



Musth

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Musth in Asian bull elephants is known in range countries from the beginning of its domestication. Asian elephants have been domesticated as early as 4th century BC. One of the oldest text on elephant keeping "Hasthi Ayurveda" which literally translates to Ayurveda of Elephants written by sage Palakapya has given detailed account of this.

Musth is a physiological phenomenon seen in all healthy adult male elephants. It is characterised by aggressive behaviour and heightened sexual activity especially in the initial stages. It is even mentioned in old literature, that elephants in musth were used in war.

Since musth is more or less exclusively seen in elephants, biologists by mistake called it as rut which is seen in ungulates. But elephants are reproductively active during non-musth period also. Occurrence of musth in African elephants is confirmed only recently.

The biological role of musth has been a subject of discussion by various scientists. During musth period the level of male sex hormones (androgens) in the blood reaches very high level. This enables the bulls in musth to establish dominance over other bulls in the range, even if they are smaller in size and age. This gives the bull in musth a chance to mate with receptive females. The biological significance of this being equitable distribution

of all genes in a given population. This diversity is important in the survival of the species.

The bull shows more interest in seeking a cow in estrus than going for combat with other bulls. It may do so only for the sake of a receptive female. The bulls which are not in musth in turn, avoids the bulls in musth. Thus the physical combat is not in proportion to the level of aggressiveness shown by the bulls in musth. Musth is seen usually once in a year and rarely twice in a year. Musth in a particular animal is usually repeated during the same period of the year, provided the animal is healthy. Illness, debility, prolonged periods of work, changes in climate etc. may shift the occurrence of musth. Sick and debilitated animals which fail to exhibit musth during the usual time may come to musth when health is regained. Some studies in the wild herd reveal that not all bulls come to musth simultaneously, but instead they come to musth one after another. When captive elephants are taken to the forest, they avoid bulls in musth, even if the captive ones are bigger in size. It is further noted that when they are forced to go near a bull in musth they resist and even bolt. A wild bull in musth, even if it is tranquilized and in recumbency, can be handled only by a very smart kunkie. The bull elephants are sexually active even during non-musth period when brought near an oestrus female. It may also be noted that they will show personal preference over one female over the other females.

The wild bulls in musth are less aggressive than the bulls in captivity, may be they are wandering in search of a cow in oestrus and spend the time in courtship and mating. Aggression shown by the captive bulls in musth is some sort of diverted aggression. The bulls in musth will keep other bulls off, from its mate. Excessive sexual activity is seen in early and mid musth. Later the libido comes to normal and even becomes below normal. But it will still not allow other bulls to approach the female.

Usually musth starts during 15 - 20 years of age. Before the appearance of the full-blown musth the animal shows asymptomatic musth. In such cases the temporal discharges may not be seen. The change in mood may be on and off. Only after 2- 4 years the animal will exhibit full-blown musth with all the standard symptoms. Since the animal may not show characteristic type of symptom from the management point of view of captive animals, this is dangerous and involves risk to the mahout and other people attending on the animal. Since the animal becomes aggressive and may try to bolt, special chains are used to control. Musth chains are stronger than the normal ones and





links are made up of 12 - 14 mm thickness. All the joints, connections and locks are made foolproof. The old saying that a chain is as strong as the weakest link is worth remembering. For convenience of description of musth is divided into three stages.

Stage I - Premusth.

Temporal glands (musth glands) become swollen. There will be occasional discharge which is brown in colour and has a characteristic smell. Rarely the opening may get blocked causing discomfort to the animal. It may scratch the area with the trunk tip or even with do so with the help of a small stick and scratching with wooden stick may lead to injury and infection. Hence in cases where there is no proper discharge, attempts must be made to make the flow easy. However scratching with trunk is normal. There is oedema and enlargement of the perineal region. Frequent erection of the penis and attempts to masturbate are also noticed. Erected penis is beat repeatedly on the belly during masturbation. Tendency to * the mahout is common. As a sort of diverted aggression the animal gore on the ground. Maximum aggression is shown towards the mahout. Sometimes it may allow other persons to come near. However any attempt to give command is often resisted aggressively.

Stage II - Musth

Phase I - The discharge from the temporal glands become slow and viscous. Penis is enlarged and partially erected. There is very little or no discharge from the penis. During this period also, animals will not obey the commands. Even the very sound of the mahout throw the animal into a fit of fury. Body is stretched. Trunk reaches out frequently and ears are spread out as if listening to something.

Phase II - There is continuous discharge of the temporal gland. The characteristic smell which some people describe as "gun powder smell" is felt even from a distance. Redness around the temporal opening, hitting the trunk on the ground, attempts to break the chain, anorexia, reduced intake of water are the other symptoms noticed during this phase. Animal urinates without protruding the penis and hence soils the inner aspect of the thigh. There is dribbling of urine. Animal fiddles with the palm leaves and may throw it at the mahout. Stereotypic movements of the head and whip like movements of the trunk are noted. Gradually the temporal gland shrinks and the animal starts urinating with the protruded penis. Animal becomes more responsive to the commands and shows less aggressiveness.

Phase III - Temporal glands are reduced back to their normal size and there is no discharge either. Urination is normal and he behaviour also becomes apparently normal. But mahouts must be cautious, since at any time the animal may turn violent. It is advisable to put hobbles while marching.

Tethering site must have a slight slant towards the hind portion which will help in proper drainage. The tree or the peg on which one of the hind limb is tethered should be strong. A paved surface of 60 cm radius around the tree will help to keep the area clean. Dung and left over fodder must be removed daily. A long hook can be used for this purpose.

Care during musth : Usually the animal in musth is tethered both on its hind limb and forelimb. This will help in removing the dung and left over and keep the site clean. Elephants may be off feed and there are chances for dehydration. Hence the animal should be watered properly. It will destroy the iron or plastic buckets and hence it is often a practice to have a concrete trough kept at the tethering site. In traditional places a trough cut out from rock is used. A half cut drum sunk on the ground is another alternative. In any case the water trough is to be kept clean at all times. Using a water hose from a distance may not always work. Tethering site near a running stream is also advisable.

Injuries caused by the chains are the most common problems during musth. Spiked belts which are common in certain North and North Eastern regions should not be used. These can cause wounds and even The chain should be moved up every day and the hind legs should be alternated frequently. Mahout should not leave the place taking a "musth leave".

The duration of the musth is seen to vary in different countries. The following table gives an idea on this.

Sri Lanka (Wild Bulls)	1 - 34 days
Myanmar (Burma)	3 - 80 days
Kerala	1 - 1.5 months (12 %)
	1.5 - 2 months (16 %)
	2 - 3 months (72 %)

Incidence of Musth in Captive Males (Sri Lanka

Age	% Showing Musth
Below 10 years	0
10 - 20 years	10
21 - 25 years	62
25-30 years	75

In Myanmar recurrence of musth is most common during the period of March April and May and lasts for 3 - 80 days. But majority of the 210 elephants studied exhibited musth for 23 - 27 days. During the cool months of December January and February the working elephants show musth even if they are subjected to heavy work. This is in agreement with the findings in Kerala

Month wise Incidence of Musth in Elephants in Myanmar

Month	No: of animals	%
January	15	10.13
February	11	7.43





March	17	11.48
April	36	24.32
May	29	19.6
June	4	2.71
July	4	2.7
August	4	2.71
September	7	4.73
October	4	2.71
November	4	2.71
December	13	8.77

Age wise distribution of Musth in Elephants %

41-50 Years	6
41-51 Years	20
41-52 Years	40
21-40 Years	33
10-20 Years	01

Hormones and musth: There is an increase in the male hormone testosterone in the blood during musth. Aggressive nature of the elephant is attributed to the high level of the male hormone. This high level of androgen is preceded by a pulse of leutinising hormone. This surge of LH is noticed prior to musth. There are not many major biochemical changes in the blood except for some enzymes and creatinine.

Testosterone level in elephants

Non musth period	0.2 - 1.4 nano grams per ml
Just prior to musth	4.3 - 13.7 nano grams per ml
Full musth	29.6 - 65.4 nano grams per ml

Based on this use of antiandrogen, (Droge nil) was tried in protracted case of musth and found to be effective. The antiandrogen was also supplemented with sedative (haloperidol) and diuretic (frusemide - Lasix). There are some studies of using GnRH analogues like Lupramide, especially the long acting ones to suppress the secretion of androgens.

Castration has been tried and found to be effective. But it is a major surgery since the gonads are situated intra abdominally. The recommended age is between 2 - 4 years. Hence there is practical difficulty in the surgical method.

Therefore in the Kerala situation the best method will be the use of drug like depot acting GnRH analogue, antiandrogen and long acting sedatives. But these have to be undertaken with strict supervision of an experienced and qualified veterinarian to develop a standard protocol that can be adapted by less experienced persons.

It must always be borne in mind that musth is a natural phenomenon and its control should be done only if it is urgent and unavoidable. The old dictum of "therapeutic hazard should not exceed disease hazard" has to be taken into consideration.

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caused due to ignorance and uncontrolled use of restraining devices by the mahouts as recorded in the book "Gajaparipalanam - prasnangalum, pariharangalum".

There is legal recommendation too in this regard. The Government of Kerala had laid out the rules regarding captive elephant management vide provisions under section 64 of Wild Life Protection Act 1972. Some of the relevant rules read as follows:

1. All the mahouts in service and newly recruited shall undergo inservice/pre service training by Forest Department and obtain license.
2. The Chief Wild Life Warden/authorised officer will issue license based on his performance in training.
3. The license should be renewed every two years.

Similarly, the rules insist the proper housing, ownership, care of elephants, feeding practices, work load, timber hauling, acts of cruelty to elephants, norms and standards of transportation, retirement of elephants, care of old elephants, record keeping, breeding policy, cutting tusks and remuneration to mahouts.

There has always been a strong public feeling regarding the importance of training the mahouts and owners and inculcating a right attitude in them. The disdain with which we ignored this might explain most of the accidents involving loss of precious lives. We are yet to learn the lesson. This costly neglect nonetheless should not continue.

Mahouts have been trained in the traditional ways. This traditional system of learning i.e., learning informally from the predecessor involves transfer of irrational know how as well that may include brutal practices. This system should be replaced by the modern one so that scientism and human practices find a place. Empathy, compassion and right attitude are to be inculcated through appropriate curriculum and instructional methods.

Therefore, it is high time that we realised the importance of formal training. Perhaps a functional literacy programme is the foremost priority to the mahouts. Experts of elephant management, experienced and renowned mahouts and nonformal educationists can jointly formulate the curriculum and lesson plans for such a functional literacy programme.

