Before the High Court: the legal systematics of cannabis

Bosse, J. (2020). Before the High Court: the legal systematics of cannabis. *Griffith Law Review*, *29*(2), 302-329. https://doi.org/10.1080/10383441.2020.1804671

Published in:
Griffith Law Review

Document Version:
Peer reviewed version

Before the High Court: The legal systematics of *Cannabis*

Accepted Manuscript (AM) for publication in the *Griffith Law Review*

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Abstract

This article examines the history of a legal-scientific controversy: the challenges to criminal prohibitions on marijuana, which invoked contested scientific views of the taxonomy of the cannabis plant. Facing prosecution in the 1970s, numerous defendants raised the 'botanical defence', an argument that relied on the expert testimony of scientists to dispute the classification and nomenclature of genus *Cannabis*. This article analyses judicial opinions from the three nations where the botanical defence was raised – the United States, Canada, and Australia – where the meaning of the name, '*Cannabis sativa* L.', was found to be in the domain of judicial, not scientific, authority. Although this satisfied the need for closure in the criminal cases, the article draws attention to the ongoing consequences of the taxonomic debate for the regulation of the cannabis plant under intellectual property laws.

Keywords

botany; history; criminal law; statutory interpretation; plants; intellectual property

To cite or download the Version of Record (VoR) of this article:

Jocelyn Bosse (2020) 'Before the High Court: the legal systematics of Cannabis' *Griffith Law Review*, 29:2, 302-329, DOI: 10.1080/10383441.2020.1804671

Authors note: I maintain an updated list of *Cannabis* plant patents and plant variety rights on my personal website: www.jocelynbos.se

Introduction

Cannabis is one of the oldest known cultivated plants in the world, having been used by humans for thousands of years as a source of fibre, oil, and a psychoactive drug.[1] The plant has been the subject of both scientific attention and international regulation for more than a century. However, it was not until the heightened enforcement of marijuana prohibitions in the early 1970s that the law encountered an unexpected controversy: during many criminal trials in Australia, Canada, and the United States, the courts faced a divergence of scientific opinion about the botanical taxonomy of the genus *Cannabis*.

Occasionally, the law may aggravate a technoscientific controversy through its efforts to legislate or decide cases about recent scientific discoveries or new technological developments that have uncertain consequences for society.[2] This was not the case for the *Cannabis* dispute. Rather than mapping onto the common assumption that the law simply lags behind and responds to scientific and technological changes, the criminal law was an active participant in producing the controversy.[3] It was recent changes to the legal environment in the 1960s and 1970s – notably the development of international drug treaties, domestic legislative changes, and increased enforcement – that spurred botanists to re-evaluate scientific evidence that was decades, sometimes centuries, old.

At stake was the determination of the guilt or innocence of persons charged with illegal possession, transfer, or sale of marijuana, as well as the efficacy of the criminal laws which prohibited cannabis. The problem lay with the statutory definitions of marijuana in the United States, Canada, and Australia, which only referred to the species

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[1] Iverson (2019), p 1; Schultes (1969a), pp 11-38, 12.

[2] Jasanoff (1995).

[3] Sherman (2008), p 575.

'*Cannabis sativa* L.' The laws were drafted on the assumption that the consensus amongst plant scientists in the English-speaking world was that genus *Cannabis* contained only one species: *Cannabis sativa* L., hence the governments presumed that the legislative prohibition on '*Cannabis sativa* L.' would capture all types of marijuana.

Contrary to that expectation, many accused parties sought to introduce expert scientific testimony of a different taxonomic view: that the genus *Cannabis* contained multiple other species, such as *Cannabis indica* Lam. or *Cannabis ruderalis* Janisch. Based on expert scientific evidence, the accused person would argue the 'botanical defence': since the prosecution could not prove beyond reasonable doubt that the marijuana seized by law enforcement was the species (*Cannabis sativa* L.) named in the statutory definition, and not any other species of marijuana, the court must acquit.

Both prosecution and defence lawyers expected the proceedings to be a typical 'battle of the experts', whereby the judge and jury would assess which botanists were the more reliable purveyors of scientific claims, and therefore, which view of the taxonomy of cannabis was more credible.[4] Instead, the judges found that the meaning of the name, '*Cannabis sativa* L.', was not a question of scientific fact to be resolved by a jury based on the evidence of expert witnesses, but instead, a question of law, whereby the judges had exclusive authority to interpret the meaning of the botanical name in the statutes. The judges ruled that the definition, '*Cannabis sativa* L.,' had the meaning intended by the legislatures at the time when they enacted the marijuana prohibitions. While this approach ensured that the courts achieved closure on the scope of the criminal prohibitions, recent developments in intellectual property law have seen the science of plant systematics re-emerge as a matter of concern for the regulation of genus *Cannabis*. Hence, drawing on

[4] Solomon and Hackett (1996).

theoretical insights from both legal scholarship and science and technology studies, this article provides overdue evaluation of the previously obscure history of the botanical defence.

Early Cannabis Legislation

This article begins with an overview of the early regulation of cannabis which laid the groundwork for the legislation at issue in the 1970s. Once the international powers of the early twentieth century had negotiated agreements to criminalise opiates (including morphine, heroin and cocaine), those treaties became the blueprint for the regulation of ‘Indian hemp’. The members of the League of Nations revised the *International Convention relating to Dangerous Drugs* in 1925 to include a prohibition on ‘the export of the resin obtained from Indian hemp and the ordinary preparations of which the resin forms the base (such as hashish, esrar, chiras, djamba) to countries which have prohibited their use,’ where:

> “Indian hemp” means the dried flowering or fruiting tops of the pistillate plant *Cannabis sativa* L. from which the resin has not been extracted, under whatever name they may be designated in commerce.[5]

In the United States and Australia, both the state and federal governments have the power to enact criminal laws; by contrast, in Canada, the federal government has exclusive criminal jurisdiction. The export prohibition in the *International Convention relating to Dangerous Drugs* was adopted by the Australian Government in 1926 through

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[5] *International Convention relating to Dangerous Drugs*, opened for signature 19 February 1925, (entered into force 25 September 1928), art. 1, quoted in Official Documents, ‘International Convention Relating to Dangerous Drugs’ (1929) 23(3) *American Journal of International Law* 135.

amendments to the *Customs Act 1901* (Cth), while the individual states legislated to control cannabis in fragmented ways over the subsequent decades.[6] The implementation of the treaty was more harmonised in the United States, where the federal and state legislatures developed the *Uniform State Narcotic Drug Act 1932*, which was soon adopted in all jurisdictions in the nation, followed by the federal *Marihuana Tax Act 1937*. Meanwhile, the Canadian Government had already criminalised 'cannabis indica (Indian hemp) or hasheesh and its preparations' under the *Opium and Narcotic Drug Act 1923*.[7] During this period, the treaties and domestic criminal laws of Australia, Canada and the United States still allowed the sale and use of cannabis for medical and scientific purposes, albeit with the imposition of strict labelling laws and higher taxes.

As these legal instruments demonstrate, 'Indian hemp' was a popular name for the cannabis plant in the early twentieth century, a name which was often used synonymously with its Latin translation, 'Cannabis Indica.' Other vernacular names included 'marijuana' for the dried flowering tops of the plant that are often smoked, or the name 'hashish' for the separated resin of the cannabis plant that is compressed into sticks or blocks.[8] At times, the difference between common names and scientific names can be quite slippery: the botanical name of the genus (*Cannabis*) is also a common name for the plant (cannabis), and one of the published scientific names is *Cannabis indica*, which is almost indistinguishable from the above-mentioned common name, 'Cannabis Indica'.

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[6] *Poisons Act 1928* (Vic); *Dangerous Drugs Act 1934* (SA); *Police Offences Amendment (Drugs) Act 1935* (NSW); *Health Act 1937* (Qld); 1950 Proclamation under the *Police Offences (Drugs) Act 1928* (WA); *Dangerous Drugs Act 1959* (Tas).

[7] On the origins of early drug control in Canada, see Carstairs (2000).

[8] Iverson (2019), p 4.

A growing body of scholarship explores the histories of colonialism and class relations that shaped the naming and public imagination of the cannabis plant. Alfred Crosby outlines the important commercial use of cannabis fibre, called ‘hemp’, in the production of sails and rigging for ships used in the transatlantic trade of the eighteenth and nineteenth centuries, with Russia as the dominant supplier of this essential commodity.[9] In contrast with public understanding of European ‘hemp’ as an industrial crop, Bradley Borougerdi highlights the exotic descriptions of ‘Indian hemp’ as a psychoactive plant.[10] The accounts of colonial botanists emphasised the intoxicating properties of Cannabis Indica, describing how the plant induced laziness, madness, and other behaviours which mapped onto the Orientalist conceptions of the colonial subjects in British India who used the drug.[11] A century later, cannabis would become known as ‘marijuana’ in the western United States, associating a Mexican name for the plant with stories of deviant behaviour of immigrants and labourers who consumed it.[12]

With the criminalisation of cannabis throughout the United States in the early twentieth century, many accused persons sought to use this variety of common names to their advantage, making legal arguments which judges viewed as ‘engaging in an extended battle in semantics’.[13] For example, in *State v. Navaro* (1933), a man was arrested in Salt Lake City and charged with unlawful possession of ten cigarettes which, according to the testimony of the city chemist, ‘contained American cannabis or

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[9] Crosby (1965).

[10] Borougerdi (2018).

[11] Mills (2000); Said (1979).

[12] Musto (1999), p 219; on the significance of class relations in the marijuana policies in Mexico, see Campos (2012); for recent studies on the racialized enforcement of drug laws in the United States, see Alexander (2010).

[13] *Martinez v. People*, 417 P.2d 485, 486 (1966).

mariguana'. The defendant argued that the name 'mariguana' did not have the same meaning as 'cannabis sativa' or 'cannabis', and since the criminal charges did not use the exact terminology from the legislation, it rendered the charges against him invalid. However, the Supreme Court of Utah decided that, as a matter of law, the terms could be used interchangeably: 'the flowering tops and leaves of cannabis sativa, which is but the scientific name of the hemp plant or loco weed, constitute a drug known as cannabis and commonly known in this locality as mariguana'.[14] Subsequent cases affirmed the synonymy of 'marijuana', 'Indian hemp' and other terms.[15]

A few decades later, there were major shifts in the public understanding of marijuana. Cannabis had posed a significant challenge for the nineteenth and twentieth century chemists who sought to extract and identify the active compounds in the plant. Thus, it was not until 1964 that researchers successfully isolated the molecule, tetrahydrocannabinol (THC), and reported that it was main psychoactive component of marijuana.[16] Alongside the progress in the field of chemistry, the 1950s and 1960s saw the dissemination of research by ethnobotanists like Richard Evans Schultes, whose reports described the properties of hallucinogens encountered on his expeditions through Mexico and the Amazon, such as ayahuasca (and its chief ingredient, *Banisteriopsis caapi*), as well as marijuana.[17] These accounts were popularised by the advocates of the

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[14] *State v. Navaro,* 26 P.(2d) 955, 959 (1933).

[15] *People v. Savage,* 64 Cal. App. 2d 314, 315 (1944); *State v. Economy,* 61 Nev. 394 (1942); *Gonzales v. State,* 293 S.W.2d 786 (1956); *Davis v. State,* 219 So. 2d 678 (1969); *State v. Allison,* 466 S.W.2d 712 (1971).

[16] Gaoni and Mechoulam (1964).

[17] Schultes (1940); (1969b).

recreational use of drugs, such as Timothy Leary, during the counterculture movements of the 1960s.[18]

This increasing social use of drugs in the 1960s was met with heightened enforcement of criminal prohibitions. By this time, marijuana users and their lawyers had largely abandoned arguments based on the variable common names for the plant. Instead, they often focused on undermining the expert testimony of forensic chemists, who used the recent discovery of THC to identify the plant material seized by law enforcement based on its chemical composition. The strategies to undermine the chemical evidence followed familiar patterns: defence lawyers addressed issues like the expertise of the chemists who appeared for the prosecution, or disputed the reliability and precision of the methodologies used to extract and identify the chemical components of the plant material.[19] Furthermore, defence lawyers used provisions in the US Bill of Rights to challenge the constitutionality of the criminal prohibitions on marijuana.[20]

While the constitutional challenges were generally unsuccessful, an important exception was *Leary v. United States* (1969), in which Timothy Leary was charged with smuggling cannabis into the US from Mexico without having paid the transfer tax under the federal *Marihuana Tax Act 1937*. Leary argued that procedural requirement to disclose the transfer of marijuana for tax purposes amounted to self-incrimination under the state laws in Texas, in violation of the Fifth Amendment to the US Constitution. The US Supreme Court agreed, and part of the *Marihuana Tax Act* was struck down.[21]

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[18] Ponman and Bussmann (2012), p 16.

[19] Kurzman et al (1975).

[20] Soler (1974).

[21] *Leary v. United States*, 89 S.Ct. 1532, 1542-1543 (1969).

In some ways, however, it was a pyrrhic victory. First, during the trial, in an effort to prove knowledge of illicit transfer, the prosecution argued that the Mexican origins of the plant would be evident from the characteristics of the plant material, hence 'a smoker may be able to tell the source of his marihuana from its appearance, packaging, or taste'.[22] Such arguments had been made before, hence Leary's attorneys responded by tendering the transcript of the expert testimony of the ethnobotanist Richard Evan Schultes in *United States v. Adams* (1968) to support the assertion that it was not possible to determine the origin of the material by sight.[23] The US Supreme Court accepted that '[a]s for appearance, it seems that there is only one species of marihuana, and that even experts are unable to tell by eye where a particular sample was grown'.[24] That remark would take on new significance in subsequent judicial opinions.

Secondly, with aspects of the *Marihuana Tax Act 1937* no longer in force, the US Congress took the opportunity to introduce a new framework for the criminalization of cannabis. The federal and state legislatures implemented a harmonised law, the *Uniform Controlled Substances Act 1970*, which prohibited 'all parts of the plant *Cannabis sativa* L.'. The legislative changes were soon coupled with heightened enforcement: US President Richard Nixon declared the 'War on Drugs' on 17 June 1971 and merged two existing government bodies to form the US Drug Enforcement Administration (DEA) in 1973.

Meanwhile, the United Nations (UN) *Single Convention on Narcotic Drugs 1961* was amended by a 1972 Protocol to expand international drug control measures, notably

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[22] *Leary v. United States*, 89 S.Ct. 1532, 1554 (1969).

[23] *Leary v. United States*, 89 S.Ct. 1532, 1551 (1969), citing *US v. Adams*, 293 F.Supp. 776 (1968).

[24] *Leary v. United States*, 89 S.Ct. 1532, 1555 (1969).

over the cultivation of cannabis.[25] The UN *Single Convention on Narcotic Drugs* defined the cannabis plant as 'any plant of the genus cannabis', which was a departure from earlier treaties, since it avoided listing particular species, and instead deployed a broad taxonomic definition that referenced the entire genus. In tandem with the UN negotiations, the Canadian federal government enacted the *Narcotic Control Act 1970*, while the Australian government amended the *Narcotic Drugs Act 1967* (Cth) to comply with its international obligations. However, unlike the treaty provisions, the criminal statutes in the United States, Canada, and Australia prohibited the possession of '*Cannabis sativa* L.' It was this species-level definition that became central to the cannabis taxonomic dispute and allowed the botanical defence to emerge.

The Emergence of the Botanical Defence

Before examining the botanical defence, it is important to distinguish between two different, albeit co-dependent, aspects of plant taxonomy. First, systematics: the process of examining the variation in the features of plants and classifying them into groups, using characteristics such as leaf shape, flower types, fruits, and branching patterns.[26] The groups of plants are arranged in a nested hierarchical system of taxonomic ranks (or 'taxa'); importantly for the purposes of the *Cannabis* controversy, the lower taxa include the ranks of 'genus' and 'species'. The genus is a more inclusive group of plants that have shared characteristics; within each genus, botanists may draw boundaries between different species. Below the rank of species, botanists sometimes classify 'varieties' or

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[25] *Protocol amending the Single Convention on Narcotic Drugs 1961*, opened for signature 25 March 1972, 976 UNTS 3 (entered into force 8 August 1975), art 12

[26] Jeffrey (1982), p 51.

'subspecies' based on minor differences between plants in the same species.[27] The systematics of cannabis is complicated by the sexual dimorphism of the plant: generally, the flowers of cannabis are either staminate (and designated 'male') or pistillate (and designated 'female').[28] The male plants are generally grown for hemp fibre, while the female plants exude more resin at the flowering tops of the plants, from which marijuana is usually prepared and smoked. Since the seeds and flowers are an important diagnostic tool for plant systematics, botanists have often classified the *Cannabis* species based on the characteristics of the female plants.

Second, botanical nomenclature: the scientific naming of plants, which aims to ensure that each plant species has a unique, stable and universal name. Over the last few centuries, European botanists developed and eventually codified a set of rules and procedures for naming plants; in the twentieth century, those rules were called the *International Code of Botanical Nomenclature* (ICBN). A key aspect of the rules is the binominal system, whereby each botanical name has two components: the genus name (e.g. *Cannabis*) and the species epithet (e.g. *sativa*). The purpose of the rules is to avoid duplicate names and to facilitate the unambiguous communication about plants; in that vein, the ICBN requires that there can only be one legitimate name for each taxon, and if synonyms exist, the name that was published first in time takes priority: any names published subsequently are illegitimate synonyms (*nomen illegitimum*).

The formal tether between a published scientific name and its taxonomic group is the 'type specimen'. Since the fifth International Botanical Congress in 1930, the ICBN

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[27] Spencer et al (2007), pp 33-34.

[28] Stearn (1974), pp 326-327; Schiebinger (1996), p 163. Historically, many naturalists have applied the terms *mas* (male) and *foemina* (female) to cannabis in the opposite way to the current designation.

has required that a plant specimen be designated as the 'type' by the author of the name when it is published. The specimen is dried, affixed to a labelled sheet of paper, and deposited in a museum or herbarium (see example herbarium specimen in Figure 1). Despite the name, it is not meant to be typical of its species; rather, it is a randomly chosen specimen that is 'only accidentally and not essentially a representative sample of the species'.[29] The type specimen became a matter of concern with the emergence of the botanical defence in the 1970s, since the legal-scientific controversy exposed that no type specimen had been assigned for the *Cannabis* species. For example, the botanical name, *Cannabis sativa* L., was cemented in the eighteenth century, before there was a requirement to designate a type specimen. With the debate over *Cannabis* taxonomy, the botanist William T. Stearn (1911-2001) was prompted to examine the materials that informed the original classification, and in 1974, assigned a pistillate (female) specimen as the type for *Cannabis sativa* L.[30]

It was these norms of plant systematics and rules of botanical nomenclature that were invoked to provide scientific evidence for the guilt or innocence of persons accused of violating the sanctions on possession, transfer, or sale of marijuana in the 1970s. Before that point, the English-language literature and the courtroom testimony of scientists affirmed that botanists in the Anglophone world generally accepted that the genus *Cannabis* contained only one species: *Cannabis sativa* L. (the 'monotypic view'). The prevailing taxonomy was called into question, however, when some prominent botanists changed their opinions and argued that there are multiple species of *Cannabis* (the 'polytypic view'), including *Cannabis ruderalis* and *Cannabis indica*. Although the

[29] Daston (2004), pp 163-164.

[30] Stearn (1974), p 329.

scientific literature contains a great number of names for species and varieties of *Cannabis*—not all of which were published in accordance with the rules of botanical nomenclature—the following sections only sketch the history of the three putative *Cannabis* species names that would become integral to the botanical defence.

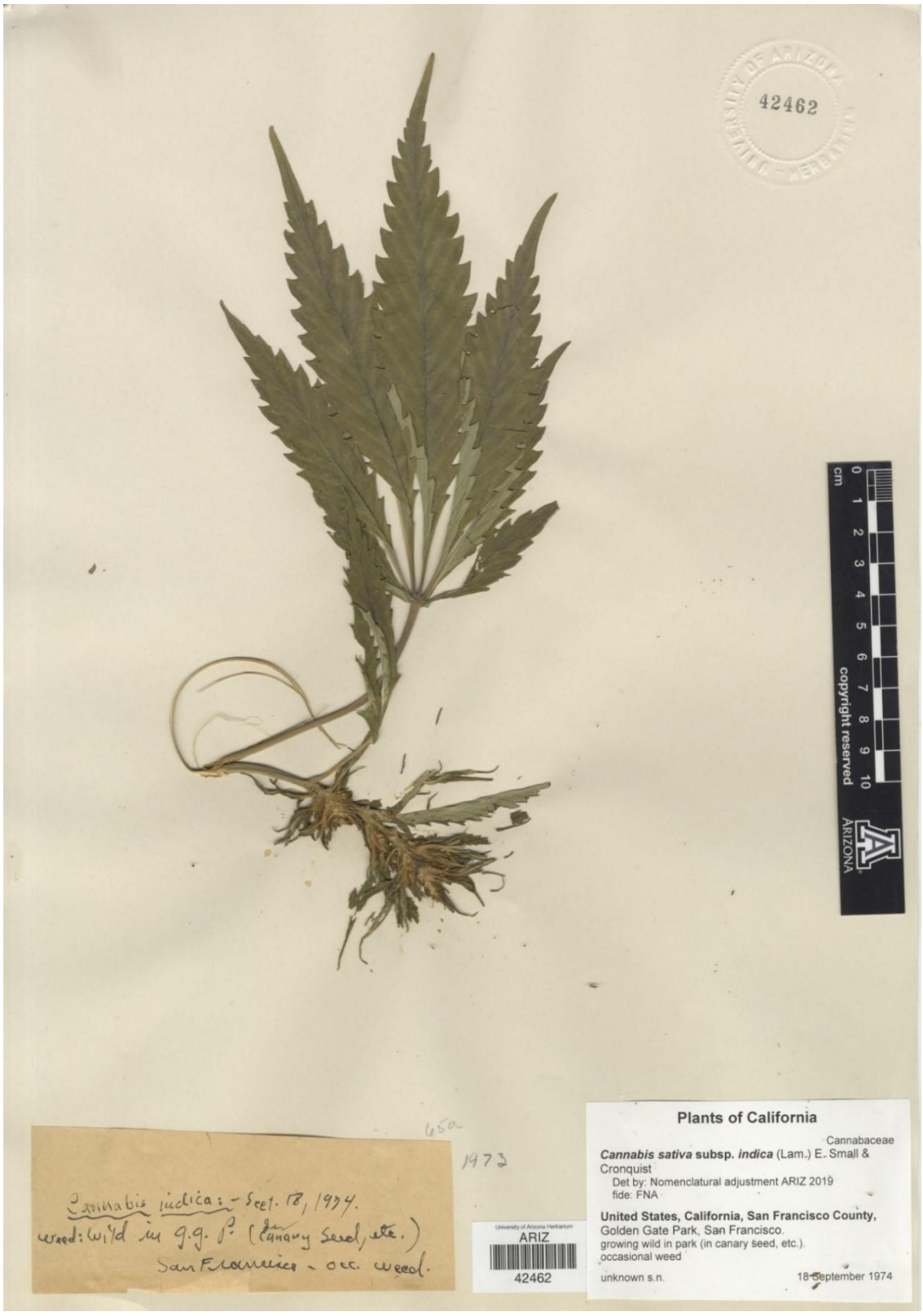

Figure 1. Herbarium Specimen (ARIZ Accession No. 42462), showing the nomenclatural adjustment from *Cannabis indica* to *Cannabis sativa* subsp. *indica* (Lam.) Small & Cronquist, courtesy of the University of Arizona Herbarium, USA.

Cannabis sativa

The name *Cannabis sativa* has been used for centuries, the word ‘sativa’ being Latin for ‘sown, planted, or cultivated’.[31] The binominal was retained by the Swedish botanist, Carl Linnaeus (1707-1778), in the publication of his *Species Plantarum*.[32] Linnaeus is credited with cementing the binominal system, whereby scientific names for plants have two components (genus name and species epithet); during the twentieth century, the ICBN also required that plant names include an ‘author-citation’, an abbreviation of the name of the person who first published the plant name.[33] However, since the priority of botanical names arbitrarily commences from the publication of Linnaeus’s *Species Plantarum* (1753), he is cited as the author of many names, even if it was actually coined before he published it, as with *Cannabis sativa*. Linnaeus’s author-citation consists simply of the letter ‘L.’, so botanists referred to the cannabis plant as ‘*Cannabis sativa* L.’.

Some American defendants argued that the absence of the author-citation rendered criminal charges or arrest warrants invalid. However, the courts were quick to find that ‘Cannabis sativa’ was legally synonymous with ‘*Cannabis sativa* L.’. For example, in the case *State v. Thompson* (1968), the police officers testified that they ‘identified the package which they saw defendant throw from his auto and which was found by the police laboratory technician to contain 2.59 grams of ‘Cannabis Sativa, known as marijuana’’. Thompson unsuccessfully argued that the police laboratory

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[31] Stearn (2004), p 487.

[32] Linnaeus (1753), p 1027; McPartland and Guy (2017), p 330.

[33] Stafleu et al (1972), art 46. The requirement was introduced to deal with ambiguity in cases of homonymy, where the same botanical name is used by different authors for different taxons.

evidence did not satisfy the elements of the charge, since it did not identify the prohibited material as named in the legislation. The court held that the difference was not consequential, since:

> … there is no doubt that 'Cannabis Sativa L.' and 'Cannabis Sativa' are one and the same. The addition of the abbreviation 'L.' in § 195.010(5) merely serves, for purpose of botanical classification, to identify the source of the recognized botanical name as the Swedish taxonomist, Carl von Linné.[34]

Cannabis indica

The French naturalist, Jean-Baptiste Lamarck (1744-1829), coined the binominal *Cannabis indica* using samples from India and distinguished it from *Cannabis sativa* L. based on eight morphological characters, describing it as shorter, with more branching and a stronger smell, but noted that the species did not produce the hemp fibres that made *Cannabis sativa* commercially valuable.[35] Lamarck noted that:

> [t]he principal effect of this plant consists of going to the head, disrupting the mind, where it produces a sort of intoxication that makes one forget one's sorrows, and produces a strong gaiety. To induce this gaiety, the Indians extract the resin from the leaves and the seeds, and by mixing with the stem, make a drink which stimulates the senses'.[36]

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[34] *State v. Thompson*, 425 S.W.2d 80, 84 (1968), before the Supreme Court of Missouri. For an example under the *Comprehensive Drug Abuse Prevention and Control Act 1970*, see *US v. King*, 485 F.2d 353 (1973) and *State v. Simpson*, 534 S.W.2d 568 (1976).

[35] McPartland and Guy (2017), p 331.

[36] Lamarck (1785), 695. Author's translation. Original French : « La principale vertu de cette plante consiste à porter à la tête, à déranger le cerveau, à lui procurer une espèce d'ivresse qui fait oublier le chagrin, & donne une forte de gaieté. Pour se procurer cette gaieté, les Indiens expriment le suc de ses feuilles & de ses graines, & en font avec l'écorce une boisson qui agite beaucoup les sens. »

The emphasis on the distinct psychoactive effects of *Cannabis indica*, initially bound up with its Oriental provenance, was filtered through a medicalised lens in the nineteenth century, alongside the rise of medicine as a legitimate profession in industrial societies. From that time, much of the pharmacological literature and the medical community in Western Europe recognised 'indica' as a distinct group, and understood Cannabis Indica to have a higher potency of intoxicating substances that could be used as a remedy.[37] As such, Cannabis Indica was regulated separately in some legislation in the early twentieth century, especially food and drug regulations in Australia and the United States.[38] In particular, numerous American statutes listed *Cannabis sativa* in the legislative chapter on 'Narcotics' but referred to *Cannabis indica* in the separate chapter on 'Pharmacy'.[39] On that basis, some American defendants argued an embryonic form of the botanical defence by suggesting that the US Government had recognised *Cannabis indica* and *Cannabis sativa* as different species of cannabis, and that legislature deliberately regulated *Cannabis indica* as a pharmaceutical substance, while only prohibiting *Cannabis sativa* as a narcotic. However, the courts held that 'there is no essential difference between *Cannabis sativa* L. and *Cannabis indica'*, and therefore allowed state prosecutors to tender evidence from chemical analysis, even if the tests to identify marijuana could not distinguish the two types of cannabis.[40]

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[37] Borougerdi (n 9); Schultes (1969a), pp 24-27.

[38] In the United States, see the federal *Pure Food and Drug Act of 1906*; in Australia, see J.W. Colville, 'Regulations as to Drugs, signed 20 July 1906' (Wednesday 5 September 1906) *Victoria Government Gazette* 101:3731, 3749. See also *Report of the Royal Commission on Secret Drugs, Cures and Foods* (Final Report, August 1907) vol 1.

[39] *US v. Moore,* 330 F.Supp. 684, 687 (1970).

[40] *State v. Wind,* 208 N.W.2d 357, 360 (1973); *State v. Tapia,* 420 P.2d 436 (1966); *State v. Romero,* 74 N.M. 642, 646-647 (1964).

Cannabis ruderalis

The Soviet botanists Nikolai Vavilov (1887-1943) and Dmitry Janischevsky (1875-1944) both studied the variation of cannabis in south-eastern Russia. In 1922, Vavilov classified a group of wild cannabis as a variety called *Cannabis sativa* var. *spontanea*.[41] However, Janischevsky elevated it to the level of species and gave it the name *Cannabis ruderalis* in 1924.[42] The word ‘ruderalis’ means ‘weedy’ or ‘growing among waste’,[43] chosen to describe marijuana plants which were shorter (usually less than two feet tall) and exhibited sparse branching compared to *Cannabis sativa* or *Cannabis indica*. The name *Cannabis ruderalis* Janisch. was used in scientific texts in the Soviet Union,[44] but it was largely unknown outside of Europe until it was raised in criminal proceedings in the 1970s.

The Polytypic View

The publication of the species names, *Cannabis sativa* L., *Cannabis indica* Lam., and *Cannabis ruderalis* Janisch., was not enough to make them legitimate. As mentioned earlier, the rules of botanical nomenclature stipulate that there can be only one legitimate name for each species, and that the first-in-time takes priority: any names published subsequently are illegitimate synonyms. Therefore, the legitimacy of a species name derives from its classification; for example, if botanists accept the Linnaean unification

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[41] Vavilov (1922). The type specimen of *Cannabis sativa* var. *spontanea* Vavilov. was identified and deposited at the Vavilov Institute (WIR) in St. Petersburg and a photograph of the specimen published in Small and Cronquist (1976), pp 423-424.

[42] Janischevsky (1924).

[43] Stearn, *Botanical Latin* (n 30), p 485.

[44] Yarmolenko (1936), pp 383-384; Rabinovich et al (1959); Zhukovsky (1971); Zeven and Zhukovsky (1975).

of all cannabis plants into one species, the name *Cannabis sativa* L. (1753) has priority and is the name for every plant in the genus. However, if botanists recognise the distinguishing characters identified by Lamarck or Janischevsky as sufficient to divide the genus into multiple species, then cannabis plants might also be named *Cannabis indica* Lam. (1783) or *Cannabis ruderalis* Janisch. (1924), which have priority in their respective groups. In this way, any disagreement about systematics has the downstream effect of frustrating the demands of both science and law for stable and unambiguous nomenclature.[45] As the proponents of the polytypic view put it:

> Plants were not made to be catalogued and classified. They can never easily and with complete satisfaction be put into tight compartments. This simple and basic truth, usually not appreciated by non-scientists and sometimes overlooked by zealous taxonomists, should be borne in mind much more strongly for groups such as Cannabis, where an historical perspective is imperative.[46]

On that basis, plant taxonomy was harnessed as a potential mechanism for resistance to the expansion of criminal approaches to drug control. The botanical defence was argued in the United States, Canada, and Australia, where the explicitly adversarial courts of law allow either party to retain their own expert witnesses to give evidence. To that end, the defence lawyers for a client charged with importing marijuana retained two botanists as expert witnesses:[47] Richard Evans Schultes (1915-2001), the executive director and curator of economic botany at the Botanical Museum of Harvard University, and William M. Klein (1934-1997), of the Missouri Botanical Garden. Schultes had spent years conducting research on the use of hallucinogenic plants by indigenous

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[45] Lawson (2018), pp 77, 120-121; Lawson (2010), p 493.

[46] Schultes et al (1974), pp 344-345.

[47] *US v. Honeyman*, 470 F.2d 473, 473 (1972).

communities, especially in Mexico and the Amazon. In contrast with his publications and courtroom testimony in the late 1960s, Schultes publicly changed his opinion of *Cannabis* taxonomy and argued for a revised view: that the genus *Cannabis* contained other species.

The change of view occurred after 1971, when defence lawyers instigated and funded Schultes and Klein to undertake a field study of 'wild' cannabis plants in their 'natural habitat' in Afghanistan, as well as to examine specimens stored in herbarium collections and grown at an experimental site in Mississippi managed by the US National Institutes of Health (NIH).[48] Since 1968, as the exclusive holder of a license from the DEA, the NIH facility at the University of Mississippi has been the only US research facility authorised to grow and supply marijuana for scientific study. Following this research, the two botanists, Schultes and Klein, testified in *United States v. Rothberg* (1972) that the conclusion of this study was that the genus *Cannabis* was polytypic, with at least three recognizable species: *Cannabis sativa* L., *Cannabis indica* Lam., and *Cannabis ruderalis* Janisch. The US Government had charged Rothberg with transporting marijuana from Afghanistan, but Schultes and Klein argued, based on their recent field studies, it was the country of origin for *Cannabis indica* Lam., not the species *Cannabis sativa* L. that was prohibited in the statute.

Making the botanical defence entailed asking the courts to treat the meaning of the name '*Cannabis sativa* L.' in the criminal statutes as a question of fact to be resolved by reference to the testimony of expert witnesses on the taxonomy of genus *Cannabis*. Taking as their premise the longstanding legal presumption of strict interpretation, that ambiguity in a criminal statute should be interpreted favourably to the accused,[49] botanists

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[48] *US v. Rothberg*, 351 F.Supp. 1115, 1116 (1972).

[49] *US v. Bass*, 404 U.S. 336 (1971) *Momcilovic v The Queen* (2011) 245 CLR 1 [43]; *DPP v Ottewell* [1970] AC 642, 649; *Sweet v Parsley* [1970] AC 132, 149.

and lawyers rallied to expose the uncertain scope of the legislative definition of cannabis. The defence lawyers argued that the marijuana prohibitions did not encompass the entire genus *Cannabis*, and that the legislation should be interpreted narrowly to only proscribe one of the species.

The next element of the argument depended on the fact that when botanists identify a specimen, they examine multiple features of the plant (such as the characteristics of leaves, flowers, fruit, roots, and branching), but these features cannot be elucidated from cannabis material that is typically seized by law enforcement officials, because the plant is often dried, crushed, and otherwise not suitable for identification. Since the evidentiary burden lies with the prosecution to prove the elements of the offence, the defendants argued that the prosecution had not introduced sufficient evidence to prove beyond reasonable doubt that the botanical identity of the plant material possessed or sold by the defendant was prohibited taxonomic group defined in the statute (*Cannabis sativa* L.) and not another species.

For several years, the forensic identification of cannabis in legal proceedings had relied on the expertise of chemists. Thus, defence lawyers sought to draw the lines of authority to show that the testimony from chemists of the presence of THC in the plant material seized by law enforcement was not relevant. Given that THC is present in all plants in the genus *Cannabis*, they argued that the different species of *Cannabis* could not be distinguished based on chemical composition, regardless of the individual chemist’s training or the accuracy of their methodologies. defence lawyers asserted that only botanists could give a true description of the variation of *Cannabis*, and since

chemists could not give a precise identification of the plant material at the species level, their testimony did not offer a satisfactory rebuttal to the botanical defence.[50]

The expert witnesses who supported the polytypic view did not limit their arguments to the courtroom: Schultes, Klein, and two colleagues published their revised taxonomic opinion in a paper entitled ‘Cannabis: An Example of Taxonomic Neglect’, which was often cited in litigation.[51] In arguing against the prevailing opinion, they focused on uncertainty: they framed the orthodox monotypic view of *Cannabis* as based on ‘an almost total lack of taxonomic investigation’,[52] whereby their work represented the first concerted effort to delimit the boundaries of any species within the genus.

Schultes and his colleagues framed their work as preliminary investigations to remedy the incomplete botanical knowledge of *Cannabis*, and did not espouse a concrete taxonomy; instead, they asserted that there were at least three species and called for more research using the ‘sophisticated and interdisciplinary techniques for arriving at taxonomic evaluation… of plants’ that had emerged since the time of Linnaeus, Lamarck, and Janischevsky.[53] At the same time, they emphasised that the polytypic concept was not new, since it was recognised nearly 200 years earlier by Lamarck, and had been affirmed decades earlier by Soviet botanists, whose opinions on cannabis were more credible because they were based on ‘experience in the field’ with ‘wild populations’, but were unfortunately ignored because they were not translated from Russian.[54]

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[50] *State v. Shaw,* 343 A.2d 210, 212-213 (1975).

[51] *US v. Honneus,* 508 F.2d 566, 574 (1974); *State v. Vail,* 274 N.W.2d 127, 131 (1979).

[52] Schultes et al (1974), p 340.

[53] Schultes et al (1974), p 362.

[54] Schultes et al (1974), p 341.

The polytypic view was picked up by William A. Emboden (1935-) of the LA County Natural History Museum, who published articles, delivered a seminar on the legal implications of the revised taxonomy of *Cannabis* to the recently-formed California Attorneys for Criminal Justice, and appeared as an expert witnesses in criminal trials, including the key Australian case, *Yager v The Queen*.[55] Criminal lawyers also penned journal articles evangelising the botanical defence as a novel legal strategy against marijuana prosecutions.[56]

The Monotypic View

State prosecutors did not allow the polytypic view to be argued without retort. In *United States v. Rothberg* (1972), the prosecutor called the Canadian botanist, Ernest Small (1940-), to testify that there was only one species of cannabis. Ernest Small has dedicated much of his career to the study of cannabis. He was retained as a research associate of the Canadian Government's *Commission of Inquiry into the Non-Medical Use of Drugs* (the Le Dain Commission) in 1969-1972 and has worked at the Canadian federal ministry of agriculture for many years. During the 1970s, he received funding from the United Nations to conduct research and attend conferences on drug control, and his work included a study of the variation in the levels of active compounds, like THC, present in *Cannabis* plants grown at an experimental site in Ottawa, Canada.[57]

In the face of this battle of experts, the court called its own witness, Arthur J. Cronquist (1919-1992) of the New York Botanical Garden, who likewise affirmed the

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[55] Emboden (1974a); Emboden (1974b).

[56] Metzger (1975); Kurzman et al (1975).

[57] Small and Beckstead (1974), p 145.

general consensus position that cannabis was a monotypic genus.[58] Cronquist questioned the reliability of Lamarck and the Soviet botanists who were cited in favour of the polytypic view, including Vavilov and Janischevsky, while Small noted that Lamarck made his taxonomic assessment based on limited plant material and argued that Janischevsky's designation of *Cannabis ruderalis* as a distinct species was only a tentative conclusion from his field studies.[59] Although Small and Cronquist recognised the diversity in the chemical composition and other features of cannabis plants, the differences were not sufficient to draw boundaries between species; at best, they could delimit varieties with the one species (*Cannabis sativa* L.) that arose due to environmental conditions or selective breeding by humans.[60] For example, before a Canadian court, they testified that the width and growth patterns of leaves vary across different parts of the cannabis plant, so these features had 'no taxonomic significance' for delineating between species.[61]

Beyond his scientific research and readings of the historical botanical records, Small also invoked what Sheila Jasanoff described as 'not only how scientists produce facts for legal use but also how science supports ideas of causality, reason, and justice in the law, and how scientific experts supplement the work of jurists, advocates, and other actors engaged in the project of securing social stability and order'.[62] The upshot was that, in addition to using the familiar rhetorical strategies in the courtroom to represent the monotypic view as the consensus scientific position on the systematics of cannabis, Small

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[58] *US v. Rothberg*, 351 F.Supp. 1115, 1117 (1972).

[59] Small (1975a), p 3.

[60] Small and Cronquist (1976), pp 411-412.

[61] *R. v. Herbert, Coombs and Spanks* (1975) B.C.J. No. 1027, [25].

[62] Jasanoff (2007), p 761.

also made strong appeals to the social and political consequences if the polytypic view was taken seriously.

In his contemporaneous writings, Small criticised the botanical defence as a 'ploy being used to circumvent marihuana legislation',[63] arguing that it would inevitably become precedent for evading the prohibitions on other plant materials, notably the opium poppy, *Papaver somniferum*.[64] With that in mind, he published numerous articles which sought to 'forestall the potentially catastrophic consequences that could result from wholesale similar challenges to legislation', arguing that 'the question of recent scientific opinion on how many species of *Cannabis* should be recognised serves only to obscure and is only marginally germane to the critical legal issues at hand. Rather, valid resolution of the problem rests simply with clarification of usage of the names in question by society'.[65]

Decisions on the Botanical Defence

In evaluating the success of the botanical defence, a precise assessment is not possible: only published judicial opinions are accessible, since decisions made at the initial trial usually remain unreported and could not be included in this study. However, amongst decisions that were published, the botanical defence was argued in 59 cases, across both state and federal courts in the United States, Canada, and Australia. While the decisions consequently span numerous jurisdictions with their own legal cultures and precedents, the *Cannabis* dispute provides a rare opportunity for straightforward comparative analysis: the common law system operates in all three countries, which means that judges, lawyers, and expert witnesses play broadly similar roles in criminal proceedings and

[63] Small (1976).

[64] Small (1975), p 38.

[65] Small (1975b); Small (1976).

decision-making. Furthermore, much of the legislation at issue was enacted under uniform statutes, and the judges who interpreted the definitions of marijuana often cited the reasoning in decisions from other jurisdictions, including other countries.[66]

Out of the 59 published cases, the botanical defence was only successful once: *United States v. Lewallen* (1974).[67] The ruling states that Lewallen had been found with 2,212 grams of a plant in the genus *Cannabis*. During the judge-only trial in the US District Court, William M. Klein gave expert testimony in favour of the polytypic view of marijuana, while the prosecution did not call any expert witnesses to support the monotypic view. District Judge Doyle accepted the Klein’s evidence, stating that:

> ... the decisive point, it seems to me, is that those whose very function is to weigh the significance of distinctions between plants within a genus—the plant taxonomists—consider the distinctions among Cannabis sativa L. and Cannabis indica Lam. sufficient to categorize them as different species. It does not seem to me decisive whether those engaged in botanical taxonomy had addressed and investigated this question deliberately and consciously, and had arrived at some scholarly consensus, prior to 1938 or prior to 1970, when Congress acted, or whether this came later.[68]

This deference to the authority of plant taxonomists was the exception. The judiciary in United States, Canada, and Australia comprehended that the meaning of the name *Cannabis sativa* L. in the legislation was not within the domain of botanical expertise, but instead within the domain of judicial expertise about statutory

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[66] *Yager v The Queen* (1976) 27 FLR 475 at 487-488; *State v. Morrow*, 535 S.W.2d 539, 541 (1976); *R v. Herbert, Coombs and Spanks* (1975) B.C.J. No. 1027, [56].

[67] An unpublished case was often cited in the American decisions, in which the botanical defence was apparently successful: *United States v. Collier*, Crim.N. 43604-73 [Super.Ct.D.C.1974].

[68] *US v. Lewallen*, 385 F.Supp. 1140, 1142 (1974).

interpretation. Most of the decisions rejected the botanical defence on the basis that the meaning of '*Cannabis sativa* L.', was to be determined (a) by reference to the intention of the legislature, (b) based on the scientific consensus at the time of enactment, and (c) assessed by the judge as a question of law, not a question of fact for the jury. Taken together, these three elements formed the justification for judges to exclude the scientific evidence for the polytypic view and to uphold the convictions for the possession, transfer, or sale of marijuana.

Intention of the Legislature

The courts imbued the term '*Cannabis sativa* L.' with the legal meaning that was intended by legislatures. In the United States, many prosecutors directed the court's attention to the transcripts of congressional hearings during the development of the legislation.[69] From these materials, the courts distilled an intention to prohibit the possession and distribution of all types of cannabis that produce the euphoric effect or 'high' from THC, noting that any other conclusion would be a 'manifestly unreasonable' interpretation that would have 'absurd consequences' and 'frustrate legislative intent'.[70] On that basis, the expert testimony of chemists showing the presence of THC in the plant material remained an authoritative way to identify marijuana.[71]

In Australia, this element of statutory interpretation had to do more work. In December 1975, a young American woman by the name of Gloria Yager arrived in Western Australia by passenger ship. She presented herself to the Bureau of Customs, where the border officials found that her baggage contained plant material of the genus

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[69] *US v. Rothberg,* 351 F.Supp. 1115, 1116-1118 (1972).

[70] *US v. Walton,* 514 F.2d 201, 202-203, 205 (1975).

[71] *Sizemore v. State,* 308 N.E.2d 400, 408 (1974).

Cannabis, which had been dried, crushed, and rolled up into ‘Buddha sticks’. She was charged under the *Customs Act 1901* (Cth) s 233B, with the offence of importing a cannabis plant, which was defined in the legislation as ‘a plant of the genus Cannabis sativa’.[72]

However, the phrase ‘Cannabis sativa’ was not the name of a genus, it was a *species* name: the legislation had used the incorrect taxonomic rank.[73] Curiously, the faulty definition had only been inserted during amendments to the laws in 1971.[74] Only a few years earlier, the definition in the *Customs Act 1901* (Cth) was linked to the *Narcotic Drugs Act 1967* (Cth) s 4, which referred to ‘genus cannabis’. In addressing this issue, Justice Murphy of the High Court of Australia remarked:

> There is a strong presumption that Parliament, when it uses scientific terms on a technical subject uses them correctly. Parliament should not be taken to have made a legislative statement that there is a genus known as Cannabis sativa when the whole botanical world and the educated community are aware that there is no genus by that name or a statement that excluded the possibility of another species being discovered or of a new species evolving (with or without human intervention). It follows that the definition refers to plant of the genus Cannabis species sativa.[75]

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[72] *Customs Act 1901* (Cth) s 4(1).

[73] Stafleu et al (1972), art 20.

[74] *Customs Act 1971 (No. 2)* (Cth) s 2(a), an Act to amend the Customs Act 1901-1971 in relation to Narcotic Substances, commenced 13 January 1972. The reforms were partly in response to the conclusion of the United Nations *Convention on Psychotropic Substances*, opened for signature 21 February 1971 (entered into force 16 August 1976) 1019 UNTS 175, and also in response to the recommendations of the *Report of the Senate Select Committee on Drug Trafficking and Drug Abuse* (1971), which suggested separating cannabis from narcotic drugs. See discussion in Commonwealth, *Parliamentary Debates*, House of Representatives, Wednesday 8 December 1971, 4319–4320 (Richard Klugman).

[75] *Yager v The Queen* (1977) 139 CLR 28 at 50.

Consensus at the Time of Enactment

The US Court of Appeals affirmed that '[i]n construing a statute to determine the intent of Congress, we must do so in light of the conditions under which the Congress did act'.[76] The intention of the legislature in using the term '*Cannabis sativa* L.' was construed based on the understanding of 'lawmakers, the general public, and the overwhelming scientific opinion' in the lead up to the enactments in 1970-1971.[77] The congressional hearings on the US Drug Abuse Control Amendments in 1970 demonstrated that the US Congress believed cannabis was a monotypic genus containing only the *Cannabis sativa* L.[78] The legislative prohibition that named a single species was thought to be an 'all-encompassing definition of marijuana' since the 'scientific community in this country did not become aware of the possible polytypical status of marijuana until the late 1960s'.[79] Richard Evans Schultes admitted on the witness stand that he had previously 'echoed' the 'usually accepted view' that there was only one species of *Cannabis* until only a few years before the criminal trials, when further study had led his opinion on the number of species to evolve and change.[80]

In short, since it was generally accepted until at least 1971 that the botanical name *Cannabis sativa* L. referred to all cannabis, that view of the marijuana plant was imbued in the statutes in the United States, Canada, and Australia.[81] As summarised in the Supreme Court of South Australia:

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[76] *US v. Rothberg*, 480 F.2d 534, 535 (1973).

[77] *Winters v. State*, 545 P.2d 786, 790 (1976).

[78] *State v. Morrow*, 535 S.W.2d 539, 541-542 (1976).

[79] *US v. Walton*, 514 F.2d 201, 203 (1975).

[80] *US v. Honneus*, 508 F.2d 566, 574 (1974).

[81] *Perka v. R.* (1982) CarswellBC 199; *R v. Herbert, Coombs and Spanks* (1975) B.C.J. No. 1027.

> I am of the opinion that, as a matter of law, the expression Cannabis Sativa L. was used by the legislature in its then generally accepted and conventional sense and that, accordingly, even if scientific knowledge and opinion, in due time, comes to regard the sum of the botanical specimens to which was given by the legislature a single classification as more properly divided into two or more classes, and given two or more class names, the original heterogeneous group stands as the subject of the legislative definition.[82]

Question of Law, not Scientific Fact

The final issue, which became critical in the Australian case law, was whether the meaning of '*Cannabis sativa* L.' was to be determined by the judge as a matter of law, or the jury as the arbiters of the facts in the case. The North American courts held that the 'meaning to be accorded a statute is for the court and not the dialectic of experts. It is always an issue of law for the judge and not one of fact for the jury'.[83] Justice Brinsden of the Federal Court of Australia pointed out that not all questions of fact are left to the jury: 'It is true that the jury in a trial is the arbiter of the facts, but I apprehend facts relating to the charge, not facts relating to the interpretation of a word in a section under which the charge was laid'.[84]

The approach was supported by Ernest Small, who argued that 'science is much more than semantics, and as citizens we must be clear when society turns to us for guidance on interpreting names and terms, that its need for clarification of a mundane problem in semantics is not confused with a question of scientific fact'.[85] As a matter of

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[82] *Reid v Kerr* (1974) 9 SASR 367 at 376-377.

[83] *State v. Morrow*, 535 S.W.2d 539, 540 (1976).

[84] *Yager v The Queen* (1976) 27 FLR 475 at 484. His Honour compares this to the fact that the judge, not the jury, determines the admissibility of a statement of the accused based on facts led in *voir dire*.

[85] Small (1975b).

court procedure, this decision could manifest in a few ways. In some of the cases, the judge would receive an outline of the expert testimony, whether during *voir dire* or based on the written testimony recorded during deposition. Then, the judge ordered that the witnesses could not testify during the trial before the jury: since the scientific evidence was not relevant to a fact in issue, the botanists were excluded from the proceedings.[86] In other cases, the expert witnesses were allowed to testify during the trial before the jury, but then the judge instructed the jury to exclude the evidence from their decision-making about the case.

This latter process was called into question in the Australian case, *Yager v The Queen*. At the initial trial in the District Court of Western Australia, the prosecution lawyers called two botanists as expert witnesses, who testified in support of the monotypic view that *Cannabis* had only one species: *Cannabis sativa* L. Meanwhile, the defence called one American professor of botany as expert witness, William A. Emboden, who testified to the polytypic view: that the genus *Cannabis* included several species, including *Cannabis ruderalis* Janisch. and *Cannabis indica* Lam. At the conclusion of the expert witnesses’ oral testimony, the jury was sent out of the courtroom; in *voir dire*, the judge heard arguments on whether the meaning of ‘cannabis plant’ in the *Customs Act* was a matter for the judge to determine, or the jury. The jury was then called back, and the judge announced the outcome: the definition of ‘cannabis plant’ in the legislation was a question of law, and thus told the jury:

> In effect then I direct you as a matter of law that the plant material in the suitcases came from a plant or plants of the genus cannabis sativa. In other words, that the plant material in the suitcases comprises cannabis as defined in the Customs Act . . . I should think that you must be satisfied beyond reasonable doubt that all of the

[86] *US v. Honneus*, 508 F.2d 566, 574-575 (1974); *State v. Donovan*, 344 A.2d 401, 404 (1975).

> facts which the accused has admitted have been established and if you accept my direction as a matter of law as to the meaning of cannabis as expressed in the Customs Act, then with regard to each of the counts against the accused, you will return a verdict of guilty.[87]

A few minutes later, without having left the courtroom, the jury indeed returned a verdict of guilty. Yager appealed her case, but ultimately, the High Court of Australia affirmed the decision, as summarised by Justice Mason:

> As a matter of speculation this [expert testimony] is all very interesting, but it has very little, if anything, to do with the construction of the *Customs Act* and what is meant by the statutory definition of "cannabis plant" there contained… Although the existence of a conflict of evidence on this question may have created an issue of fact, in the circumstances of this case it was not necessary to resolve the conflict because, the construction of the statute always remaining a question of law, it was for the judge to decide whether the statutory description should be read as a reference to a genus or as a reference to a species only.[88]

Response to the Botanical Defence

Although acquittals on the basis of the botanical defence were very rare, the US Drug Enforcement Administration (DEA) circulated an article in the summer of 1974, entitled, 'The Federal Definition of Marihuana: A Response to Attack'. The paper highlighted the consistent rulings that the definition of *Cannabis sativa* L. 'is a question of law, not a question for the jury' and instructed prosecutors to 'stress the [botanical] classification which was intended in the statute, with an emphasis on historical classifications'.[89] Meanwhile, the legislatures did not allow the botanical defence to be argued much longer:

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[87] *Yager v R* (1977) WAR 17 at 22.

[88] *Yager v The Queen* (1977) 139 CLR 28 at 44.

[89] Quoted in *Haynes v. State*, 312 So.2d 406, 413 (1975).

many states in the US amended the criminal laws to define cannabis as the genus level.[90] In Australia, by the time the High Court handed down its final decision in *Yager v The Queen*, the definition in the *Customs Act 1901* (Cth) was amended to read that: ''Cannabis plant' means a plant of the genus Cannabis'. Elsewhere, the accumulation of binding precedent and the support for state-based decriminalization of marijuana from US President Carter saw the popularity of the botanical defence decline rapidly by the late 1970s.[91]

Conclusion: from criminal subject to proprietary object

Throughout the legal proceedings in *Yager v The Queen*, the accused was represented by a solicitor, Robert French, who would later become the Chief Justice of the High Court of Australia. Reflecting upon the case decades on, Chief Justice French remarked that, '[p]lainly the fit between science and law is not to be measured by a scale of perfection. Nevertheless, it is the job of judges, lawyers and the legal and scientific academies to make the necessary engagement work as best they can'.[92]

The confusion about the systematics of *Cannabis* has sometimes been blamed on the scientists, a view espoused by one Canadian judge who lamented 'that much of the difficulty would be avoided if the world of botany provided one accepted definition of a specie, a somewhat idealistic thought'.[93] However, the lack of scientific consensus did not arise in a vacuum: it was the engagement between lawyers, botanists, legislatures, and

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[90] *Hicks v. State*, 534 S.W.2d 872, 874 (1975); *State v. Thorp*, 358 A.2d 655, 660 (1976); *State v. Durham*, 222 S.E.2d 768, 269 (1976).

[91] Dufton (2017), pp 82-83.

[92] French (2015), p 2.

[93] *R v. Herbert, Coombs and Spanks* (1975) B.C.J. No. 1027, [62] (Skipp J); decision upheld on appeal in *R v. Coombs* [1977] 35 C.C.C. (2d) 85.

judges that produced and shaped the controversy. After all, the rise of the polytypic view and the botanical defence might have been avoided entirely if the criminal legislation in the United States, Canada, and Australia had adopted the phrasing of the *Single Convention on Narcotic Drugs 1961*, which defined cannabis at the genus level. It was criminal defence lawyers who instigated and funded the field research by Schultes and Klein in Afghanistan to bolster the polytypic view of cannabis, and the debate motivated botanists to undertake the important task of designating a type specimen for *Cannabis sativa* L. In the other direction, the expert testimony of botanists prompted legislative amendments that modified the definitions in criminal statutes to refer to the entire genus *Cannabis*. This is not the first case study of the law shaping scientific nomenclature: during the twentieth century, some industrial microbiologists strategically baptised economically important microorganisms with new, but occasionally illegitimate, species names in order to argue that they were novel and therefore eligible for patent protection, or to avoid liability for patent infringement.[94]

Although no longer required to provide expert testimony in criminal trials, plant scientists continue to publish arguments and materials to support their respective views of *Cannabis* taxonomy.[95] Presently, botanists tend to identify herbarium specimens using the monotypic view in accordance with Ernest Small’s taxonomic treatment (see Figure 1 for a specimen that typifies this tendency).[96] In popular consciousness, however, the polytypic view has gained supremacy: the vernacular dichotomy between two ‘strains’ (Sativa and Indica) has become cemented in the public understanding of the variation in

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[94] Sherman and Pottage (2010), p 204; Parry (2012), p 258.

[95] Clarke and Merlin (2013); Clarke and Merlin (2016); McPartland and Guy (2017); Small (2015); Small (2017).

[96] Small and Cronquist (1976).

the morphology and psychoactive effects of Cannabis,[97] while recent publications from genetic scientists have supported a polytypic concept.[98] In popular consciousness, the polytypic view has gained supremacy. The vernacular dichotomy between two ‘strains’—Sativa and Indica—has become cemented in the public understanding of the variation in the morphology and psychoactive effects of *Cannabis*.[99] This was illustrated in 2015 in a factsheet in the British scientific journal, *Nature*, which acknowledged the lack of taxonomic consensus, but depicted three *Cannabis* plants that visually reflected Schultes’s polytypic taxonomy (see Figure 2).

[97] Booth (2005); McPartland and Guy (2017); Piomelli and Russo (2016); Smith (2012).

[98] Sawler et al (2015); Hillig (2005); Hillig and Mahlberg (2004).

[99] Booth (2005); McPartland and Guy (2017); Piomelli and Russo (2016); Smith (2012).

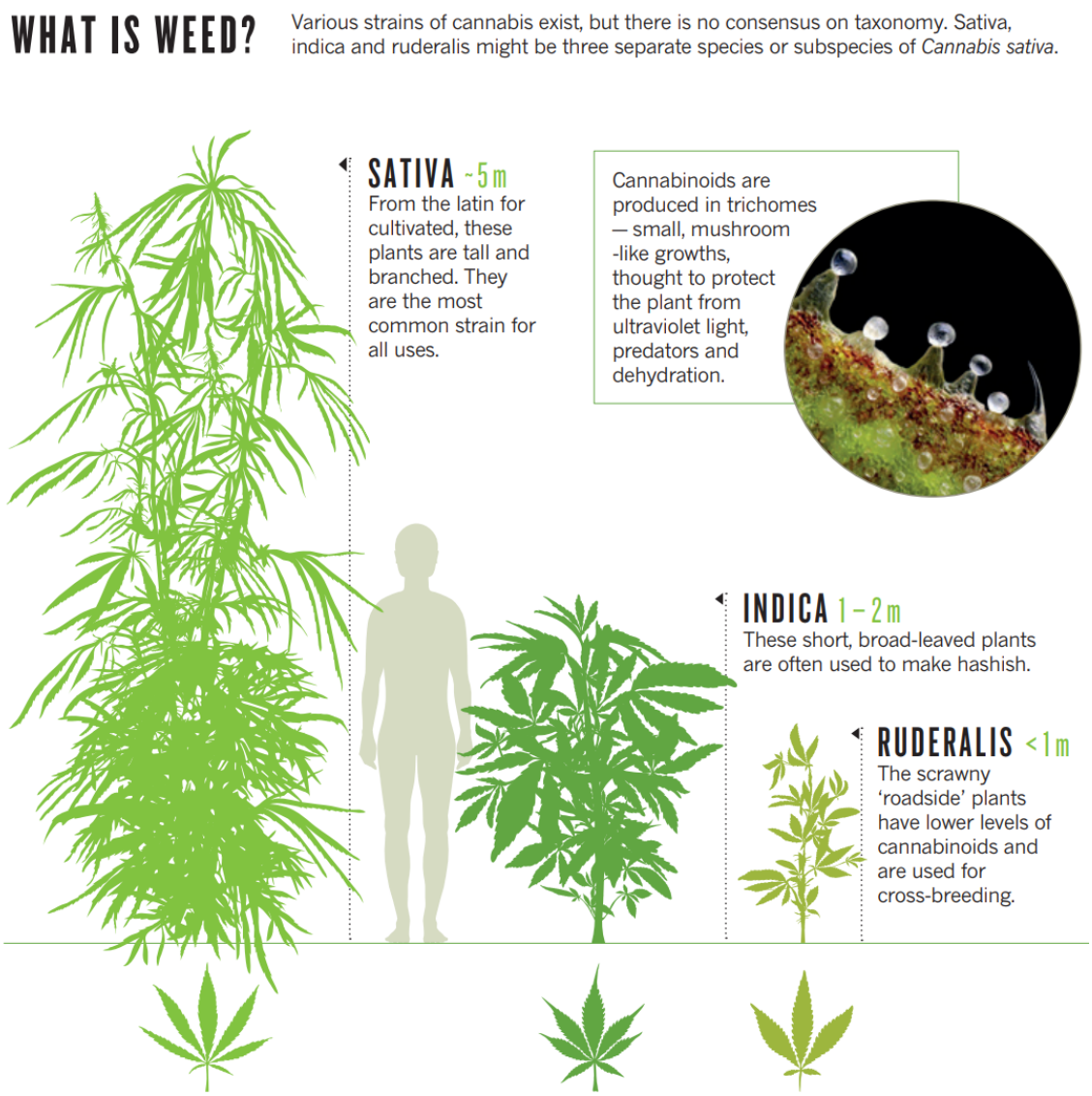

Figure 2. Illustration of cannabis taxonomy, extracted from Julie Gould, 'The Cannabis Crop' (24 September 2015) 525(7570) *Nature* S2.

In this simmering controversy, both science and law continue to influence each other. Scientific investigations that might help to resolve the taxonomic question have been inhibited by the very criminal laws that started the debate in the first place: US researchers have reported a dearth of voucher specimens of *Cannabis*, since these are prohibited by the Drug Enforcement Administration without Schedule I narcotics license—the University of Mississippi remains the only authorised grower and distributor for scientific purposes—and Ethan Russo further points out that '[m]any private companies have eschewed sharing germplasm due to legal restrictions and fear of loss of

intellectual property'.[100] What the criminal law started, intellectual property may continue.

Indeed, with the gradual decriminalisation of cannabis in various jurisdictions, especially for medical purposes, and the reopening of legitimate commercial avenues, *Cannabis* has shifted dramatically from the subject of criminal prohibitions to a proprietary object. Today, the restrictions on exchange of cannabis are not only the product of criminal law enforcement, they are increasingly the result of intellectual property rights claims. The literature has already proliferated with discussion of the impact of trademarks, appellations of origin, and patents rights over cannabis inventions,[101] but the question of how commercial actors will navigate the botanical naming of the *Cannabis* plant and its derivatives is unresolved.

The taxonomic uncertainty is especially salient for the areas of law which rely on botanical science to answer many legal questions before government agencies and courts are called upon to judge whether intellectual property protection should be granted, or whether those rights have been infringed.[102] Under plant variety protection laws in all

three jurisdictions (called plant breeders' rights in Australia and Canada), a breeder is required to provide the botanical name for the species of which the variety is a member. In Canada, there have been 20 applications and two hemp varieties granted protection, in Australia, 20 varieties of industrial hemp or medicinal cannabis have been registered; in both nations, all plant breeders have classified their varieties within one species: *Cannabis sativa*.[103]

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[100] Russo (2019), p 2.

[101] Carmona (2017); Stoa (2017); Clancy (2014).

[102] Sherman (2008), pp 561, 573.

[103] In the Australian context, see Plant Breeder's Rights Act 1994 (Cth) and IP Australia, Australian plant breeder's rights database <https://pericles.ipaustralia.gov.au/pbr_db/> (last

. In particular, taxonomy and nomenclature play a crucial role in determining whether a plant variety or invention meets the legal requirements to qualify for registration, such as appropriate subject matter, distinctiveness, or novelty; scientists are also relied upon to identify and distinguish a plant in assessing whether there has been infringement of intellectual property rights. In the United States, the first cannabis patent infringement case is underway in *United Cannabis Corp. v. Pure Hemp Collective Inc*. (2019), regarding a patent that broadly defines the term ‘cannabis plant’ to incorporate the polytypic view in the description as follows:

> Cannabis is a genus of flowering plants that includes three different species, Cannabis sativa, Cannabis indica and Cannabis ruderalis. The term “Cannabis plant(s)” encompasses wild type Cannabis and also variants thereof, including cannabis chemovars which naturally contain different amounts of the individual cannabinoids.[104]

In this context, the legal system again faces the issue of assessing the parallel taxonomies of cannabis, only on this occasion, the law will not be able to evade the issue by framing it as a question of statutory interpretation. Moving forward, the assertion of intellectual property rights may have the disciplinary effect of demanding a resolution to the botanical controversy over the systematics of genus *Cannabis*, for, in the realm of intellectual property law, the epistemic authority of science to name a plant has been consistently affirmed.

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searched 2 July 2020); in the Canadian context, see Plant Breeders’ Rights Act (S.C. 1990, c. 20) and Canadian Food Inspection Agency, List of Varieties by Botanical Name <https://www.inspection.gc.ca/english/plaveg/pbrpov/cropreport/gsce.shtml> (last searched 3 July 2020). See details in Reference List.

[104] US Patent No 9730911, ‘Cannabis extracts and methods of preparing and using same’, filed 21 October 2015 (Granted 15 August 2017), p 4.

Acknowledgment

I would like to thank Professor Brad Sherman, Dr. Xan Chacko, Dr. Susannah Chapman, Dr. Allison Fish, Dr. Tad Brown, Dr. Joseph Lelliott, and Hamish MacDonald for their critique and helpful suggestions on the paper, as well as the two anonymous reviewers for their constructive and insightful comments.

Funding

This work was supported by Australian Research Council [grant number FL150100104].

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