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## The Neapolitan contribution to the scientific studies on *Cannabis*. A historical overview

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### Abstract

After a look at the history of scientific studies of *Cannabis* in Europe and Italy, in its two forms of fiber hemp (*C. sativa*) and psychoactive hemp (*C. indica*), this article traces the history of the medical, botanical and agronomic studies undertaken in Naples starting from the mid-19th century. Two main historical periods stand out. A first phase, mainly in the 70s and 80s of the 19th Century, involved medical studies with Indian hemp which involved prominent figures of the Neapolitan culture, including Sebastiano De Luca, Eugenio Fazio, Paolo Panceri, Mariano Semmola. Raffaele Valieri's clinical research undertaken at the Incurabili Hospital stands out for its originality; his studies on the therapeutic properties of sativa hemp can be considered the most extensive and detailed not only in Italy but in Europe. A second phase, dated to the 1930s, saw the first Italian cultivations of Indian hemp by Biagio Longo at the Experimental Station for Officinal Plants of the Botanical Garden of Naples. In 1931 Longo gave rise to the "Calcutta strain", which was kept active throughout the 20th century with annual cultivations and became the primary reference sample in scientific research carried out in Italy on Indian hemp.

**Keywords:** Cannabis, Raffaele Valieri, Biagio Longo, Botanical Garden of Naples

### Riassunto

"Il contributo napoletano agli studi scientifici sulla *Cannabis*. Una rivisitazione storica". Dopo uno sguardo sulla storia degli studi

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scientifici della *Cannabis* in Europa e in Italia, nelle sue due forme di canapa da fibra (*C. sativa*) e canapa psicoattiva (*C. indica*), il presente articolo ripercorre la storia degli studi medici, botanici e agronomici intrapresi a Napoli a partire dalla metà del XIX secolo. Si evidenziano due principali periodi storici. Una prima fase, principalmente nei decenni '70-'80 del XIX secolo, riguardò studi medici con la canapa indiana che videro coinvolti personaggi di spicco della cultura partenopea, fra cui Sebastiano De Luca, Eugenio Fazio, Paolo Panceri, Mariano Semmola. Risaltano per originalità le ricerche cliniche di Raffaele Valieri intraprese presso l'Ospedale degli Incurabili; i suoi studi sulle proprietà terapeutiche della canapa sativa possono essere considerati i più estesi ed articolati non solo d'Italia ma d'Europa. Una seconda fase, datata agli anni '30 del XX secolo, vide le prime coltivazioni italiane della canapa indiana per opera di Biagio Longo presso la Stazione Sperimentale per le Piante Officinali dell'Orto Botanico di Napoli. Nel 1931 Longo diede origine al "ceppo di Calcutta", che per tutto il XX secolo fu mantenuto attivo con coltivazioni annuali e divenne il campione di riferimento primario nelle ricerche scientifiche svolte in Italia sulla canapa indiana.

**Parole chiave:** Cannabis, Raffaele Valieri, Biagio Longo, Orto Botanico di Napoli

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## Introduction

Hemp is a dioecious plant recognized in botanical taxonomy as *Cannabis sativa* L., belonging to the *Cannabaceae* family. For over two centuries the problem of the difference between fiber hemp and hemp with psychoactive properties has caused a lot of ink to flow, also for its utilitarian, social and legal implications. At a botanical level, this differentiation gave rise to a long diatribe concerning the problem of speciation of the *Cannabis* genus, focused on the recognition of only one, or two or three species within this genus (Small 1979); a diatribe that originated towards the end of the 18th century, when French botanist Jean-Baptiste Lamarck recognized psychoactive hemp as a separate species, which he called *C. indica* (Lamarck 1783, I, p.695).

Without delving further into the problem of speciation of the *Cannabis* genus, —which is now considered as monospecific, *C. sativa* being the only acknowledged species (Ren et al., 2021) – for the historical examination of the present study it is sufficient to observe how for the entire nineteenth century and a good part of the twentieth century, botanists and doctors clearly distinguished local hemp, which had been cultivated for centuries to make fabrics and ropes, from that which was imported from the East mainly in the form of *haschisch*, the resin obtained from the flowering tops of the female plant and whose name was transcribed also as *ascisc*, *haschich* or *hatschisch*. For convenience of discussion, in this writing the two varieties will be distinguished with the old terms *sativa hemp* and *Indian hemp*.

In Italy the popular names given to sativa hemp vary from region to region. In northern Italy the variants *canape*, *càneva*, *canava*, *canva* prevail, and in the Po Valley also *canapuccia* and *canapone*; in southern Italy the variants *cànnavo* (Naples), *cànnavu* (Calabria), *cannavusa*, *cànnavu* (Sicily), *cànnau*, *cagnu* (Sardinia) prevail (Penzig, 1924, I, pp. 91-92). In some cases, the female plants were distinguished with a different name from the male ones. For example, in Romagna the male plants were called *canva*, while the female ones *canavón* (Pieri 1998, p. 133).

### Hemp in Europe

Regarding the center of origin of the *Cannabis* genus, there is a certain unanimity among scholars to locate it in Asia, and according to the most modern studies in East Asia (Ren et al., 2021).

Numerous archaeobotanical data have highlighted how hemp had arrived in Europe long before man began to cultivate it, and this to the detriment of the hypothesis still in vogue that this plant had been imported in later periods from Asia into Europe by of man (see for example Dörfler, 1990). The oldest data known so far on the presence of hemp in Europe date back to the beginning of the Holocene and came to light in Italy. Among these, the presence of hemp pollen in environmental core samples carried out in Lake Albano (Rome), with a dating of 11,500 BCE, should be mentioned (Mercuri et al., 2002), and in Lake Grande of Monticchio (Potenza), dating back to 9000 BCE (Huntley et al.,

1996; for a review of archaeobotanical data see Samorini, 2019).

As regards sativa hemp, its cultivation in Italy is attested since the Roman period. Archaeological data have shown an increase in the environmental presence of hemp pollen in the Lazio region starting from the 2nd century BCE, and this would have been caused by the cultivation of the plant (Mercuri et al., 2002). Pliny the Elder, who wrote in the 1st century CE, seems to have been the first classical author to report on local cultivations, stating that "*as regards size, that of Rosea in the Sabine region reaches the height of the trees*" ("*quod ad proceritatem quidem attinet, Rosea agri Sabini arborum altitudinem aequat*"; Pliny, *Hist.Nat.*, XIX, p.174). The ancient Sabines occupied a region of the Central Apennines corresponding to the current provinces of Rieti and part of L'Aquila.

After the fall of the Western Roman empire, the cultivation of sativa hemp spread to various Italian regions, although for a long time it mostly concerned small productions to satisfy the local need for fabrics and ropes. A first notable large-scale production was achieved in Sicily starting from the 9th century CE, during the Arab domination (Andreolli, 2005). But it was only starting from the 18th century that hemp production in Italy established itself as one of the most important realities at an international level, with the most productive areas located in Emilia-Romagna, Campania (Caserta and Naples) and Piedmont (Roletto, 1923).

The knowledge and presence of psychoactive hemp (*indica*) in Europe in ancient and medieval times appears more problematic. In classical Greco-Roman literature, with the exception of a well-known passage by Herodotus on a curious Scythian ritual, the interpretation of which remains questionable (Samorini, 2018, pp. 12-13), there is a disconcerting silence on the intoxicating properties of hemp. Both Greek (Pausanias, Athenaeus, Dioscorides, Galen) and Latin authors (Pliny, Columella, Oribasius), while showing knowledge of hemp, seem to be unaware of its intoxicating potential. All that remains to be deduced is that Greeks and Romans did not know about intoxicating hemp, as suggested by Brunner (1977). Similar to classical texts, Renaissance herbals also ignore the intoxicating properties of hemp, and the distinctions they sometimes make between "domestic hemp" and "wild hemp", as well as between "male" and "female" hemp, not they correspond neither to the two forms now recognized as *sativa* and *indica*, nor to the two dioecious forms (Samorini, 2019, pp. 86-88).

Among enigmas and large gaps, the impression arises that a history of Indian hemp in ancient and medieval European times has yet to be written. However, despite all the surprises that this history could reserve, the knowledge, or the presence and use of this plant and its derivatives during the long medieval period, seems to have been limited to certain geographical and socio-cultural

areas. It was only with the French military intervention in Egypt, during the Napoleonic wars, that the knowledge and use of psychoactive hemp spread in Europe, through the two tracks of medical environments and those of the intellectual, artistic and literary avant-garde currents that crossed in those times the European nations. First of all, the French; their main antagonists, the English, followed closely behind them. It didn't take many years to see the "new" exotic drug spread to Spain and Portugal, Holland and Germany.

In nineteenth-century European literature, the first writing that dealt with the effects of Indian hemp appears to be the 1809 article by the Frenchman Silvestre de Sacy (1809), who analyzed the legend of the "Old Man of the Mountain" and the Islamic sect of the Ishmaelites, known in Europe as "Assassins", promoting the etymological interpretation of this term as deriving from "haschisch"; an etymology that prevailed throughout the 20th century but which current studies consider incorrect (Guba, 2016).

The first Western medical study on Indian hemp was performed by the Irishman William Brooke O'Shaughnessy (1809-1889). He resided for several years in India, where he had the opportunity to observe the traditional therapeutic use of *Cannabis* and studied new applications. His major paper on Indian hemp, published in a Bengali journal, and some years later in a London medical journal (O'Shaughnessy, 1840; 1843), promoted

Western medical interest in this plant, and was reviewed in medical journals from all over Europe, including Italy. It is interesting to note how the Italian review of this writing referred to its first Bengali edition (Redazione, 1840), demonstrating the attention and potential for international observation on the part of Italian doctors. This same review from 1840 would appear to be the first modern Italian writing on Indian hemp.

The best known of the scientific writings of the first half of the nineteenth century is the book by Jacques Moreau de Tours, *De l'haschisch et de l'aliénation mentale*, dated 1845. In the same periods, the *hashisch* left the strictly world of Parisian doctors and was promptly seized by that group of intellectuals and men of letters known as "cursed poets", who for the occasion had created a *Club des Haschischins*, which held its meetings in a hotel on the Île-de-France, the islet of the Seine located in the heart of old Paris. Several of these writers have left us descriptive and poetic works on their experiences with *hashish*; it is enough here to recall *The Hashish Eaters' Club* by Théophile Gautier (1846) and *The Artificial Paradises* by Charles Baudelaire (1860)

### Indian hemp in Italy

As regards Italy, for the ancient and medieval periods it cannot be excluded that Indian hemp was occasionally known among Italian populations, and that on more than one occasion it may have been present in pharmacies if not in the gardens of medieval

monasteries. However, it is quite indicative of its rarity that this plant is ignored by the *Regimen sanitatis Salernitanum* of the 12th-13th century. This writing produced by the School of Salerno was destined to become one of the best-known medical works in the medieval Western world.

For modern times, research I carried out almost 30 years ago (Samorini, 1996) has highlighted a history of interest in *Cannabis* that reaches and aligns with the periods relating to other European nations. In the current state of this historical research, the date of the first reference to Indian hemp in nineteenth-century Italian literature reaches 1840, that of the first reference to its presence in Italian territory is 1845, and 1847 is the year of the first Italian experience with this plant reported in the literature (Samorini, 2018). These origins were known to Italian authors who became interested in Indian hemp in the nineteenth century, but towards the end of the century and the beginning of the twentieth century, for reasons that remain to be clarified, this knowledge was lost.

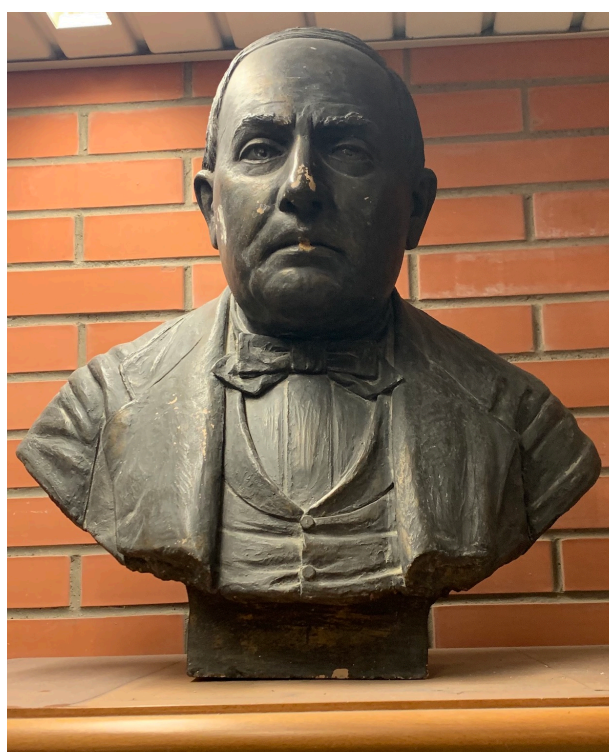
In the same way as in other European nations, in Italy Indian hemp was initially the object of attention by the medical profession, due to the medicinal properties acclaimed by the international medical literature of those years, and promptly reviewed in the Italian medical journals. It was doctors who imported the first quantities of dried flower buds and *hashish* and marketed them in pharmacies.

Nineteenth-century doctors personally experimented with Indian hemp, almost always in oral intake, and later tried it on their patients suffering from the most disparate illnesses, both physical and mental; experiments that were not always crowned with success. Yet, for various



diseases, Indian hemp showed that it really possessed those "miraculous" properties so much acclaimed, to the point of giving rise to a real trend of interest and medical studies for hemp, in no way secondary to the general interest doctor in the rest of Europe towards this plant.

Reading the accounts of personal experiences left to us by these doctors reveals, in addition to impeccable professional goals, always highlighted by the same doctors, also a certain curiosity for the *fantasia* (phantasy) produced by the plant. The term *fantasia* was used in Italian medical literature to describe the visionary state induced by *Cannabis*, and Moreau de Tours (1845, pp. 3-4) refers that this Italian term was used also in the Levant. It must be considered that, throughout the nineteenth century, doctors were in the habit of testing



**Figure 1:** Sebastiano De Luca (1820-1880). Bust preserved in the Library of the Department of Chemistry of the Federico II University of Naples (photo by the author).

each new batch of a drug on themselves before prescribing it to patients, and that many of the doctors involved in the origins of Italian relationship with Indian hemp had already known the effects of opium and its derivatives. When, towards the end of the 1850s, coca arrived in Italy, thanks to the hygienist Paolo Mantegazza, there was no doctor who recoiled from the possibility of experiencing its effects (Samorini, 1995). Moreover, all the doctors who were interested in hemp had read Moreau de Tours' text, where from the first pages this French doctor emphasised the importance of personal experimentation for scientific purposes (Moreau de Tours 1845, pp. 3-4). Most if not all psychoactive substances have medicinal properties, and it is no wonder that the role of the medical profession in the spread of these substances in Western societies has always been significant. In Italy and as regards *Cannabis*, its role was fundamental, as it was, a few decades later, in the case of cocaine.

Milan was the site of the first personal and clinical experiences with Indian hemp, and the most famous doctors of that period were involved: Andrea Verga, Carlo Erba, Filippo Lussana, Giovanni Polli. From the point of view of the historical-political context, we are at the time of the Risorgimento wars of independence, in which the Milanese population was directly involved on several occasions.

That the Milanese medical environment had been taking an interest in *Cannabis* for some years is demonstrated by the reviews and some articles that appeared in the 1840s in the *Gazzetta Medica of Milan*, at the time directed by B. Panizza and A. Bertani, in the *Annali Universali di Medicina* and on the *Annali di Chimica Applicata alla Medicina*, of

which Giovanni Polli was then director; magazines all published in Milan.

Giovanni Polli (1815-1880) was the first Italian experimenter with Indian hemp, and for over thirty years he was interested in *Cannabis*, experimenting with it on himself on different occasions and as a medicine in the treatment of various diseases, and reported the accounts of these experiences in those Annals of which he was director. In the same magazine he also published reports of experiences with hashish carried out by other doctors, reporting numerous news relating to the therapeutic use of *Cannabis* from other European nations and America (Samorini, 2018).

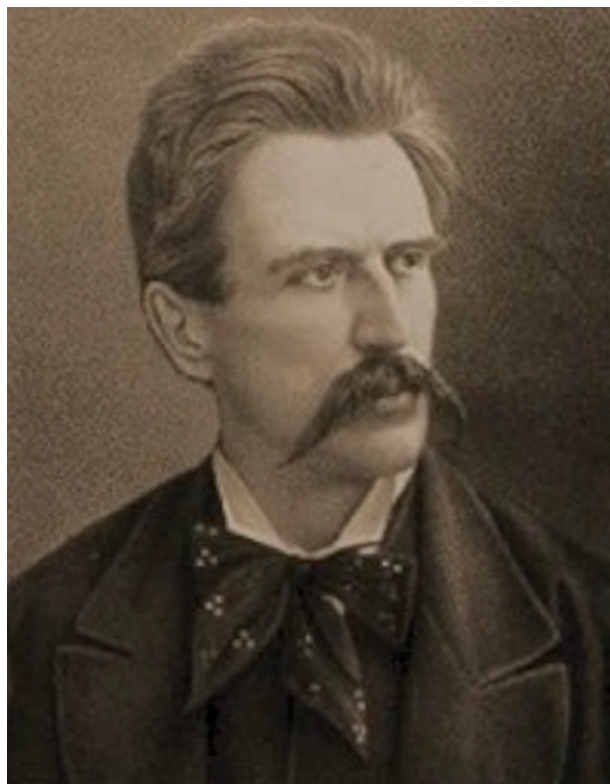
### The Neapolitan studies

A second important focus of interest in hemp developed in Naples, and in two main historical periods: a first phase, in the 70s and 80s of the 19th century, concerned medical studies that revolved around the Incurabili Hospital. A second phase, dated to the 1930s, saw the first Italian cultivations of Indian hemp at the Orto Botanico of Naples. The Neapolitan cultural environment's first contact with Indian hemp occurred abroad and saw as its protagonist a person destined to become a prominent scientist: Sebastiano De Luca (1820-1880) (Fig. 1). Of Calabrian origins, De Luca studied natural sciences and chemistry in Naples. He actively participated in the uprisings of 1848 and was sentenced to 25 years in prison. However, he managed to escape to Paris, where he continued to cultivate his interests in chemistry. Returning to Italy in 1857, he held the chair of chemistry at the University of Pisa until 1862, the year in which he returned to Naples and became the first professor of chemistry at the University of Naples. He published

around 200 scientific articles, mainly on organic, inorganic, agricultural and industrial chemistry (Colella, 2016).

During his Parisian phase, in the spring of 1854, De Luca did not miss the opportunity to experiment with *hashish*, taking advantage of the generosity of a friend who had brought a certain quantity of the drug from the East. He took *hashish* orally in the form of a sweetish paste in the amount of 2-3 g and experienced the visionary effects for about four hours. De Luca found particularly interesting that under the effect of *hashish* forgotten things come back to mind, one had clear ideas, and the changes in sensations were so extraordinary, "*that they deserve to be carefully studied by conscientious experimenters*". The report of his experience was published in French in the journal of the Paris Academy of Sciences (De Luca, 1862a), and De Luca took care to have an Italian translation published in a couple of Neapolitan scientific journals as well (De Luca, 1862b; 1865). It was mainly these publications written in Italian by De Luca that aroused curiosity about Indian hemp among scientists living in Naples.

The hygienist doctor Eugenio Fazio mentioned in one of his writings that he had received Indian hemp from Paolo Panceri, who had obtained it during a trip to Egypt. Paolo Panceri (1833-1877) (Fig. 2) was of Milanese origins and graduated in medicine in Pavia, but his interests in natural sciences and anatomy led him to hold in 1861 the position of professor of Comparative Anatomy at the University of Naples and Director of its Zoological Museum (Del Giudice, 1878; Borrelli, 2023). In 1874 he made a long journey to Egypt, and it was on this occasion that on his return he brought with him a certain quantity of Indian hemp.



**Figure 2:** Paolo Panceri (1833-1877) (from Cornalia, 1877).

Eugenio Fazio (1849-1902), of Molise origins, carried out his profession in Naples. He is known for having written the first Italian hygiene treatise and for having founded and directed the *Rivista Internazionale d'Igiene* published in Naples. Fazio also wrote another book, *L'ubriachezza e le sue forme* ("Drunkenness and its forms"), which won the Cagnola prize from the Lombard Institute of Sciences and Letters in Milan (Testa, 2010). It was in this text that Fazio mentioned the intention of carrying out experiments with the Indian hemp received from Panceri: "*We hope before long to make a contribution to the study of the topic (..) The experiments instituted so far have not warned us of relevant innovations, except for the subjective modality*" ("*Speriamo da qui a non molto portare anche noi un contributo allo studio dell'argomento (..) Gli esperimenti*

*istituiti finora non ci hanno avvisato di novità rilevanti, tranne delle modalità subbiettive*"; Fazio, 1875, p. 390). From these words it would be deduced that Fazio personally experimented with Indian hemp, but we do not know if he carried out the medical research that he intended to develop and if he left documentation of it in some of his writings which had not yet been identified.

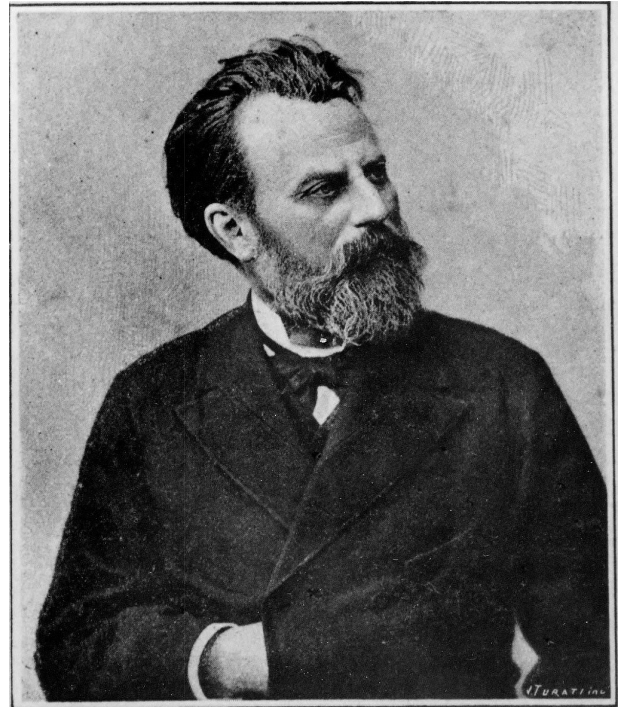
Panceri also donated some *hashish* to two doctors who worked in Naples, Luigi Calabrese and Gennaro Fabiani, who used it for experiments on humans. They reported the results in an article that could be defined as "ghost", since it was included in a Neapolitan medical journal called *Il Cirillo* of which only one issue was published in 1878, and because none of the Neapolitan and more generally Italian authors who subsequently wrote on hemp shows knowledge of this writing. I learned of its existence while leafing through a bibliographic book on US military medicine (Merrill, 1898). Despite having been published in Naples, the only issue of the magazine *Il Cirillo* (not to be confused with several other magazines with the same title) is unobtainable in Neapolitan libraries, and it was thanks to the interest of Mauro Moreno of the Department of Agriculture of the University of Naples Federico II that a copy has been identified –perhaps the only example present in Italy– at the Central University Library of Bologna.

In their paper, Calabrese and Fabiani first mentioned some experiments with *haschisch* that Panceri himself had carried out in preliminary form before his premature death. He had orally administered half a gram to a dog, in which the phenomena of "drunkenness" were evident, and later 200 mg to a medical student, a dosage that did



not cause intoxication. Then the two doctors described their experiments on humans. They first tried smoking 250 mg and then 500 mg of *hashish* mixed with tobacco, without success. They later administered 300 mg orally to a volunteer, a 28-year-old "cultured and intelligent, robust" young man. This time the intoxication manifested in an impressive manner and lasted for over 4 hours. The subject's visionary state reached such intense and eventful moments that the two doctors struggled to carry out physiological measurements, including variations in body temperature and heart rate. They concluded that, in addition to being a stimulant of brain functions, *hashish* is also a stimulant of the sympathetic system (Calabrese & Fabiani 1878).

In 1887, a long dissertation by the psychiatrist Bruno Battaglia, who for several years directed a mental hospital in Cairo, Egypt, appeared in a Neapolitan psychiatric journal (*La Psichiatria, la Neuropatologia e le Scienze Affini*). He described the effects of *hashish* on humans with an essentially psychiatric approach, based on personal clinical case studies and careful observation of the customs of the Egyptian population. Although it concerns the uses and effects of hemp in a foreign country, Battaglia's writing was useful for clarifying some problems that had arisen in Italian studies on Indian hemp, in particular the set of apparently contradictory data on its physiological effects on humans. Battaglia attributed this variability to the differences in Indian hemp products reaching Europe, which often also contained derivatives of opium, datura and other medicinal plants. In the first part of his article, he described in detail the different products based on Indian hemp, reporting the Arabic commercial names, the



**Figure 3:** Mariano Semmola (1831-1896) (from Anonymous 1888).

preparation techniques and the methods of intake. Alongside the writing of the French doctor Jean Ernest Godard translated into Italian and published in the Milanese magazine directed by Giovanni Polli (Godard, 1871), the list of Arabic recipes based on Indian hemp exposed by Battaglia is the most extensive in the Italian medical literature of the 19th century, and perhaps even the 20th century. Another cause of contradictions in the medical observations of the effects of Indian hemp was indicated by Battaglia in the failure to take into account the difference in the effects of the drug between individuals who had never taken it –as was often the case in medical observations– and individuals who made continuous use of it. To explain this important difference, the psychiatrist gave the example of alcohol: "*If, to study the consequences of alcohol abuse, it were administered to a teetotaler just once and the symptoms were studied, one would have*

*a very insufficient concept of the complex phenomenology of alcoholism*" (*"Se per studiare le conseguenze dell'abuso di alcool se ne somministrasse ad un astemio per una volta sola e se ne studiasse la sintomatologia, si farebbe un concetto insufficientissimo della complessa fenomenologia dell'alcoolismo"*; Battaglia, 1887, p. 8). Battaglia continued his dissertation by presenting a learned psychiatric evaluation – despite the limitations of the psychiatric paradigms of those times– of the patients who attended his hospital and who were consumers of Indian hemp. He also performed some experiments on himself, to better understand the phenomenology of the experience with this drug, and to distinguish its "pure" effects from those of preparations that included a combination of hemp with datura or opium; combinations that were frequent in Egypt.

In a writing by Raffaele Valieri –which will be discussed in detail in the next section– this doctor mentioned the fact that his colleague Mariano Semmola, a chief doctor who worked in the Incurabili Hospital, had used Indian hemp shortly before him in some cases of hysteria with mental disorders. Dr. G. Rummo too, director of the *Rivista Clinica e Terapeutica*, had added a note to the Italian edition published in Naples of a treatise on materia medica, in which he reported that *"Semmola assures that he has had good effects of hachisch in hysterical young girls, with weak organism, in which disturbances in the psychic sphere predominated"* (*"Semmola assicura di avere avuto buoni effetti dall'hachisch in giovanette isteriche, con organismo debole, nelle quali predominavano disturbi nella sfera psichica"*; Nothnagel and Rossbacj, 1882, p. 527). From observation of the extensive medical

literature left to us by Semmola, it does not appear that he has published a written report regarding these clinical studies with hemp. Mariano Semmola (1831-1896) (Fig. 3) was an illustrious figure. Of Neapolitan origins, he held various professional positions, including those of Professor of Clinical Therapeutics and Experimental Pharmacology and Dean of the Faculty of Surgical Medicine and Pharmacy of the University of Naples. He was also a politician and held the positions of senator and secretary of the Parliament of the Kingdom of Italy.

### Raffaele Valieri's clinical research

One of the most articulate Neapolitan clinical studies on hemp was carried out by Raffaele Valieri. On the frontispiece of his booklets, Valieri reported with a certain pride the long list of titles and awards obtained during his professional activity, including those of Member of the Medical-Surgical Academy of Naples, Commander of the Philanthropic Order of Montréal, Knight of the Crown of Prussia. He also held political offices: he was elected Councillor of the Municipality of Naples four times (in the years 1868-1872) and held the position of Deputy Mayor for a short period. In the years 1865-66 he held the position of President of the Hygiene Commission of the Pendino Section and drafted a Hygiene Report mainly focused on the problem of cholera epidemics, which had some success as it was used as an example in the context of metropolitan hygiene policies of several Italian cities (Valieri, 1867).

Valieri worked as a doctor at the Incurabili Hospital, where, at the time of his clinical research with hemp, he held the position of director of the 3rd women's room. After

much insistence he managed to have an Inhalation Cabinet installed, which he used for the administration of various medicines, including hemp.

Valieri attempted his first therapeutic treatment with Indian hemp in 1874 or 1875, when he treated a case of exophthalmic goitre –also known at the time as "Flajani's disease", nowadays called "Flajani-Basedow's disease"– which resolved in six-month period. In the first phase of the treatment the therapy was based on *cannabene*. This compound was isolated from hemp in France around the mid-19th century (Personne, 1857), but later it was considered a mix of compounds (Vignolo, 1895). Continuing the therapy with nicotine and subsequently with camphor bromide, the patient improved more and more and Valieri, underlining the importance of the therapy with a *Cannabis* preparation, added: "*if another case of exophthalmic goitre with convulsive complications occurs again, I would start always from this precious remedy*" (Valieri, 1875, p. 119).

In the years that followed, Valieri attempted a long series of clinical treatments with Indian hemp and sativa hemp, and in 1887 he set out the results of his research in a booklet entitled *Sulla canapa nostrana e suoi preparati in sostituzione della Cannabis indica* ("On sativa hemp and its preparations in substitution of Indian hemp") (Fig. 4).

He first undertook a series of clinical studies with Indian hemp, which he obtained at a high price on the international market, where it was mostly called *Gaza grass*, but not before having tested its effects on himself. In a couple of places, the doctor made mention of the fact that he suffered from asthma, and that he used both kind of *Cannabis* and *hashish*, smoked, to relieve his ailment.

Valieri administered *hashish* to patients suffering from various conditions, including asthma, pulmonary emphysema, hysteria and "*in other neuroses of central and peripheral origin, in neuralgia of the peripheral nerves, trigeminal, occipital and brachial cervico plexus, lumbar and sacral plexus, in facial and accessory of Willis hyperkinesis*" ("*in altre nevrosi di origine centrale e periferica, nelle nevralgie dei nervi periferici, dei plessi cervico trigemino, occipitale e brachiale, dei plessi lombari e sacrali, nell'ipercinesesi facciale e dell'accessorio di Willis*"). He also treated cases of amnesia and "inconsistencies of ideas" positively. His clinical experience made him understand the importance of administering non-intoxicating quantities of this remedy, that is, it was necessary to avoid bringing the patient into a state of *fantasia* (Valieri, 1887, p. 20-30).

Valieri was also interested in the therapeutic properties of sativa hemp, in such an in-depth manner that his clinical studies on this plant can be considered the most extensive not only in Italy but in all of Europe. He started from the observation that the two species of hemp, *indica* and *sativa*, represent the same species, "*and only differ from each other in terms of origin, strength of action, and price*". He complained that the batches of *ascisc* that he was able to obtain at a very high price from abroad differed in purity and therapeutic potential.

Valieri also wanted to personally ascertain the rumours circulating among growers about the alleged intoxicating effects of sativa hemp; rumours that were reported from many places and not just in the Neapolitan area. These effects are not to be confused with other physical intoxications that were attributed to hemp, such as *hemp*



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# SULLA CANAPA NOSTRANA E SUOI PREPARATI

IN SOSTITUZIONE DELLA CANNABIS INDICA

*Prof. Valieri*

PEL

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NAPOLI

STABILIMENTO TIPOGRAFICO DELL'UNIONE

Nell'ex Convento di S. Antonio a Tarsia

1887



**Figure 4:** Frontispiece of a 1887 booklet by Raffaele Valieri preserved in the Civic Library of Bologna.



fever caused by its pollen, as was believed in the Bolognese area (Mendini, 1907), or nutritional disorders and muscular atrophy, accompanied by feverish events and nervous disorders, observed in France among hemp combers (Salomon, 1893, p. 4). It is interesting to observe how these same French workers experienced these ailments more intensely with hemp of Italian origin, and especially Neapolitan one (*id.* p. 24).

Already at the beginning of the 19th century, the well-known Neapolitan botanist Michele Tenore (1780-1861) believed that hemp sativa gave off an unpleasant, *nidoso* odour, which had "*the strength to arouse a foggy heaviness in the head*" (Tenore, 1816, p. 230). In 1858, Charles Baudelaire wrote that "*during the harvest of hemp, workers, men and women, suffer similar effects; it seems that a miasma rises from the harvest capable of maliciously disturbing their cerebral faculties. The reaper's head is full of swirls, sometimes full of reveries*" ("*lorsque se fait la moisson du chanvre, le travailleurs mâles et femelles subissent des effets analogues; on dirait que de la moisson s'élève un miasme qui trouble malicieusement leur cerveau. La tête du moissonneur est pleine de tourbillons, quelquefois chargée de rêveries*"; Baudelaire, 1860, p. 15). In the Italian review of O'Shaughnessy's text from 1840, the editor (probably Giovanni Polli), in comparing Indian hemp with sativa hemp, added the consideration that "*even our hemp, when fresh, gives off a virous odour, and such that those who allow themselves to sleep in the fields where it grows wake up dizzy, fearful and almost drunk*" ("*anche la nostra, quando è fresca, tramanda un odore viroso, e tale, che coloro che si lascian andar al dormire nei campi ove essa cresce, si*

*destano con vertigini, temulenti, e quasi ubbriachi*"; Redazione, 1840, p. 435). Even among the French growers of sativa hemp, dizziness and a kind of drunkenness had been observed which were believed to be due to the emanations of a volatile principle which the plants emitted even more when the heat was more intense and whose effect was compared to that of chloroform (Salomon, 1893, p.14). The same Valieri learned from a certain Count Spinelli that the farmers at the time of hemp flowering, if they lay down under the shade of the plants, or in the farmhouses located among the crops, or next to the bundles of freshly harvested plants, "*they felt a heaviness in the head, a drowsiness with hallucinations, with strange and fantastic dreams*" (Valieri, 1887, p. 21).

As mentioned, Valieri wanted to personally ascertain these effects, and went to the flowering hemp plantations specifically in the evening, "*when the fragrance of all the herbs becomes more pronounced*". Although he did not experience the fantasy of Indian hemp, he felt a heaviness in the head and an increase in talkativeness which later gave way to a sweet and pleasant drowsiness. During his sleep he had markedly unusual dreams (Valieri, 1887).

These anecdotal data regarding the psychic effects caused by sativa hemp plantations – which I also collected forty years ago from elderly Emilian farmers (Samorini, 1996, p. 18)– do not appear to have ever been scientifically studied.

As regards the therapeutic properties of sativa hemp, starting from the 1850s, i.e., starting from the diffusion of Indian hemp in Italy, alongside the thickest literature concerning the "new" exotic drug, in the medical literature we find reports of pharmacists and doctors who, wondering if

sativa hemp possessed the same therapeutic properties of Indian hemp, had undertaken specific research in this regard.

In a note commenting on a clinical study by the French doctor François Coutenot, Giovanni Polli had underlined the successes obtained with hempseed oil in the treatment of rheumatism and joint pain *"especially in the poor of the mountains, often attacked by these diseases due to the tiring work and the inclement weather to which they are exposed, thus giving them a remedy that is easy and economical to prepare even without the need to resort to pharmacies"* (*"soprattutto nei poveri delle montagne, spesso aggrediti da queste malattie per i faticosi lavori e le inclemenze atmosferiche a cui si espongono, dando così nelle loro mani un rimedio di facile ed economica preparazione anche senza il bisogno di ricorrere alle farmacie"*; Coutenot, 1857, p. 134). In 1864 Pietro Brugo, pharmacist from Romagnano (province of Novara), published a pharmaceutical recipe for the preparation of medicines based on sativa hemp, citing the fact that preparations with this local plant were increasingly requested for the treatment of various ailments. Brugo successfully tested sativa hemp oil as a topical in the treatment of milk engorgement, acute joint pain, gout, and recommended that doctors use this medicine *"to save patients from blisters and other uncomfortable and more expensive therapies"* (Brugo, 1864).

Such was the ethical spirit of these nineteenth-century doctors, doctors who had a limited number of medicines and therapeutic techniques at their disposal, but who were nevertheless moved in the exercise of their profession by humble principles of honesty and humanity. Polli,

Brugo, Valieri were concerned about the high price of exotic medicines, in particular Indian hemp, and offered their patients medicines obtained from sativa hemp, available in large quantities and at low cost, as an alternative.

In July 1885, during the hemp flowering period, Valieri went to Casoria to see a certain Don G.P., a rich landowner and at that time a municipal councillor, who acted as a guide to the doctor in his fields cultivated with hemp, for the collection of a certain quantity of selected flowering tops. Valieri first tried the effects of sativa hemp on himself, drinking a decoction of the flowering tops. With a dosage of 4 g dry he felt *"the true phenomena of cannabism (..) but very faded and reduced in number and potential"*. He experienced similar effects with the resin at dosages of 20 and 40 cg. and came to the general conclusion that in the therapeutic prescription of sativa hemp it was necessary to double the dose compared to the dosage used with Indian hemp (Valieri, 1887, pp. 24-25).

Having identified the therapeutic dosage, Valieri ventured into the clinical applications of sativa hemp. With part of the harvest, he made numerous galenic preparations: distilled water, essential oil, alcoholic and ethereal tinctures, extracts, syrups, tablets, liqueurs, decoctions, infusions, and he also administered the drug to his patients by chewing the herb dried, fumigations, and smoking pipes and cigarettes filled with the vegetable. He found these preparations useful in the treatment of many ailments, from respiratory diseases (asthma, emphysema, chronic catarrhs) to nervous diseases. Hemp cigarettes were useful as a substitute for datura and henbane, Solanaceous plants long used in the

treatment of asthma, but which produce a thick smoke difficult to inhale (Valieri, 1887, p. 14-15).

In another pamphlet by Valieri published the following year (1888), and dedicated to the treatment of exophthalmic goitre with sativa hemp, we learn that Mr. Spinelli was Count Francesco Spinelli of Scalea, at that time Superintendent of the same Incurabili Hospital where our doctor worked. In the preface Valieri mentioned that it was a first booklet of clinical hemp case studies, thus implying that others would follow, which however do not appear to have been published.

In this booklet Valieri reported a long account of the three cases of exophthalmic goitre (all women) that occurred to him in the years 1875, 1884 and 1887 and which, after having in vain tried conventional therapies, he resolved completely with the use of sativa hemp alone. Thus, we see Valieri again in his Inhalation Cabinet intent on administering hemp preparations, also making the patients smoke sativa hemp pipes and cigarettes, and he noted how this method of introducing the medicine was the one preferred by the patients, for whom the smoking desire was so strong that he had to control its therapeutic use to prevent it from turning into "vicious consumption". Within two or three months all three patients recovered completely (Valieri, 1888).

### **The "Calcutta strain" at the Orto Botanico of Naples**

The second phase of the Neapolitan history of studies on hemp, dating back to 1931, saw the Orto Botanico of Naples and its Director, Biagio Longo, as protagonist, and concerned the first Italian cultivations of

Indian hemp and its diffusion for scientific purposes from Naples to the rest of Italy.

Of Calabrian origins, Biagio Longo (1872-1950) (Fig. 5) initially held the role of assistant at the Botanical Institute of Rome, and then that of professor of botany at the University of Siena and later at the University of Pisa. During the years 1925-1929 he held the position of Director of the Botanical Garden of Pisa, and in 1929 he was called to succeed Fridiano Cavara in the Chair of Botany, and to direct both the Orto Botanico of Naples and the adjoining Stazione Sperimentale per le Piante Officinali (Experimental Station for Officinal Plants), positions he held until 1948. During the Neapolitan phase he had the opportunity to see the happiest and unhappiest moments in the history of the Neapolitan Orto Botanico follow one another, where the unhappiest ones concerned the years of its



**Figure 5:** Biagio Longo (1872-1950) (from Parisi, 1952). Library of Bologna.

occupation/devastation by of the Anglo-American army (De Luca, 2008-2009).

The creation of the Experimental Station for Officinal Plants in 1928 was part of the directives aimed at the autarchic policies of the fascist regime, and the study of the acclimatization of exotic medicinal plants for their indigenous production had become even more necessary, mindful the consequences of the First World War, which had seen the impossibility of their supply from abroad due to the interruption of relations with the Central Powers, the closure of the two ports of Hamburg and Trieste, and the foreclosure of the Balkan and Russia trade routes (Longo, 1931). During the years 1929-1948, up to 150 different species of medicinal plants were cultivated in the Station, which were studied for the production of strains with a high yield of active ingredients and for the production of seeds which were sent to the botanical and agronomic institutes from all over Italy. Among the most studied species were Indian hemp and the opium poppy.

The problem of the speciation of the *Cannabis* genus was at that time in an effervescent phase of the controversy. A diatribe that was also reflected in Italy, where many scholars –including Antonio Targioni-Tozzetti (1853, p. 92) and the editors of the Official Pharmacopoeia of the Kingdom of Italy– followed the taxonomy decided by Linnaeus, which envisaged the existence of only *C. sativa* species with different varieties (*indica*, *erratica*, *chinensis*). Other authors did not recognize the *indica* as a variety of *sativa* but as its synonym, and among these were Adriano Fiori (1923-1925, I, p. 376) and Filippo Parlatore (1867, IV, p. 308). In Italy there seem to have been few who followed the thesis that the psychoactive variety was a

species in itself, *C. indica* Lamarck. Among these there was Biagio Longo. In Pisa he developed a first series of experiments with the aim of studying the differences between *sativa* and Indian hemp. Many botanists and pharmacologists believed that Indian hemp grown in Europe lost its pharmacological and psychoactive properties and "degenerated" into *sativa* hemp. Longo wanted to experiment with "the reverse path", that is, he subjected *sativa* hemp seeds to cultivation with various soil modifications, in particular with the addition of various salts, to see if at least some of the seeds of the plants developed in these conditions could give rise to plants with characteristics similar to those of Indian hemp. The results were negative, and Longo deduced that they were two distinct species. He communicated the results of this research in two conferences held in 1935 in Argentina, in Buenos Aires and in Cordoba (Longo, 1937a).

In 1931, having received *Cannabis indica* seeds directly from Calcutta, Longo began cultivating them at the Experimental Station. To his surprise, all 200 seeds placed in cultivation in March germinated after 17 days. The culture produced 152 dioecious plants (134 females and 17 males) and 60 monoecious plants (Fig. 6). The plants flowered in the second half of September, and initially Longo believed that this had been caused by late sowing, but with the cultivations of the following years he found that September flowering was the norm and was independent of the sowing period (Longo, 1934).

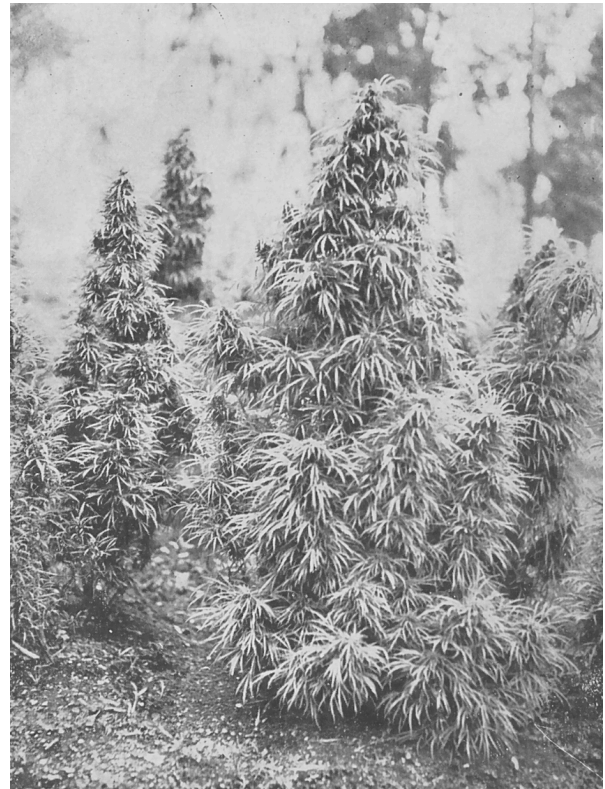
Although lush plants had been obtained in this first cultivation, Longo reported that they were inactive from a pharmacological point of view, while those of the second year (and



all subsequent ones) were powerfully active. This followed *in vivo* experiments developed first, in 1933, by Pio Marfori, who at that time directed the Institute of Pharmacology and Therapy of the University of Naples (Longo, 1934), and a few years later by Vittorio Susanna, of the Institutes of Pharmacology and Pharmaceutical Chemistry of the same University (Susanna, 1936). About ten years later Susanna developed further studies on the Longo hemp strain, confirming that its pharmacological activity was maintained over the generations (Susanna, 1948). Strangely, Susanna never mentioned the first pharmacological works carried out by Marfori, of which he was certainly aware, since in the preambles to the descriptions of his research he always took great care to retrace the history of Longo's Indian hemp strain.

Longo was surprised by the vitality and acclimatisation power of the plants, characterised by notable resistance to low temperatures and which reached a height of 3.5 metres, and even reported the case of a female plant from the 1932 crop that had been abandoned to itself, without care or watering, and which lived until the following year, flowering again. Regarding the problem of speciation of the *Cannabis* genus, with the direct observation of plants of Indian origin Longo became even more convinced that the species he was cultivating was a species distinct from sativa hemp, and that it was the *C. indica* by Lamarck (Longo, 1934).

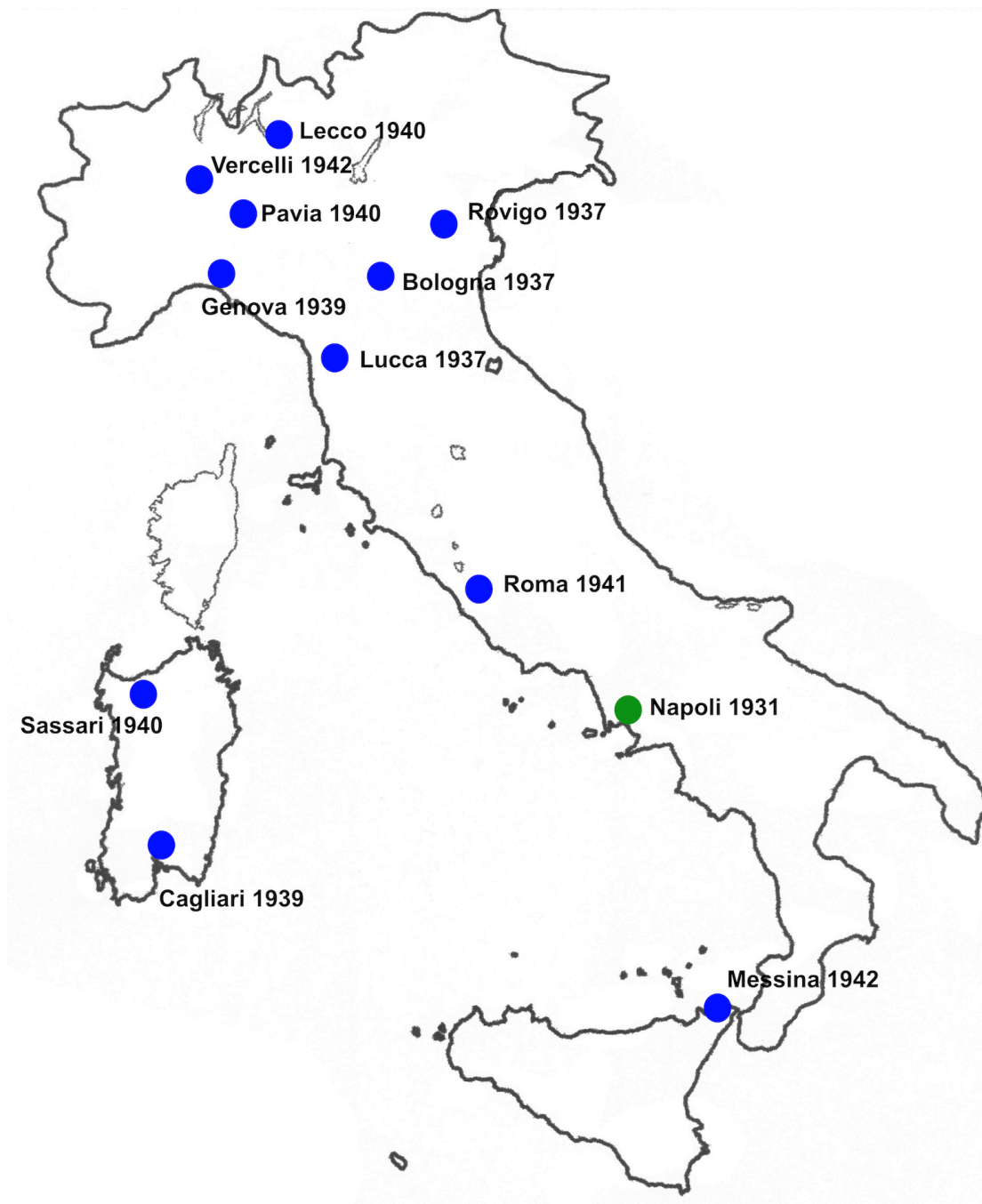
In the years that followed, Longo continued his cultivation experiences, and sent the seeds of the "Calcutta strain" which reproduced year after year in Naples to various botanical and agricultural institutes throughout Italy. From the detailed reports



**Figure 6:** Photograph taken in December 1931 of the first Italian cultivation of Indian hemp at the Experimental Station for Officinal Plants of the Botanical Garden of Naples (from Longo 1937a, Fig. 2, p. 349).

that he wrote every year on the activity of the Experimental Station, and which were published in the *Bullettino dell'Orto Botanico* (see for example Longo, 1937b; 1941a), it was possible to follow the Italian diffusion of the Calcutta strain (Fig. 7). In 1939 seeds of this strain were even sent to Addis Ababa, Ethiopia, which was part of Italian East Africa (Longo, 1941b).

Longo's "Calcutta strain" was kept active with annual cultivations for several decades, first at the Experimental Station, and subsequently –following the re-incorporation of the Station in the early 1970s (Zecchino 2005)– at the grounds of the Botanical Garden. Colombo Cavara, who in the 1940s and 1950s was Chief Cultivator



**Figure 7:** Map of the diffusion in Italy for scientific purposes of the “Calcutta strain” of Indian hemp originated in Naples (author's elaboration).

of the Experimental Station, reported a detailed description of the cultivation technique optimised following decades of agronomic experiences of the Calcutta strain (Cavara, 1955, pp.48-50).

Professor Bruno Menale, a botanist and ethnobotanist who currently works at the Orto Botanico, told me that in the 1990s the Calcutta strain was still cultivated under the guidance of Paolo Casoria, albeit to a lesser

extent than in previous decades. In the 2000s, for a series of reasons (including a decline in interest in phytochemical and pharmacological research on the Calcutta strain, and above all an incessant "predation" by students and visitors), Indian hemp was no longer cultivated. The last cultivated specimen was observed by Menale more than 10 years ago.

For over 50 years the Calcutta strain has been a primary reference sample in phytochemical and pharmacological research carried out in Italy on hemp, both for scientific and forensic purposes.

Among these we must remember the studies conducted by Mario Covello, of the Institute of Pharmaceutical and Toxicological Chemistry of the University of Naples, who based his chemo-pharmacological analyzes on a batch of several kilograms of female inflorescences coming from the 1946 harvest of the Calcutta strain (Covello, 1947; 1948).

Towards the end of the 1930s, Longo sent a quantity of seeds from the Calcutta strain to Professor Puecher of the Agricultural Technical Institute of Sassari. From these seeds Puecher obtained the first Sardinian crops of Indian hemp and delivered the raw product to Giuseppe Carbonaro and Antonio Imbesi of the Institute of Pharmacology of the University of Messina, for pharmacological studies (Carbonaro & Imbesi, 1942). These same authors undertook cultivation of Indian hemp at the Botanical Garden of the University of Messina, with seeds coming from Longo's Calcutta strain. This is the first cultivation of Indian hemp in Sicily (Carbonaro & Imbesi, 1946).

A large set of important and more modern studies on the Calcutta strain was carried out by Gesualdo Siniscalco Gigliano's team of

the Department of Biology of the Federico II University of Naples (see for example Siniscalco, 1984; Siniscalco & Di Fizio, 1993-1994).

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