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IDENTITY AND CURRENT ETHNOBOTANICAL KNOWLEDGE OF FRANCISCO HERNÁNDEZ'S "*CICIMATIC*"

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ABSTRACT.– Francisco Hernández's "*History of the Plants of New Spain*", written during the second half of the 16th century, is the main source of historical and ethnobotanical knowledge about the plants that were known during colonial times in Mexico. Despite the importance of this work, the lack of a universal system of nomenclature at that time makes it hard to identify many of the plants encountered in this volume. Currently, more than 2,000 plants remain unidentified and several previous identifications are questionable. Historical investigation of the uses of species belonging to the genus *Ramirezella* (Leguminosae) resulted in an identification proposed for Hernández's "***Cicimatic***" as *Ramirezella strobilophora* (Robinson) Rose, a conclusion in accord with Hernández's description, illustration and reported medicinal use. A ***Cicimatic*** was also mentioned in the work of Sahagún ("*General History about the Things of New Spain*"), indicating that it was most likely a valuable plant during colonial times in Mexico. If *Ramirezella strobilophora* is the ***Cicimatic*** of Hernández, the ethnobotanical traditions maintained over more than 400 years may indicate the potential pharmacological value of this species.

Key words: Ramirezella, Leguminosae, Mexico, Colonial times, Medicinal plants

RESUMEN.– La obra de Francisco Hernández "*Historia de las plantas de la Nueva España*", escrita en la segunda mitad del siglo XVI, es la principal fuente de conocimiento histórico y etnobotánico sobre las plantas que se conocían durante los tiempos de la Colonia en México. A pesar de la importancia de este trabajo, la falta de un sistema de nomenclatura universal en aquel tiempo hace difícil la identificación de algunas de las plantas. Actualmente aún quedan más de 2,000 plantas por identificar, además de varias con dudosas identificaciones, que requieren especial atención de los taxónomos. Una investigación sobre el posible uso de especies en el género *Ramirezella* (Leguminosae) durante los tiempos de la Colonia en México permite proponer una identificación para el "***Cicimatic***" de Francisco Hernández como *Ramirezella strobilophora* (Robinson) Rose. Esta conclusión se basa en la descripción botánica, en la ilustración y en uno de los usos medicinales reportados por Hernández. Debido a que un ***Cicimatic*** también se menciona en el trabajo de Sahagún ("*Historia general de las cosas de la Nueva España*"), es posible suponer que se trataba de una planta valiosa durante los tiempos de la Colonia en México. Si *R. strobilophora* corresponde al ***Cicimatic*** de Hernández, las tradiciones etnobotánicas que se han mantenido por mas de 400 años podrían usarse como indicativas de un verdadero valor farmacológico de la especie.

RÉSUMÉ– L'oeuvre de Francisco Hernández *"Histoire des plantes de la Nouvelle Espagne"*, écrite dans le second montié des XVI sénturi, c'est la principale source historique et ethnobotanique de connaissance sour les plantes employer dans les Colonial temps au Mexique. En dépit de l'importance de c'est oeuvre, la manque d'un système de nomenclature universelle dans c'est temps difficulté la connaissance de l'identité des quelque plantes. Actuellement il y a plus que 2,000 plantes par identifier, en plus d'autre avec discutable identité, que nécessite de spéciale atention par les taxonomist. Une recherche sour le possible utilité d'espèces du genre *Ramirezella* (Leguminosae) dans les Colonial temps au Mexique a permis de proposer une identité pour le *"**Cicimatic**"* de Francisco Hernández comme *Ramirezella strobilophora* (Robinson) Rose. C'est conclusion est appui sur la description botanique, l'illustration et l'utilisation médicinal rapporté par Hernández. Puisque un ***Cicimatic*** est aussi mentionne dans l'oeuvre du Sahagun (*"Histoire générale de las choses de la Nouvelle Espagne"*), il est possible du supposer qu'il éte un plante de valeur dans les Colonial temps au Mexique. Si *R. strobilophora* correspondre avec le ***Cicimatic*** d'Hernández, les traditions ethnobotaniques qu'il s'aveaux garder pour plus que 400 année pouvoir indiquer une vrai valeur médicinale de c'est espèce.

INTRODUCTION

Francisco Hernández's *History of the Plants of New Spain* is the main source of historical and ethnobotanical knowledge about the plants that were known during early colonial times in Mexico. Hernández's work provides botanical descriptions for 3076 plants (Flores and Valdés 1979), together with their common names, uses and, in some cases, illustrations. The significance of Hernández's work is reflected in the various attempts to publish his entire contribution. Portions of it were published in four versions: in Mexico by Ximénez (1615); in Italy (1651); in Madrid (1790), and again in Mexico by the Instituto de Biología, Universidad Nacional Autonoma de México (1942-1946). The only complete version of Hernández's work was published in seven volumes by the Universidad Nacional Autonoma de México between 1959 and 1984 as the result of a multidisciplinary effort that involved the participation of botanists, zoologists, linguists, geographers, and historians.

Despite the unquestionable merit of Hernández's work, botanical writings of the era lacked a universal nomenclatural system. The use of common names that can refer to more than one species, be modified, or disappear with time, confounds the ability of modern workers to determine the identity of the species reported by Hernández. Many researchers have provided significant contributions to the better understanding of the *History of the Plants of New Spain* (*e.g.*, Sessé and Mociño 1887 a and b; Ramírez 1893; Altamirano 1896; Urbina 1897; Standley 1920-26; Batalla *et al.* 1942-1943; Miranda *et al.* 1946). However, the sheer volume of information and the more than 400 years that have passed since its creation still leave much interesting ethnobotanical information to be rescued.

To obtain a better understanding of the information for the more than three thousand plants mentioned by Hernández, it is essential to know their taxonomic identity. Only about half of the plants mentioned by Hernández have been stud-

ied (1,544). Based on the short but accurate botanical data provided by Hernández as well as the occasional figures, identifications have been proposed for 98 names to the level of family, 249 to genera, and 667 to species (Flores and Valdés 1979). These names were compiled by Valdés and Flores (1984) in the seventh volume of *The Complete Work of Francisco Hernández*. The remaining 530 of the studied names were not identified. The more than 2,062 names for which either no botanical comment has been given (Flores and Valdés 1979), or whose taxonomic identity is doubtful, stress the need for the participation of taxonomic specialists who could interpret Hernández's work.

In revising the genus *Ramirezella* (Leguminosae, Papilionoideae), it was noted that one species, *R. strobilophora* (Robinson) Rose, has many common names and traditional medicinal uses in Mexico (Ochoterena-Booth 1991). Distributed primarily along the Pacific slope of the Sierra Madre Occidental, from southern Sonora and Chihuahua to Nicaragua, *R. strobilophora* is known by 11 common names: ***Nowá*** (Chihuahua); ***Cuahuexutl, Ejote de Monte*** or ***Dichi-kuu*** (Guerrero); ***Frijolillo*** (Guerrero, Morelos and Oaxaca); ***Periquito Azul Grande*** (Morelos); ***Flor de Paloma*** or ***Ie-paloma, Gallinita*** (Oaxaca); ***Choreque*** (Chiapas) and ***Choncho*** (El Salvador). The root of *R. strobilophora* is used by indigenous groups in northwestern Mexico as a catalyst in the fermentation of *Agave* to prepare the beverage that the Warihios call ***batari*** (H. S. Gentry 2404, F, MEXU, US). The Rarámuri (Taraumaras) use it for the same purpose during the fermentation of maize to produce ***tesgüino*** (R. Bye 2847, COLO). In Oaxaca (Mexico) the bark of the liana is ground with water to treat ***fuegos*** (M. Sousa 7069 *et al.*, MEXU), a kind of ulcer of the mouth (cold sores). In addition to this medicinal use, the boiled or toasted fruits are eaten locally (M. Sousa 7069 *et al.*, MEXU; J. L. Viveros and A. Casas 332, MEXU). The present-day uses of *Ramirezella strobilophora*, as well as the great number of common names, motivated bibliographic research on the possible uses of this species during colonial times.

METHODOLOGY

Due to the morphological similarity between the genus *Ramirezella* and *Phaseolus* (the common bean), descriptions and illustrations of Hernández that refer to beans (***frijoles***) were compared to species of *Ramirezella*. These were located using the indices of the *History of the Plants of New Spain* (Hernández 1959). All descriptions that clearly did not correspond to *Ramirezella* were ruled out. The works of de la Cruz (1964, first edition 1552) and Sahagún (1969, first edition 1590) were then consulted using Hernández's names in addition to beans (***frijoles***). The current ethnobotanical information of *Ramirezella strobilophora* was obtained from the notes on the labels of herbarium specimens.

RESULTS

Great resemblance was found between *Ramirezella strobilophora* and the illustration of the "***Cicimatic***" (Fig. 1A) from the *History of the Plants of New Spain* (Hernández 1959). The similarity of the illustration was corroborated by the de-

scription of the "***CICIMATIC*** *or a plant similar to the* ***címatl***" (Book 1, Chap. LVII), which can be translated as follows:

> About the ***CICIMATIC*** or a plant similar to the ***címatl***, The root is like that of the turnip and fibrous; twining red stems are borne from it with three-foliolated leaves that are heart shaped and similar to those of the other beans, of which it is a species, and medium size legumes which are produced by purple flowers in cluster like groups. It has a cold and astringent temperament. The root, when crushed and sprinkled, cures ulcers because it cleans them and favors healing; therefore many people call it ***palancapatli***, which means medicine for ulcers. It relieves in an admirable manner the inflamed sick eyes, removes clouds and fleshy excrescence, stops discharges of the abdomen, cures cough and makes parturient [women in labor] stronger. The cooked root is good against dysentery. It grows in temperate or warm regions like the Mexican one.

The same name (***Cicimatic***) was found in the *General History about the Things of New Spain* from Sahagún (1969: Volume III, Book 11, Chap. 7, No. 232, Pg. 322) and the description also could be assigned to *Ramirezella*.

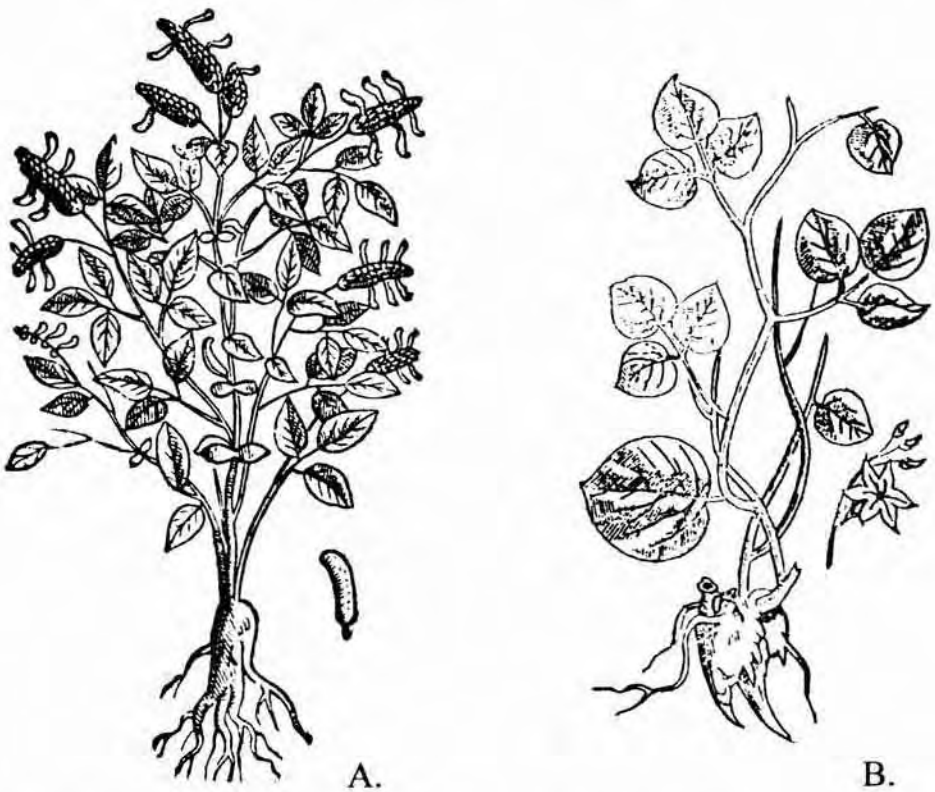

FIGURE 1A and B.– "***Cicimatic***" reproduced from Hernández (1959).

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DISCUSSION

About the name.– Santamaría (1942 and 1974) reported that *"Senecio vulneraris"* (presumably *Senecio vulneraria* DC) is known as ***"Cicimate,"*** a name derived from ***"Cimatl."*** Nevertheless, the description and illustration of Hernández do not correspond to species of *Senecio* or any other Composite and therefore it is easy to discard this as a potential identification for Hernández's ***Cicimatic***. Many of the common names reported by Hernández are apparently not applied any more. This could be due to the lack of current ethnobotanical information about Mexican plants, or it could be that the names were lost after the more than 400 years that have passed since the work was written. The second case represents a likely possibility for the ***Cicimatic*** since the name itself referred to another plant, as can be seen in the Hernández's translation: *"a plant similar to the* ***Cimatl***. Nonetheless, the existence of another species known with that common name (*Senecio vulneraria* DC) allow us to still consider the first alternative. None of the 11 common names by which *Ramirezella strobilophora* is currently known is linguistically related to it. According to Martínez (1979), the name ***Cimatl*** refers to *Phaseolus coccineus* L., but this reference could have been obtained from a proposed identification of Hernández's ***Cimatl***. According to Paso and Troncoso (1988) the word ***Cimatl*** "was applied to roots which are almost always succulent, commonly perpendicular, and sometimes pivoting, whether they were edible or not... **címatl** was equivalent to stump or underground axis."

About the proposed identification.– Urbina (1897) proposed that the description and characteristics of the figure correspond with *Canavalia villosa* Benth. More recently, Batalla *et al.* (1942-43) took up Urbina's identification (Valdés and Flores 1984).

While some of the characteristics of the genus *Canavalia* agree with Hernández's illustration, others do not. The stipules in this genus are small and deciduous, contrasting with the illustration of Hernández (Fig. 1A), which shows very conspicuous stipules. On the other hand, the inflorescence of *Canavalia* is a cluster in which the lower, more mature flowers are bigger than the upper ones, giving to it a conic aspect similar to Hernández's illustration. Although the flowers have the color mentioned by Hernández, the morphology is different from the flowers of beans (*Phaseolus*) and can be easily distinguished. The fruits are comparatively larger than the legume of beans and have a rib along the side, which lends them a distinctive and characteristic aspect hard to confuse with a bean.

Besides the lack of conclusive morphological evidence to interpret Hernández's ***Cicimatic*** as a *Canavalia*, there is no current common name known for any species in this genus that can be connected with ***Cicimatic*** or ***Palancapatli***. Nor is there ethnobotanical support for this identification. Although the fruit of *Canavalia* is eaten in some regions (*e.g.* Guerrero, Mexico), there is no information about any medicinal use. In summary, although there are some similarities between the illustration and *Canavalia*, this identification is not supported.

About the description.– Several species of the genus *Ramirezella* were described or considered at some point as *Phaseolus* before that genus was convincingly delimited. This reflects the great morphological similarity of both genera. The description

FIGURE 2.– Morphological characteristics of *Ramirezella*: (A) inflorescence of *R. strobilophora* (Robinson) Rose; (B) fruits (legumes) of *R. strobilophora*; (C) root of *R. nitida* Piper.

sition of uses. Are there more medicinal uses for *Ramirezella* that we do not know? If not, why did the other medicinal uses reported by Hernández get lost? On the other hand, were the roots of *Ramirezella* always used in the preparation of fermented drinks and Hernández did not capture this information? If not, when and how was this used acquired? More ethnobotanical research is needed in order to try to understand these questions.

About the illustrations.– As can be seen in the illustrations of the ***Cicimatic*** reproduced from Hernández's work (Fig. 1 A and B), there are differences between the two plants illustrated. The plant of figure 1A has a shorter root than that of Figure 1B and the detail of the flower (bottom right Fig. 1B) does not correspond to one of the Phaseolinae group because of its radial symmetry. The plant of figure 1A can be identified as a kind of bean or a related group because it shows trifoliolated leaves with stipules and a legume similar to a green bean (bottom right).

Comparing the illustrations with the descriptions of Hernández, figure 1B can be best assigned to ***AYECOCIMATL,*** which has the descriptive subtitle "a herb similar to the ***Címatl***" (Book 1, Chap. LV). The fact that the name ***Ayecocimatl*** also alludes to the ***Cimatl*** could be the cause of a mistake in the inclusion of this figure under the ***Cicimatic***. In the description of the ***Ayecocimatl,*** Hernández says that it has "...flowers at the end of the branches, scarlet and radiated as a star...," just as it is represented in the detail of figure 1B. To assign this figure to the ***Ayecocimatl,*** which from the description was identified as *Phaseolus coccineus* L., opens the need for its reinterpretation, which in fact requires further study.

Figure 1A, on the other hand, corresponds to the description of the ***Cicimatic*** and *Ramirezella*, especially because of the inflorescences, which appears to be a many-flowered cluster, and has the general aspect of this genus (Fig. 2A). In the drawing of the inflorescences it is possible to distinguish structures that can be interpreted as buds protected by bracts (Fig. 1A). Relatively large and persistent bracts are characteristic of the genus *Ramirezella*. The fruit and vegetative characteristics can also be associated with this genus (Fig. 2 B and C).

About other sources of the XVI century.– In the *de la Cruz codex* (1964), the first written work we know that refers to medicinal Mexican plants (originally published in 1552), also known as Badiano codex, there is no plant that can be related with the ***Cicimatic*** (Valdés *et al.*1992).

In the *General History about the Things of New Spain* (Volume III, Book 11, Chap. 7, No. 232, Pag. 322) Sahagún (1969, first published in 1590) wrote:

> There is another medicinal herb called ***cicimatic***; it is a vine, with many very green leaves and wide growing in groups of three; it is like the beans; the green parts are not useful at all; the root has no flavor and is hard as a trunk, almost the size of the head of a person and large as an elbow; it has a thick bark, black outside and with thick red spots inside. Grounded, it is good for people with sick eyes that have a fleshy excrescence called ***ixnocapachiui***; the ground-up root is covered with a cloth and squeezed over the eyes, after that, the fleshiness that covered the eyes is gone; it grows in all the mountains.

Later in the same work (Volume III, Book 10, Chap. 28, No. 9, Pag. 170), Sahagún wrote:

> Against the sores outside the ears there are these remedies: take the leaf of ***coyolxóchitl***, grind it and mix it with ***ocótzotl*** and put it over the sore, or grind it and mix it with the ***ajíya*** already mentioned and apply it on the sore, or take the herb called ***cicimatic*** in the [native] language, mix it with egg whites and apply it on the sore, or use all the other herbs that can be used to treat the rotten sores like the herb called ***chipilli*** and the stone of the avocado.

The woody and hard root of *Ramirezella* can reach up to 70 cm in length. A red resin is present in both the stem and the root (Ochoterena-Booth 1991), characteristics that coincide with Sahagún's description. The names mentioned by Sahagún are the same as Hernández, which suggests that it was an important plant during prehispanic and colonial times in Mexico. Estrada Lugo (1989), probably following Urbina's identification, suggested that the Sahagún's ***Cicimatic*** corresponds to *Canavalia* sp. The same arguments made in favor of the *Ramirezella* identification can be also applied here.

CONCLUSIONS

Due to the inherent problems interpreting a treatment greater than 400 years old, it would be incorrect to reject categorically any alternative identification for Hernández's plants. However, Hernández's description of ***Cicimatic*** as "...similar to those of the other beans, of which it is a species;" the evidence of stipules in the illustration (Fig. 1A); the characteristics of the inflorescence in the drawing, here interpreted as bracts (Figs. 1A and 2A), the kind of fruit (Figs. 1A and 2B); the uses for the plant, and the description of Sahagún, more probably correspond with those of *Ramirezella*. If this is true, considering the distribution and morphological characteristics of its species, it appears to be *R. strobilophora*. With this new interpretation, interesting alternatives emerge for future research related with the ethnobotany and potential pharmacological value of the genus *Ramirezella*. This kind of research could reinforce the proposed identification for the ***Cicimatic*** and at the same time allow a better use of Mexican natural resources.

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