



Characterisation, Conservation and Sustainable Utilization of Kombai Dog Breed: A Unique Genetic Resource of India

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

Kombai is an ancient dog breed of Tamil Nadu, India. The Kombai dog is renowned for its fierce loyalty to its family and aggressiveness towards its adversaries. They are incredibly powerful, extremely intelligent, courageous, protective, resilient, territorial, and amiable breed making them as excellent guard dogs. Other names of this breed are Indian/Tamil Bear Hound, Poligar Dog, Mandai War Dog and Indian Rottweiler. The significant feature of this breed is that it lacks a fierce bark, it barks infrequently. Kombai is a sight hound, it hunt by sight and speed rather than by scent and stamina. The breed originated from the foothills of the Western Ghats in Theni district, Tamil Nadu. The breeding tract of this dog are Kombai, Uthamapalayam, Pannaipuram, Thevaram, Periakulam, Bodinayakkanur, Cumbam and Kudalur of Theni district and consequently dispersed throughout the southern India. The variants of this breed are Pulicharai Kombai and Porr Kombai. Kombai is

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medium-sized dog with muscular physique. True to this type of breeds are tan, brown, or reddish brown in color with a black muzzle, hence it is called as "Karuvaisevalai" or "Karumunji naai". Piebald and brindle coat types are less popular. The head of a Kombai dog appear to be slightly larger than the body as a whole. Large oval-shaped dark brown eyes, strong jaws, and a broad, deep chest characterize the Kombai, and it has single, uniform, dense coat that is neither patchy nor uneven. It has lean muscles and a ridge that runs the length of their spine in the opposite way strengthens the entire body. Their mid-length ears are mostly flat or fold over at the front or sometime erect. The legs are designed for agility and quickness. The tail has smooth hair and is long, curling at the edge like a sickle. An adult dog weigh up to 30kg (Male 25–32 kg; Female 20–25 kg) and 24 inches in height (Males: 22 to 24 inches; Females:19 to 22 inches). Average life span of this breed is 12-15years. Litter size is 4 to 6. Kombai dogs attain sexual maturity between 6-10 months. At present, the Kombai breed is becoming scarce and is in danger of going extinct as a result of ban on hunting, indiscriminate breeding, lack of knowledge about their significance, and shortage of traditional breeders. It is imperative to take immediate action to conserve this superior distinctive genetic resource. Establishment of Kombai breeders association and proper coordination and integration among various agencies is highly needed. This unique Kombai dog should be conserved in their innate habitats by implementing partaking approach by including breeders, communities, and other pertinent shareholders in conservation programs and it should be registered as breed.

Keywords: Kombai; morphological characters; breeding tract; utility; conservation.

1. INTRODUCTION

Indigenous dog breeds are recognized for their power, alertness, loyalty, and ingenuity; each has unique traits, functions, and cultural implications. In very beginnings they are used for hunting and guarding and companionship. Their role in the livestock production system is evident in the way they driving the flock sheep, goats, and other livestock. Because native breed dogs are so resilient, they will require less maintenance. The Indian Agricultural Research Institute - National Bureau of Animal Genetic Resources (ICAR - NBAGR), the nodal agency for the registration of newly recognized livestock and poultry germplasm of the country, has registered three indigenous dog breeds in 2020, namely Rajapalayam, Chippiparai and Mudhol Hound and reported in the Gazette of India for the first time. Rajapalayam and Chippiparai are originated from Tamil Nadu. Rajapalayam dogs are mostly present in Tamil Nadu's Virudhunagar, Tirunelveli, and Madurai districts, with a population estimated at 3000-4000. Chippiparai dogs are present in Thoothukudi, Tirunelveli, Virudhunagar, and Madurai districts of Tamil Nadu, with a population of around 6,000 [1]. The other home-grown dog breeds of Tamil Nadu are Kombai/Combai, Alangu, Malayeri, and Sengottai dog. Indigenous breeds are naturally hunters, however, since hunting is banned, the number of breeders has decreased. Those who continue to breed them do so solely for personal interest and enthusiasm

by the time the foreign breeds of dogs became famed everywhere.

This article reviews about the characteristics of endangered Kombai dog, an ancient breed, native of Tamil Nadu, their breed attributes, its conservation and management techniques. They are used as a guard dog for rural farmers, householders, or as a companion dog. The Kombai dogs are thought to have originated from the red wild dog known as "Shen naai", they resemble the Rhodesian Ridgebacks of South Africa and also the other wild dog, known as Dhole, appear to represent the common progenitor of the Kombai. At present, the Kombai breed is becoming scarce and is in danger of going extinct as a result of ban on hunting, indiscriminate breeding, a lack of knowledge about their significance, and a shortage of traditional breeders [2].

2. KOMBAI – GENERAL CHARACTERS

The Kombai dog is a strong, brave, protective, and energetic animal. Although they are a very territorial, loving, clever, and friendly breed, they can be aggressive towards strangers. The Kombai dog is renowned for its fierce loyalty to its family and fierceness towards its adversaries. Other names of this breed are Combai, Indian or Tamil Bear Hound, Poligar Dog, Mandai War Dog and Indian Rottweiler. The significant feature of this breed is that it lacks a fierce bark, barks infrequently, and has a typical rural dog

appearance [3]. Traditionally, the Kombai breed has been employed to hunt deer, bison, and other hazardous wild creatures. Being a sight hound, the Kombai hunt by sight and speed as rather than scent and stamina. Additionally, the Kombai breed is maintained for protection and guarding; they are known to make outstanding guard dogs [4]. They are robust, resilient creatures with an innate defense against illness and parasites. They are able to withstand high humidity and heat. Naturally healthy, the Kombai dog breed requires less veterinary care and grooming. The Kombai is specifically recognized as "one-man dog". Adopting and training a Kombai dog at an early age is recommended due to their potential for aggression. It exhibits hostility against strangers as a result of its fierce protectiveness over its family and livestock. It is also a territorial dog that exhibits aggression against other dogs. Overly protectiveness and stubbornness are innate traits that can be mistaken for violence. Proper socialization can transform the Kombai into a devoted and energetic companion, fostering strong relationships with kids [5]. The price range for a month-old Kombai puppy is ₹5,000–6,000.

3. ORIGIN AND DISTRIBUTION

The breeding tract of this dog are Kombai, Uthamapalayam, Pannaipuram, Thevaram, Periakulam, Bodinayakkanur, Cumbam and Kudalur areas in the Western Ghats of Theni district and consequently dispersed throughout the southern India [6]. However, The Tamil dictionary definition of "Kombai" is "Interior corner", the bottom of the mountains. The word 'kombai' means a fertile, low-level tract in the scrub to be found in the foothills of the Western Ghats region and as this breed originated in this sort of topography, hence the breed had been named after it [7]. The Kombai panchayat town is located at the foothills of the Western Ghats in Theni district. The Kombai town is surrounded by mountains, north - Pannaipuram, east - Salamalai hills, west Ramakkal mettu hills and Kerala border hills, South -Uthamapalayam. Kombai town was one of the 72 palayams, each ruled by a Palyakkarar (Poligar) under the Madurai Nayak dynasty. The Kombai dog was traditionally kept by Zamindar's family for hunting and guarding purpose [8].

4. HISTORY

The Kombai is one of the ancient dog breeds that still exist that date back to the year 580–630 CE.

The antique sculpture known as "Hero Stone or Nadukal or Veerakal" at Eduthanur village, Chengam, Tiruvannamalai District, Tamil Nadu, erected during approximately 624 CE by the Pallava King Mahendravarman-I, showing a man with dog [9]. According to the sculpture's tale, a guy by the name of Karundevakathi was watching over the village's animals. The dog supported him during his battle with the livestock robbers, but both of them perished in the conflict. The dog is called "kovivan," and it has a muscular and well-built body, erected ears and open jaw that displays its teeth and that is exactly similar to the appearance of Kombai breed. The Kombai dogs are also called Polygar dog. Polygars means "Palaiyakkarars" who were chosen to serve as military commanders and administrative governors beginning in the Vijayanagara Empire (1336–1646). In the Kombai town's main temple, Lord Ranganathar is the chief deity and the idol was sent by Tipu Sultan from Srirangapatna, Karnataka. The Kannada Zamindars of Kombai, gave Tipu Sultan Kombai dogs for his army when Hyder Ali and Tipu Sultan invaded the south. The vicious dogs were trained to tear the hamstrings of the enemy horses. Tipu Sultan sent a Lord Ranganathaswamy idol to the Kombai town's temple to show his gratitude. According to Colonel James Welsh, a British army commander who wrote a book titled "Military Reminiscences (1830)" and documented the Poligar war, the Marudhu brothers' forces employed the Kombai dog to defend their fort at Kalaiyarkovil, close to Tirunelveli. In his book "Madhura Country," James Henry Nelson (1868) outlines the qualities of the Kombai dog, characterizing it as courageous, dependable, and extremely significant in prehistoric civilization. The deal between the local rulers, who offered their horses in exchange for the Kombai Dog, was also recounted by him [2]. Throughout history, this canine was employed as an aggressive guard dog to protect forts and palaces.

5. MORPHOLOGICAL CHARACTERS

Kombai is a sturdy, medium-sized dog with an athletic, muscular physique. This breed is most commonly tan, brown, or reddish brown with a black muzzle and it is called as "Karuvaisevalai" or "Karumunji naai". This breed may have a dark stripe running down its back and a tiny bit of black pigment on its ears and feet. Piebald and brindle coat types are less popular. Piebald is referred to as "porr," and brindle as "pullisaral."

The head of a Kombai dog appear to be slightly larger than the body as a whole. Large oval-shaped dark brown eyes, strong jaws, and a broad, deep chest characterize the Kombai, which have a single, uniform, dense coat that is neither patchy nor uneven. It has lean muscles and a ridge that runs the length of their spine in the opposite way strengthens the entire body. Their mid-length pendant-shaped ears are erect or flat and fold over at the front. The legs are designed for agility and quickness. The tail has smooth hair and is long, curling at the edge like a billhook. An adult dog weigh up to 30kg (Male 25–32 kg; Female 20–25 kg) and 24 inches in height (Males: 22 to 24 inches; Females:20 to 23

inches) (Picture 1 and 2). In Rajapalayam dog, the mean adult body weight for male and female was found to be 24.69 ± 0.43 and 21.42 ± 0.47 kg [10], whereas in Kanni dog it was 23.50 ± 1.59 kg and 18.51 ± 1.18 kg, respectively [11]. The mean height at withers of Rajapalayam dog in male and female animals was 63.10 ± 0.91 and 58.91 ± 0.57 cm, respectively, whereas in Kanni dog it was 67.39 ± 0.54 and 65.07 ± 0.66 (25), respectively [11]. Karthickeyan et al., [12] reported the overall height at withers of Chippiparai dog was 59.56 ± 1.30 cm. Average life span of this breed is 12-15years. Litter size is 4 to 6. Kombai dogs attain sexual maturity between 6-10 months (Picture 3).



Picture 1. Kombai male



Picture 2. Kombai female



Picture 3. Kombai with puppy

6. KOMBAL DOG BREED VARIETIES

There are two variants of this breed, namely Pulicharai Kombai and Porr Kombai [13].

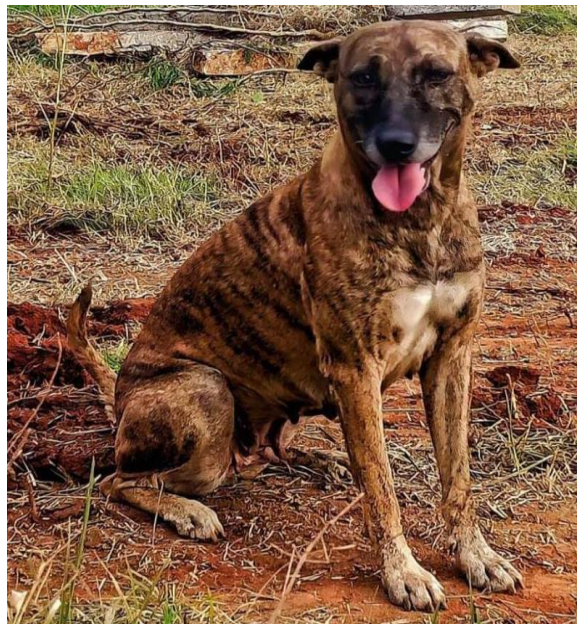
6.1 Pulicharai Kombai

The Pulicharai Kombai is a brindled variation with a color combination of gold and brownish tones

that resembles tiger stripes. In Tamil, "charai" denotes stripes and "puli" denotes tigers (Picture 4).

6.2 Porr Kombai

The piebald variant is Porr Kombai. Piebald have fur that is speckled or blotched in distinct colors, with one color appearing in uneven patches.



Pic 4. Pulicharai Kombai

7. UTILITY AND MANAGEMENT

In earliest periods the Kombai breed was employed as royal bodyguards and to protect forts and palace grounds. Farmers used Kombai to protect their livestock and King's used Kombai as a battle dog. They are excellent guard dogs, and are employable by the military and police. The Kombai are extremely clever canines with a keen sense of intuition. Because of their innate loyalty and protectiveness toward those they feel comfortable with, they make excellent pets. The Kombai breed requires less upkeep and care because to its short hair and single coat, and they do well on home-cooked food. Since Kombai puppies have a nervous temperament, severe training methods do not work; instead, they should be educated using rewards. Kombai require training in agility, speed, and biting since they will make excellent security dogs [14].

8. CONSERVATION

As explained by various studies, the indigenous dog breeds have high levels of inbreeding and genetic diversity loss, which reduces their capability to adapt in particular situations and highlights the need for conservation efforts [15]. To emphasize the importance of indigenous dog breeds, extensive research should be carried out on behavioral genetics, physiological aspects, and morphological aspects from a molecular perspective. Dog breeders and farmers will also benefit from breed characterization and behavioral studies [16].

Kombai dogs are on the edge of extinction. It is difficult to find a purebred Kombai and its lineage has been diluted over the years, as the importance of this dog has diminished due to the modernization, a decline in the demand for their traditional duties as hunters and protectors, and people's interest in non-native dog breeds. In order to preserve and restore this native breed that is in danger of extinction, prompt action must be taken. The Kombai dog is exceptional, possessing great physical qualities, resistance to diseases, more economical for maintenance, friendliness, and good guarding abilities. These days, this breed might find new uses as sport dogs, companion dogs, or therapy dogs. By conserving these native breeds, we pay tribute to their historical achievements and ensure the survival of an exceptional cultural inheritance and preserve their genetic diversity for future generations. Preservation of the distinct genetic legacy of these dogs is greatly aided by

conservation efforts, which include breed-specific programs and breed recognition. Breeders, communities, and other pertinent stakeholders should be included in conservation efforts in order to adopt a participatory approach to conserve this excellent indigenous breed in its natural habitat.

An emphasis should be placed upon identifying various molecular markers that will enhance dogs' adaptability to hypoxic conditions, disease resistance, sniffing abilities, and other characteristics that will enhance their utility. Of late, genomic technologies such as molecular markers specifically PCR-based microsatellite markers and DNA sequencing-based single-nucleotide polymorphism markers have been widely used to estimate genetic diversity and promote genetic conservation. The microsatellite markers are the ideal tool to analyze genetic diversity among the dog populations [17]. To protect this unique breed for future generations, conservation efforts are being made through campaigns to raise awareness and educate the public about the importance of this breed. Further declining the number of this unique breed can be minimized through encouraging controlled breeding methods, promoting adoption, and offering appropriate care and nutrition.

9. CONCLUSION

Kombai is the iconic dog breed of Tamil Nadu, primarily used as a guard dog. This indigenous dog breed is evolved over the thousands of the years through the natural selection and they adapted to the local climate and living conditions. Their rich history, diverse characteristics, more resilient and adaptability make them as unique genetic resources. Kombai dog is well-known for their loyalty, intelligence and have the instinct to protect their families, making them great companions and guard dogs. Because of years of ignorance, negligence and indiscriminate breeding, this superlative breed is at the edge of extinction. It is imperative to take immediate action to conserve this superior distinctive genetic resource. The conservation entails the protection besides enhancement of the genetic potential and management of a breed for henceforth. Identification, characterisation, assessment, recording, and conservation should all be a part of an efficient conservation effort. It is imperative that the Kombai Breeders Association be established, and that different entities properly coordinate and integrate with one another. Breeders, communities, and other

pertinent shareholders should be included in conservation plans in order to adopt a partaking approach to the breed's conservation in its natural habitats.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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