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# A Voyage in the World of Plants as Mentioned in the Holy Quran

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**Abstract:** Almost 22 identifiable plants belong to seventeen plant families are cited in the Holy Quran including *Ficus carica*, *Olea europoea*, *Phoenix dactylifera*, *Vitis vinifera*, *Panica granatum*, *Ocimum basilicum*, *Dryobalanops camphora*, *Zingiber officinale*, *Brassica nigra*, *Salvadora persica*, *Tamarix*, *Zizyphus spina-christi*, *Citrulus colocynthis*, *Cucurbita pepo*, *Cucumis sativus, Allium sativum*, *A. cepa*, *lens esculents*, *Musa sapientum*, *Hordeum vulgare*, *Triticum vulgare* and *Trifolium*. The present study describes the wide range of plants mentioned distinctly in the Holy Quran to denote holy plants such as fig, olive, date palm and pomegranates; or aroma plants such as zinger, basil and chamfer; or popular nutritious plants like onion, garlic and lentils; astringent plants as colocynth or Pasteur plants like clover. On the other hand, key words like plants, seeds, grains, ornamentals, gardens, trees, fruits and herbs are also mentioned very often in the Quran to denote a plant, a plant part, type and/or habit of a plant or places where plants are normally grow. A comprehensive list of surahs and ayahs where a distinct plant or a keyword indicates plants are included. The taxonomic position and common names of those plants are included. Typical biological issues such as biodiversity, seed germination, photosynthesis and diverse uses of plants are interpreted from various surahs of the Quran.

**Key words:** Biodiversity, germination, higher plants, holy quran, uses of plants

## INTRODUCTION

Although the Holy Quran is a religious book more than 1400 years old with a total of 6600 verses dealing with many aspects of regular life, about 1000 of those verses are of a scientific nature. There are more than 900 verses in the Holy Quran that can be related to relatively new scientific discoveries, which miraculously are said not to contradict the facts as we currently understand them (Bucaille, 1987).

The Holy Quran reviews diverse scientific topics such as astronomy, geology, embryology, genetics, biology, archaeology, etc. The Quran reveals the secrets of critical scientific issues such as the big bang model of the origin of the universe, the theory of the expansion of the universe, gaseous state of the universe, celestial bodies tied to orbits, the existence of sun's orbit, the rounded shape of the earth, the reduction of matter from the earth's edges, the fact that the earth and the moon are moving each in its own path, the fact that the light from the moon is a mere reflection of the light from the sun, the critical positioning of the stars, the fact that the mountains are considered as a wedge for the Earth, human exploration of space, the protection of the earth by the atmosphere from bombardment by meteorites, the ending of sensation at the palm of skin at which the nerves end, various aspects of embryology (including the development of babies in a mother's womb and that the amnion consists of three layers), gender determination, existence of pairs in all creations (Bucaille, 1987).

The Holy Quran is the word of God as transmitted by the Angel Gabrielle, in the Arabic language through Prophet Mohammed. The Holy Quran is regarded as untranslatable since the Arabic language is inseparable from its message. The Quran is actually available in many languages, but these versions are regarded as interpretations rather than translations.

The Quran is divided into 114 surahs, or chapters and the surahs are conventionally assigned to two broad categories: those revealed at Mecca or Medina. All the surahs are divided into ayahs or verses. The surahs themselves vary in length, ranging from the longest Surah 2, with 282 verses, to the three shortest (Surahs 103, 108 and 110) each of which has only three verses. With some exceptions, the surahs are arranged in the Quran in descending order of length, with the longest at the beginning and the shortest at the end. The Quran as a whole is divided into thirty parts, which in turn are divided into short divisions of nearly equal length, to facilitate study and memorization.

The traditions, life and actions of the Prophet Mohammed as well as the historical context for many of

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the surahs are the basis for what is called the sunnah, or practice of the Prophet. The Hadith or Sunna, which are the recorded and authenticated sayings and traditions of the Prophet Mohammed is regarded as a secondary source of Muslims inspiration. Very early in the Islamic era, the Hadith literature had accumulated a number of sayings and traditions of the Prophet under a collection called the Prophetic Medicine (El-Gozeiha, 1990). Higher plants are mentioned very often in both Prophetic Medicine and The Hadith due to their precious nature as natural remedies for the management of simple ailments like headache, fever, sore throat, etc. and for improving diets and general health (El-Batanony, 1986). Consequently, several books have been published to enumerate the plants mentioned as part of the Hadith or Prophetic Medicine practice (El-Batanony, 1986; El-Gozeiha, 1990). On the other hand, animal stories and descriptions of animals cited in the Holy Quran were generally attractive to both public and scientific fields. Accordingly, books report animals revealed in the Holy Quran have often been published on a regular basis. There is an apparent gap in the literature for a scientific index of plants cited in the Holy Quran.

The present study aims to catalogue the scientific names of plants mentioned in the Holy Quran, to relate them to their genera, families and orders and to list the surahs and verses where a distinct plant or a plant-related keyword is mentioned. Discussing momentous scientific issues such as biodiversity, seed germination and diverse uses of plants are also attempted with the enlightenment of the Holy Quran.

**Distinct plants versus key words describing plants:** Generally, only one surah from the Quran is named to indicate a specific plant, the common fig (*Ficus*), whereas more than one surahs are titled to denote organisms from the animal kingdom such as bees, ants, the cow, livestock, etc. Although, distinct plants or keywords characterizing plants are frequently cited in diverse surahs, they are mentioned more frequently in surahs titled with an organism name.

Particular plants cited in the Holy Quran were probably mentioned to indicate holy plants such as fig, olive and date palm; or aroma plants such as zinger, basil and chamfer; or to denote popular nutritious plants such as onion, garlic and lentils; also to describe fine particles as the seeds of black mustard or astringent plants such as colocynth.

We related various plants mentioned in the Holy Quran to their taxonomic orders, families and genera were done according to standard text books in the field (Dejey, 1975; Tackholm, 1974; Boulos, 1983). Several hundred medicinal plant species from the Arabian area (Khatibi *et al*., 1989; Helmy *et al*., 1990; Githinji and Kokwaro, 1993; Khafagi and Dewedar, 2000) have been identified and their usage documented in the ethnobotanical literature (Ayensu, 1978; Bailey and Danin, 1981; Boulos, 1983; Danin, 1983; Rizk, 1986; Mitscher *et al*., 1987; Deans and Svoboda, 1990; Khafagi, 1988, 1992, 1998). Those ethnobotanical data were used as a guide in understanding the medicinal and other uses of distinct plants cited in the Holy Quran.

About twenty-two plants belong to seventeen families were mentioned in the Quran as distinct plants, which can be related to a specific genera and belong to a definite family (Table 1). Higher plants revealed including *Ficus carica*, *Olea europoea*, *Phoenix dactylifera*, *Vitis vinifera*, *Panica granatum*, *Ocimum basilicum*, *Dryobalanops camphora*, *Zingiber officinale*, *Brassica nigra*, *Salvadora persica*, *Tamarix*, *Zizyphus spina-christi*, *Citrulus colocynthis*, *Cucurbita pepo*, *Cucumis sativus, Allium sativum*, *A. cepa*, *lens esculents*, *Musa sapientum*, *Hordeum vulgare*, *Triticum vulgare* and *Trifolium*. On the other hand, key words describing plants were also mentioned very often. For example, words like plants, seeds, grains, cultivers, ornamentals, gardens, trees, fruits, herbs, etc. were mentioned to denote a plant and/or a plant part, a plant type or to indicate places where plants are normally grow (Table 1 and 2).

Frequently, plants mentioned in the Quran as illustration, inspiration or as part of a definite story. The conceivable meaning of ayahs deals with botanical issues will be discussed in the following section. Allah swears by the fig and the olive in Surah the Fig. 1 to indicate Palestine, the place where they grow together and where Jesus was born. Olive tree was mentioned in surah The light (35) to describe Allah as a light produced from an olive-tree, which yield high quality clear and pure oil because it is grown in the desert un-sheltered from the sun. The sun shining on it all the day from the dawn until the sunset. Olives was mentioned again with the palm-tree, grapes and pomegranates as holy plants and to indicate species diversity (The Livestock 99 and 141).

Palms and vines were mentioned together in more than one site n the Quran including: The Cow 266, The Livestock 99 and 141 etc. In surah the Cow 266. Both palms and vines were cited in the Cow 266 to reflect rich fruits, which make a garden appear like paradise. The advice from the ayah is to do good things continuously. Various types, shapes, taste and color of pomegranate, palms, vines and olive was mentioned in the Livestock 99 and 141 to report species and genetic diversity. In the Livestock (99) a combination of several plants moncots and dicots, large trees and short reachable ones looks the

Table 1: A comprehensive list of higher plants mentioned in the Holy Quran

| Order/ Family/ Species | Common names: English (Arabic) | Surahs and verses in English translated version |
|---|---|---|
| | | **I. Holy plants** |
| | | **Fig, olives, palms, grapes and pomegranates** |
| Vrticales | Common Fig | The Fig 1 |
| Moraceae | (El-teen) | 95.1: I swear by the **fig** and the **olive** , |
| *Ficus carica* L. | | |
| Oleales | Olive | The Light 35 |
| Oleaceae | (Zaytoon) | 24.35: Allah is the light of the heavens and the earth; a likeness of His light is as a niche in which is a lamp, the lamp is in a glass, (and) the glass is as it were a brightly shining star, lit from a blessed **olive-tree,** neither eastern nor western, the oil whereof almost gives light though fire touch it not -- light upon light -- Allah guides to His light whom He pleases, and Allah sets forth parables for men, and Allah is Cognizant of all things. |
| *Olea europoea* | | |
| Principes | Date palm (Nakla, | The Livestock 141 |
| Palmae | Nakil) | 6.141: And He it is Who produces gardens (of vine), trellised and untrellised, and **palms** and seed-produce of which the fruits are of various sorts, and **olives** and **pomegranates**, like and unlike; eat of its fruit when it bears fruit, and pay the due of it on the day of its reaping, and do not act extravagantly; surely He does not love the extravagant. |
| *Phoenix dactylifera* L. | | |
| Rhamnales | Common grape | The Cow 266 |
| Vitaceae | vine, Vine | 2.266: Does one of you like that he should have a garden of **palms** and **vines** with streams flowing beneath it; he has in it all kinds of fruits; and old age has overtaken him and he has weak offspring, when, (lo!) a whirlwind with fire in it smites it so it becomes blasted; thus Allah makes the communications clear to you, that you may reflect. |
| *Vitis vinifera* L. | (Enab) | |
| Myrtiflorae | Pomegranate | The Livestock 99 |
| Punicaceae | (Romman) | 6.99: And He it is Who sends down water from the cloud, then We bring forth with it buds of all (plants), then We bring forth from it green (foliage) from which We produce grain piled up (in the ear); and of the **palm-tree**, of the sheaths of it, come forth clusters (of dates) within reach, and gardens of **grapes** and **olives** and **pomegranates**, alike and unlike; behold the fruit of it when it yields the fruit and the ripening of it; most surely there are signs in this for a people who believe. |
| *Panica granatum* | | |
| | | **II. Flavor, fragrance and aroma plants** |
| | | **Basil, camphor and ginger** |
| Tubiflorae | Basil, sweet basil | The Mercy-giving 11-12 |
| Labiatae | (Rihan) | 55.11: Therein is fruit and palms having sheathed clusters, |
| *Ocimum basilicum* L. | | 55.12: And the grain with (its) husk and **fragrance** . |
| Dipterocarpaceae | Camphor | The Human: 5 |
| | (kafur) | 76.5: Surely the righteous shall drink of a cup the admixture of which is **camphor** |
| *Dryobalanops camphora* | | |
| Scitamineae | Ginger | The Human: 17 |
| Zingiberaceae | (Zangabil) | 76.17: And they shall be made to drink therein a cup the admixture of which shall be **ginger**, |
| *Zingiber officinale* | | |
| | | **III. Fine seeds: Mustard seeds** |
| Papaverales | Black Mustard, | The Prophets 47 |
| Cruciferae | True Mustard, | 21.47: And We will set up a just balance on the day of resurrection, so no soul shall be dealt with unjustly in the least; and though there be the weight of a grain of **mustard seed**, (yet) will We bring it, and sufficient are We to take account. |
| *Brassica nigra* (L.) Koch. in Rohling | (Khardel) | |

Table 1: Continued

| | | |
|---|---|---|
| | **IV. Arid and Bitter plants**<br>**Tooth-brush tree, Tamarisk, Christ's thorn and Colocynth** | |
| Salvadoraceae<br>*Salvadora persica* L.<br><br>Violales<br>Tamaricaceae<br>*Tamarix* L.<br>Rhamnales<br>Rhammaceae<br>*Zizyphus spina-christi* (L.) Willd.<br>Cucurbitales<br>Cucurbitaceae<br>*Citrulus colocynthis* L. | Tooth-brush tree<br>(Arak)<br><br><br>Tamarisk<br>(Tarf, Tarfa, Tarfaa)<br>Christ's thorn<br>(Nabaq, Sidr)<br><br>Bitter apple<br>Colocynth<br>(Hanzal, Zaqqum) | Saba 16<br>34.16: But they turned aside, so We sent upon them a torrent of which the rush could not be withstood, and in place of their two gardens We gave to them two gardens yielding **bitter fruit** and (growing) **tamarisk** and a few **lote-trees**.<br><br>The Arrangers 62-66<br>37.62: Is this better as an entertainment or the **tree of Zaqqum**?<br>37.63: Surely We have made it to be a trial to the unjust.<br>37.64: Surely it is a tree that-grows in the bottom of the hell;<br>37.65: Its produce is as it were the heads of the serpents.<br>37.66: Then most surely they shall eat of it and fill (their) bellies with it. |
| | **V. Nutritious plants**<br>**Pumpkin, cucumber, onion, garlic and lentils** | |
| Cucurbitales<br>Cucurbitaceae<br>*Cucurbita pepo* L. | Pumpkin<br>(Qarah, Yakteen) | The Arrangers 146<br>37.146: And We caused to grow up for him a **gourdplant.** |
| Cucurbitales<br>Cucurbitaceae<br>*Cucumis sativus*<br><br>Liliflorae<br>Liliaceae<br>*1. Allium sativum* L.<br>*2. Allium cepa* L.<br><br>Rosales<br>Leguminosae<br>*Lens esculents* | Cucumber<br>(Kiar)<br><br>1.Garlic<br>(Thom)<br><br>2. Onion (Basal)<br><br>Lentils<br>(Adas) | The Cow 61<br>2.61: And when you said: O Musa! We cannot bear with one food, therefore pray Lord on our behalf to bring forth for us out of what the earth grows, of its **herbs** and its **cucumbers** and its **garlic** and its **lentils** and its **onions**. He said: Will you exchange that which is better for that which is worse? Enter a city, so you will have what you ask for. And abasement and humiliation were brought down upon them, and they became deserving of Allah's wrath; this was so because they disbelieved in the communications of Allah and killed the prophets unjustly; this was so because they disobeyed and exceeded the limits. |
| | **VI. A supplementary example of a nutritious monocot plant**<br>**Banana** | |
| Scitamineae<br>Musaceae<br>*Musa sapientum* | Banana<br>(Muse) | The Event 28-35<br>56.28: Amid thornless lote-trees,<br>56.29: And **banana**-trees (with fruits), one above another.<br>56.30: And extended shade,<br>56.31: And water flowing constantly,<br>56.32: And abundant fruit,<br>56.33: Neither intercepted nor forbidden,<br>56.34: And exalted thrones.<br>56.35: Surely We have made them to grow into a (new) growth, |
| | **VII. Grains**<br>**Barley and wheat** | |
| Graminales<br>Graminae<br>*Hordeum vulgare* L.<br><br>*Triticum vulgare* | Barley<br>(Al-sheir)<br><br>Wheat<br>(Al-Qameh) | Josef 43<br>12.43: And the king said: Surely I see seven fat kine which seven lean ones devoured; and seven **green ears** and (seven) others dry: O chiefs! Explain to me my dream, if you can interpret the dream.<br><br>The Cow 261<br>2.261: The parable of those who spend their property in the way of Allah is as the parable of a **grain growing seven ears** (with) a hundred grains in every ear; and Allah multiplies for whom He pleases; and Allah is Ample-giving, Knowing. |

Table 1: Continued

| | | | |
|---|---|---|---|
| | | **VIII. Forage** | |
| | | **Clover and herbage** | |
| Rosales | Clover | | The Frowned 26-31 |
| Leguminosae | (Barseim) | 80.26: | Then We cleave the earth, cleaving (it) asunder, |
| *Trifolium sp.* | | 80.27: | Then We cause to grow therein the grain, |
| | | 80.28: | And grapes and **clover**, |
| | | 80.29: | And the olive and the palm, |
| | | 80.30: | And thick gardens, |
| | | 80.31: | And fruits and **herbage** |

Table 2: Citation of the surahs and verses where botanical issues including seed germination, photosynthesis, biodiversity or diverse uses of plants were mentioned in the Holy Quran

| Scientific Issue | An English translated version of surahs and verses |
|---|---|
| I. Seed germination | |
| • Contrasting a seed and a grain | The Livestock 95<br>6.95: Surely Allah causes the **grain** and the **stone** to germinate; He brings forth the living from the dead and He is the bringer forth of the dead from the living; that is Allah! How are you then turned away. |
| • Essential role of water in germination process | Ta-Ha 53<br>20.53: Who made the earth for you an expanse and made for you therein paths and sent down **water** from the cloud; then thereby We have brought forth many species of various **herbs**.<br><br>The Ant 60<br>27.60: Nay, He Who created the heavens and the earth, and sent down for you **water** from the cloud; then We cause to **grow** thereby beautiful gardens; it is not possible for you that you should make the **trees** thereof to **grow**. Is there a god with Allah? Nay! They are people who deviate. |
| • Germination process | Q 9-10<br>50.9: And We send down from the cloud **water** abounding in good, then We cause to **grow** thereby gardens and the grain that is reaped,<br>50.10: And the tall palm-trees having spadices closely set one above another,<br><br>Ya-Sin 34-36<br>36.34: And We make therein gardens of palms and grapevines and We make **springs** to flow forth in it,<br>36.35: That they may eat of the fruit thereof, and their hands did not make it; will they not then be grateful?<br>36.36: Glory be to Him Who created pairs of all things, of what the earth **grows**, and of their kind and of what they do not know.<br><br>The Rock 19<br>*15.19*: And the earth -- We have spread it forth and made in it firm mountains and caused to **grow** in it of every suitable thing. |
| II. photosynthesis | |
| • Combination of light energy (Sun) and chlorophyll (trees) | The Mercy-giving 6<br>*55.6*: And the **star** and the **trees** do adore (Him). |
| III. Biodiversity | |
| • Genetic diversity | The Livestock 141<br>6.141: And He it is Who produces gardens (of vine), trellised and untrellised, and palms and seed-produce of which the fruits are of **various sorts**, and olives and pomegranates, **like and unlike**; eat of its fruit when it bears fruit, and pay the due of it on the day of its reaping, and do not act extravagantly; surely He does not love the extravagant.<br><br>The Bee 69<br>16.69: Then eat of **all the fruits** and walk in the ways of your Lord submissively. There comes forth from within it a **beverage of many colours**, in which there is healing for men; most surely there is a sign in this for a people who reflect. |

Table 2: Continued

| | |
|---|---|
| Species diversity | The Frowned 26-31<br>80.26: Then We cleave the earth, cleaving (it) asunder,<br>80.27: Then We cause to grow therein the **grain**,<br>80.28: And **grapes** and **clover**,<br>80.29: And the **olive** and the **palm**,<br>80.30: And thick gardens,<br>80.31: And **fruits** and **herbage** |
| III. Diverse uses of plants | |
| Shade and food | Human 14<br>76.14: And close down upon them (shall be) its **shadows**, and its **fruits** shall be made near (to them), being easy to reach. |
| Food, feed, drink and shelter | The Bee 67-69<br>16.67: And of the **fruits** of the **palms** and the **grapes** -- you obtain from them **intoxication and goodly provision**; most surely there is a sign in this for a people who ponder.<br>16.68: And your Lord revealed to the bee saying: Make **hives** in the mountains and in the trees and in what they build:<br>16.69: Then **eat** of all the **fruits** and walk in the ways of your Lord submissively. There comes forth from within it a **beverage** of many colours, in which there is healing for men; most surely there is a sign in this for a people who reflect. |
| Food and shade | The Event 28-35<br>*56.28*: Amid thornless **lote-trees**,<br>*56.29*: And **banana-trees** (with **fruits**), one above another.<br>*56.30*: And extended **shade**,<br>*56.31*: And water flowing constantly,<br>*56.32*: And abundant **fruit**,<br>*56.33*: Neither intercepted nor forbidden,<br>*56.34*: And exalted thrones.<br>*56.35*: Surely We have made them to grow into a (new) growth, |
| Food and animal feed | Younus 24<br>10.24: The likeness of this world's life is only as water which We send down from the cloud, then the **herbage** of the earth of which **men and cattle eat** grows luxuriantly thereby, until when the earth puts on its golden raiment and it becomes garnished, and its people think that they have power over it, Our command comes to it, by night or by day, so We render it as **reaped seed**; produce, as though it had not been in existence yesterday; thus do We make clear the communications for a people who reflect. |
| Food and shade | Ya-Sin 56-58<br>*36.56*: They and their wives shall be in **shades**, reclining on raised couches.<br>*36.57*: They shall have **fruits** therein, and they shall have whatever they desire.<br>*36.58*: Peace: a word from a Merciful Lord. |
| Food, fat and dyes | The Believers 19-20<br>23.19: Then We cause to grow thereby gardens of **palm trees** and **grapes** for you; you have in them many **fruits** and from them do you **eat**;<br>23.20: And a tree that grows out of Mount Sinai which produces **oil** and a **condiment** for those who eat. |
| Aromatic drink | The Human: 5<br>76.5: Surely the righteous shall **drink** of a cup the admixture of which is **camphor** |
| Pungent drink | The Human: 17<br>76.17: And they shall be made to **drink** therein a cup the admixture of which shall be **ginger**, |

same morphologically but vary genetically. The command from the ayah is to look at the mature fruits wisely, as they are signs for believing in God. Ayah 141 from the same surah also addresses the issue of biodiversity through the same plants growing wild and cultivated as trees, shrubs and herbs. Here the instruction was to eat the ripe fruits and pay the due of it in the day of harvesting without being excessive.

Basil was mentioned in the Quran to denote any fragrance plant with green leaves (The Mercy-giving 11-12). Ayah 11 contrasts various sorts of fruits with palms having sheathed clusters. Ayah 12 addressed the difference between husks and fragrant green leaves of grains.

Ayah 5 of the Human characterizes aroma drink supplied to the righteous in paradise with a fresh cool sensation taste of camphor followed by a pungent warming drink with the taste of ginger (The Human 17). The two sequential tastes are needed for fitness and delight.

In the Prophets 47 Allah reports that every soul will be accounted with justice. Even if there is a charge as light as the weight of a grain of mustard, it will be counted too. The mustard seed here is used as a clear example of fine grains.

Ayahs 16-17 of Saba tells part of the story of the kings of Saba. It is the story of a man who has ten children. God sends them the best weather and they built a dam, where it initiated two gardens on its sides. The gardens were impressive and full of various sorts of edible fruits. They were not thankful and believed in the Sun in stead of God. He turned both gardens to yield slightly productive trees such as tooth-brush tree, tamarisk and a few lotto-tree.

The Arrangers 62-66 contrast the refreshing fruits found in paradise with the zaqqum tree (Colocynth). It is made as a trial for the unjust. It grown as the heads of the serpents and shall be the only food in the hell.

The Arrangers 146 indicate that God grow a tree of pumpkin in the area, where Youns was thrown out from the abdomen of the whales. The interpretation of the ayah is that pumpkin is a fast growing plant and nutritionally rich. It is an excellent plant for Prophet Youns, who spend long time with fear, hunger and thirst inside the huge sea mammal. Pumpkin is a creeping plant and not a tree. The description may reflect supported growth or giant appearance.

Some plants are mentioned in ayah 61 from The Cow. The children of Israeli were used to eat rich diet composed of edible birds and mushroom-like food. They asked Musa to pray God to grow for them herbs including cucumber, garlic, onion and lentils. Allah found that they exchange good food with cheap one, which can be found in any city.

The Event 28-35 descripe part of paradise in which there will be thornless lotto-trees (cultivated), banana-trees packed with fruits grown from thorns, widespread shade, water gliding constantly, abundant fruits, neither intercepted nor forbidden and magnificent royal seats. God initiated all that resources from nothing.

The Egyptian King (Pharos) saw in a dream seven fat cows eaten by another seven leans ones and seven green ears as well as seven another dry. They brought Josef from the prison in order to interpret the dream. He predict that seven fruitful years will be followed by seven dry years. He advised the king that people should eat enough and leave the rest on the green ears for the arid years. Substantial plants like wheat and barley are mentioned once more in the Cow 261 to indicate that good work pay off and magnified as one grain produces seven ears, which contains a hundred grains in it. A grain ends up with seven hundred grains reflect that one good work should be charged generously.

**Seed germination and the Holy Quran:** Seed germination as a developmental physiological issue is mentioned very often in several sites in the Holy Quran. Contrasting our physiological experience of that topic with what was revealed 1400 years ago is noteworthy.

The seed occupies a critical position in the life history of higher plants. The new plant formed by sexual reproduction starts as an embryo within the developing seed, which arises from the ovule. When mature, the seed is the means by which the new individual is dispersed. The time, the place and the vigor of the young seedling is largely determined by the physiological and biochemical features of the seed, the responses of the seed to the environment and the food reserves it contains. Cultivation of most crop species depends on seed germination (Bewley and Black, 1994). Moreover, seeds such as those of cereals and legumes are themselves major food sources whose importance lies in the storage reserves of protein, starch and oil accumulated during development. About 70% of all food for human consumption comes directly from seeds (mostly those of cereals and legumes) and a large proportion of the remainders is derived from animals that are fed on seeds (Come and Corbineau, 1993).

Seed germination begins with water uptake by the seed (imbibition) and ends with the start of elongation by the embryonic axis, usually the radical. It includes numerous events such as protein hydration, subcellular structural changes, respiration, macromolecular syntheses

and cell elongation, none of which is itself unique to germination. But their combined effect is to transform a dehydrated, resting embryo with a barely detectable metabolism into one that has a vigorous metabolism culminating in growth (Taylorson, 1989). Germination therefore does not includes seedling growth, which commences when germination finishes.

Generally, germination can be determined by measuring water uptake or respiration rate. Unfortunately, these measurements give us only a very broad indication of what stage of the germination process has been reached. The only stage of germination that we can time fairly precisely is its termination, when the radical merges. To enrich our physiological knowledge of seed germination as a developmental science, various surahs and verses in the Holy Quran describing seed germination is listed (Table 2).

Skimming those verses, which describing the seed germination issue give clear impression that water uptake is by far the main factor responsible for seed germination. Similarly, physiological experiments reveal that seed germination is mainly depends on water as the limiting germination factor. Accordingly, water uptake is usually used to measure germination rate.

The Angiosperm seed is usually comprised of the embryo, the endosperm, the perisperm and the testa or seed coat. Although all mature seeds contain no embryo and many are surrounded by a distinguishable seed coat, the extent to which the endosperm or preisperm persists varies between species. Sometimes, the testa exists in a rudimentary form only, the prominent outermost structure being the pericarp or fruit coat derived from the ovary wall; in these cases, the dispersal unit is not a seed, but a fruit. Legumes, castor bean, tomato, coffee bean, etc. are dispersed as seeds, while the dispersal unit of cereals, lettuce, sunflower, composite, hazel, oak, etc. is a fruit (Bewley and Black, 1994). Similarly, the difference between a seed and a fruit is also arises in some verses in the Holy Quran indicating that wherever a seed is mentioned, it is only to denote a seed not a fruit and vise versa (Table 2).

**The significance of biodiversity:** Studying biodiversity is essential for conservation of biological resources, maintenance of genetic resources and presence of genetic variation. Although, awareness of the importance of investigating the biological diversity of the universe is increasingly gaining all the attention recently, especially since the organization of the United Nations Conference on Environment and Development in 1992 in Rio de Janeiro, Brazil (the Rio Summit), such issue was raised 1400 years ago in the Holy Quran. Conservation of the diversity of various organisms needs the management of human interactions with genes, species and ecosystems so as to provide the maximum benefit to the present generation, while maintaining their potential to meet the needs and aspirations of future generations; encompasses elements of saving, studying and using biodiversity.

Biodiversity, which means the diversity of life, describes all aspects of biological diversity, especially species richness, ecosystem complexity and genetic variation. According to the Convention on Biological Diversity, biodiversity means "The variability among living organisms from all sources including, inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and ecosystems" (UNEP, 1992). The Global Biodiversity Strategy (WRI, IUCN and UNEP, 1992) introduced a short definition of biodiversity "The totality of genes, species and ecosystems in a region".

Generally, biodiversity concerns the vast range of plants and animals currently alive, in which biodiversity is used in two contexts: the diversity of natural organism and the diversity of farmed crops or animals. Usually, the measure of biodiversity is genetic diversity, a measure of how many distinct genetic species present in an area or population (di Castri and Younés, 1996).

God creates diverse organisms which provides human with faith and joy of life. The Holy Quran documents the diversity of natural organisms, farmed crops, domestic animals as well as the genetic diversity. Table 2 displays the surahs and verses in the Holy Quran, which distinguish the diversity of natural organisms, farmed crops, domestic animals as well as the genetic diversity concept.

**Diverse usage of plants:** Plants affect virtually all aspects of human life, either directly or indirectly. Green plants generate the oxygen that sustain life on earth. Plants supply our foods and many of our drinks. For example, about 95% of our food comes from only twenty species of plants; 80% of our food comes from six of those species (Moore and Clark, 1995). Plant fibers, wood and other useful structures have formed the basis of the material culture in many human societies. Also, plant chemicals have long been exploited by human populations (Cotton, 1996). Today, plant chemicals continue to provide an important range of products to both traditional and industrialized communities (Ayensu, 1978) including the processing of plant extracts to make paint, plastics, soap, oils, adhesives, natural rubber, waxes, dyes, spices

and drugs such as morphine, cocaine, aspirin, caffeine, codeine, digitoxine, quinine, vinblastine and most antibiotics (Farnsworth, 1990). We use flowers for decorations, perfumes and to express our feelings. Today, plants dominate our lives and economy, just as they have in all civilizations.

Table 2 lists the surahs and sites where different uses of plants are cited in the Holy Quran. Various uses of plants, which are cited in the Holy Quran can be classified into food, drinks, animal feed, aroma, fat, dyes, shelter and shade. Several ayahs documented the diverse utilization of plants for both Human and animal.

## CONCLUSIONS

The present communication is designed to be a quick scientific reference for Botanist practiced both basic and applied aspects of plant research as well as for both under-graduate and post-graduate students studying general botany. This note may supply the scientific knowledge of plants revealed in the Holy Quran fourteen century ago, may encourage integral ethno-pharmacological exploration of most of those plants, if not actually exists for any of them, may correlate botanical enlightenment with unique religious book like the Holy Quran or may represent an added biological topic to the list of momentous impartial subjects learned from the Holy book.

Finally, reading the Holy Quran is marvelous. For a botanist, such reading to a Holy book take more than one dimension and boost various aspects of biology. As for the biodiversity and germination, clear sites in the Quran documents those biological issues. Also, diverse uses of plants and the importance of plants for food and feed, folk medicine, shelter and shade and for every day life is reported distinctly in more than one verse in the Holy Quran. The botanical voyage through various surahs and verses from such a unique book like the Quran can be a multidimensional trip. The smell, taste and texture of a plant together with the shade, which can be supplied from the trees and shrubs are experience learned form reading just one verse from the Quran.

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