

***Charpentieria itala*: subspecies, species, superspecies**

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I. Introduction and history

In the revision of the *Charpentieria* species from the southern limestone Alps (NORDSIECK 1963: 174-190, as *Delima*) I tried to describe the intraspecific diversity of *C. itala* (G. VON MARTENS 1824) by a subdivision of the species of that region into several subspecies. These are (from W to E) *C. i. albopustulata* (CRISTOFORI & JAN 1832), *C. i. latestriata* (KÜSTER 1850), *C. i. rubiginea* (ROSSMÄSSLER 1836), and *C. i. serravalensis* (H. NORDSIECK 1963), besides, as transitional forms within *C. i. albopustulata*, but later on treated as subspecies, *C. i. braunii* (ROSSMÄSSLER 1836) and *C. i. baldensis* (CHARPENTIER 1852) [already described by STROBEL (1851: 25)]. A complex of forms from the same region which in shell morphology and ecological preferences are similar to the related species *C. stenzii* (ROSSMÄSSLER 1836), but in genital morphology largely correspondent with *C. itala* and in part connected with it by transitional forms, was included in the latter as so-called stenzioid subspecies (NORDSIECK 1963: 171-173, 181-187): *C. i. clavata* (ROSSMÄSSLER 1836), *C. i. variscoi* (PINI 1883), *C. i. balsamoi* (STROBEL 1850), *C. i. lorinae* (GREDLER 1869). Later on, because of its semispecies character, that complex has been separated as species *C. clavata* (NORDSIECK 1979: 259).

In the 1963 paper the subspecies of *C. itala* from the remaining distributional range (Monti Berici and Colli Euganei, Provence, Maritime and Ligurian Alps, northern and central Apennines) were not considered. The related species *C. dyodon* (STUDER 1820) from Piedmont was not treated either, because at this time its close relationship to *C. itala* was not known.

ZILCH (1972), in a type catalogue of the Delimini, has also listed the subspecies of *C. itala* outside the southern Alps: *C. i. itala* from Monti Berici and Colli Euganei, and *C. i. nigra* (ISSEL 1866) and *C. i. punctata* (MICHAUD 1831) from the remaining range.

Several Italian authors called in question the proposed subdivision of *C. itala* into subspecies, with the following arguments:

GIUSTI & MAZZINI (1971: 294): "Sulla scorta delle sue descrizioni [NORDSIECK 1963] abbiamo provato a determinare alcuni materiali dell' Italia settentrionale, tuttavia, senza riuscirci mai con sicurezza. Tanto variabili sono i caratteri conchiliologici ..."

BOATO et al. (1985: 312): *C. itala* cfr. *punctata*: "..., sia questa, che le numerose altre che normalmente si includono nella *C. itala* sono spesso variabili e poco definite".

MANGANELLI et al. (1995: 47): "Molte delle entità sottospecifiche convalidato da NORDSIECK (1963 ...) e da ZILCH (1972 ...) qui riportate appaiono di validità dubbia".

These statements, however, are only opinions, not substantiated by further investigations.

Therefore, for this chapter the shell characters, on which the subspecies division of *C. itala* was based, have been checked once more, and the revision of 1963 was supplemented by the inclusion of the forms from beyond the southern Alps and of *C. dyodon* from Piedmont. The stenzioid subspecies of *C. itala* = *C. clavata* and the transitional subspecies *C. i. allatollae* (KÄUFEL 1928) were not considered in this revision, because new results could not be expected. The examined shell material of *C. itala* has been augmented by a third (from 350 samples for the 1963 paper to 460 for this chapter), and 25 samples of *C. dyodon* have been included. The material is deposited in the collection of the Forschungsinstitut Senckenberg (SMF) and in my own collection (deposited mainly in the Staatliches Museum für Naturkunde Stuttgart).

It resulted that the most important characters, those of lunellar and clausilium plate, are not at all too variable and are therefore suited for the definition of subspecies. Obviously, these characters were not considered or not understood by the named authors (because the paper was written in German). In the following they are once more described and figured.

II. Results

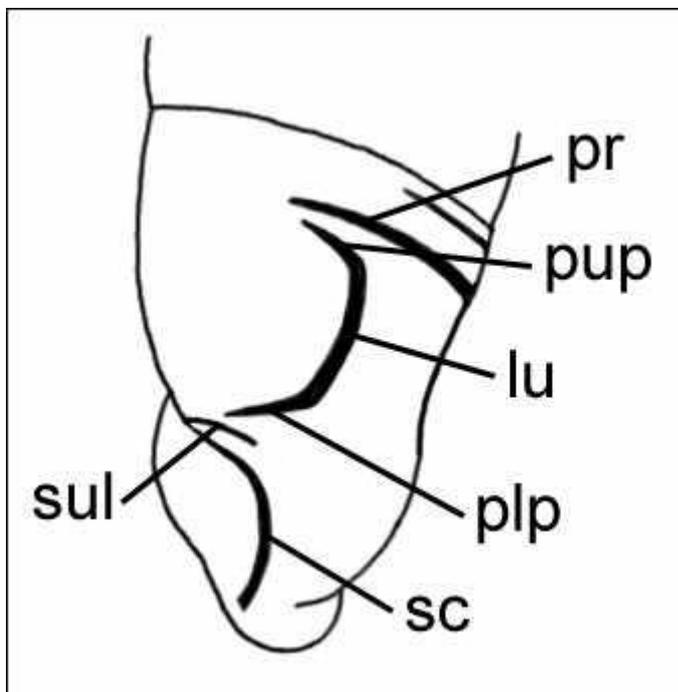
1. Character analysis:

The lunellar of *C. itala* (Fig. 1) consists of (posterior) upper palatal plica, lunella and posterior lower palatal plica. An anterior upper palatal plica and an anterior lower palatal plica (= basalis) are absent. The posterior lower palatal plica is named subclaustralis; it is connected with the lunella by an obtuse or nearly right angle. A further posterior lower palatal plica, the lowest one, is named sulcalis. It is in part weakly developed; as a rule, it

is not connected with the subclaustralis. The outer edge of the clausilium plate rests against the lunella and the subclaustralis in the closed position. There are two possible shapes of lunellar (NORDSIECK 1963: 175, Figs. 2-9). In one type (A, Figs. 5-7) the upper palatal plica is connected with the lunella by an angle; the lunella is about perpendicular with respect to the shell axis. In the other type (B, Figs. 2-4, 8-9) the upper palatal plica is connected with the lunella by a curve; the lunella is more oblique with respect to the shell axis. There are also two possibilities, how the clausilium plate rests against the subclaustralis; this can be observed by an oblique view into the aperture. In type A (Figs. 6-7) the outer edge of the clausilium plate rests against the subclaustralis up to its distal end and does not overlap this plica, in type B (Figs. 8-9) the outer edge of the clausilium plate overlaps that plica (at least in most specimens) at its distal end. *C. i. serravalensis*, *C. i. rubiginea* and outside the southern Alps *C. i. punctata* (see part 3) exhibit the type A, *C. i. albopustulata*, *C. i. latestriata*, *C. i. braunii*, *C. i. baldensis* and outside the southern Alps *C. i. itala* (see part 2) the type B.

Another shell character used for defining subspecies of *C. itala* is the length of the principal plica. The remaining shell characters, size, shape, sculpture, development of peristome and palatal callus are of minor importance. The subspecies division of *C. itala* from the southern Alps, as proposed in my 1963 paper, has been confirmed, at least partially, by the DNA study of SCHEEL & HAUSDORF (2012).

Fig. 1. Lunellar of *Charpentieria itala* (scheme).



Abbreviations:

lu = lunella; plp = posterior lower palatal plica (subclaustralis); pr = principal plica; pup = (posterior) upper palatal plica; sc = subcolumellar lamella; sul = lowest palatal plica (sulcalis).

Figs. 2.-5. *C. itala*. Actual shell height (mm) = H.
Body whorl dorsal, view on lunellar.

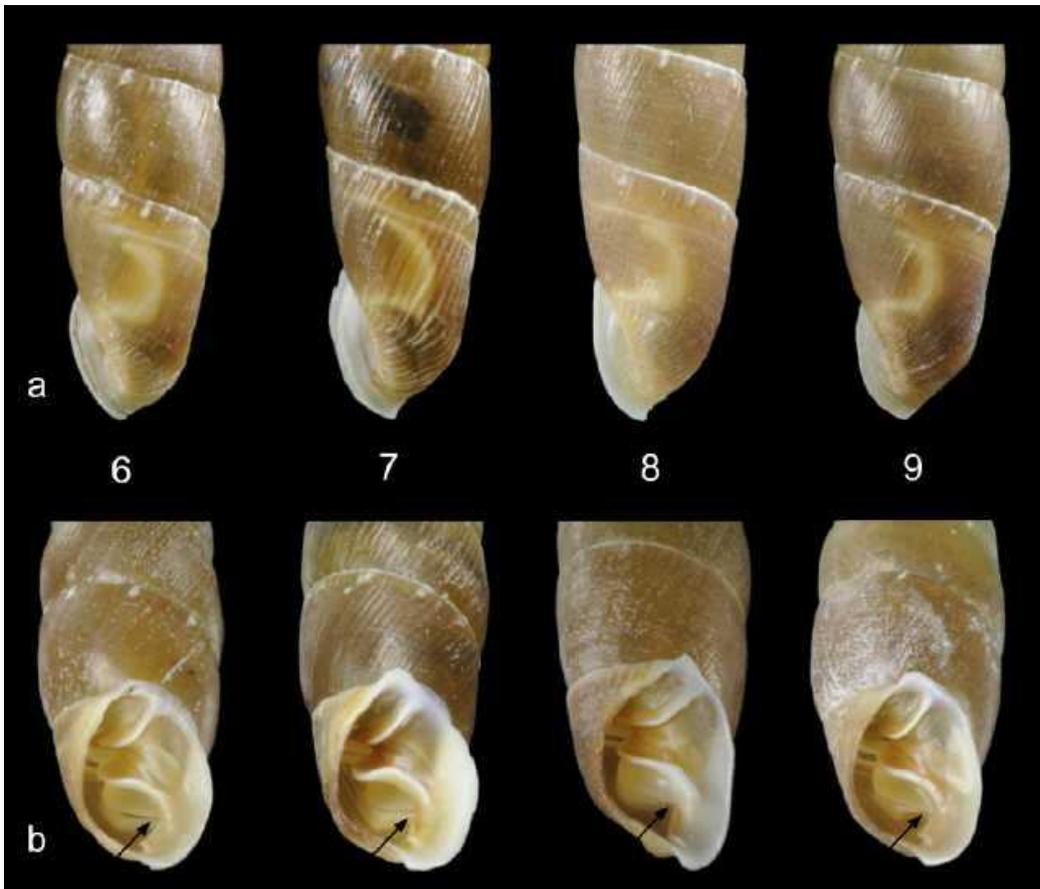


2. *C. i. itala*, Mira (Villa Ducale) (ex SMF 193974), H = 18.9.
 3. *C. i. itala*, Vicenza (syntype of. *C. i. var. vicentina*, ex SMF 196209), H = 21.3.
 4. *C. i. albopustulata*, Varone waterfall near Riva (ex SMF 174367), H = 18.3.
 5. *C. i. serravalensis*, Vittorio Veneto (ex SMF 265953), H = 18.4.

Figs. 6-9. *C. itala*. Actual shell height (mm) = H.

a. Body whorl dorsal, view on lunellar.

b. Body whorl frontal, oblique view into aperture. Different position of clausilium plate with respect to the subclaustralis marked by an arrow.



6. *C. i. rubiginea*, Bozen (ex coll. Bosch), H = 17.1.
 7. *C. i. punctata*, Fivizzano (ex SMF 186744), H = 16.7 (apical part broken).

8. *C. i. albopustulata*, Lugano (ex coll. Bosch), H = 18.4.
9. *C. i. braunii*, Heidelberg (castle) (ex coll. Bosch), H = 15.9.

2. *C. i. itala*:

G. VON MARTENS (1824: 442, pl. 3, fig. 1) described *C. itala* from Miravecchia ("... Garten des aelterlichen Hauses ...", according to E. VON MARTENS 1857: 129 between Mira and Dolo). ZILCH (1972: 247) regarded the forms from Monti Berici, Mira and Colli Euganei as representing the nominotypical subspecies and listed the specimens collected by me in Mira (SMF 193974, NORDSIECK 2007: pl. 13, fig. 6; Fig. 2) as topotypes. The type form from Mira is relatively small and similar to large forms of *C. i. albopustulata* (eastern form, see NORDSIECK 1963: 177). The samples from Monti Berici (e. g., Arcugnano) and Vicenza (*C. i. var. vicentina* A. SCHMIDT 1868, syntypes SMF 196209, Fig. 3) have a larger and more ventricose shell. The samples from Colli Euganei (Abano Terme, Teolo) (*C. i. var. vicentina* f. *tridentina* O. BOETTGER 1879, types SMF 167941) have in part a larger shell, but of the same shape as the type form. In contrast to the other samples, in those from Teolo the clausilium plate does not overlap the subclaustralis (type A).

Among the samples classified by ZILCH (: 247) with *C. i. itala*, however, some from Padova are wrongly affiliated to this subspecies. The sample from Padova (botanical garden) (SMF 156968, including the specimen figured by ZILCH 1960: fig. 1532) belongs to *C. i. braunii*.

C. i. itala does not much differ from *C. i. albopustulata* (eastern form), but is separated as subspecies because of its shell size (on average larger) and its isolated range (see map). The *vicentina* form differs from *C. i. albopustulata* also by its shell shape (more ventricose); thus the type form of *C. i. itala* is transitional between the *vicentina* form and *C. i. albopustulata*. The form from Teolo, however, resembles *C. i. serravalensis*.

3. *C. i. punctata*:

The various forms of *C. itala* from Provence, Maritime and Ligurian Alps and northern and central Apennines (see map) are characterized by a stronger sculpture and a clausilium plate which does not overlap the subclaustralis (type A, Fig. 7). The form from the Provence (*C. punctata* MICHAUD 1831) and those from the Apennines (*C. alboguttulata* var. *obesa* ISSEL 1866 [non L. PFEIFFER] from Lucchese, *C. a. var. nigra* ISSEL 1866 from Volterra, *C. a. var. elegans* GENTILUOMO 1868 [non CANTRAINE] from Vallombrosa) do not much differ and are therefore not separated as subspecies (in contrast to GIUSTI & MAZZINI 1971: 295, ZILCH 1972: 251). The whole subspecies has to bear the oldest name *C. i. punctata*. This was already proposed by BOATO et al. (1985: 312), but as cfr. *punctata*, and MANGANELLI et al. (1995: 24), but with the statement (: 47): "L'attribuzione del materiale della Liguria e dell' Appennino a *C. i. punctata* permane incerta."

The alleged syntypes of *C. punctata* from the ROSSMÄSSLER collection (SMF 196374) are much smaller and more ventricose than the type specimens (MICHAUD 1831: 55, pl. 15, fig. 23) and belong to *C. i. braunii*. This has not been noticed by the previous authors (ROSSMÄSSLER, O. BOETTGER) and by ZILCH (1972: 251), who listed them as syntypes.

It is unclear, if *Clausilia genei* LESSONA 1880 from Valle Pesio, Piedmont, is a form of *C. i. punctata*, because material is not available.

It should be checked, if *C. i. punctata* is distributed in Italy beyond the southern border (as indicated in the map), e. g., as far as the Colli Albani, where it is said to occur by E. VON MARTENS (1857: 136).

4. *C. i. "braunii"* from Meran:

The *C. itala* form from Meran and surroundings, South Tyrol, differs much from *C. i. braunii* (type form Figs. 9-10), to which it was affiliated in my 1963 paper (: 177). Unlike *C. i. braunii*, it has a long principal plica and a clausilium plate not overlapping the subclaustralis (type A). It thus corresponds with *C. i. serravalensis* (the only subspecies in which a long principal plica is present, Fig. 5) and is therefore classified with that subspecies. It may have been introduced by man (with winegrowing?) in the Meran region, like *C. i. braunii* from Trentino in the Brixen region.

5. *C. dyodon*:

C. dyodon, which was formerly classified with another group (*Dilatatoria* VEST) in another subfamily (ZILCH 1960: 401), has been recognized by an examination of the genitalia (NORDSIECK 1972: 38) as closely related to *C. itala*. The shell differs from that of *C. itala* mainly by the reduction of the sutural papillae and a lunellar tending to reduction. Until now, forms transitional to *C. itala* have not been found. Therefore, in spite of its

genital similarity to *C. itala*, *C. dyodon* is regarded as an independent species. Its distributional range in Piedmont (see map) fills partly the gap between that of the *C. itala* subspecies from the southern Alps and that of *C. i. punctata*. Therefore I assume that *C. dyodon* has originated from an isolate of the common stem form in that region. *C. itala* (with the stenzioid subspecies = *C. clavata*) and *C. dyodon* may belong to a monophyletic group of closely related species, the superspecies of *C. itala*.

For the diversity within *C. dyodon* see NORDSIECK (2002: 36).

6. Subdivision of *Charpentieria*:

The genus *Charpentieria* includes besides the superspecies of *C. itala* two further species, *C. ornata* (ROSSMÄSSLER 1836) and *C. stenzii*. *C. ornata* differs from *C. itala* by shell characters somewhat more than the subspecies of the latter from each other (NORDSIECK 1963: 198). *C. stenzii* differs from *C. itala* in shell morphology to about the same extent as *C. dyodon*, but more in genital morphology (NORDSIECK 1963: 191, 201). A subgenus *Itala* O. BOETTGER, in which *C. itala*, *C. ornata* and *C. stenzii* are united, has therefore been rejected (NORDSIECK 2002: 36). SCHEEL & HAUSDORF (2012), in their DNA study on the stenzioid subspecies of *C. itala*, have stated that *C. ornata* is the sister group of *C. itala* (+ stenzioid subspecies) and thus more closely related to *C. itala* than *C. stenzii*. This is in accordance with the genital characters. *C. dyodon*, however, has not been included in that study. By further DNA analyses, it must be found out if *C. dyodon*, as assumed in the superspecies concept, is in fact more closely related to *C. itala* than *C. ornata*.

Map. Distribution of *C. itala* subspecies and *C. dyodon* ("stenzioid subspecies" of *C. itala* = *C. clavata* not considered).

Marked ranges cover the regions in which samples of the respective taxa have either been collected or are mentioned in the literature.

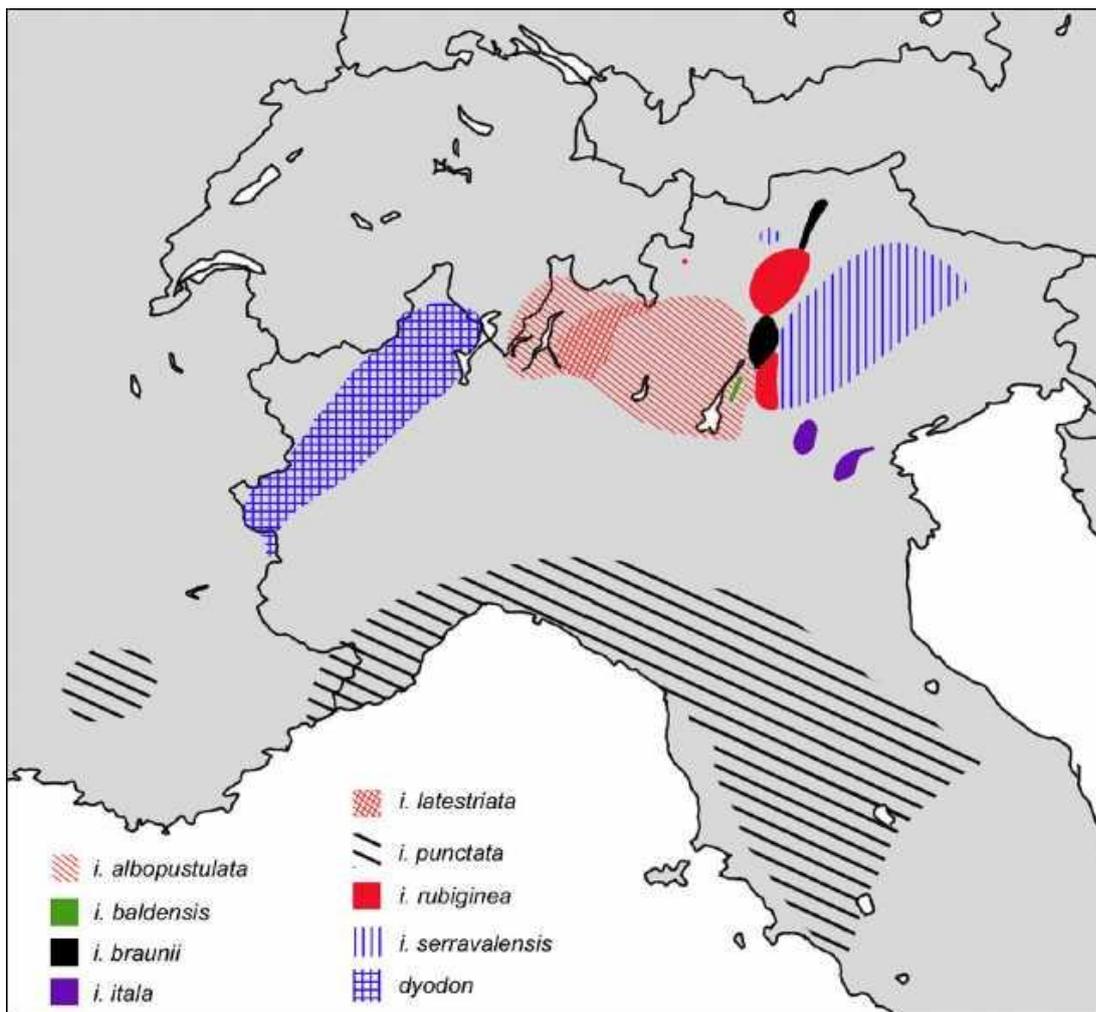




Fig. 10. *C. i. braunii* (type form), on a wall near the castle of Weinheim, Germany. The type locality of *C. i. braunii* ("Auf dem Odenwalde") is restricted to Weinheim.

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