



SANDRO PIGNATTI: THE TRIESTE YEARS

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ABSTRACT – The twenty years spent in Trieste by Sandro Pignatti as Professor of Systematic Botany are briefly outlined. Through his leadership, Trieste became a centre of excellence in geobotany, phytosociology, and ecological research. His pioneering use of computational methods, his monumental *Flora d'Italia*, and his ability to inspire new generations of botanists left an indelible mark on Italian and European plant sciences. His work during the Trieste years laid the foundations for modern vegetation science in Italy and contributed significantly to the internationalisation of Italian botany.

KEYWORDS: SANDRO PIGNATTI, SYSTEMATIC BOTANY, GEOBOTANY

INTRODUCTION

The twenty years that Sandro Pignatti spent as Professor of Botany at the University of Trieste (1962–1982) represent a most fertile and transformative period in the history of Italian plant sciences. During two decades, he not only rebuilt a botanical tradition that had been severely weakened by the political and social upheavals of the early twentieth century, but also founded what came to be known as the *Triestine Geobotanical School*, a centre of excellence whose influence extended far beyond Italy. His work in Trieste combined classical botanical scholarship, pioneering ecological research, early adoption of computational methods, and an extraordinary capacity to train and inspire new generations of scientists, both in Italy and abroad.

REBUILDING BOTANICAL RESEARCH IN TRIESTE

When Pignatti arrived in Trieste in 1962 as Professor of Botany, the local botanical tradition – once vibrant – had been

nearly extinguished by the consequences of two world wars. As the newly appointed director of the Institute of Botany, he undertook the ambitious task of reconstructing this tradition from the ground up. His leadership transformed the Institute into a dynamic cultural and scientific hub, where students and researchers engaged in lively discussions, international collaborations, and field-based learning. One of Pignatti's most enduring contributions was the establishment of a genuine school of geobotany, characterised by:

- a strong emphasis on fieldwork,
- rigorous phytosociological analysis,
- integration of ecological, floristic, and biogeographical perspectives,
- openness to international scientific dialogue, particularly within the Central European tradition.

The Triestine school became a reference point for vegetation science in Europe, attracting scholars from Austria, Slovenia, Germany, and beyond.

MARINE BIOLOGY: A SHORT BUT PIONEERING CHAPTER

Although Pignatti's primary interests lay in terrestrial vegetation, his early years in Trieste saw a remarkable revival of marine biological research. Drawing on his youthful experience with algology (Pignatti S., 1962a,b), he encouraged the Institute to reconnect with Trieste's historic strengths in marine science. Two oceanographic cruises - one in the Adriatic aboard the *Sea Queen* (1966), another in the Tyrrhenian Sea aboard the *Entella* - marked a turning point (Pignatti S., 1966). These expeditions, involving several young researchers, produced one of the first Italian studies in marine ecophysiology, early acoustic observations of deep phytoplankton layers, and the first attempt in Italy to quantify the net primary productivity of a benthic ecosystem (Lausi & Pignatti S., 1974). These achievements were extraordinary for a group of researchers primarily trained in terrestrial botany, and helped re-establish marine biology as a research field in Trieste. Pignatti drafted a key for the identification of the macroalgae of the Gulf of Trieste (Pignatti S. & Giaccone, 1967), which was also extremely useful for students like me, who were required to prepare, in addition to the traditional herbarium, an "algarium". The studies in marine biology begun by Pignatti were later continued by Edmondo Honsell, Giuseppe Giaccone, Laura Talarico, Guido Bressan, Angela Ghirardelli, Marina Cabrini, and Annalisa Falace.

THE KARST AS A BIOGEOGRAPHICAL CROSSROADS

Trieste is a strange city, suspended between the Mediterranean and Eastern Europe, a transition point where the Latin, Slavic, and Germanic worlds meet and collide, as do diverse climates, flora, and fauna. In just a few minutes, you pass from Muggia, a miniature Venice, through Slovenian-speaking villages to the heart of a "little Vienna on the sea". Field excursions with students, organised by Pignatti and his wife and collaborator Erika Wikus, became a hallmark of his teaching. In just a few minutes, they took the students on their first spring excursion from the verdant Mediterranean scrub to the barren Karst plateau, where a gentian similar to those found on Alpine peaks blooms. Near Santa Croce, there is a strip of land, just a few meters wide, where the evergreen Mediterranean forest gives way to the deciduous woodland: there, generations of young people have pondered the abrupt transition between two worlds, the Mediterranean and Central Europe. The Triestine Karst offered Pignatti an exceptional natural laboratory. Its abrupt transitions provided

ideal conditions for studying vegetation dynamics, ecotones, and bioclimatic gradients. Pignatti's first assistant in Trieste, Livio Poldini, developed into one of Europe's leading experts on the flora and vegetation of Friuli Venezia Giulia. Together with other collaborators, the group focused on:

- vegetation of the Triestine coast,
- syntaxonomy of Mediterranean and submediterranean shrublands,
- phytosociology of halophilous vegetation,
- biogeographical patterns across the northeastern Adriatic region.

While in Trieste, Pignatti was also active in launching projects of floristic cartography and vegetation mapping. Worthy of note is the vegetation map of the areas of Friuli affected by the 1976 earthquake (Lausi et al., 1978), while the floristic mapping project (Pignatti S., 1975, 1979) was started mainly in the Dolomites and in Friuli Venezia Giulia, where it was later completed by Livio Poldini.

THE MEDITERRANEAN AND THE DOLOMITES

I met Pignatti in the early 1970s: he asked me to prepare a thesis under his guidance already in my freshman year of university, on the thorny-shrubs vegetation of the high Mediterranean mountains. We set off for Sardinia, Sicily, and Calabria in a Volkswagen van, with the entire Pignatti family, the five children included. It was a memorable trip during which I learned so much. The origin of these formations could date back to late Miocene, under a warm-arid climate, when an east-west migration of thorny-cushion plants took place from the Irano-Turanian region. Subsequent climatic changes reduced the thorny-cushions stands to a few relict stations with a particularly dry microclimate due to the physiological effect of wind, i.e. mountain tops and rocky coasts, where geographic separation favoured the formation of vicariant schizoendemics (Pignatti E. et al., 1980). Sandro Pignatti's work on the Dolomites represents a long-term, field-centred programme of floristic inventory, phytosociological sampling and ecological interpretation carried out in collaboration with his wife Erika. Their research was initiated during the Trieste years (Lasen et al., 1977; Pignatti E. & Pignatti S., 1984) - I took part myself in a month-long survey of the vegetation in the Boite Valley - and spans more than five decades, culminating in the later multi-volume project *Plant Life of the Dolomites* (Pignatti E. & Pignatti S., 2014), which documents the structure, composition and ecology of Dolomite plant communities based on nearly 2,000 phytosociological relevés. Pignatti combined classical floristic practice -

careful species identification and distributional notes - with phytosociological relevés to characterise plant communities. The dataset assembled for the Dolomites project emphasises quantitative tables of species presence and abundance across associations, enabling comparisons of community composition along gradients of altitude, exposure, substrate and human influence. This methodological pairing produced a robust empirical foundation for vegetation classification and ecological interpretation. The Pignatti's *Plant Life of the Dolomites* stands as a landmark regional vegetation study: exhaustive in scope, rigorous in method and directly useful for both academic research and applied conservation. Its combination of floristic detail and vegetational synthesis ensures that the Dolomites are documented not only as a list of species but as a structured set of ecological communities shaped by geology, climate and human history.

INTERNATIONAL NETWORKING

In 1961, even before his arrival in Trieste, Pignatti co-founded the *Ostalpin-Dinarische Pflanzensoziologische Gesellschaft* with Erwin Aichinger (Klagenfurt) and Max Wraber (Ljubljana). During his Trieste years, this association became a crucial platform for:

- scientific exchange across the former Austro-Hungarian cultural space,
- annual congresses held in Italy, Austria, Slovenia, Croatia and other Central European countries,
- dissemination of phytosociological research in the German language, then the lingua franca of vegetation science.

This network helped position Trieste as a bridge between Mediterranean and Central European scientific traditions. While in Trieste, Pignatti had already articulated a vision for a *Prodromus of Plant Communities* - a systematic, comparative account of European vegetation units. Pignatti served as President of the International Association for Vegetation Science (IAVS) for two consecutive terms, from 1986 to 1994. As IAVS President, he promoted this vision institutionally, encouraging standardised relevé methods, shared nomenclature for associations and cross-border data exchange, so that a continental *Prodromus* could become feasible. Pignatti convened a decisive workshop at the Orto Botanico in Rome on 13-14 March 1992, an event that effectively launched the European Vegetation Survey (Pignatti S., 1990), bringing together researchers from many countries to plan a coordinated effort for compiling and standardising information on European plant associations.

THE FLORA D'ITALIA: A MONUMENTAL ACHIEVEMENT

The most monumental scientific enterprise of Pignatti's Trieste years was the writing of the three-volume *Flora d'Italia* (Pignatti S., 1982). This work synthesised decades of floristic and taxonomic research, provided the first modern, comprehensive flora of the Italian peninsula, and became an indispensable reference for botanists, ecologists, conservationists, and students. The *Flora* was produced without computers or digital resources: Pignatti dictated the text on a mechanical Olivetti typewriter, assisted by his secretary Fioretta Dusa. The intellectual discipline required for such an undertaking - combined with administrative duties, teaching, international commitments, and family life - was extraordinary: he was somewhat reminiscent of Kant, who was said to be useful for setting clocks by tracking his movements between home and work. It should be noted that when he began writing *Flora*, word processing programs and the Internet did not exist, so all information had to be acquired from paper-printed texts. Even today, every time I use the *Flora*, I wonder how it was possible to create it with a non-electric Olivetti typewriter on four sheets of carbon paper. I have always kept that typewriter in my office, showing it to students as a symbol of changing times. Today, I have left it to Lucia Muggia, who has replaced me as professor of Systematic Botany in Trieste.

THE COMPUTER REVOLUTION: TRIESTE AS A EUROPEAN PIONEER

From the "electronic brain" to the Working Group for Data Processing

One of the most innovative aspects of Pignatti's work in Trieste was his early recognition of the potential of computers - at that time called "electronic brains" - for ecological research. In the mid-1960s, the Institute of Botany became the first in Italy to apply computational methods to geobotany.

A landmark project involved the analysis of phenology in European beech forests. Collaborating with more than fifty researchers across Europe (Marcello & Pignatti, 1965), the Trieste team processed an unprecedented dataset using an IBM 1620 computer at the University's new Computing Centre. The complex analysis of an impressive amount of data allowed to identify characteristic periods in the flowering of European beech forests, which could be interpreted almost as endogenous rhythms of the "physiology" of forest

ecosystems. This publication (Lausi & Pignatti S., 1972), written in German, remains a seminal contribution to forest ecology. The next step was the application of computers to the processing of vegetation relevés. The 1970s saw a dramatic development in vegetation science throughout Europe, including Italy: thousands of relevés were published each year, and ever-new syntaxa, often described based on a few relevés from small areas, continued to inflate the phytosociological nomenclature (Pignatti., 1968). The Trieste group, led by Pignatti and composed of his wife Erika, Cristofolini, Lausi, and Poldini, had the good habit of discussing these issues in depth - and often unceremoniously - usually over tea prepared by Fioretta Dusa and often attended by students. The time was ripe to apply the enormous potential of computers, demonstrated in the case of beech forest phenology, to the processing of vegetation relevés. This idea resulted in an important theoretical publication, presented at one of the international phytosociological conferences organized by Reinhold Tüxen in Rinteln, which gave rise to a very lively discussion (Cristofolini et al., 1970). The Trieste group became known internationally - half-jokingly, half-critically - as *die Mathematiker* or even *die Heretiker* for their insistence on applying numerical and multivariate methods to vegetation classification. Duilio Lausi, with his typical humor, even proposed summarizing the new ideas - Luther-style - in a few lapidary theses to be posted on the door of the hall before the start of the congress! The work of the Trieste team led by Pignatti resulted in the creation of the *Working Group for Data Processing* within the International Association for Vegetation Science, whose first meeting took place in Trieste in 1969. The practical application was attempted within a vast project on the syntaxonomy of European halophytic vegetation, in which a new addition to the close-knit Trieste group took part: Enrico Feoli. This project, which was one of the first and most important contributions of the Working Group's activity, allowed the information contained in hundreds of phytosociological relevés to be synthesized into a numerically derived model, fostering further attempts to formalize the operations intrinsic to vegetation classification processes (Lausi & Feoli, 1979). Two co-founders of the Working Group were the great Dutch botanist Eddy van der Maarel and László Orlóci, a Hungarian botanist who fled to Canada in 1956 and played a key role in introducing multivariate analysis methods to plant ecology (van den Maarel et al., 1980).

The data-bank on the Flora of Italy

In parallel with the writing of the *Flora d'Italia*, Pignatti also created one of the world's earliest floristic databases, dictating data daily to be transcribed onto punched cards.

When Pignatti moved to Rome, he asked me to send him the very heavy cases of punched cards, but initially he had various problems reviving the database, as the cards had by then been replaced by magnetic tape. Since then, I have retained a great interest in databases, along with great skepticism about their permanence over time. The following databanks had been created in Trieste by the end of 1982: 1) a central databank on the Italian flora, whose principal aim was to provide a standardized nomenclatural and coding system, 2) a central databank for storage and retrieval of phytosociological relevés, aiming to provide a tool for the elaboration of synthetic monographs on Italian vegetation, 3) a series of local databanks for floristic mapping data, based on ad hoc software created by the Trieste team, including the computerization of the TSB lichen herbarium, the first one to be fully digitized in Italy (Nimis et al., 1984). The most innovative idea of the Trieste group was the development - well before the advent of the internet - of a network of local databanks in the form of a distributed database. The coordination of different databases in which similar data are stored was envisaged as one of the main problems in this field, requiring an integrated system in which information flow between databanks should play a major role. This required strict standardization of nomenclature, coding procedures, and the creation of standard software (Pignatti S., 1976; 1980). Such a pioneering effort anticipated modern biodiversity informatics by several decades.

TEACHING, MENTORSHIP, AND CULTURAL INFLUENCE

Beyond his scientific achievements, Pignatti was renowned as a teacher and mentor. His courses, especially the monographic course in General Biology, were intellectually stimulating and culturally rich. Those fortunate enough to work with Pignatti know that he left behind much more than a series of fundamental and innovative works, inspirations and ideas for a new generation of researchers. Pignatti was a wonderful person, a true Master, always ready to listen and generous with advice for young people. Above all, Pignatti was a man of culture. His was a truly Central European culture, ranging from literature to history, to a lived understanding of worlds as diverse as the Germanic and Latin cultures. With Pignatti, one could discuss everything, from German *Naturphilosophie* to Japanese culture. His love of music, especially Bach's, played an important role in his life: every year at Easter, we were invited to the Pignattis' home to listen to Bach's Mass in B minor. The Institute of Botany he directed was an extremely stimulating environment for us young people: we were often involved in scientific discussions and invited

to interact with the many foreign and Italian botanists who came on pilgrimage to Trieste. The monographic course in General Biology, taught by Pignatti, was one of the most interesting I've ever attended, with interminable discussions on e.g. the recently published book *The Limits to Growth*, Ludwig von Bertalanffy's General Systems Theory, the holistic approaches to plant morphology by Swiss botanist Eric Nelson, etc. In Pignatti's time, the Institute of Botany, far from being a mere exam factory, was a true cultural center, where culture was formed - as it should always be in a true university - through an extraordinary dialogue between professors and students, a culture that we young people didn't always realize - just like the air we breathed - and that today it would be important to revive on the lineage of a tradition that has now become "historical," to which Pignatti gave birth and a fundamental contribution.

DEPARTURE AND LEGACY

In 1983, a critical period began for the *Scuola Triestina*: Pignatti decided to move to Rome for taking up the chair of Plant Ecology at the local University. In the last Trieste years, the driving force behind all previous developments had retreated into a kind of hermitage, where he watched both his *Flora d'Italia* grow and - somewhat distantly - the progresses of the far-from-mundane scientific personalities of his former students and collaborators. Once the *Flora* was completed, Pignatti probably decided that his former students had grown up, that they no longer needed him, and that, indeed, his presence in Trieste might constitute more of an obstacle than a stimulus to their further development. Thus, in Trieste we had to learn to "walk alone": Livio Poldini was now one of Europe's leading regional botanists, Enrico Feoli was a promising young man now launched full speed into the world of numerical ecology, Duilio Lausi began collaborating with me on the study of the vegetation of distant places like Alaska and Tierra del Fuego, and Giovanni Cristofolini, who with his biosystematic studies had already sprouted a new branch on the trunk of the Trieste school, soon moved to Bologna, leaving behind a series of "orphans" of his own... The departure of Pignatti marked the end of an era for the Triestine school, but his legacy endured through the scientific maturity of his former students and collaborators, who continued to develop the research directions he had initiated. Pignatti's Trieste years thus represent a unique combination of scientific innovation, institutional reconstruction, and cultural vitality. His work laid the foundations for modern vegetation science in Italy and contributed significantly to the internationalisation of Italian botany.

CONCLUSION

Sandro Pignatti's scientific activity at the University of Trieste stands as a model of how a single scholar can revitalise an entire field. Through his leadership, Trieste became a centre of excellence in geobotany, phytosociology, and ecological research. His pioneering use of computational methods, his monumental *Flora d'Italia*, and his ability to inspire new generations of botanists left an indelible mark on Italian and European plant sciences. His legacy is not only scientific but profoundly cultural: a vision of the university as a place where knowledge, curiosity, and humanistic breadth converge. In this sense, his Trieste years remain a testament to the transformative power of intellectual passion and academic community. A passage from an author much loved by Pignatti, Wolfgang von Goethe, well reflects the spirit that inspired him as he journeyed and closed his personal magic circle of research and life: "*Man knows himself only to the extent that he knows the world he recognizes within himself, and in which he recognizes himself.*"

REFERENCES

- Cristofolini, C., Lausi, D. & Pignatti, S. (1970). Über statistische Eigenschaften der Charakterarten und deren Verwertung zur Aufstellung einer empirischen Systematik der Pflanzengesellschaften. In *Gesellschaftsmorphologie: Strukturforchung* (pp. 8-25). Dordrecht: Springer Netherlands.
- Lasén, C., Pignatti, E., Pignatti, S., & Scopel, A. (1977). *Guida botanica delle Dolomiti di Feltre e di Belluno*. Manfrini.
- Lausi, D., & Feoli, E. (1979). Hierarchical classification of European salt marsh vegetation based on numerical methods. *Vegetatio*, 39(3), 171-184.
- Lausi, D., & Pignatti, S. (1973). Die Phänologie der europäischen Buchenwälder auf pflanzensoziologischer Grundlage. *Phytocoenologia*, 1-63.
- Lausi D., & Pignatti S. (1974). Sur la productivité primaire dans l' écosystème benthique du Golfe de Trieste (Mer Adriatique), Bull. Soc. Phycol. de France, 19, 222-228.
- Lausi D., Pignatti S., & Poldini L. (1978). *Carta della vegetazione dell' Alto Friuli. Zona colpita dai terremoti del maggio-settembre 1976*. Quaderno AQ/1/3. Consiglio Nazionale delle Ricerche, Roma.

Marcello A., & Pignatti S. (1965). Prime notizie di una rete fenologica internazionale nelle faggete europee per l'anno 1963. *Giorn. Bot. Ital.*, 72: 582-586.

Nimis, P., Feoli, E., & Pignatti, S. (1984). The Network of Databanks for the Italian flora and vegetation. In *Databases in systematics* (pp. 113-124). Academic Press.

Pignatti S. (1962a). *Associazioni di alghe marine sulle coste veneziane*. Mem. Ist. Ven. Sc. Lett. Arti, 32(3), 1-134.

Pignatti, S. (1962b). *Sulla vegetazione di alghe marine del litorale veneto*. N. Giorn. Bot. Ital., 69, 1-3.

Pignatti, S. (1966). La crociera della motonave "Sea Queen" per lo studio della vegetazione bentonica del mare attorno al Gargano. *Giorn. Bot. Ital.*, 73: 210-211.

Pignatti S. (1968). Die Inflation der höheren pflanzensoziologischen Einheiten. *Ber. Internat. Symp. Vegetationskunde* 1964, pp. 85-97.

Pignatti S. (1975). Zum Stand der floristischen Kartierung Mitteleuropas in Norditalien. *Goettinger Flor. Rundbriefe*, 2, 61-63.

Pignatti S. (1976). A system for coding plant species for data-processing in phytosociology. *Vegetatio*, 33(1), 23-32.

Pignatti S. (1979). Dieci anni di cartografia floristica nell'Italia di Nordest. *Inform. Bot. Ital.*, 10, 212-219.

Pignatti S. (1980). Check-list of the flora of Italy with codified plant names for computer use (under assistance of C. Anzaldi, F. Dusa, P.L. Nimis and L. Passerini). Consiglio Naz. delle Ricerche, pubbl. AQ/5/13. Roma, pp. 256.

Pignatti S. (1982). *Flora d'Italia*. 3 voll. Edagricole, Bologna.

Pignatti S. (1990). Towards a Prodromus of plant communities. *Journ. Veg. Sci.*, 1, 425-426.

Pignatti S., & Giaccone G. (1967). Flora sommersa del Golfo di Trieste. *Nova Thalassia*, 3(1), 1-17.

Pignatti E., & Pignatti S. (1984). La vegetazione delle Vette di Feltre. *Studia Geobot.*, 3, 7-47.

Pignatti E., & Pignatti S. (2014). *Plant life of the Dolomites* (Vols. 1-3) Berlin, Heidelberg: Springer.

Pignatti E., Pignatti S., Nimis P., & Avanzini A. (1980). La vegetazione ad arbusti spinosi emisferici. *Pubbl. AQ/1/79*. CNR, Roma, 130 pp.

van der Maarel E., Orloci L., & Pignatti S. (ed.) (1980). *Data processing in phytosociology*. Junk, The Hague, 226 pp.