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## From Ethiopia to Fiesole, Kew and Paris: The discovery, naming and typification of *Cadia purpurea* (*Fabaceae*)

### Abstract

Lack, H. W.: From Ethiopia to Fiesole, Kew and Paris: The discovery, naming and typification of *Cadia purpurea* (*Fabaceae*). — Fl. Medit. 31 (Special Issue): 9-21. 2021. — ISSN: 1120-4052 printed, 2240-4538 online.

*Cadia purpurea*, an unarmed shrub to small tree of the tribe Podalyrieae, is native in East Africa and southern Arabia. Seeds collected by James Bruce in Eritrea or Ethiopia in 1770-1772 were raised in gardens in Fiesole, Kew and Paris. Several names were based on this cultivated material. The nomenclature is clarified, a neotype superseded and a revised typification presented.

*Key words*: East Africa, southern Arabia, James Bruce, nomenclature, botanical illustration.

### Dedication

As a botanist and vegetation ecologist with a very broad spectrum of interests Sandro Pignatti has worked, collected, published and lectured in several parts of the world. During his tenure as professor at Trieste University he accepted the position of guest professor at Jaamacadda Ummadda Soomaaliyeed [National University of Somalia] in Mogadishu in 1982 and studied the Boscalia vegetation of the southern Somalia (Pignatti & Warfà 1983). This publication was followed by another paper on pastoralism and plant cover in southern Somalia (Barkhadle & al. 1994). During his visit in southern Somalia in 1982 Sandro Pignatti may well have encountered the member of the extremely diverse *Fabaceae* family which is the subject of this paper. On the occasion of his ninetieth birthday this paper is dedicated to him.

### Introduction

*Cadia purpurea* is an unarmed shrub to small tree of the *Fabaceae*, subfamily *Papilionoideae*, which occurs widely from southern Saudi Arabia in the north to southern Somalia in the south and from northern Kenya in the west to southern Oman in the east. Well documented in the floristic literature (Eritrea: Thulin 1989; Ethiopia: Thulin 1989; Kenya: Gillett & al. 1971; Oman: Ghazanfar 2007; Saudi Arabia: Colletette 1999;

Somalia: Thulin 1993; Yemen: Wood 1997), *Cadia purpurea* has been reported as a common, sometimes abundant plant occurring in bushland and reaching in Yemen an altitude of c. 3500 m. For a distribution map of the species in Africa see African Plant Database (<http://www.ville-ge.ch/musinfo/bd/cjb/africa/details.php?langue=en&id=62679>). For recently collected specimens from the Arabian Peninsula examined by the present author see Appendix 1.

The flowers of *Cadia purpurea* with their cream petals when opening, later wine-red in colour (Gillett & al. 1971) offer the most striking character of *C. purpurea*: they are actinomorph, an anomaly in the *Papilionoideae* with otherwise almost exclusively zygomorphic flowers. This has created very considerable interest and led to molecular studies (e.g. Citerne & al. 2003, 2006) which associate *C. purpurea* to an informally delimited genistoid clade. Further work on a broader spectrum of material has clarified the phylogenetic position of the small genus *Cadia* within the now clearly circumscribed tribe *Podalyriaceae* (Boatwright & al. 2008, Cardoso & al. 2013). This paper, however, does not address the phylogeny of the genus and its next relatives but deals with the discovery, naming and typification of *C. purpurea*. Admittedly the major points of this argument have already been elucidated in the monograph of the genus (van der Maesen 1970), but his choice of the neotype has to be superseded. In addition, over the last fifty years a considerable amount of new evidence has come to light, in particular in Florence, London and Paris, which necessitates this paper and results in a revised typification.

### The pioneers – Forsskål and Bruce

The first to collect *Cadia purpurea* was Pehr Forsskål (1732-1763), who travelled as member of the Royal Danish Expedition in what is now Yemen in 1762-1763. His specimen, i.e. *Forsskål 1038*, has survived and is kept in C (Hepper & Friis 1994). In his posthumously published *Flora aegyptiaco-arabica* the pertinent locality is given as “Hadîe” (Forsskål 1775: 90), which has been interpreted as Al Hadiyah (14°31’N, 43°34E; Hepper & Friis 1994) and is plausible for this taxon. In his travel diary (Forsskål 1950, 2009) Forsskål does not mention *C. purpurea* and the locality “Hadîe” only in passing, but the Arab plant name “Kadi” given in the *Flora aegyptiaco-arabica* (Forsskål 1775: 90) became the basis for the generic name *Cadia* (Hepper & Friis 1994). As a consequence, the collection date remains unknown but judging from the itinerary in the “montes hadienses” (Forsskål 1775: lxxxix) it is safe to assume that this was in March 1763. Only a few months later, on 11 July 1763, Forsskål died in Yarim, probably from malaria (Hepper & Friis 1994). Carsten Niebuhr (1733-1815), the leader of the expedition and only surviving participant, managed to reach Bombay [Mumbai], from where he sent Forsskål’s collections and notes to Copenhagen (Hepper & Friis 1994). Later he returned via Shiraz and Istanbul to Copenhagen and first published his travelogue (Niebuhr 1772, 1774, 1778). On the basis of Forsskål’s notes and specimens, Niebuhr subsequently arranged for the publication of the *Flora aegyptiaco-arabica* which appeared in June 1775 (Hepper & Friis 1994). In this work the specimen from “Hadîe” was described and the generic name *Cadia* based on it validated (Forsskål 1775: 90), but no specific epithet was given. Even the

medicinal, or rather superstitious use of the fresh leaves of this plant by local informants was mentioned (Forsskål 1775: 90).

James Bruce of Kinnaird (1730-1794), a gentleman of private means, was one of the pioneers of the exploration of what are now Ethiopia and Eritrea (Bredin 2001). Like Niebuhr he published an extensive travel account (Bruce 1790) and brought back artefacts, in particular Ethiopian manuscripts and illustrations prepared for him by Luigi Balugani (1737-1771), as well as natural history items, among them seeds. No seeds seem to have survived in a herbarium and no details are available about the locality and the date where they were collected. However, this collection must have included seeds of *Cadia purpurea* (see below). Considering Bruce's travel route and the fact that he sailed along the eastern coast of the Red Sea as far as Al Luhayya in what is now Yemen without venturing further inland in 1769, it is almost certain that he collected these seeds in Africa between 1770 and 1772. Consequently an Ethiopian or Eritrean progeny is extremely likely. Significantly no illustration of *C. purpurea* prepared by Balugani is known among his drawings kept in the Yale Center for British Art (Hepper & al. 1991).

### Seeds donated to gardens in Fiesole, Kew and Paris

On the way back to his native Scotland, Bruce is known to have stopped in Paris in spring 1773 and donated seeds of *Cadia purpurea* to André Thouin (1747-1824), then the head gardener at the Jardin du Roi (Laissus 1986; Letouzey 1989). Because of illness Bruce continued from the French capital to Tuscany and donated seeds of his trophy to Giovanni Mariti (1736-1806), a correspondent of Balugani then based in Florence (Hepper & Friis 1991). The latter passed them on to Niccolò Marchese Panciatici (1742-1811; Passerini 1858), chamberlain of Pietro Leopoldo (1747-1792), Grand Duke of Tuscany, and of the latter's brother Joseph II (1741-1790), Emperor of the Holy Roman Empire. Panciatici was a member of the Florentine aristocracy, who cultivated botanical and horticultural interests and owned, among several other properties, La Loggia, a *villa suburbana* in Fiesole, today via Bolognese 165, just outside Florence (Passerini 1858). Panciatici gave the seeds to Giuseppe Picciuoli [Piccioli] (- 1818), his head gardener at La Loggia (Picciuoli 1783), who was later invited by Grand Duke Ferdinand III (1769-1824) to become "giardiniere botanico" [botanical gardener] at the Regio Museo di Storia Naturale in Florence (Grifoni 1999). However, Picciuoli's manuscript catalogue of the garden at La Loggia, dated 1773-1780 (Grifoni 1999), mentions only two accessions received from Bruce (but see below).

After a stay in Bologna and Rome, Bruce returned to Paris and was back in London in June 1774 (Hulton 1991). According to a letter sent by Bruce to Joseph Banks (1743-1820), the informal supervisor of the Royal Garden at Kew soon to be elected President of the Royal Society (Carter 1988), seeds collected in Ethiopia had been previously sent to "Mr. Eaton" (Dawson 1958: 177). The recipient was clearly William Aiton (1731-1793), the head gardener at Kew (Desmond 2007). It is hypothesized that among this material were seeds of *Cadia purpurea*.

### ***Panciatica purpurea* in Fiesole**

The plant cultivated in Fiesole was described by Picciuoli in his *Hortus Panciaticus*, an exceedingly rare brochure on the garden of La Loggia (Picciuoli 1783), as a species new to science. He coined the name *Panciatica purpurea* G. Picciuoli, offered an extremely detailed description (Picciuoli 1783: 9-10) and included a coloured copper engraving with analysis based on a drawing of an anonymous illustrator (Fig. 1). From the contents it is clear that the plant was among those cultivated from material donated by Bruce although Picciuoli refrained from specifying an individual specimen. It is of interest that at the end of his description Picciuoli explicitly noted that the plant “appartiene alla classe decima, o decandria di Linneo, e per l’unità del pistillo dei suoi fiori, merita la medesima di essere arruolata tra le piante del primo ordine della classe stessa” “[belongs to the tenth class, or the Decandria of Linnaeus, and because of it having only one pistil in its flowers, merits to be listed among the plants of the first order of that class]” (Picciuoli 1783). The name Bruce had given to the seeds, i.e. “Acacia nova Abissinica”, has also been mentioned in the protologue.

The herbarium Micheli-Tangiori, a historical herbarium kept at FI (Nepi 2009), contains a specimen of *Cadia purpurea* (FI063817) annotated in ink “Panciatica purpurea”, though without a date or a provenance (Fig. 2). The paper strips fixing the specimen on the sheet carry the note in ink “Cl X O I”, which stands for classis X ordo I, i.e. *Decandria monogynia* which Picciuoli had explicitly referred to in the protologue. A letter written by Picciuoli dated 28 December 1802 kept in the Archives of the Conservatoire et Jardin botaniques in Geneva shows a handwriting which indicates that FI063817 was annotated by Picciuoli. Another specimen of *C. purpurea* kept in Candolle herbarium, G-DC (G00652597) carries the pencil note “Panciatica purpurea Picciuoli hort. Flor.” in the same hand. The second specimen was sent in 1808 by Giuseppe Raddi (1770-1829), then curator at the Reale Museo di fisica e di storia naturale in Florence, to Augustin-Pyramus de Candolle (1778-1841), when the latter was professor at Montpellier University. At that time Picciuoli had left the services of Niccolò Panciaticchi and worked as head gardener of the garden attached to this museum (Grifoni 1999) and was, in a sense, Raddi’s colleague. FI063817 is selected as lectotype of the name *Panciatica purpurea*, G00653597 could be an isolectotype.

A specimen in the Banks herbarium (BM001134363, upper specimen) merits attention. Annotated on the back of the sheet “1. Hort. Florent. 1780 2. Hort Kew without flowers” it consists of a flowering and a non-flowering branch of *C. purpurea* plus dissected flowers with the individual parts glued on oval pieces of paper attached to the herbarium sheet. Considering the rarity of the species, the flowering branch may well originate in the garden of La Loggia in Fiesole, but since there is no plant name associated with this material, the specimen cannot be used for typification.



Fig. 1. *Cadia purpurea* (Piccioli) Ait. Coloured copper engraving. – F. Piccioli, Hortus Panciaticus, Firenze 1783. – München, Bayerische Staatsbibliothek Res/4 Phyt. 157, after p. 20.





Fig. 2. *Cadia purpurea* (Piccioli) Ait. Lectotype. Specimen annotated by G. Piccioli. FI063817. – Firenze, Museo di Storia naturale.

### ***Cadia purpurea* at Kew and in Milan**

In the *Hortus kewensis*, the first printed inventory of the Royal Garden at Kew, *Cadia purpurea* is listed with the note “Introd. 1775, by Jame Bruce, Esq.” under the addenda, and reported as cultivated in “S”, i.e. in a warm house (Aiton 1789, vol. 3: 492). The habitat is given as “Arabia”, almost certainly in error (Aiton 1789, vol. 3: 492). Although the name of William Aiton (1731-1793), then the head gardener at Kew, appears on the title-page of this work, it is largely the work of Daniel Solander (1733-1782) and Jonas Dryander (1748-1810), who in succession were librarians to Banks (Mabberley 2019). Remarkably the *Hortus Panciaticus* is listed in the bibliography of the *Hortus kewensis* (Aiton 1789, vol. 1: xxv) and appears also in the catalogue of Banks’s library (Dryander 1797). The availability of the *Hortus Panciaticus* in this library was apparently the reason why the combination *C. purpurea* (Piccioli) Aiton was formed in the *Hortus kewensis*. The existence of a living plant of this species cultivated in the Royal Garden at Kew is documented by an undated specimen annotated “Hort Kew [ink] without flowers [pencil]” kept in the Banks herbarium (BM001134363, lower specimen). When *C. purpurea* flowered for the first time at Kew, remains unknown.

Separately from Aiton, or rather Dryander, and apparently at the same time, a teacher at the Brera in Milan came to the same conclusion. This was Fulgenzio Vitman (1728-1806), the professor for botany and founder of the botanic garden at this institution (Visconti 2012), and he transferred the name *Panciatica purpurea* to the genus *Cadia* (Vitman 1789). However, the third volume of his *Summa plantarum* appeared in December 1789 or early 1790 and therefore just after the *Hortus kewensis* (Stafleu & Cowan 1976, 1986). Interestingly Vitman ascribed the *Hortus Panciaticus* to Attilio Zuccagni (1754-1807), director of the botanical garden of the Reale Museo di Fisica e Scienze naturali in Florence and physician in ordinary to Grand Duke Pietro Leopoldo (Sarchiani 1812), not to Piccioli.

### ***Cadia arabica* in Göttingen**

When Johann Friedrich Gmelin (1748-1804), since 1775 professor of philosophy and since 1778 also professor of medicine at Göttingen University (Wagenitz 1988), sat down to write the thirteenth edition of Linnaeus’s *Systema naturae* he also dealt with the genus *Cadia* Forssk. Referring to “Forsk. fl. aeg. arab. p. 90.” he published the naked name *Cadia arabica*. For good reason Gmelin is regarded as “mainly a compiler” (Stafleu & Cowan 1976) and nothing indicates that he had ever seen a specimen of this species.

### ***Cadia varia*, *Spaendoncea tamarindifolia* and *C. pendula* in Paris**

The specimen in the Jardin des plantes, the re-named Jardin du Roi now belonging to the newly founded Muséum d’Histoire naturelle, flowered in 1794 at the latest, and it was definitely just one specimen (Desfontaines 1795). It immediately attracted the

attention of the initiated – Pierre-Joseph Redouté (1759-1840), a free-lance illustrator who regularly received commissions from botanists based in Paris; Charles-Louis L'Héritier de Brutelle (1746-1800), a self-taught botanist who had lost his position at the Cour des Aides due to the French Revolution and was then a *commis* at the ministry of justice (Stafleu 1963); and René-Louiche Desfontaines (1750-1833), one of the professors at the Muséum. However, the precise sequence of events remains unclear.

Redouté produced a water-colour of a specimen of *Cadia purpurea* for the Collection des vélins, now conserved in the Bibliothèque centrale of the Muséum national d'Histoire naturelle in Paris (Vol. 54, f. 19). It is annotated in calligraphy “*Spaendoncea tamarindifolia*. (Desf:) *Cadia purpurea*. (Forsk:) Abissinie” and shows a flowering branch with (1) two flowers, one with the petals removed, the other with the sepals and petals removed, (2) a separate petal, (3) a separate stamen and (4) a juvenile pod. Painted on vellum and signed (though difficult to discern) outside the painted frame, this drawing is undated. However, judging from the fake gold (a paint containing copper and turning brown) in the frame, it can be dated to the period between c. 1794 and c. 1804, when good quality gold paint was difficult to obtain (Raynal-Roques & Jolinon 1998). Notably, the water-colours integrated into the Collection of vélins were intended as documents and not primarily for publication. As a matter of fact Redouté's image of *C. purpurea* was first published complete, i.e. with all details, only some 180 years after it had been made (Anonymous 1980).

For good reason an anonymous correspondent of Paul Usteri (1768-1831), a botany-minded publicist based in Zurich, wrote “die Botanicker und Liebhaber sind allhier [in Paris] nichts weniger als mittheilend, hat jemand eine seltene Pflanze in der Blüthe so wird sie strenger bewacht als ein Schatz bewahrt [botanists and amateurs here [in Paris] are anything but communicative, when someone has a rare plant in flower, it is guarded more closely than a treasure]” (Anonymous 1791). Four years after this statement had been published, the situation had not changed. One of the rare plants in flower was the specimen of *Cadia purpurea* raised by Thouin. At an interval of a few months it was described as new to science independently – by L'Héritier as *C. varia* L'Hér. (L'Héritier 1795) and by Desfontaines as *Spaendoncea tamarindifolia* Desf. (Desfontaines 1795). Both protologues explicitly refer to a living plant in the Jardin des plantes raised from seeds received from Bruce who had them collected in Ethiopia. Furthermore both protologues contain copper engravings, one of them with the note “del. P. Redouté” (L'Héritier 1795) the other unattributed, and both engravings show a flowering twig and an analysis. The two analyses differ only in details: one of them shows (1) two flowers, both without petals, (2) two stamens in different views, (3) a separate petal and (4) a juvenile pod (L'Héritier 1795), the other consists of a representation of (1) one flower without petals, (2) one flower without petals and sepals, (3) a separate petal, (4) one separate stamen and (5) a juvenile pod (Desfontaines 1795). A comparison of the two analyses with the analysis on the water-colour (see above) shows that the individual elements are identical and were copied, while in contrast the three twigs shown in water-colour and in the two engravings differ. No specimen annotated *Cadia varia* in L'Héritier's hand could be traced, though material annotated by Pierre-Étienne Ventenat exists (G00341938). In contrast specimens annotated by Desfontaines “*Spaendoncea tamarindifolia*” have been located (G00341939, P02778642).



In the years following the hot phase of the French Revolution communication among botanists was extremely quick. Only months after the publication of the names *Cadia varia* and *Spaendoncea tamarinifolia* in Paris Zuccagni in Florence realized their identity with *Cadia purpurea* (Zuccagni & al. 1796). This paper which appeared in Zurich consist of two parts: (1) Zuccagni's arguments, (2) a re-issue of the two previously published papers (L'Héritier 1795; Desfontaines 1795), albeit including only one illustration (Desfontaines 1795). Although synonymies were convincingly clarified, all three names remained in use. A few years later Jaume St.-Hilaire (1772-1845) validated one further name for this species, i.e. *Cadia pendula*, ascribing it in error to Forsskål; in the protologue no specimen is mentioned, but only the habitat "Arabie".

In May 1827, Redouté started to publish his *Choix des plus belles fleurs*, a work consisting of 144 colour stipple engravings issued in 36 instalments with 20 pages of text by Antoine Guillemain (1796-1842) issued with the last part; the work came to its conclusion in June 1833 (Stafleu & Cowan 1983). The contents is an amalgam of newly produced and previously published plates which had appeared in Redouté's earlier works, with the plates of the latter group often modified in comparison to their first issue (Lack 2018: 450-452). Both numbered and unnumbered plates are known. The engraving inscribed on the lower left hand margin "P. J. Redouté \_76" had not previously been published and shows *Cadia purpurea*, more specifically the upper part of the branch depicted by Redouté for the Collection des vélins whereas the analysis was suppressed. While the engraving is inscribed *Spaendoncea tamarindifolia* Guillemain regarded in his comments the name *Cadia varia* as correct.

### Nomenclatural summary

***Cadia purpurea*** (G. Piccioli) Aiton, Hort. Kew. 3: 492 (1789).

≡ *Panciatica purpurea* G. Piccioli, Hortus Panciaticus 9 (1783). – Lectotype designated here: FI063817, image! (Fig. 2); isolectotype (?): G00653597, image!. – Note: In accordance with ICN Art. 9.19a (Turland & al. 2018) the neotype previously selected "Forskål herb. 267" (Meusen 1971: 283), i.e. *Forsskål 1038*, is herewith superseded, because FI063817 is regarded as original material of *P. purpurea*.

= *Cadia varia* L'Hér. in Mag. Encycl. 5: 22 (1795). – Lectotype here designated: Mag. Encycl. 5: plate without number following p. 20.

= *Spaendoncea tamarindifolia* Desf. in Décade Philos. 7: 259 (1795). – Lectotype here designated: G00341939, image!, P02778642 image!.

= *Cadia pendula* J. St. Hil., Exposition 2: 206 (1805).

### Eponyms

The generic name *Panciatica* Picc. does not refer to Niccolò Marchese Panciaticchi, the owner of La Loggia in Fiesole and Picciuoli's superior, but to the former's great uncle, cardinal Bandino Marchese Panciaticchi (1629-1718), long-sitting prefect of the Congregation for the Clergy in Rome (Passerini 1858). His robe had the same colour

as the flowers of this plant specifically referred to in the protologue (Picciuoli 1783), at least in their late stage. *Spaendoncea* Desf. is a tribute to the painter and plant illustrator Gerard [Gerrit] van Spaendonck (1746-1822), one of the twelve professors when the Muséum d'Histoire naturelle in Paris was founded in 1792, and therefore a colleague of Desfontaines. Van Spaendonck had Redouté as his most prominent pupil, starting from 1792 he taught botanical illustration at the Muséum and is famous for having created the logo of this institution which continues to be in use today (e.g. Spary 2000).

## Epilogue

In a nutshell the fate of the generic names *Cadia*, *Panciatica* and *Spaendoncea* exemplify the interdependence of taxonomic work undertaken in the late eighteenth century and the results of collaborative versus competitive approach by the botanists involved. At the same time this case story shows that not only specimens and printed texts are essential for clarifying plant names but also illustrations, both originals and prints, as well as archival material.

## Acknowledgements

This paper could not have been written without help and advice received from Martin W. Callmander (Geneva), Anna Donatelli, Chiara Nepi (both Florence) and Jacek Wajer (London). Thanks are due to Nick Turland (Berlin) for advice on nomenclatural matters. A preliminary version of this paper was read and commented by M. Callmander (Geneva), N. Kilian and E. Lack (both Berlin). The Museo di Storia naturale, Florence and the Bayerische Staatsbibliothek, Munich kindly permitted the publication of materials in their care.

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## APPENDIX

**List of selected specimens of *Cadia pupurea* recently collected on the Arabian Peninsula and reexamined**

**Oman: Dhofar**, Jebel Qamar, along road to Khadrafi on Mughsail-Sarfayt road, c. 2.5 km W of junction with track to Dalkut, 16°45'15"N, 53°11'40"E, 27. 9. 2002, *Meister & Oberprieler 10230* (B); Jebel Qamar, along road to Khadrafi on Mughsail-Sarfayt road, c. 17.3 km W of junction with track to Dalkut, 1060 m, 16°42' 16"N, 53°07'44"E, 27. 9. 2002, *Meister & Oberprieler 10231* (B).

**Yemen: Gov. Dhamar**, western escarpment, Jabal Uthmar, near village Mrisa'a, ca. 5 km SW of village Uthmar, 14°28'07.7"N, 44°00'20.0"E 1620-1720 m, 12.8.2002, *Kilian, Hein & Al-Naggan YP2611* (B, P); Gov. **Lahaj**, Jebel Eraf, between 13°06'44.1"N, 44°14'57.4"E and 13°06'32.4", 44°15'14.5"E, 1430 m, *Kilian, Hein, Kürschner, Shaber, Habib & Hubaishan YP1444* (B, P); Gov. **Abyan**, escarpment W of Lawdar, near the serpentine road E of the pass Naqil Thirah, 1650-1750 m. 13°53'N, 45°46'E, 26. 3. 1997, *Hein 3635* (B, W); Gov. **Hadramout**, Kor Seiban, 14°49'37.2"N, 48°48'21.3"E, 1900-1950m, 16. 10. 2001, *Kilian, Meister & Hubaishan YP1267* (B); Jol Plateau, 2 km S of Bayn al Jibal, Kor Seyban escarpment, upper Mawla Matar gorge, 1800-1930 m, 14°48'N, 48°46'E, 30. 10. 2000, *Kilian, Bahah, Bin Nesr, Hein & Hubaishan NK 6550* (B), *Hein 7805* (B); Jol Berka, 14°36'N, 48°40'E, on the track from village As Safal in the upper Wadi Fuwwah = Wadi Al Muhammedin, 1350 m, 14. 11. 1999, *Kilian, El-Mashjary & Hein NK 6013* (B); Jol Berka plateau above the Wadi Muhammedin, 1200 – 1400 m, 14°36'N, 48°40'E, 14. 11. 1999, *Hein 6351* (B, W); Gov. **Al Mahra**, track from Hawf towards NE up to the first plateau, 16°39'N, 53°03'E, first plateau, 200-260 m, 22. 11. 1999, *Kilian, Bahah, Bashmeilah, Ghoufaly, Hein, Kodah & Al-Shameli NK 6250* (B); coastal mountains between Al Faydami and Hawf, 1.plateau, 250-500 m, 16°39'N, 53°02'E, 22. 11. 1999, *Hein 6667* (B, W); track from Hawf to the village Con, second plateau, 16°39'N, 53°02'E, 700-900 m, 22. 11. 1999, *Kilian, Bahah, Bashmeilah, Ghoufaly, Hein, Kodah & Al-Shameili NK 6281* (B); coastal mountains between Al Faydami and Hawf, plateau of the Jabal Chatan (3.plateau), 1300-1350 m, 16°40'N, 52°58'E, 23. 11. 1999, *Hein 6782* (B, W); Hawf Mts, near a locality called 'Uteq', 16°38'57.5"N, 52°57'39.2"E, c. 900 m, 1. 10. 2001, *N. Kilian YP628* (B); Costal mountains between Al Faydami and Hawf, plateau and slopes N of the village Damqawt, 520 m, 16°34'N, 52°47'E, 12. 11. 2000, *Hein 8078* (B, W).

