

The contribution of the Florentine collections to the knowledge of the Flora of Ethiopia and Eritrea

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In this paper the landmark contribution of the Florentine tropical botanical collections played in the Flora of Ethiopia and Eritrea Project is presented as well as a historical sketch of the Tropical Herbarium of Florence (FT). The most important steps from the beginning of the studies in tropical African botany, especially in Ethiopia and Eritrea, by Italian botanists up to the present time are described.

Key words: Flora of Ethiopia and Eritrea, Italian botanists, importance of Florentine herbaria.

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First explorations in Africa: Ethiopia and Eritrea

After the unification of the Italian nation in 1861, interest in African territories arose and Italian botanists and agronomists began to explore the flora of Ethiopia, Eritrea and other countries of North Africa.

In 1870 Orazio Antinori (Fig. 1A), and Odoardo Beccari (Fig. 1B) were the first scientists in charge of research and botanical collecting in Ethiopia (Scioa) during an expedition that was primarily arranged in order to allow for the purchase of Assab Bay. Antinori, in particular, was deeply involved in geographical and geobotanical research in Ethiopia. In 1877 he created a scientific research station in Let-Marefià under the aegis of the Emperor Menelik. Antinori, born in Perugia died in Ethiopia, and was buried in Let-Marefià. Beccari's plant collections from the expedition can be considered the first made in Ethiopia by an Italian botanist (Pichi Sermolli 1988). In 1886 Ugolino Martelli published his *Florula Bogosensis* based on the plant specimens collected by Beccari in the Bogos area (Martelli 1886) and a further contribution to the knowledge of the flora of Ethiopia based on material from the expedition was published by Avetta (1895).

Between 1878 and 1892, important expeditions were carried out by Luigi Robecchi Bricchetti, Domenico Riva and Eugenio Ruspoli in southern Ethiopia (between Zeila and Harrar) and in Somalia. Later, between 1892 and 1914, Achille Terracciano and Agostino Pappi collected in Eritrea (Dahalac Archipelago, Anfilah Bay, Bogos and Habab areas) under the aegis of Romualdo Pirotta in

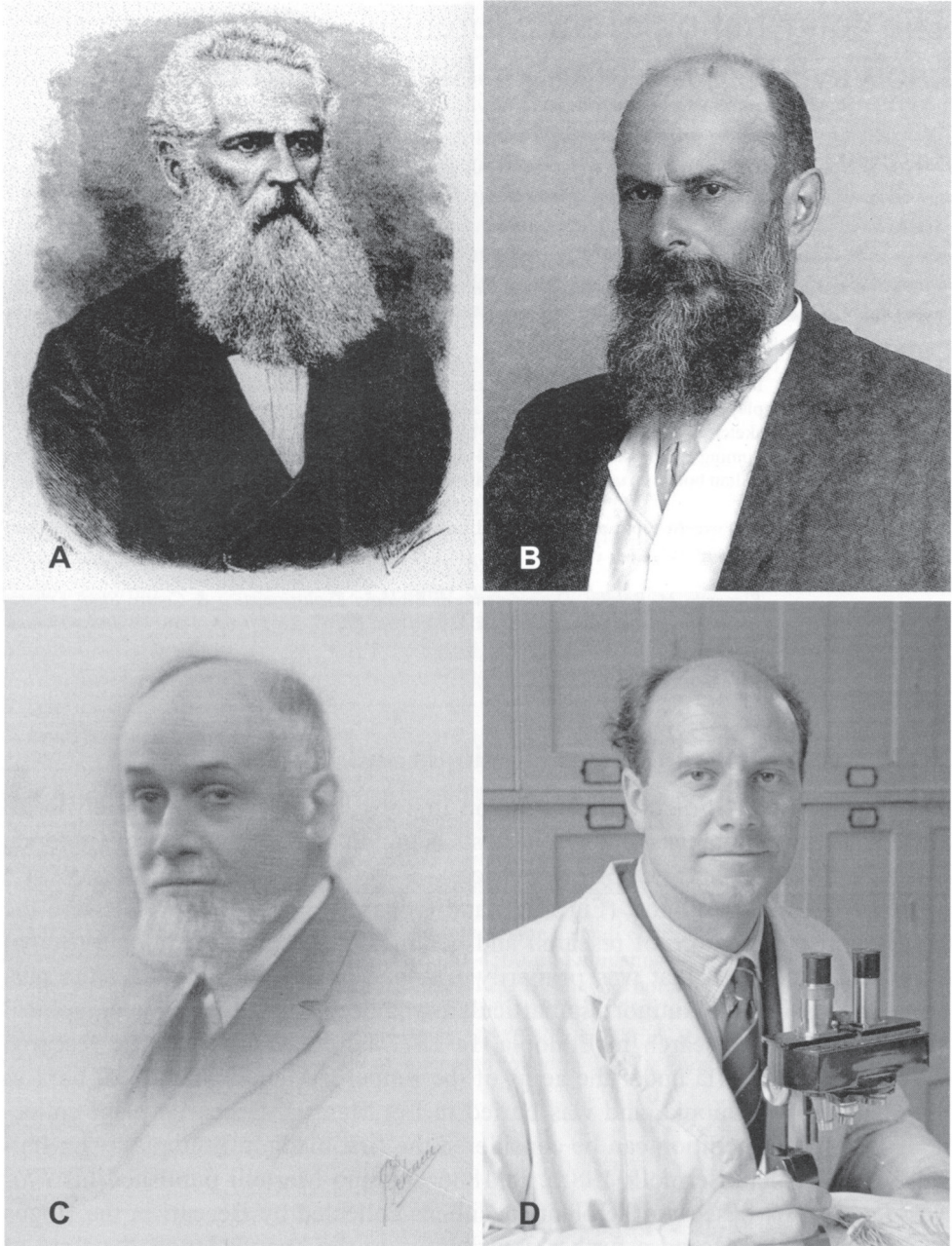


Figure 1. Italian botanists of importance for the Flora of Ethiopia and Eritrea. A. Orazio Antinori (1811–1882); B. Odoardo Beccari (1843–1920); C. Emilio Chiovenda (1871–1941); D. Rodolfo Pichi Sermolli (1912–2005, courtesy of Pichi Sermolli's family).

Rome. Pirotta (1893–1902, 1896, 1903–1908) supervised a series of contributions to the flora of Ethiopia, Eritrea and Somalia, mostly based on the collections made between 1870 and 1900.

The number of tropical botanical collections, mainly from eastern Africa, in Italy at the beginning of the 20th century could be estimated at c. 50,000. At about the same time a very important geographical expedition was carried out in Ethiopia and Eritrea by Giotto Dainelli and Olinto Marinelli. No botanists were involved, but this expedition set the basis for future journeys to those areas.

The birth and history of the Tropical Herbarium of Florence

In order to ensure that the collections made by Italian botanists and collectors in the tropics were housed in an appropriate location, Pirotta promoted the idea of a Colonial Herbarium and Museum in Rome. In that way all botanical collections from the tropics, with emphasis on the Italian colonies, would be brought together in one place. In 1904 the *Erbario e Museo Coloniale* was established at the Botanical Institute of the University in Rome.

According to Moggi (1996), the activities of the Tropical Herbarium can be divided into three periods: the Roman period (1904–1914); the move to Florence and the period between the two World Wars (1914–1945); and after World War II (1945–1994), to which we should add, the most recent period (1995–2009), i.e., the situation in the 21st century and the prospects for the future.

The Roman period (1904–1914)

During this period the most important collections were made by Adriano Fiori, Achille Terracciano and Agostino Pappi in Eritrea and Somalia, and in Ethiopia by Emilio Chiovenda (Fig. 1C) and Giovanni Negri. Between 1909 and 1913 Fiori (1912–1913) published several contributions on the flora of Ethiopia and Eritrea including an important work on the trees and forests of Eritrea (Fiori 1912).

The period between the two World Wars (1914–1945)

In 1914 the *Erbario e Museo Coloniale* moved from Rome to Florence in order to consolidate the most important botanical collections in a more appropriate center: the University of Florence. The original institute changed its name to *Regio Erbario Coloniale di Firenze* (the Royal Colonial Herbarium of Florence). In 1969 it became *Erbario Tropicale* (the Tropical Herbarium of Florence) and, in 2004 the current *Centro Studi Erbario Tropicale* (Centre for Studies of the Tropical Herbarium), which houses important type collections, represented here by specimens collected by Antinori, Robecchi-Brichetti and Pichi Sermolli (Fig. 2).

During this period the role of Chiovenda was predominant. He visited Eritrea and Ethiopia for the first time in 1909 and returned to Italy with 3000 specimens. Later he focussed his research mainly on the Somalian flora. Between 1911 and



Figure 2. Type specimens from Centro Studi Erbario Tropicale (FT): upper left – type of *Vernonia antinoriana* Avetta (= *V. urticifolia* A. Rich.); upper right – type of *Ergrostis hararensis* Chiov. based on Robecchi-Brichetti's specimen; lower left – type of *Acacia bavazzanoi* Pic. Serm. based on Pichi Sermolli's specimen.

1940 he published the results of his research in North East and East Africa (Chiovenda (1911–1915, 1917, 1928, 1940).

Since Chiovenda was really attracted by the flora of Ethiopia, he tried to compile the first Flora of Ethiopia, but was not able to carry out this project. Most of Chiovenda's original manuscripts and drawings are now kept at FT (Settesoldi et al. 2005).

Studies of the Ethiopian and Somalian flora and vegetation were intensified between 1914 and 1945. In Ethiopia two large expeditions were carried out under the leadership of A. Zavattari: one to southwestern Ethiopia, Borana, Dawa, Ganaale in 1937 with Georg Cufodontis as botanist (Cufodontis 1939) and the other to Sagan-Omo river in 1939 with Rinaldo Corradi as botanist (Corradi 1950; Chiovenda 1951a, 1951b, *posthumous*).

As a result of Zavattari's expedition in 1937, Cufodontis wrote a series of contributions on the flora of Ethiopia and Somalia which were published after the Second World War, including his *Enumeratio Plantarum Aethiopicarum* (Cufodontis 1951, 1952; Pichi Sermolli 1947, 1975) and the subsequent supplements (Cufodontis 1953–1972) until his death in 1974.

Rodolfo E. G. Pichi Sermolli (Fig. 1D) took part in many expeditions in Africa. One of the most important was in northern Ethiopia (Lake Tana and Semien between January and April 1937), organized by the Academia d'Italia under the supervision of G. Dainelli. The botanical results were published only after the Second World War (Pichi Sermolli 1951b). This is the period during which many collections were made in applied botany by agronomists, foresters and others which considerably enriched the Tropical Herbarium in Florence. The collecting activity was, however, interrupted during the last three years of World War II.

After World War II (1945–1994)

After the Second World War, the studies in tropical Africa were mainly carried out by Pichi Sermolli. He represented the real turning point for the *Tropical Herbarium of Florence* (FT), enhancing the study of African flora and vegetation, which gave an international rank to both FT and FI (*Herbarium – Botanical Section “F. Parlatore” of the Natural History Museum of the University of Florence*) (Bizzarri 1993).

Until 1959 he was a member of the UNESCO committee for the study of the arid and semiarid tropical areas (Exell et al. 1955; Pichi Sermolli 1955) and was also a member of the Italian Foreign Office of the UNESCO conference held in Bukavu (Zaire) in 1953 on the preservation and conservation of African flora and fauna.

A further outcome on the knowledge of East African flora and vegetation worth mentioning is the “*Geobotanical Map of East Africa (Eritrea, Ethiopia,*

Somalia)” published by Pichi Sermolli in Webbia (1957), as well as the beginning of *Adumbratio Florae Aethiopicae* [VV.AA. (various authors) 1953–1978], which covers a large area of the study of the flora of East Africa including Ethiopia, Eritrea and Somalia (Chiarugi 1953).

Between 1980 and 1990 the activity of the Tropical Herbarium of Florence mainly focussed on the *Flora of Ethiopia and Eritrea* (Hedberg et al. 1989, 1995, 2003, 2004, 2006, 2009a, 2009b, Edwards et al. 1995, 1997, 2000) and *Flora of Somalia* (Thulin 1993–2006). From 1989, under the supervision and managing of its Director, Guido Moggi (1927–), FT in collaboration with FI has also taken part in other projects in Africa.

Further to the expeditions and collections made in North East Africa, mainly in Somalia (G. Moggi, R. Bavazzano, G. Moggi, M. Raffaelli, M. Tardelli, G. Sartoni), many others have been carried out in the neo-tropical areas of the world.

Contact and exchange with other institutions such as Kew, the Smithsonian Institution in Washington, the Missouri Botanical Garden and many others have resulted in an increase in the number of specimens, and the Ethiopian and Eritrean collections still represent the majority of specimens kept in FT (Tardelli 1997).

The last decade: present situation of FI and FT

In spite of the economic difficulties caused by the financial cutbacks at the University of Florence, some expeditions have been carried out in the last decade, for instance those of Tardelli and Bigazzi in Ethiopia, Raffaelli and Tardelli in Dhofar (Oman), Baldini and Tardelli (Yemen, Soqatra Island), Baldini (Brazil, Chile, Oman, Panama), and Tardelli and Raffaelli (Ethiopia, Tanzania).

The collaboration of FT and FI in the African Plants Initiative Project (API) enhanced the value of the Florentine botanical collections in a worldwide perspective.

An important acquisition has recently been made by the University of Florence. After Pichi Sermolli’s death in 2005, his private Pteridological Herbarium of 25,000 specimens, mainly from tropical areas, has been incorporated into FI. Many other flowering plant specimens collected by Pichi Sermolli were already housed either at FT or FI. Pichi Sermolli’s library, consisting of 450 books and 7,000 miscellaneous publications, has also been purchased from his heirs by the University of Florence.

FI with about 5 million specimens, and FT with about 200,000 specimens and 6,000 type specimens have become very important to botanists in general and especially to those involved in tropical studies (Moggi 1993; Tardelli 1988; Tardelli et al. 2009a, 2009b). Also for historical reasons the Florentine herbaria are definitely some of the most important sources of data for African, and particularly North East and East African flora.

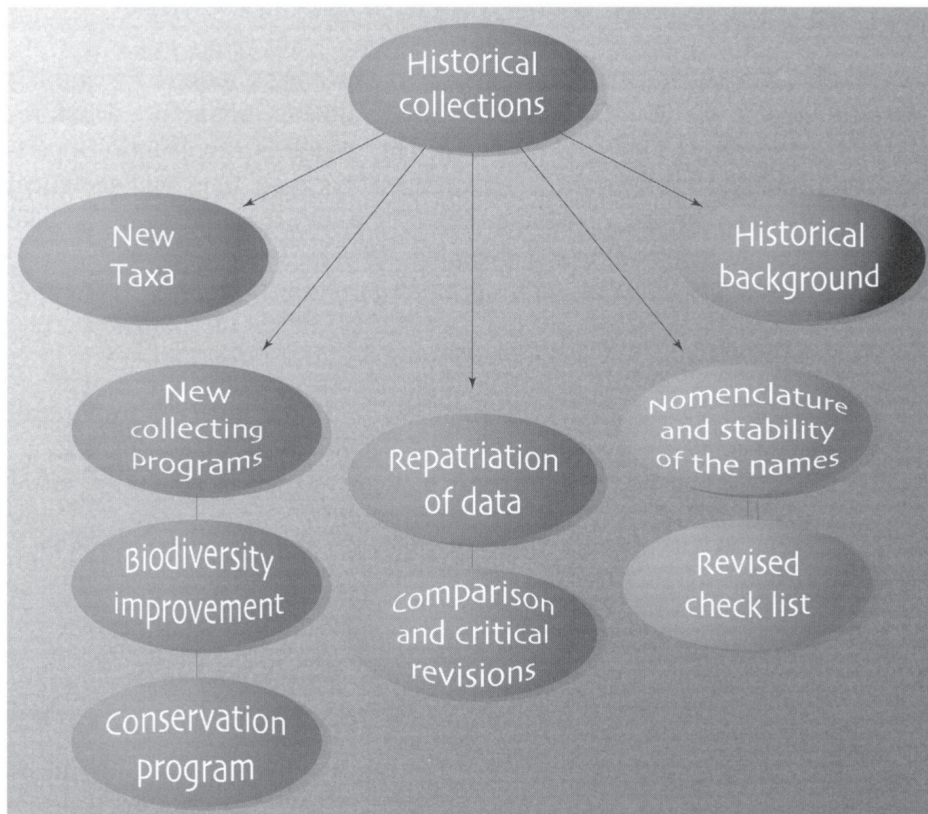


Figure 3. Use of historical botanical collections in the biodiversity age.

Afterword and hopes

As always, the main problem is to find new partners for joint collaboration on large Flora projects, either in paleotropical or neotropical countries. Herbaria such as FT and FI with their high information value are definitely too important to be left out by the authorities involved in financing culture and science.

Herbaria with tropical collections play a key role for the future of botanical science (Bateman 1975), especially in tropical developing countries, covering different aspects in taxonomic, floristic and biodiversity research (Fig. 3) as well as in applied botany.

Funding is not easy to obtain, especially in an era where the biological collections and related libraries are seen as obsolete – they are treated as if they would never be a useful tool in taxonomical studies (Lane 1996; Stuessy & Stuckey 1997; Blackmore 2002; Funk & Richardson 2002; Will & Rubinoff 2004; Ebach & Holdrege 2005). Therefore a concerted effort must be made to create a better future for a science such as taxonomy on a global scale (Wheeler et al. 2004).

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References

- Avetta, C. 1895. Contribuzioni alla conoscenza della flora dell’Africa orientale. IV. Materiali per la Flora dello Scioa. – *Annuario del Regio Istituto Botanico, Roma* 6: 44–66.
- Bateman, J. A. 1975. The functions of museums in biology. – *Museums Journal* 74: 159–164.
- Bizzarri, M. P. 1993. L’attività scientifica del prof. Rodolfo E.G. Pichi Sermolli. – *Webbia* 48: 701–733.
- Blackmore, S. 2002. Biodiversity Update. Progress in Taxonomy. – *Science* 298: 365.
- Chiarugi, A. 1953. Adumbratio Florae Aethiopicae. I. Introductio. – *Webbia* 9(1): 1–8.
- Chiovenda, E. 1911–1915. *Plantae novae vel minus notae e regione aethiopica*. – *Annali di Botanica (Roma)* 9: 51–85 (N. 1–58). 1911; 9: 124–152 (N. 59–98). 1911; 9: 315–322 (N. 100–108). 1911; 10: 383–415 (N. 109–146). 1912; 13: 371–410 (N. 147–187). 1915.
- 1917. *Plantae novae vel minus notae e regione aethiopica*. – *Bullettino della Società Botanica Italiana*: 21–27 (N. 188–193); 38–69 (N. 194–203).
- 1928. *Plantae novae vel minus notae ex Aethiopia* (N. 204–230). – *Lavori del Regio Istituto Botanico di Catania* 1: 3–32.
- 1940. *Plantae novae vel minus notae ex Aethiopia*. (N. 231–297). – *Atti della Accademia d’Italia, Memorie della Classe di Scienze fisiche, matematiche e naturali* 11: 17–67.
- 1951a. *Missione Biologica Sagan-Omo. Monocotiledoni. II*. – *Webbia* 8(1): 1–122.
- 1951b. *Plantae novae vel minus notae ex Aethiopia*. – *Webbia* 8(1): 229–240.
- Corradi, R. 1950. *Podocarpaceae, Cupressaceae, Aponogetonaceae, Potamogetonaceae* ed altre famiglie di Fanerogame raccolte in Abissinia dalla Missione Biologica Sagan-Omo. – *Webbia* 7: 459–468.
- Cufodontis, G. (ed.) 1939. *Missione Biologica nel Paese dei Borana. Vol. IV. Raccolte botaniche*. – *Regia Accademia Italiana, Centro Studi sull’Africa Orientale Italiana, Roma*.
- 1951. *Vorläufige Aufzählung der Laubmoose Äthiopiens*. – *Oesterreichische Botanische Zeitschrift* 98(3): 217–244.
- 1952. *Enumeratio Plantarum Aethiopiae II (Bryophyta: Hepaticae)*. – *Phyton (Horn)* 4(1–3): 72–82.
- 1953–1972. *Enumeratio Plantarum Aethiopicae. Spermatophyta. Supplements to the previous papers in: Bulletin du Jardin Botanique de l’État (Bruxelles)* 23(3–4), 24(2), 25(2,3), 26(3), 28(1,4), 29(1,3), 30(4), 31(4), 32(2), 33(3,4), 35(1,2), 36(3). 1953–1966. / *Bulletin du Jardin Botanique National de Belgique* 37(3), 38(4), 39(2,3,4), 40(3), 41(3), 42(3). 1967–1972.
- Ebach, M.C. & Holdrege, C. 2005. More Taxonomy Not DNA Barcoding. – *BioScience* 55(10): 822–823.

- Edwards S., Mesfin Tadesse & Hedberg, I. (eds) 1995. *Flora of Ethiopia and Eritrea*, Vol. 2(2). Addis Ababa and Uppsala
- Edwards S., Sebsebe Demissew & Hedberg, I. (eds.) 1997. *Flora of Ethiopia and Eritrea*, Vol. 6. Addis Ababa and Uppsala.
- Edwards S., Mesfin Tadesse, Sebsebe Demissew & Hedberg, I. (eds) 2000. *Flora of Ethiopia and Eritrea*, Vol. 2(1). Addis Ababa and Uppsala.
- Exell, A.W., Moreau, R.E., Pichi Sermolli, R.E.G., Haiman, L., Scott, R., Hoyle, A.C., Cufodontis, G., Hedberg, O. & Ross, R. 1955. Some aspects of the Montane Flora of Tropical Africa. *A.E.T.F.A.T. – Webbia* 11: 489–496.
- Fiori, A. 1912. *Boschi e piante legnose dell’Eritrea*. Firenze (Reprint from “*L’Agricoltura Coloniale*”, 3,4,5. 1909–1912).
- 1912–1913. *Piante raccolte nella Colonia Eritrea nel 1909*. – *Nuovo Giornale Botanico Italiano*, n.s., 19: 412–462. (1912); 20: 345–394. (1913).
- Funk, V. A. & Richardson, K. S. 2002. Systematic Data in Biodiversity Studies: Use It or Lose It. – *Systematic Biology* 51(2): 303–316.
- Hedberg, I. & Edwards, S. (eds) 1989. *Flora of Ethiopia*, Vol. 3. Addis Ababa and Uppsala.
- Hedberg, I. & Edwards, S. (eds) 1995. *Flora of Ethiopia and Eritrea*, Vol. 7. Addis Ababa and Uppsala.
- Hedberg, I., Edwards, S. & Sileshi Nemomissa (eds) 2003. *Flora of Ethiopia and Eritrea*, Vol. 4(1). Addis Ababa and Uppsala.
- Hedberg, I., Friis, I. & Edwards, S. (eds) 2004. *Flora of Ethiopia and Eritrea*, Vol. 4(2). Addis Ababa and Uppsala.
- Hedberg, I., Ensermu Kelbessa, Edwards, S., Sebsebe Demissew & Persson, E. (eds) 2006. *Flora of Ethiopia and Eritrea*, Vol. 5. Addis Ababa and Uppsala.
- Hedberg, I., Friis, I. & Persson, E. (eds) 2009a. *Flora of Ethiopia and Eritrea*, Vol. 1. Addis Ababa and Uppsala.
- Hedberg, I. Friis, I. & Persson, E. (eds) 2009b. *Flora of Ethiopia and Eritrea*, Vol. 8. Addis Ababa and Uppsala.
- Lane, M.A. 1996. Roles of Natural History Collections. – *Ann. Missouri Bot. Garden* 83(4): 536–545.
- Martelli, U. 1886. *Florula Bogoensis*. Tipografia M. Ricci. Firenze.
- Moggi, G. 1993. Botanical collections in Florence from their origin to the present day. – *Webbia* 48: 35–60.
- 1996. The Tropical Herbarium of Florence. Ninety years of research in Tropical Botany (1904–1994). – *Museologia scientifica* 13(3–4): 309–317. (1997).
- 2009. Le raccolte botaniche. – In: *Atti del XVII Congresso ANMS “Al di là delle Alpi e del Mediterraneo”*, Verona, 4–7 Dicembre 2007. – *Memorie del Museo Civico di Storia Naturale di Verona*. 2. serie. *Monografie Naturalistiche* 4 (2009): 14–19.
- Moggi, G., Nepi, C. & Cucchini, P. 2009. Le collezioni extraeuropee di Fanerogame negli erbari della Sezione Botanica del Museo di Storia Naturale dell’Università di Firenze. – In: *Atti del XVII Congresso ANMS “Al di là delle Alpi e del Mediterraneo”*, Verona, 4–7 Dicembre 2007. – *Memorie del Museo Civico di Storia Naturale di Verona*. 2. serie. *Monografie Naturalistiche* 4 (2009): 158–160.
- Pichi Sermolli, R. E. G. 1947. *Missione Biologica Sagan-Omo* diretta dal Prof. Edoardo Zavattari. Pteridophyta. – *Rivista di Biologia Coloniale* 7: 137–149. (1946).
- 1951a. The publication – dates of Colla’s “*Plantae Rariores in regionibus chilensibus a carissimo M.D. Bertero nuper detectae*” and “*Herbarium Pedemontanum*”. – *Webbia* 8(1): 123–140.
- 1951b. *Fanerogame raccolte nel Bacino Idrografico del Lago Tana, nel Semien, nella Regione di Tucùr Dinghià ed in Eritrea*. *Missione di studio al Lago Tana*. Vol. VII. *Ricerche Botaniche*. Parte I. – *Accademia Nazionale dei Lincei*, Roma.

- 1955. The arid vegetation types of tropical countries and their classifications. – Proceedings of the Montpellier Symposium. Paris, 1955. UNESCO. Arid Zone Research. Plant Ecology, pp. 29–33.
- 1957. Una carta geobotanica dell’Africa Orientale (Eritrea, Etiopia e Somalia). – *Webbia* 13(1): 15–128. tav. I–XXI. 1 map (1:5,000,000).
- 1975. Cufodontis G., Enumeratio Plantarum Aethiopiae. Wien 1951, Horn (Austria) 1952, Bruxelles 1953–1972. – *Webbia* 29: 798–802.
- 1988. Il contributo degli Italiani alla conoscenza delle flore extra-europee (Pteridophyta e Spermatophyta): I. Note introduttive. Africa. – In: Pedrotti, F. (ed.), 100 anni di ricerche botaniche in Italia (1888–1988), vol. II. Società Botanica Italiana, Firenze, pp. 1013–1044.
- Pirotta, R. (ed.) 1893–1902. Contribuzioni alla conoscenza della flora dell’Africa orientale. I–XXIII. – *Annuario del Regio Istituto Botanico, Roma* 5: 76–77. 1893; (I) 5: 78–82. 1893; (II) 5: 89–121. 1894; (III) 5: 174–180. 1894; (IV) 6: 44–66. 1895; (V) 6: 67–83. 1896; (VI) 6: 84–87. 1896; (VIII) 6: 88–96. 1896; (VIII) 6: 97–99. 1896; (IX) 6: 155–160. 1896; (X) 6: 161–176. 1896; (XI) 6: 177–180. 1896; (XII) 6: 181–188. 1897; (XIII) 6: 189–190. 1897; (XIV) 7: 13–31. 1897; (XV) 7: 32–43. 1897; (XVI) 7: 58–78. 1897; (XVII) 7: 85–98. 1897; (XVIII) 7: 223–236. 1898; (XIX) 9: 17. 1900; (XX) 9: 18–22. 1900; (XXI) 9: 117–118. 1901; (XXII) 9: 119–123. 1901; (XXIII) 9: 243–256. 1902.
- 1896. Contribuzioni alla conoscenza della flora dell’Africa orientale. IX. Prima aggiunta alla florula dello Scioa e dell’Harar. – *Annuario del Regio Istituto Botanico, Roma* 6: 155–160.
- (ed.). 1903–1908. Flora della Colonia Eritrea. – *Annuario del Regio Istituto Botanico, Roma* 8(1): 1–128. 1903; (2): 129–264. 1904; (3): 265–464. 1908.
- Settesoldi, L., Tardelli, M. & Raffaelli, M. 2005. Esploratori Italiani nell’Africa Orientale fra il 1870 ed il 1930. Missioni Scientifiche con Raccolte Botaniche, Rilievi Geografici ed Etnografici. – *Centro Studi Erbario Tropicale*, publ. n. 104: 1–142. Università degli Studi, Firenze.
- Stuessy, T. F. & Stuckey, R. L. 1997. Botanical Libraries and Herbaria in North America. 1. Introduction. – *Taxon* 46(4): 639–641.
- Tardelli, M. 1988. Le Pteridophyta presenti nell’Erbario Tropicale di Firenze. – *Museologia scientifica* 5(1–2): 69–76.
- 1997. The Botanical Collections in the Tropical Herbarium of Florence. – *Museologia scientifica* 13(3–4): 319–344.
- Tardelli, M., Settesoldi, L. & Raffaelli, M. 2009a. Collezioni storiche dell’Erbario Tropicale di Firenze, dal 1870 al 1950. – In: *Atti del XVII Congresso ANMS “Al di là delle Alpi e del Mediterraneo”*, Verona, 4–7 Dicembre 2007. – *Memorie del Museo Civico di Storia Naturale di Verona*. 2. serie. *Monografie Naturalistiche* 4 (2009): 161–162. 162.
- 2009b. Collezioni dell’Erbario Tropicale di Firenze, dal 1950 ad oggi. – In: *Atti del XVII Congresso ANMS “Al di là delle Alpi e del Mediterraneo”*, Verona, 4–7 Dicembre 2007. – *Memorie del Museo Civico di Storia Naturale di Verona*. 2. serie. *Monografie Naturalistiche* 4 (2009): 163–164.
- Thulin, M. (ed.). 1993–2006. Flora of Somalia. Vol. 1 (1993); Vol. 2 (1995); Vol. 3 (1999); Vol. 4 (2006). – *Royal Botanic Gardens, Kew*.
- VV.AA. (various authors) 1953–1978. *Adumbratio Florae Aethiopiae*. – *Webbia*, vols. 9–33. 1. (Introductio. Chiarugi, A. 9: 1–8. 1953. – 2. *Ericaceae*. Pichi Sermolli, R.E.G. & Heiniger, H. 9: 9–48. 1953. 3. *Ophioglossaceae, Osmundaceae, Schizaeaceae*. Pichi Sermolli, R.E.G. 9: 623–660. 1954. – 4. *Hymenophyllaceae, Negripteridaceae, Cyatheaceae*. Pichi Sermolli, R.E.G. 12: 121–146. 1955. – 5. *Parkeriaceae, Adiantaceae, Vittariaceae*. Pichi Sermolli R.E.G. 12: 645–704. 1957. –

6. *Caesalpinaceae* (excl. gen. *Cassia*). Roti-Michelozzi G. 13: 133–228. 1957. – 7. *Cruciferae* (Trib. *Lepidieae*, *Euclideae*, *Sisymbrieae*). Franchetti G. 14: 161–211. 1958. – 8. *Gleicheniaceae*. Pichi Sermolli, R.E.G. 17: 33–43. 1962. – 9. *Cryptogrammaceae*. Pichi Sermolli, R.E.G. 17: 299–315. 1963. – 10. *Actiniopteridaceae*. Pichi Sermolli, R.E.G., 17: 317–328. 1963. – 11. *Oleandraceae*. Pichi Sermolli, R.E.G. 20: 754–769. 1965. – 12. *Buxaceae*. Serrato Valenti G. 20: 771–778. 1965. – 13. *Hemionitidaceae*. Pichi Sermolli, R.E.G. 21: 487–505. 1966. – 14. *Hypericaceae*. Moggi, G. & Pisacchi, A. 22: 233–289. 1967. – 15. *Elaphoglossaceae*. Pichi Sermolli R.E.G. 23: 209–246. 1968. – 16. *Marattiaceae*. Pichi Sermolli R.E.G. 23: 329–351. 1969. – 17. *Turneriaceae*. Roti-Michelozzi Clavarino G. 23: 353–378. 1969. – 18. *Lomariopsidaceae*. Pichi Sermolli R.E.G. 23: 379–396. 1969. – 19. *Thymeleaceae*. Gastaldo P. 24: 337–389. 1969. – 20. *Globulariaceae*. Braggio Morucchio G. 24: 619–634. 1970. – 21. *Primulaceae*. Bizzarri M.P. 24: 635–698. 1970. – 22. *Caesalpinaceae*. Gen. *Cassia*. Serrato Valenti G. 26: 1–99. 1971. – 23. *Onagraceae*. Bizzarri M.P. & Raven P.H. 27: 467–504. 1972. – 24. *Rhizophoraceae*. Arena M.R. & Orsino F. 28: 135–159. 1973. – 25. *Saxifragaceae*. Rampi A. 28: 521–542. 1973. – 26. *Menispermaceae*. Benvenuto E. 29: 17–80. 1974. – 27. *Selaginellaceae*. Bizzarri M.P. 29: 545–594. 1975. – 28. *Oleaceae*. DeFilips R. 30: 177–190. 1976. – 29. *Oxalidaceae*. Roti-Michelozzi Clavarino G. 32: 417–453. 1978. – 30. *Zygophyllaceae*. Nabil El Madidi M. 33: 45–101. 1978. – 31. *Equisetaceae*. Gastaldo P. & Paola G. 33: 103–113. 1978. – *Nephrolepidaceae*. Pichi Sermolli R.E.G. 33: 115–135. 1978.
- Wheeler, Q. D., Raven, P. H. & Wilson, E. O. 2004. Taxonomy: Impediment or Expedient? – *Science* 303: 285.
- Will, K. W. & Rubinoff, D. 2004. Myth of the molecule: DNA barcodes for species cannot replace morphology for identification and classification. – *Cladistics* 20: 47–55.