who was kind enough to collect Koelerias for me on his Crimean collecting trip.

S p e c i m i n a e x a m i n a t a: A. CALLIER: Iter Tauricum tertium anni 1900. curavit I. DÖRFLER. No. 763. *Koeleria cristata* PERS. var. *pseudoglauca* (SCHUR.) HACKEL. Karasubazar. In collibus cretaceis prope praedium Burultscha, 27. VI. det. HACKEL. Nota UJHELYII: exempl. orig. *Koeleriae glaucovirentis* DOMIN var. *pseudoglaucae* (HACK.) DOMIN: A. CALLIER: Iter Tauricum tertium anni 1900. curavit I. DÖRFLER. No. 763. *Koeleria cristata* PERS. var. *pseudoglauca* (SCHUR) HACKEL. Karasubazar. In collibus cretaceis prope praedium Burultscha. 27. VI. det. HACKEL. Schedula DOMINI: *Koeleria glaucovirens* m. var. *pseudoglauca* (HACK.) DOMIN, exempl. orig. *Koeleriae splendentis* PRESL var. *Callierii* DOMIN: A. CALLIER: Iter Tauricum tertium anni 1900. curavit I. DÖRFLER. No. 763. *Koeleria cristata* PERS. var. *pseudoglauca* (SCHUR.) HACKEL. Karasubazar. In collibus cretaceis prope praedium Burultscha. 27. VI. det. HACKEL (Hb. U. Z.).

Description of the leaf epiderm: On the abaxial side of the innovational leaves, the senile leaves have strongly incrassate cellular walls, scrobiculately thickened. Costal zone 4—6-seriate, basic cells regularly alternating with silica bodies, these latter cubic, their walls sinuous; intercostal zone 7—11-seriate, basic cells alternating with prickle-hairs, and with some occasional macro-hairs. Stomata in two rows. They are large, long. The structure of the juvenile leaves differ insofar from the senile ones that the intercostal zone is multiseriate, the micro-hairs are denser, hence the basic cells shorter and the macro-hairs absent (with at most vestigial traces). In general, the cells have thicker walls (Plate VI, figs. 1,2).

The new species, referring by all its external and internal (anatomical) characters to an alliance with, and a descent from, the first two members of the Series *Glaucae* UJH., was wholly misinterpreted in literature. The exsiccate specimens, collected by A. CALLIER, are much too disintegrated to show the habit of *Koeleria glauca* DC. em. UJH., as well as does the exemplar collected by Dr. A. BORHIDI. The more mature panicles, the more developed spikelets, the sterile shoots so characteristical of *Koeleria glauca* DC., and their rigid, grey state, do not resemble, even as to habits, *Koeleria splendens* PRESL. While the diploid member of the Series, namely *Koeleria glauca* DC. em. UJH., grows on loose sand, and the tetraploid *Koeleria rochelli* SCHUR inhabits the more compact sandy lawns, *Koeleria callieri* (DOM.) UJHELYI, the highest grade of the series, occurs on limestone. The plant of high polyploidy, separated from its original area, became distinct in the oecological conditions of the different climatal circumstances.

The plant is densely cespitose, 30—48 cm high. The leaf sheaths are by far not as hirsute as in *Koeleria glauca* DC. This holds for the innovational leaves. In this respect, the plant resembles the Transylvanian (Mezőség) specimens of *Koeleria rochelii* SCHUR. Especially the undersides of the senile leaves seem to be hirsute from more the scattered macro-hairs than the much smaller micro-hairs, since these latter are considerably tinier than in *Koeleria glauca* DC. em. UJH. Aside of the difference in stature, this latter feature could have been one of the reasons why it was not originally relegated to the present group, but, with view of the generally glabrous leaves of *Koeleria splendens* PRESL, allocated to this collection alien to it. The other reason might have been that though the apices of the lemmae and glumae are rather blunt, this feature is still not as striking as in

Koeleria glauca DC. em. UJH. Even with regard to this latter trait, the taxon stands nearer to *Koeleria rochelii* SCHUR.

References; 1. ASCHERSON, P. & GRAEBNER, P.: Synopsis der Mitteleuropäischen Flora (**2**, Leipzig, 1900, pp. 795)—2. DEGEN, Á.: Flora Velebitica **1—4** (Budapest, 1936, pp. 2105)—3. DOMIN, K.: Fragmente zu einer Monographie der Gattung Koeleria (Magy. Bot. Lap., **3,** 1904, p.254—281)—4. DOMIN, K.: Monographie der Gattung Koeleria (Bibl. Bot., Stuttgart, Heft 65, 1907, pp.354) – 5. FREYN, J.: Die Flora von Süd-Istrien (Wien, 1877, pp.251)—6. HAYEK, A. & MARKGRAF, FR.: Prodromus Florae peninsulae Balcanicae (Repertorium species novarum regni vegetabilis. Beihefte, 30)—7. KERNER, A.: Descriptiones plantarum novarum (Oester. Bot. Zeitschr., **17**, p.7)—8. KOMAROV, L.V.: Flora U R S S, **2** (Leningrad, 1934, pp. 778)—9. UJHELYI, J.: Data to the Systematics of the subsectio Glaucae of Sectio Bulbosae of the Genus Koelerie (Ann. Hist.-nat. Mus. Nat. Hung., **53,** 1961, p. 207—224)—10. UJHELYI, J.: Data to the Systematics of the Sectio Bulbosae of the Genus Koeleria II. (Ann. Hist.-nat. Mus. Nat. Hung., **54,** 1962, p. 199 – 220) – UJHELYI, J.: Data to the Svstematics of the Sectio Bulbosae of the Genus Koeleria III, (Ann. Hist.-nat. Mus. Nat. Hung., **55,** 1963, p. 187-214).

Explanation of plates

Plate I

Fig. 1. *Koeleria subcaudata* (ASCH. & GR.) UJH., spikelet and flower.
Fig. 2. *Koeleria borbasii* UJH., spikelet and flower.
Fig. 3. *Koeleria borbasii* UJH., var. *canescens* (VIS.) UJH., spikelet and flower.
Fig. 4. *Koeleria borbasii* UJH. var. *elata* UJH., spikelet and flower.
Fig. 5. *Koeleria splendens* PRESL em. UJH., spikelet and flower.
Fig. 6. *Koeleria callieri* (DOM.) UJH., spikelet and flower.

Plate II

Fig. 1. *Koeleria subcaudata* (ASCH. & GR.) UJH., holotype, underside epiderm of senile leaf.
Fig. 2. *Koeleria subcaudata* (ASCH., & GR.) UJH., holotype, underside epiderm of juvenile leaf

Plate III

Fig. 1. *Koeleria subcaudata* (ASCH., & GR.) UJH., underside epiderm of leaf; Italy.
Fig. 2. *Koeleria borbasii* UJH., underside epiderm of leaf.

Plate IV

Fig. 1. *Koeleria borsbasii* UJH. var. *canescens* (VIS.) UJH., underside epiderm of leaf.
Fgi. 2. *Koeleria borbasii* UJH. var. *elata* UJH., underside epiderm of leaf.

Plate V

Fig. 1. *Koeleria splendens* PRESL em. UJH., underside epiderm of juvenile leaf.
Fig. 2. *Koeleria splendens* PRESL em. UJH., underside epiderm of senile leaf.

Plate VI

Fig. 1. *Koeleria callieri* (DOM.) UJH., underside epiderm of juvenile leaf.
Fig. 2. *Koeleria callieri* (DOM.) UJH., underside epiderm of senile leaf.

Plate I.

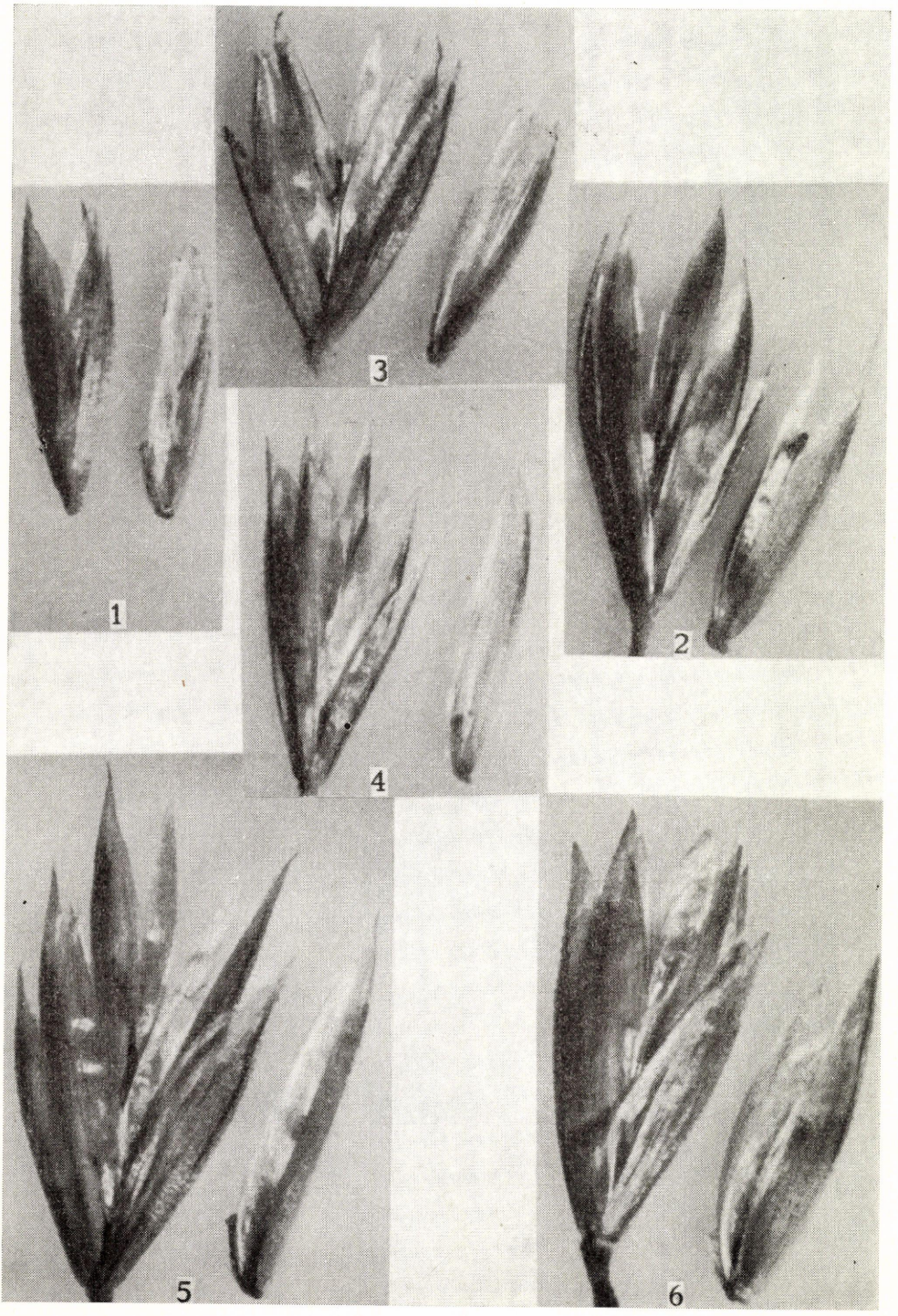
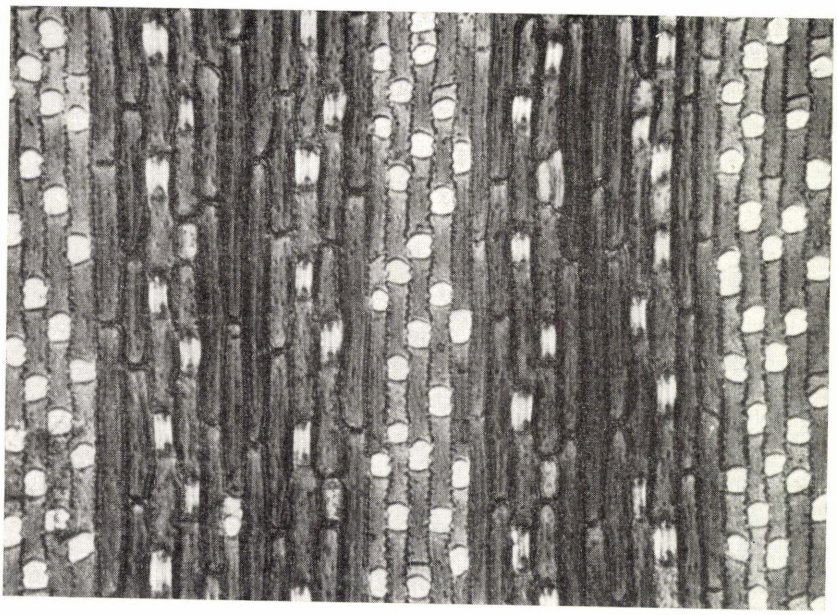


Plate II.

1

2

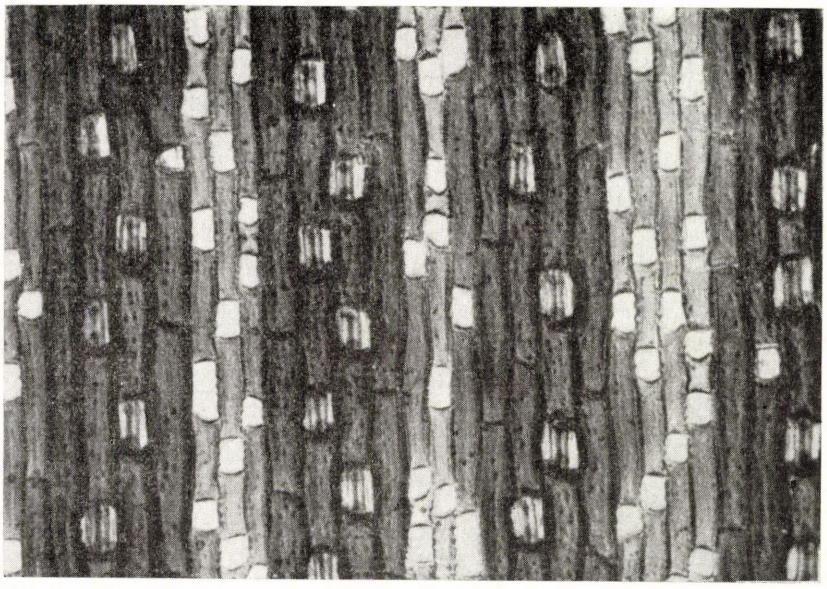
Plate III.



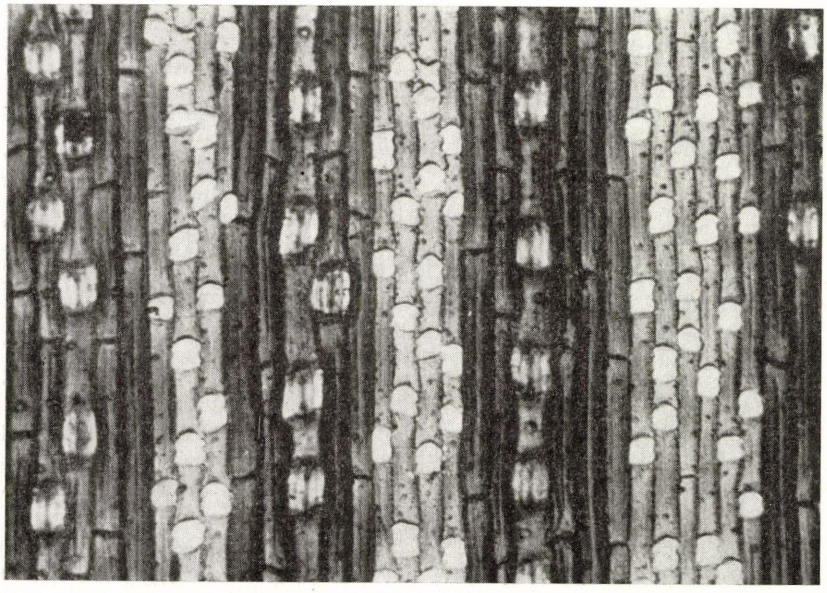
1

2

Plate IV.



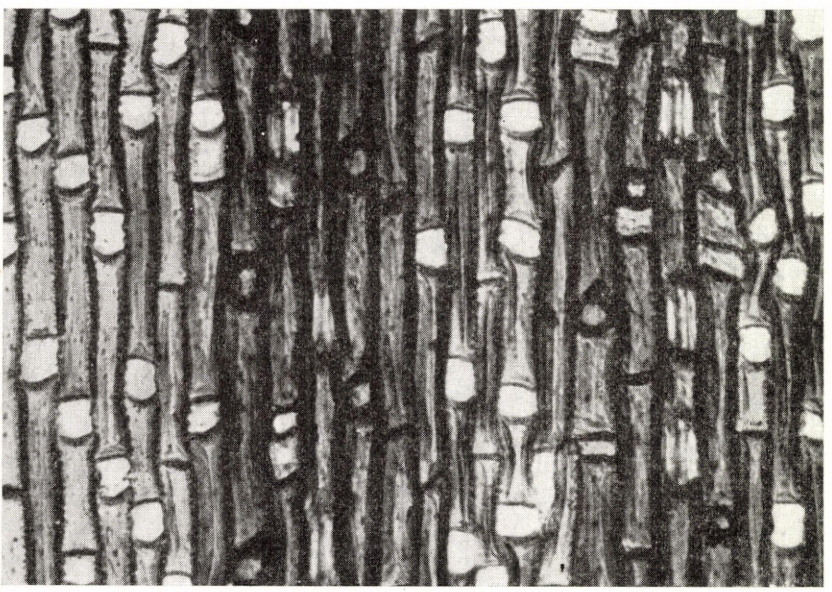
1



2

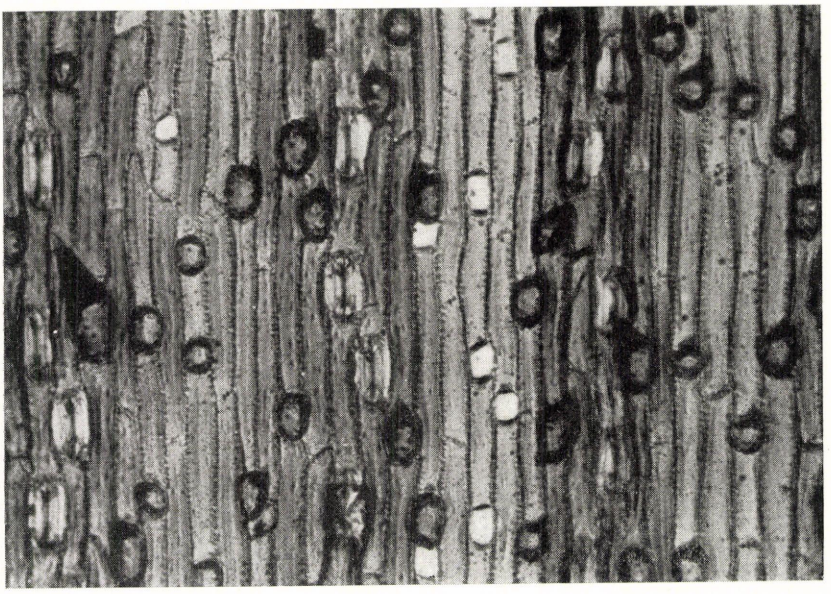
Plate V.

1



2

Plate VI.



1

2