

*Perspective*

# Emperor Jahangir's method of observation and approaches to investigation of Kashmir ecology: An appraisal of his 'deep sense of sensitivity' towards nature

Mumtaz Ahmad Numani

Centre of Advanced Study, Department of History, A. M. U., Aligarh, India.

Received 18 February, 2015; Accepted 23 March, 2015

Historically speaking, 'ecology' today is an interdisciplinary as well as complex science. Modern ecology characterises more facts than possibly known. Any ecologist is today a specialist, with favourite and specialised questions. And hence, there are different sub-disciplines in ecology with its own set of concept(s) and all try to unify looking only at 'ecology'. Moreover, it is now an established fact, that plants and animals both exhibit behaviour, but plant behaviour is most often examined in the context of its morphological growth. And behaviour is in part, the ability to respond rapidly and reversibly in response to environmental stimuli during the life time of an individual. Hence, the main objective of writing this paper is to trace and better synthesize, "Jahangir's method of observation and approaches to investigation of Kashmir ecology", in order to gain more from the past in the present about: how man should communicate better with other living things of different species.

**Key words:** History, ecology, Kashmir, Jahangir, approaches to investigation.

## INTRODUCTION:

Ecology today is an interdisciplinary as well as complex science. Modern ecology characterises more facts than possibly known. Any ecologist is today a specialist, with favourite and specialised questions. And hence, there are different sub-disciplines in ecology with its own set of concepts and all try to unify looking only at 'ecology'. The term ecology was first coined by Reiter (1885) followed by Haeckel (1886), who defined ecology as the science that is concerned with 'all the relations of animals and plants to one another and to the outer world'. Haeckel was followed by Elton (1927), who defined ecology as

'scientific natural history'. And, Elton was followed by Woodbury (1955) who defined ecology 'as a science which investigates organisms (species of all kind) in relation to their environment; a philosophy in which the world of life is interpreted in terms of natural processes' (Subrahmanyam and Sambamurty, 2004, pp. 1-4). But, all definitions rest on the fact that the natural environment itself consists of two broadly distinguishable sectors: the inanimate and the animate. The inanimate ('the outer world') includes the earth's structure with which geology and physical geography deal. The animate (comprising

E-mail: [mumtaznumani@gmail.com](mailto:mumtaznumani@gmail.com).

Author(s) agree that this article remain permanently open access under the terms of the [Creative Commons Attribution License 4.0 International License](https://creativecommons.org/licenses/by/4.0/)

all levels of 'organisms') include all plant and animal species (the 'flora and fauna' of formal usage), whose study is often described by the term 'natural history', which, however, usually excludes from its purview, the human and the domesticated species (Habib, 2010, p.20).

As of now, the much established shows goes that, plants and animals exhibit behaviour, but plant behaviour is most often examined in the context of its morphological growth. And, behaviour is in part, the ability to respond rapidly and reversibly in response to environmental stimuli during the life time of an individual. Interestingly, here it bears to mention that, Jahangir's own-way of study on the eco-morphology, anatomy and behaviour of the different species has covered one important aspect of them in relation to their basic environment. He has sought to examine the 'environmental influences' upon the 'species' in order to understand and explain the 'study of structure and function of nature'.

## SOURCE AND METHODOLOGY

The Mughals' had a flourishing tradition of history writing (Thackston, 1999, p. xxi). And our best textual source on Jahangir is Jahangir himself in his *Jahangirnama*, an autobiography in which he reveals his multi-faceted persona as a sovereign, naturalist-cum-ecologist, aesthete, hunter, patron of the arts and collector (Jahangir, 1624; Khan, 1864). The importance and complexity of this text begins only now to be fully understood by modern historians, has been earlier pointed out by Lefevre-Agrati, and subsequently highlighted by Ebba Koch (Koch, 2009, p. 298). Indeed, the interdisciplinary discourse between natural scientists and art historians is brought about by Jahangir himself to explain the advantages of a combined method, written and visual, in representing natural phenomena, and sees in it an improvement of his ancestor Babur's approach (Koch, 2009, p. 298). Ebba Koch (2009) goes on to point out that: scientists have explored the *Jahangirnama* for its observation(s) on geology and biology (botany, ornithology and zoology). Whereas, art historians have analysed how Jahangir directed his artists to turn his observations of natural phenomena into nature studies (Koch, 2009, p. 297). If we consider Jahangir's methodology, we will find that, as a scientist, he has a selective approach; he investigates, observes, records, depicts, measures, enumerates and tests what he considers as noteworthy and outstanding (Koch, 2009, p. 298). All of which shows that, he was fond of "scientific" experiments of his own devising. For example, he debunked the accepted reason for the mountain sheep's pugnacity, he tested the reported efficacy of bitumen for broken bones on a chicken and found that it had none; he took an active interest in animal husbandry and goat breeding; he determined the gestation periods for elephants with nearly correct results; and he examined a

lion's and wolf's livers to see whether their gall bladders were inside or outside the liver as a measure of courage (Thackston, 1999, p. xxiv).

## JAHANGIR'S METHOD OF OBSERVATION AND APPROACHES TO INVESTIGATION OF SOME MAMMALS AND BIRDS IN KASHMIR

Nur-ud-din Muhammad Jahangir (August 30, 1569-29 October, 1627) was the fourth Mughal Emperor from 1605 until his death in 1627. Jahangir was the eldest son of Mughal Emperor Akbar and was declared successor to his father from an early age. Jahangir built on his father's foundations of excellent administration. And, he possessed sensitivity to nature, acute perception of human character, and an artistic sensibility, all of which took him to be an outstanding personality (Jahangir, 1624; Khan, 1864, p.1-3; Thackston, 1999, pp. xix, xxiii, 4). Despite the fact that, the geographical and topographical out-look of Kashmir resembles too much that of Central-Asia, and the valley of Kashmir exhibits both rich floral and faunal diversity, Jahangir's own-way of observation and approaches to investigation of Kashmir ecology is in itself an endeavour of his scientific study.

Here much need is to go with the above discussion in order to trace and better synthesize, the 'anatomical', 'behavioural' and 'morphological' aspects of some mammals and birds that Jahangir himself had gone on observing, investigating and recording in Kashmir. The complete list of quotations (as examples) below is from Jahangir himself. He says:

**Wild ram:** "I [Jahangir]<sup>1</sup> have frequently heard from the hunter that, at a certain time a warm develops in the horns of the wild ram which irritates him into fighting with his kind and that if he finds no rival, he strikes his head against a tree or a rock to allay the irritation. After investigation, the warm was found in the horns of the female sheep also, and since the female would not fight (on that account) the story does not seem to be based on truth" (Alvi and Rahman, 1968, pp. 20-21)<sup>2</sup>.

**Ibex:** "The Ibex, which is brought from Bhakkar and the hills of Garmser, is extremely good-looking, but it has little wool. Animals that thrive in the mountains have a lot of hair and are ugly due to the severity of the cold and snow. The Kashmiris call the Ibex, *Kayll Kail* (Jahangir, 1624; Khan, 1864, p. 302; Alvi and Rahman<sup>3</sup>, 1968, pp. 28-30; Thackston, 1999, p. 335). During these days

<sup>1</sup>In all the quotations "I" represents Jahangir henceforth

<sup>2</sup>Alvi and Rahman identify this mammal as *Ovis cyclaceros hutton*. According to them, it is known as *Shapo* and *Sha* (male) and *Shamo* (female) in Ladakh.

<sup>3</sup>They identify this mammal as *Capra sibirica* and it is known as *kayl* in Kashmir, *Sakin* (male) and *Dabmo/ Danmo* (female) in Ladakh.

Sayyid Bayazid Bukhari<sup>4</sup>, the commander of the Bhakkar garrison, sent as a gift, an Ibex he had captured young in the mountains and reared in his house. It was viewed and I liked it a lot. I had seen many markhor goats and mountain rams domestically reared, but I had not seen an Ibex so reared. I ordered to keep it with a Barbary goat so that they would mate and produce offspring. Without exaggeration, it was beyond comparison with a markhor or a mountain ram. Sayyid Bayazid was promoted to the rank of 1000/700" (Jahangir, 1624; Khan, 1864, p. 284; Thackston, 1999, p. 318).

**Papiha:** "In Hindustan, there is a bird called Papiha. It has a beautiful voice, and during the monsoon season it sings heart-rending laments. Just as the cuckoo lays its eggs in a raven's nest, and the raven raises the young as its own, in Kashmir, the papiha was seen to have laid its eggs in a ghawghai's nest, and the ghawghai raised the chicks" (Jahangir, 1624; Khan, 1864, p. 309; Alvi and Rahman, 1968, p. 80, Thackston, 1999, p. 342).

**Humay:** "Prior to this, it had been repeatedly reported that there was an animal known as the humay in the Pir-Panjal Mountains, and the people of that region said that it fed on small bones. It could often be seen flying through the air, and it rarely alighted. In as much as His Majesty [Jahangir] was very much inclined to investigate the truth of this report, it was ordered that any of the scouts who shot such a bird would be rewarded with a thousand rupees. By chance, Jamal Khan Qaravul shot one with a musket and brought it to the Emperor's presence. Since it had been wounded in the leg, it was brought to the Emperor alive and healthy. He ordered its crop inspected to find out what it ate. When the crop was opened, small bones came out of its gullet, just as the people of the mountains had said that its food consisted of small bones and that it always flew in the air with its gaze upon the earth, and wherever it spotted a bone, it would pick it up in its beak, fly away, and cast it onto a rock to break it into little pieces. Then it would pick at it and eat it. In this case, the prevailing opinion was that this was the famous humay. Really, the humay is superior to all birds because it eats bones and harms no creature. Its head and beak looked like a buzzard's, but a buzzard's head has no feathers while this one had black feathers. In the Emperor's presence it weighed 415 tolas, which is equivalent to 1,037 (1/2) mithcals<sup>5</sup>" (Jahangir, 1624; Khan, 1864, pp. 398-99; Alvi and Rahman<sup>6</sup>, 1968, pp. 85-87; Thackston, 1999, pp. 434-35).

**Jan Bahman:** "Baso, the Zamindar of Talwara brought for my inspection a bird the people of the hills call *Jan Bahman*. Its tail is like that of a qirqavul, which is also called tazarv [pheasant]. In colour, it is exactly like a female qirqavul, but its body is larger by a ratio of ten to

fifteen. Around this bird's eyes is red, while around a pheasant's eyes is white. Baso, reported that, this bird lives in snowy mountains and eats grass and herbs"

(Jahangir, 1624; Khan, 1864, p. 338; Alvi and Rahman<sup>7</sup>, 1968, pp. 61-63; Thackston, 1999, p. 372).

**Sonlu:** "One of the birds seen in the hill country is the horned pheasant, which the Kashmiris' call *Sonlu*. It is an inch smaller than a peahen. The tail and both wings are blackish, rather like the wings of a bustard, and have white spots. The belly up to the breast is black with white spots, and in some places there are red spots too. The ends of the legs are a brilliant, beautiful fiery red. From the tip of its beak to the front of the neck is also shiny black, and on top of its head are two fleshy turquoise coloured horns. Around its eyes and mouth the skin is red, and its crop is a piece of round skin about the size of two palms. In the middle of that skin is a violet coloured patch the size of a hand with turquoise-coloured spots, and turquoise-coloured spots around it too consisting of eight plumes, and around those is a line two fingers wide that is peach-blossom red. Around that is another turquoise-coloured line. Its feet are also red. I ordered to weigh it alive, and it was 152 tolas. And, after being killed and cleaned, it weighed 139 tolas" (Jahangir, 1624; Khan, 1864, pp. 338-39; Alvi and Rahman<sup>8</sup>, 1968, pp. 60-61; Thackston, 1999, p. 372).

**Gil-Char'd:** "In the stream, I saw a bird that looks like a starling. A starling is black in colour and has white spots, while this one was the colour of a nightingale with white spots. It dives under the water, stays under for a while, and comes up somewhere else. I ordered two or three of them are caught and brought to me so that I could see whether the feet were webbed like a duck's or open like other birds of the field. Two of them were caught and brought. One died immediately, and the other remained a day. Its feet were not webbed like a duck's. I ordered Master Nadirul'asri Mansur the painter to draw its likeness. The Kashmiris call them *gil-char'd*, that is, water starlings" (Jahangir, 1624; Khan, 1864, pp. 305-6; Alvi and Rahman<sup>9</sup>, 1968, pp. 78-79; Thackston, 1999, p. 339).

**Pooth:** "Another is the zarrin bird, which the inhabitants of Lahore called *shan* and the Kashmiris call *Pooth*. In colour it is something like peacock's breast. It has a tuft on top of its head and its tail is yellow, the length of four or five fingers, like the long feathers of peacock. Its body is equal in size to a goose, although a goose's neck is long and ill-proportioned, while the zarrin's is short and elegant. My brother, Shah Abbas, had requested [for] a zarrin. And, several were sent with an emissary" (Jahangir, 1624; Khan, 1864, p. 339; Alvi and Rahman<sup>10</sup>,

<sup>4</sup>Sayyid Bayazid Bukhari, was governor of the province of Thatta, and was awarded the title of Mustafa Khan. The Emperor Jahangir, promoted him to the rank of 1000/700, for that he brought a rarity to Jahangir, liked

<sup>5</sup>One mithcal= 4.6 grams (i.e., 0.161 ounce).

<sup>6</sup>They identify this bird as *Gypaetus barbatu shemachalmus* (Lammergeier).

<sup>7</sup>They identify this bird as *Tetraogallushimalayensis* (Himalayan Snow-Cock). It is known as Gurka-kao in Kashmir.

<sup>8</sup>They identify this bird as *Tragopan melanocephalus* (Horned Pheasant). It is known as Sonlu in Kashmir

<sup>9</sup>They identify this bird as *Ciacluscinclus* (Dipper)

<sup>10</sup>They identify this bird as *Lophophorus impejanus lathan* (Impeyan Pheasant). According to them, it is known as Jungli Mohr in Kashmir.

**Table 1.** List of the animals.

Vernacular name	English name	Scientific name
Suh (in Kashmir)	Yellow Lion	<i>Pantheraleo</i>
	Leopard	<i>FelisPardus</i>
Rama Hun (in Kashmir)	Wolf	<i>Canis lupus</i>
Jangli Dand	Wild Ox	<i>Bosaurochi/Bosurus</i>
Ha'angul (in Kashmir)	Black Antelope	<i>Antilopecervicapra</i>
	Chikara Antelope	<i>Antilopechikara</i>
Hiran	Hog Deer	<i>Hyelaphusporcinus</i>
Neelgau	Nilgai	<i>Bosephalustragocamelus</i>
Botakhar	Wild ass	<i>Equushemionus</i>
Riyang (in Ladakh/Khargosh in other parts of Kashmir)	Hare (woolly)	<i>Lepusoiostolus</i>
Eeh (in Ladakh)	Lynx	<i>Felis lynx</i>
JangliBeror	Jungle Cat	<i>Felischaus</i>
Susmar	Lizard	<i>Acanthodactylus(sp)</i>
NA*	Porcupine.	<i>Hystricomorphhystriidae</i>

\*Not available.

1968, pp. 56-57; Thackston, 1999, pp. 372-73).

**Markhor goat:** "The Shinwari Afghans brought a hunted markhor goat the like of which I had never heard of or imagined. I ordered the painters to draw a likeness of this animal. It weighed four Hindustani mounds. The horns measured one and a half yards', by the yard stick" (Alvi and Rahman<sup>11</sup>, 1968, p. 22).

**Bustard and crane:** "It is an amazing thing that in all birds the windpipe, which the Turks call *Chanaq*, goes straight from the top of the neck of the crop, while in the bustard, unlike any other bird, there is a single windpipe from the top of the throat from a distance of four fingers, then it splits in two and goes to the crop. At the point at which it forks there is a blockage, like a knot, that can be felt with the hand. In the crane, it is even stranger, for its windpipe twists like a snake through the bones of the chest and passes to the root of the tail, and then it turns around and comes back to the throat. There were thought to be two kinds of bustard, one black and spotted and the other dun coloured. Recently, it was learnt that they are not two types: the spotted black one is male and the dun coloured one is female. The proof was that testicles were found in the spotted one and eggs in the dun-coloured one. And, the experiment was made repeatedly" (Jahangir, 1624; Khan, 1864, p. 379; Thackston, 1999, p. 416).

**Fish:** "It is well known that the fish of Anantnag spring are blind. I stopped a moment at the spring and cast a net in. Twelve fish were caught in the net. Three of them were blind, and the other nine had eyes. Apparently, the

water of this spring has the influence of making the fish blind" (Jahangir, 1624; Khan, 1864, p. 314; Thackston, 1999, p. 346).

Interestingly, Jahangir also does mention about the carnivorous and herbivorous animals, especially those of which he could not come across in Kashmir. According to him, these animals do not belong and/or exist in this habitat (most probably, he was confused)<sup>12</sup>. The list he provides goes is as shown in Table 1 (Jahangir, 1624; Khan, 1864, p. 311; Bernier, 1983, pp. 395-396; Lawrence, 1895, pp. 108-117; Thackston, 1999, p. 344).

It is very important to note that, Jahangir also records a list of the birds he found in Kashmir. He also adds to our information that, since the name(s) of some of these birds are not known in Persia-(they do not even exist in Persia), they have been written in Hindi. The list of the birds recorded by Jahangir goes are as shown in Table 2 (Jahangir, 1624<sup>13</sup>; Khan, 1864, p. 311; Lawrence, 1895, pp. 117-115; Alvi and Rahman, 1968, pp. 88-90; Thackston, 1999, p. 344).

<sup>11</sup>They identify this mammal as *Capra megaceros hutton* (Wild Goat). It according to them is known as Markhor in Kashmir, and Rawche (Female) and Rapoche (Male) in Ladakh.

<sup>12</sup>It appears that, Jahangir seems to be confused while recording a list of the animals (especially those of which) he had not found in Kashmir. Because, it has been reported that, some of the carnivorous and herbivorous animals such as: leopard, antelope, wolf, hare, the lynx, wild ass and porcupine are quite possible to exist in Kashmir during that period also, and many of them are existing in Kashmir even today. See also, Bernier, *Travels in the Mogul empire*, trans. A. Constable, (Revised by V. A. Smith), Reprint: Delhi, 1983, pp. 395-396; And also, Walter Lawrence, *The valley of Kashmir*, (London, 1895), 2nd ed. Srinagar, 2005, pp. 108-117. For identifying these animals with scientific and vernacular names, I sought the help of some teachers, and research scholars pursuing research in Wild-Life Department of Aligarh Muslim University, Aligarh.

<sup>13</sup>Interestingly, the underlined birds are never heard to exist in Kashmir which Jahangir records to be found in. Here, (H) stands for Hindi and (P) stands for Persian.

**Table 2.** List of the birds.

Vernacular name	English name	Species or genus only
Kulang (p)	Lord Lilford' Crane	<i>Gruslilfordi</i>
Saras (H)	Sarus Crane	<i>Grusantigoneantigone</i> .
Taus (P)	<u>Peacock</u> <sup>14</sup>	<i>Pavocristatus</i>
Charz (P)	Bustard	Otis (sp).
Laglag (H)	Stork	Ciconia (sp).
Tughdari (P)	Great Bustard	<i>Otis tarda</i>
Taghdagh (H)	Lesser Bustard	<i>Otis tetrax</i>
Karwanak (P)	Stone-curlew	<i>Burhinusoedicnemus</i>
Zardpilak (P)	Grey-headed Bunting	<i>Emberizaarcuata</i>
Nuqra (P)	White-legged courser	<i>Cursoriuscoromandalicus</i>
Hawasil (P)	<u>Pelican</u>	<i>Pelecanusphilipensis</i>
Qaz (P)	Goose	Anser (sp).
Konkla (H)	European Cuckoo	<i>Cuculuscanorus</i>
Durraj (P)	Partridge	<i>Perdix(sp); Francolinus (sp)</i> .
Sharak (P)	Starling	<i>Sturnus (sp)</i> .
Nolsurkh (P)	Red-crested Pochard	<i>Brantarufina</i>
Haryal (H)	Green pigeon	Treron (sp).
Dheek (H)	Adjutant	<i>Leptoptilos (sp)</i> .
Quail (H)	Indian cuckoo	<i>Coturnix (sp)</i> .
Shakar-khwara (P)	<u>Sunbird</u>	<i>Nectarina (sp)</i> .
Mahokah (P)	Crow-pheasant	<i>Centropus (sp)</i> .
Mahalat (H)	Tree pie	<i>Dendrocittaformosac</i>
Hans (H)	Bar-headed goose	<i>Anserindicus</i>
Kalchidri (H)	Black robin	<i>Petroica traverse</i>
Tatiri (H)	Lapwing/ Sandpiper	<i>Vanellus/Tringa (sp)</i> .
Bachirm (P)	NA	
Lelolah (H)	Shrike	<i>Lanius (sp)</i> .
Makshah (P)	NA	
Taqlah (P)	NA	
Musichah (P)	Wood-pegion	<i>Columba hodgsoni</i>

## FLOWER PLANTS: SOME NOTES ON MORPHOLOGY AND BEHAVIOUR

Jahangir's botanical interests were primarily horticultural. Alvi and Rahman, best elaborate this phenomenon of Jahangir in the words they write: "Jahangir tells us of having made it possible to cultivate high altitude trees like the cypress, juniper, pine and the jawanesesandal tree in the plains of India. He laid out some beautiful gardens. He compares the fruits and grains of various regions and notes down average and record weights of some of the specimens. Unfortunately, most of his paintings of flower plants have been destroyed by the passage of time. The extent of this loss can be imagined from the fact, that of the more than a hundred paintings of Kashmir flowers,

painted by Mansur alone, not one has survived to this day" (Alvi and Rahman, 1968, p. 6).

Moreover, at about the earliest botanical illustrations, Ebba Koch proposes to remind that, Ustad Mansur's famous Tulips, c. 1620, at the Maulana Azad Library, Aligarh Muslim University, could possibly be the earliest botanical illustration of *Tulipa Linifolia Regel* (Figure 1), 1884 (Koch, 2009, p. 309). She further adds that, it grows in western Central Asia, reaching into the Himalayas in Kashmir and North India, Mansur renders correctly the undulating leaves, and the broad glowing red petals that abruptly contract to a fine point and curve outward, all characteristic of the species (Koch, 2009, pp. 309-313). Another favourite of the Mughals, says Ebba Koch, was *Fritillaria imperialis*, or *crown imperial*. Jahangir described one (along with some other species) he saw during a trip to Kashmir in March 1620, and in this context, also comments on the problem of methodology in assessing his material (Koch, 2009, p. 313). For example, Jahangir

<sup>14</sup>Here underline shows that, this bird does not exist in Kashmir. Jahangir seems to be confused while recording the list.



**Figure 1.** Tulips, signed Mansur, c. 1620, opaque water colour on paper, Maulana Azad Library, Aligarh Muslim University, Aligarh. (Adapted from S. P. Verma, Mughal Painter of Flora and Fauna Ustad Mansur, Plate XI. Verma identifies this flower as *Tulipa clusiana*, but, Koch rightly argues that it fits the description of *Tulipa linifolia* better).

writes: "In some near place of Bambyar<sup>15</sup> there was one strange flower in particular with an odd shape. It had five or six orange coloured flowers blooming with their heads down, and several leaves were poking out from inside the flowers. It was something like a pine apple. The name of this flower is *bulanik*. There was another flower like the *boni*, and around it were the tiny flowers shaped and coloured like *jasmine*. Some were blue and others were pink with a yellow spot in the middle. It is extremely nice looking and harmonious. Its name is *ledor posh*<sup>16</sup>. The flowers of Kashmir are beyond counting or enumeration. Which ones shall I write about? How many can one write about? Only that which are really special can be recorded" (Jahangir, 1624; Khan, 1864, p. 294; Alvi and Rahman<sup>17</sup>, 1968, p. 100; Thackston, 1999, pp. 327-328; Koch, 2009, p. 309).

Thus, it bears to mention that Jahangir qualifies as a keen researcher and finest observer of the flowers of Kashmir, too. And keeping the accuracy at that, he records many of the examples (describing physical appearance and behaviour of the flower plants) with which we can go as under:

<sup>15</sup>Name of a place in Kashmir

<sup>16</sup>Flower named in Kashmiri language

<sup>17</sup>They have described this flower as *Fritillaria imperialis* (Crowned Imperial lily) and the other as *Thistle*.

**Lotus, lily and the black bee:** "The lotus flower is larger than the water lily, and it is pink. I saw many lotuses in Kashmir with a hundred petals. It is a fact that lotus opens by day and closes into a bud by night; whereas the water lily is vice-versa. The black bee, (the people of India call *Bhaunra*), always alights on both these flowers and goes inside to suck the nectar inside them. The lotus flower often closes up and traps the *Bhaunra* inside for the whole night. It also happens with the water lily. But when they open, it comes out and flies away. Because the black bee is a constant visitor to these flowers, the Hindi poets consider it to be like the nightingale in love with the rose, and they produce marvellous poetic conceits based on it" (Jahangir, 1624; Khan, 1864, p. 204; Alvi and Rahman, 1968, p. 96; Thackston, 1999, p. 239).

**Tulip and jasmine flowers:** "In the Fifteenth Regnal year, the tulips in Kashmir bloomed exceptionally well in the palace garden and on the roof of the congregational Mosque. There is abundant blue jasmine in the gardens, and the white jasmine, which the people of India call *chambeli*, is fragrant. Another variety is the colour of sandalwood, and it too looks very beautiful and occurs only in Kashmir. Red roses of several varieties were seen, and one was very fragrant. There is another sandal-wood coloured flower whose fragrance is extremely subtle and fine. It is something like a red rose, and its bush also resembles the rose. There are two sorts of lilies. The one that grows in gardens is very tall and green in colour, the other grows in fields. Although its colour is less vibrant, but, it is fragrant. The *ja'fari* flower grows large and is fragrant, and its bush gets taller than a man. Some years, however, when it gets large and sets flowers, it is caught by worms that spin something like a spider's web over the leaves, destroying them and desiccating the bush. It happened this year also. The flowers seen in the summer pastures of Kashmir are beyond enumeration. Those drawn by Master Nadirul'asri Mansur, the painter, number more than a hundred" (Jahangir, 1624; Khan, 1864, pp. 299-300; Thackston, 1999, pp. 332-333).

**Hollyhock:** "In this land [Kashmir] I saw a flower fiery red and shaped like a marshmallow flower, but smaller in size. So many flowers had blossomed next to each other, that from a distance, it looked like one flower. The tree is the size of an apricot tree. There were also many wild violets growing on the mountain slopes. They were extremely fragrant and their colour was lighter than that of a normal violet" (Jahangir, 1624; Khan, 1864, p. 289; Alvi and Rahman<sup>18</sup>, 1968, p. 98; Thackston, 1999, p. 323).

**Saffron flower:** About saffron flower, Jahangir, records a surprising observation he passed through. He says: "When the river [Bahat] reaches Pampur, ten kos from the city, it increases. All the saffron of Kashmir is produced here.

<sup>18</sup>They identify this flower as *Althea officinalis* (Hollyhock).

**Table 3.** Flower plants.

Vernacular name	English name	Species or genus only
Gul-i Bulanik	Crowned Imperial Lily	<i>Fritillariaimperialis</i>
Lidarposh	Thistle	<i>Centaureasolstitialis</i>
Arghwan-i Zard	Buttercup	Ranunculus (sp).
Nargis	Narcissus	<i>Narcissus poeticus</i>
Banafshah	Violet flower	<i>Viola odorata</i>
Gul-i Badam	Almond flower	<i>Prunusamygdalus/ Amygdaluscommunis</i>
Gul-i Shaftalu	Peach flower	<i>Prunuspersica</i>
YasmanKabud	Lit. Blue Jasmine	Jasminum (sp).
YasmanSafaid	Jasmine white	<i>Jasminumpubescens</i>
YasmanSandali	Sandal coloured Jasmine	Jasminum (sp).
Nilofer	Lotus	<i>Namphaeastellata</i>
Kanwal	Indian Lotus	<i>Nymphaeapurplea</i>
Gul-i Surkh	Rose	Rosa (sp).
Susan	Iris	<i>Iris persica</i>

It is not known whether so much saffron is produced anywhere else in the whole world. Every year five hundred Indian maunds, (which is the equivalent of four thousand Persian maunds), of saffron are produced. I once came to this land with my exalted father during the saffron flowering season. With all other flowers in the world, first is the stalk, and then the leaves and flowers are produced. The saffron flower is just the opposite: when the stalk is up four fingers from the dry earth, an iris-coloured flower with four petals blossoms. In the middle of the flower are four filaments as orange as a safflower and as long as one finger joint. This is the saffron. It grows in un-ploughed, un-watered earth in the midst of clouds. In some places, the saffron fields extend for a kos, and in others for half a kos. It looks better from a distance. At the time of picking, all my inmates got headaches from the intense smell. I got a headache too. I asked the Kashmiris- who were picking the flowers, how they were. And, from their answer, it was obvious that, it had never occurred to them in all their lives to have a headache” (Jahangir, 1624; Khan, 1864, p. 45; Alvi and Rahman<sup>19</sup>, 1968, pp. 91-93; Thackston, 1999, p. 70).

And, in their work, Alvi and Rahman (1968, pp. 100-102), have scientifically classified all those flowers of Kashmir, which Jahangir himself had gone on observing and recording. The same list of the flower plants is given in Table 3.

### FRUIT TREES IN KASHMIR: SOME SIGNIFICANT NOTES OF JAHANGIR

Interestingly, Emperor Jahangir had also been keenly

observing and investigating the fruit trees of Kashmir. His scientific observation bears typical example of the fact that he records, measures, counts and gives a logical comparison of the fruits he had eaten before. Say for instance, he writes: “Before his Majesty Arsh-Ashyani’s reign [Akbar], there [Kashmir] were absolutely no cherries. Muhammad Quli Afshar brought them from Kabul and grafted them. Now there are ten or fifteen fruit-bearing trees. There were also a few trees of grafted apricots. The same person spread grafting throughout the land, and they are now abundant. The Kashmiri apricot really grows well. There was a tree in *Shahrara Garden* in Kabul called the Mirza’i, which bore better fruit than any we had ever eaten. In Kashmir, there are several of such trees in the gardens. The pears are of the finest sort, better than those of Kabul and Badakhshan, and almost as good as the pears of Samarkand. The Kashmiri apple is renowned for being good, but the guavas are middling. Grapes are abundant, though most of them are sour and inferior. The pomegranates are not so great. Watermelons grow very well, and Persian melons get extremely sweet and aromatic. Mostly, however, when they ripen they get worms inside that spoil them. Occasionally, when they escape being wormy, they are extremely fine. Since there are no black mulberries, there are fields of ordinary mulberries. At the base of every mulberry tree climbs a grape vine. The mulberries are not edible, only those from a few trees that have been grafted in gardens are edible” (Jahangir, 1624; Khan, 1864, p. 300; Thackston, 1999, p. 333). He further adds to our information that, the earliest fruit to mature in Kashmir is the *Ashkin*. It is smaller than a sour cherry, it is much better in terms of flavour and delicacy. I commanded that henceforth the *Ashkin* should be called *Khoshkin*. Apparently it also grows in the mountainous regions of Badakhshan and Khurasan, where the people call it

<sup>19</sup>They identify this flower as *Crocus sativus linn* (Saffron), and in Kashmir it is known as Zaaff’ran.

**Table 4.** Fruit trees.

Vernacular name	English name	Species or genus only
Shah Alu	Sweet cherry	<i>Prunusavium</i>
ZardAlu	Apricot	<i>Prunusarmeniaca</i>
Naspati	Peer	<i>Pyruscommunis</i>
Saib	Apple	<i>Malussylvestris</i>
Amrud	Guava	<i>Psidium guava</i>
Angur	Grape	<i>Vitisvinifera</i>
Anar	Pomegranate	<i>Punicagranatum</i>
Tarbuz	Water-melon	<i>Citrullus vulgaris</i>
Kharpuzah	Melon	<i>Cucumismelo</i>
Tut	Mulberry	<i>Morus alba</i>
Ashkin	Straw-berry	<i>Fragaria vesca</i>
AluBalu	Sour cherry	<i>Prunuscerassus</i>

*Najmad*. The largest ones weight is half a mithcal (Jahangir, 1624; Khan, 1864, p. 306; Alvi and Rahman, 1968<sup>20</sup>, p. 108, Thackston, 1999, p. 340). The cherries in the Nurafza garden, says Jahangir, appeared to be about the size of a chickpea on the fourth of Urdibihisht [April 14]. By the twenty-seventh [May 17], they changed colour, and on the fifteenth of Khurdad they were perfectly ripe and the first crop was taken in. The cherry to my taste is the most delicious of all fruits. Four trees had borne fruits in *Nurafza Garden*. I named one of them *Shirinbar* [of sweet fruit], the second *Khoshguvar* [of good taste], the third which produced the most fruit of all, *Purbar* [full of fruit], and the fourth, which had the least fruit, *Kambar* [of little fruit]. One tree in Khurram's Garden had borne fruit, and I named it *Shahwar* [kingly]. There was a sapling in *Ishratafza Garden* I named *Nawbar* [newly bearing]. The cherries of Kashmir are not inferior to those of Kabul, in-fact, they are even larger. The biggest ones weighed a tank and five surkhs. From the four trees in the *Nurafza Garden* fifteen hundred cherries were picked, and from all others, five hundred. I ordered the officials of Kashmir to have cherry trees grafted in most of the gardens and let them to propagate (Jahangir, 1624; Khan, 1864, pp. 306-07; Thackston, 1999, p. 340-41).

And, on the account of Jahangir's significant notes, Alvi and Rahman (1968, pp. 106-08), have further scientifically classified these fruit trees of Kashmir (Table 4).

## CONCLUSION

Indeed, much that has been presented in this paper will remain fragmentary, but, this paper, as proposed, will work as a key concept to the further study of what has been paid a little attention so far. The extra-ordinary qualities of Emperor Jahangir are positive inspirations to

explore further in his field of science in general and his ecological concerns, in particular, as they promise very much possibilities of not only being historically important, but, permanently relevant which may have escaped the analytical eye so far. Perhaps, most importantly, the constant mobility of Jahangir's royal court offered him the opportunity of satisfying his 'scientific passion' almost daily.

What is now set forth as an ideal is that, the existence of the largest possible number of species (viz., birds, animals, plants, and etcetera) is considered an indicator of the ecological health of an area and these in combination are an essential part of the aesthetic life-scape of humans. It was, in-fact, Emperor Jahangir whose own-way of observation and approaches to investigation (whether anatomical, behavioural and/or morphological) of different species' brought us to gain more about: how the natural environment in different ways attracts man, and how man in turn by his concerns was thinking of the biodiversity in several ways in the past. Including how man should communicate better with other living things of different species.

It was, Reiter and Haeckel, in late 19<sup>th</sup> Century, who acquainted us with the concept of, 'ecology' in general, and now, by others, 'behavioural' and 'morphological' ecology as specialised branch(s) in particular, yet, equally it appears that, Jahangir, was no less than a person-of-having also 'deep sense of sensitivity' towards nature. Needless to put that he was acquainted with the concept of 'ecology' before, though in a different manner. Interestingly, the only demerit covered him was his habit of hunting inherited from his predecessors' which unlike others brought him close to the set procedure of knowing 'anatomical structure' of the different species, he did. As it goes that, the 'ecologists', today observe nature, conduct experiments and construct mathematical models, thus my findings about Jahangir would not go wrong proposing that, he had also been observing, conducting and experimenting all, long ago in some significant manner. Or, briefing in other words is to theorise that, Jahangir had some greater scientific bent of mind than any other contemporary ruler of his period in and around. As of now, he is very much in the know that he was a naturalist, but his environmental concerns and scientific notes on 'behavioural' and 'morphological' ecology of different species, proves that he was no less than a person as an 'ecologist' who lived in the past for the use of the present. And all this showcase that, he was not only an Emperor, but was many men rolled into one.

## Conflict of interests

The author did not declare any conflict of interest.

## ACKNOWLEDGEMENTS

The author's mentor and supervisor Dr. (Mrs.) Gulfshan

<sup>20</sup>They have described this fruit as *Fragaria vesca* (straw-berry).



Khan, associate professor in Centre of Advanced Study, Department of History, A.M.U., Aligarh, deserves to be thanked for improvement and guidance throughout the study. Thanks are due to the reviewers' whose comments helped in improving this paper also. And, also thankful Zia-ul Haq Razaqi, for technical guidance while finalizing this paper.

#### REFERENCES

- Alvi MA, Rahman A (1968). *Jahangir-The Naturalist*, National Institute of Sciences of India, New Delhi.
- Bernier F (1983). (1656-1668), *Travels in the Mogul empire*, (Trans.) Constable, A., Oriental books reprint, Delhi.
- Habib I (2010). *Man and Environment: The Ecological History of India*, Tulika Books, New Delhi.
- Jahangir NM (1624). *Tuzuk-i- Jahangiri*, (Ed). Khan, S. A., (1863-1864). Sir Syed Academy reprint, (2007). Aligarh Muslim University, Aligarh.
- Koch E (2009). Jahangir as Francis Bacon's Ideal of the King as an Observer and Investigator of Nature. *J. R. Asiatic Soc. Lond. Third Series* 19 (3): 293-338.
- Lawrence W (1895). *The valley of Kashmir*, Gulshan publishers, Srinagar.
- Subrahmanyam NS, Sambamurty AVSS (2004). *Ecology*, Narosa, New Delhi.
- Thackston WM (1999). (Trans. Ed.). *The Jahangirnama: Memoire of Jahangir, Emperor of India*. Oxford University Press, New York.