

## Research Article

# Re-Correcting the Scientific Nomenclature of Species of *Erythrina* Trees Introduced to Libya

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**Abstract**—*Erythrina* spp. known as South African coral, one of the ornamental trees common in many countries worldwide, its presence was recently reported in Libya in 2019 AD as *Erythrina humeana* Spreng. This work was carried out to verify the taxonomic status of these trees in Al-Bayda City, Libya, after describing them accurately, reviewing the taxonomic keys for this genus and reviewing the digital herbarium (NYBG). The results and discussions of this study focused on the morphological characteristics of this species and its scientific name. The results of the taxonomic morphological field study showed that tree species found in Al-Bayda City belong to named is back to *Erythrina lysistemon* Hutch., not the previously known name *Erythrina humeana* Spreng., due to the presence of fundamental differences in several morphological characteristics (height, flower structure, leaf shape and flowering date). In this work, we propose to rename this species as *E.lysistemon* Hutch., as a preliminary treatment.

**Keywords**— *Erythrina* spp., Scientific named, Libya.

## 1. Introduction

Identifying plants in any environment, counting them, documenting them and studying their morphological characteristics and characteristics is one of the main accepted methods for classifying and identifying endemic and introduced species [1]. Species identification is not just limited to botany or agricultural scientists but is considered a joint activity between local residents and wildlife observers. , tourists, photographers, farmers and those interested in the environment, despite the difficulties they face in classifying plants [2]. Classification is mainly a process that directly depends on shared and well-defined biological characteristics [3]. The classification of plants is one of the oldest sciences, which developed primarily in the 15th century with the use of drying, the emergence of the herbarium to the present day and the discovery of the nucleic acid sequence [4], but still exists There are many obstacles such as lack of experience and weak databases on flora and biodiversity, especially in developing countries [5]. It has been found that the general public still classifies plants according to their traditional folk uses as medicinal, edible or harmful [6].

*Erythrina* spp. is known as tree coral of the family Fabaceae, one of the ornamental trees widespread in many countries of world, which includes about 200 species [7,8]. This genus can be described as a heteromorphic compound, due to the large internal hybridization between species, and

hummingbirds an important role in the pollination process [9]. The genus is characterized by being trees or shrubs that are deciduous, with long branches are covered with conical thorns. The thick, branches usually covered with thorns. Its height is 3-30 meters. The branches bear individual triangular, compound leaves arranged in a spiral pattern. The leaflets are heart-shaped, and oval, often with sharp tips and pinnate veins. The branches bear terminal or axillary clusters of hermaphrodite flowers, often odorless, in clustered inflorescence. corollas, red or crimson, tending to bright orange, and in rare cases may be cream-colored, the calyx tube, campanulate with serrated margin above, erect or curved, green or brownish, Stamens 9 fused and one free; gynoecium of one uni-locular ovary, with parietal placentation [10-14].

## 2. Related Work

The genus (*Erythrina*) has previously been divided into five sub-genera and 26 sections. (Burdeau) Although phylogenetic studies do not fully support all these generations [15]. A recent study in the Italian city of Naples updated the classification of all *Erythrina* tree species previously introduced in Italy using a combination of traditional methods such as morphological examination and advanced methods such as nucleic acid sequence tracing [16]. A study in Mexico was also able to correct the taxonomic status of one of the species in this genus, *E.insularis*, reclassifying it to the original species, *E.vespertilio* [17]. A study in Malaysia was

able to provide a modern taxonomic key for local species of *Erythrina* spp. provide after a previously classified group of species has been assigned to other species [18].

Therefore, this study was undertaken to investigate only species of *Erythrina* trees found in Libya by tracing the morphological characters based on the taxonomic keys of this genus.

### 3. Experimental Method

#### 3.1. Field study:

*Erythrina* trees found in three locations in Al-Bayda city were examined:

- The first location: within the campus of the Faculty of Agriculture - Omar Al-Mukhtar University - Al-Bayda-Libya.
- The second location: The park opposite the local branch of the Ministry of Social Affairs – Al-Bayda-Libya.
- Third location: In the inner garden of Al-Thawra Hospital – Al-Bayda-Libya.

Important measurements were taken and documented from within the study sites with photographs using mobile.

#### 3.2. Morphological and taxonomic study:

Some samples of parts of these trees were collected for morphological study, identification and description. The previous name was also reviewed and compared to the taxonomic keys for this genus, in addition to data available on the Internet and a review of the dried specimens from The New York Botanical Garden electronic herbarium.

### 4. Results and Discussion:

#### 4.1. Field Study:

The field study results showed that this species is a deciduous tree with a height of about 10 meters. The trees at the first location were measured to be 9.70 meters high. In comparison, the trees at the second location were height to be 8.00 meters high, and the height of the trees at the third location reached 9.50 meters, (Figure.1). The flowering period begins in mid-spring and lasts until the end of summer.

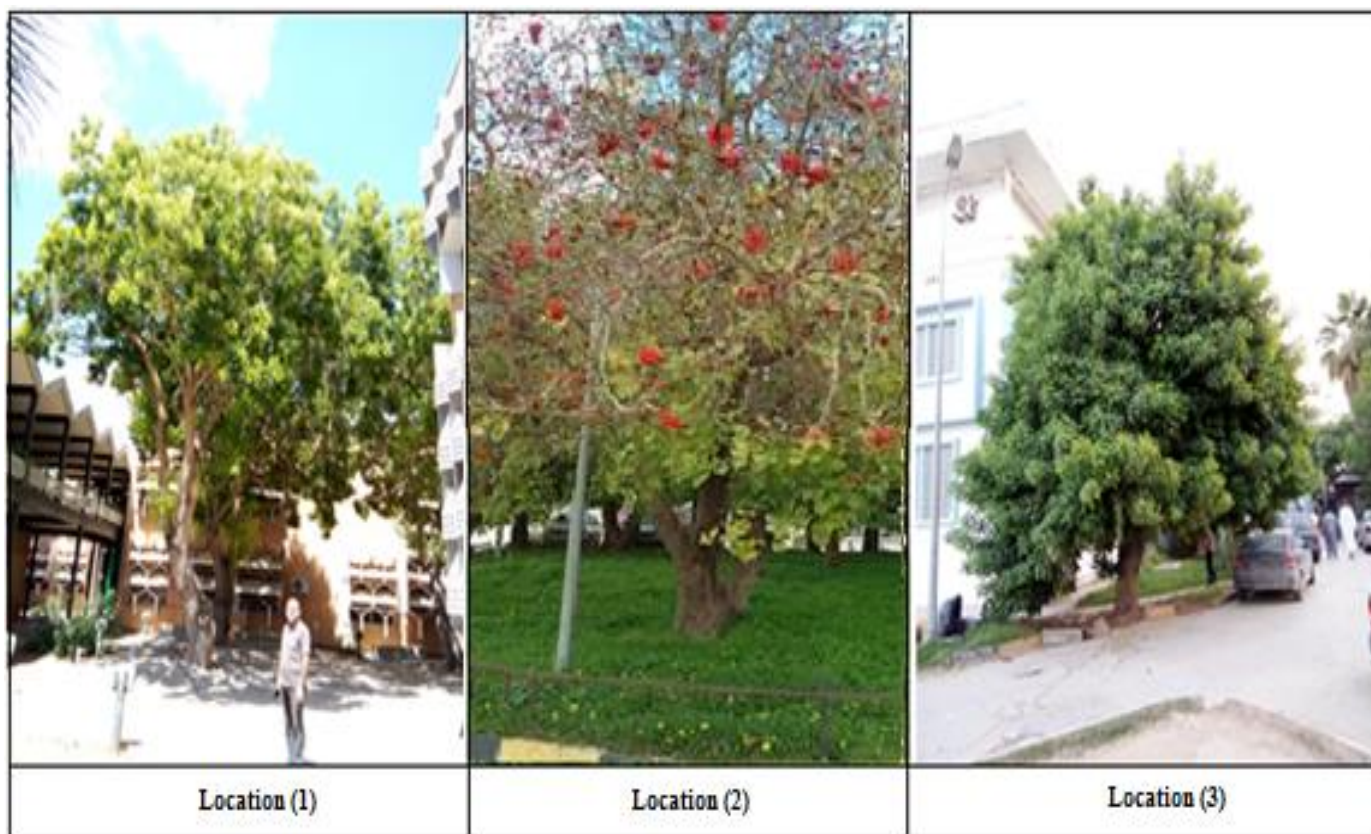


Figure. 1. Locations of the studied trees.

#### 4.2 Morphological study:

##### 4.2.1. Morphological description of a species studied:

This tree species has a wide trunk about 2.10 meters thick, which branches into 5-6 thorny branches, about 1.10 meters thick. The bark is pale gray to grey-brown, somewhat smooth,

wrinkled and fissured longitudinally and transversely, often with deep, dispersed holes. It bears intertwined, branches of thorny green then turn gray, they start relatively low, about 2 meters from each stem. The branches bear triangular compound leaves and terminal red inflorescences (Figure. 2).





Figure 2. Stems and thorny branches.

The leaves are compound trifoliate, single, with long peduncle, arranged in a whorl arrangement on the branches, consisting of three petiolate, cordate, asymmetric leaflets with a long acuminate apex, inclined to one side, and entire blade margin. The terminal leaflet slightly larger than the two lateral leaflets, with pinnately reticulate venation, and short petiolules, gray to dark grey-brown (Figure. 3).

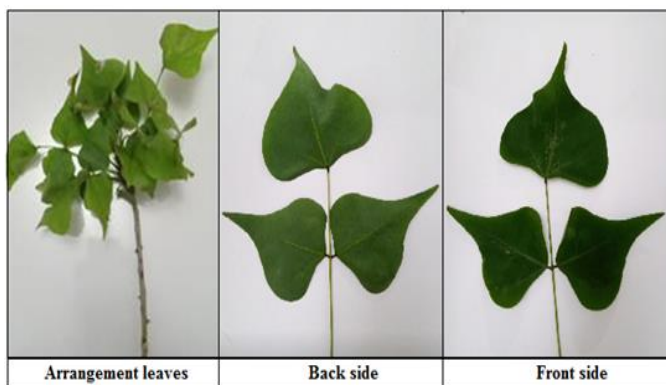


Figure 3. Structure and arrangement of Leaves.

The flowers are in dense, tufted, terminal inflorescences, consisting of 30–50 flowers, bisexual (Figure. 4). The papilionate flowers consist of five petals. The large petal is known as the standard or vexillum, is strongly folded, and has two lateral petals (wings) and two lower-keeled petals (carina or ala). The vexillum is bright red. It consists of a long petal curved above and below, 5.0 cm long and 1.3 cm wide, with a basal end (claw). The vexillum surrounds the remaining petals. The wings are two small, separate lateral petals of green color, 1.0 cm long. The carina consists of two small, fused, green lower petals 0.7 cm long. The calyx is pentagonal and campanulate shape, with curved lips tending to brown, and it contains very fine hairs on the outside. The male organ; has 10 stamens, 9 of which are fused and one is free, a small part of which can protrude beyond the vexillum.

The anther is brown oval. The female organ; is a tubular thin upper ovary with a long style slightly exceeding the length of the stamens, and a small circular stigma (Figure. 5).



Figure 4. Terminal inflorescences.



Figure 5. Floral structure.

The fruits are cylindrical, green turned dark brown or black when ripe, with segments where the seeds are placed. They reach a length of 16 cm. Seeds red with a black spot in the center (Figure. 6).



Figure.6. Fruits and seeds.

**Taxonomic study:**

The results of the current study, based on the taxonomic keys [19,20,21], showed that these trees bear the scientific name of the species *Erythrina lysistemon* and not the previously known name *Erythrina humeana*, which was mentioned by [22], due to differences in the morphological characteristics of the two species. The results showed that the species studied were trees about 10 meters high, with a non-corky (wrinkled) trunk. These results agreed with the taxonomic keys, which confirmed that the species *E.lysistemon* are trees with a height between 7 and 20 meters, while *E.humeana* are dwarf shrubs with a cork trunk reaching a maximum height of 4 meters. The results also showed that the shape of the leaflets of the studied species is cordate, which is similar to the leaflets of *E.lysistemon*, while the shape of the leaflets of the species *E.humeana* is oval to transversely elliptical. This agrees with images of dried specimens from the NYBG herbarium (Figure. 7). In addition, the structure of the flower confirms that this species is *E.lysistemon*, and not the previously described species. The inflorescences of the studied species are dense, and the flowers are characterized by a two-sided curved vexillum, which includes all the floral organs contained therein. They also have a calyx with two deeply divided lips and are not similar to the species *E.humeana*, in which the vexillum is flat from above and the calyx is red-toothed and consists of five prominent teeth, which is similar to the illustration by [15] (Figure. 8). The results also showed that the flowering period of the trees studied The species begins in mid-January and lasts until the end of summer. This

is in complete contrast to the flowering period of *E.humeana* species, which begins in mid-summer and lasts until the end of autumn and early winter.



Figure.7. Dried specimens from NYBG steere herbarium.

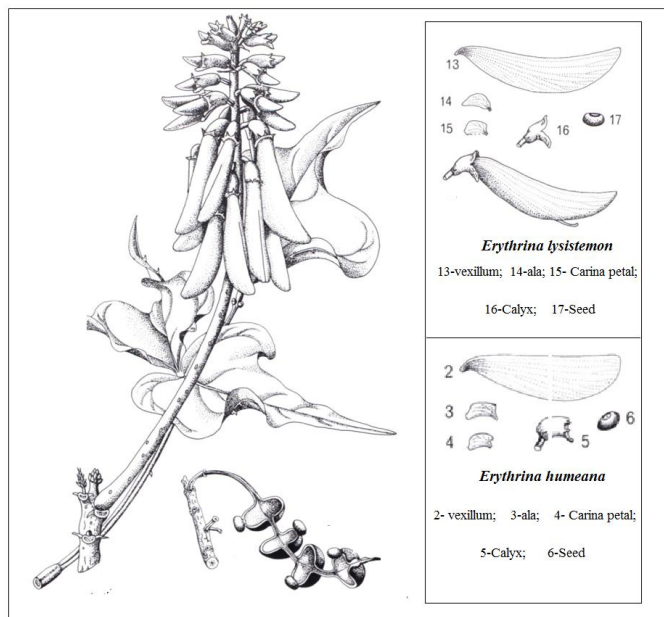


Figure.8. Illustration of two species by Hennessy, 1991.

**6. Conclusion**

The study concluded that the morphological characteristics of the trees of genus *Erythrina* that were found in Al-Bayda City, Libya, are the morphological characteristics described by many classification keys for *Erythrina lysistemon* Huch., and not what was thought to be *E.humeana* Spreng., as a large discrepancy was found in the flower characteristics and some other characteristics. Therefore, this paper proposes to re-correct the taxonomic status of these trees and register them as a new species in Libyan flora database.

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### Data Availability

Data can be obtained from the appropriate author upon request.

### Conflict of Interest

There is no conflict of interest, according to the authors.

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### Authors' Contributions

The idea of the article and field and morphological study was equally between researchers

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