

**Research Article**

Redescription of *Oligodon arnensis*, Shaw, 1802 (Reptilia: Colubridae) collected from Birbhum, West Bengal, India

P. DE*, S. Bhakat and A. K. Sinha

Associate Professor, Department of Zoology, Rampurhat College, Rampurhat—731224, Dist.- Birbhum, W. B., India

ARTICLE INFO:

Article history:

Received: 30 November 2017

Received in revised form:

20 December 2017

Accepted: 28 December 2017

Available online: 30 March 2018

Keywords:

Banding pattern,

Eye-diameter,

Infra-labials,

Morphometry,

Supra-labials.

ABSTRACT

Oligodon arnensis, Shaw, 1802 commonly known as kukri snake, a semi-fossorial snake species is taken for study as it is a most challenging group of snake. A morphometric study on several aspects like the number of supra-labials, infra-labials, ventrals, dorsals, distance between eye to nostril, eye diameter, number of bands, shape of banding etc. are reported. A significant correlation is present in between snout-vent length and tail length and in between eye diameter and distance from eye to nostril a possible explanation of large eye size related to habitat is given in the study.

Introduction

Oligodon Fitzinger, 1826 belongs to a challenging taxonomic group of snake as well as possessing a synonymous naming as *Simotes* by Boulenger, [1] while Wall [2] discarded the naming given by Boulenger. It should be noted that several herpetologists [3,4,5-11] from different corners of the world like Cambodia, Indonesia, Vietnam, Malaysia etc. described several new species of *Oligodon*. Consequently in India the study on *Oligodon* was done by several workers also [12-15]. Fellows Sandeep [16] and Gayen et al. [17] mentioned *Oligodon* in their studies. It is surprising to note that no such detailed study is done on *Oligodon arnensis* in Bengal, India though a large number of *Oligodon* is widely distributed in Bengal.

Seventy south and southeast Asian snake species of the genus *Oligodon*, also known as 'kukri' snakes as the name derived from the strongly curved broad hind teeth like Nepalese knife, 'kukri' is separated characteristically from other species of snake in having large nostril, long frontal, two shield like temporal [2]. The notable characteristic of *Oligodon arnensis* is their coloration which resembles to that of krait [18] often misleads the species as krait. Dwibedy [19] found the

similarities of the presence of inverted 'V' mark on head and alternate banding colouration with *Bangarus fasciatus* during the study of mimicry and also mentioned some differences between them. Though the species is categorized under LR-1c (Lower Risk- least concerned) [16], now the population is dwindling very fast due to urbanization, pesticide pollution and lack of shelter and food. This necessitates the present investigators to study the species in detail. The present report deals with the morphometry and colouration of *Oligodon arnensis*, Shaw, 1802.

Materials and methods

The present study is based on seven preserved specimens collected from Rampurhat (24°10'52.96"N, 87°46'52.51"E). The specimens were examined for fifteen morphological characters along with colouration, banding pattern, eye diameter and distance between centre of eye to nostril. All the data except total length and tail length were taken with the help of slide calipers to the nearest 0.1 mm. The measurements of total length and tail length were taken also in

mm. Dorsal, ventral and sub-caudal scales were counted by hand lens. Colouration and banding pattern at different positions were recorded. Comparative statistical analyses on the morphological data were calculated.

The fifteen morphological characters taken for study are listed in the table with their abbreviations (Table-1A &1B).

Results

Table 1 A: Morphometric Characters of *Oligodon arnensis* (n=7)

Characters	Mean±SD	Range	
		Minimum	Maximum
Snout-vent length (SVL)	584.29 ± 49.96	510	650
Tail length (TL)	116.71 ± 25.33	80	150
Total length	701.00 ± 75.21	590	800
Relative tail length (%)	0.1645 ± 0.018	0.1356	0.1875
Number of Ventrals (VEN)	215.86 ± 2.60	213	220
Number of Subcaudals (Sc)	44.57 ± 2.61	40	48
Eye diameter (EYED)	2.4 ± 0.68	1.25	3.25
Center of Eye to Nostril (EYEN)	5.17 ± 0.66	4.00	6.00

Table 1 B: Morphometric Characters of *Oligodon arnensis* (n=7)

Characters	Number/ Type
Dorsal (Ds)	17 rows
Ventrals (VEN)	Angulate laterally
Subcaudals (Sc)	Paired
Loreals (Lor)	1+1
Supralabials (SL)	7+7
Infralabials (IL)	5+5
Pre-ocular (Pre-oc)	1+1
Post-ocular (Post-oc)	2+2
Bands	
a. Head to Neck	2 / Arrow shaped.
b. Neck to Vent	22—30.
c. Tail	8—9

Diagnosis: Head: Seven supra-labials (3rd & 4th, entering the eye), one pre-ocular, one loreal, two post-ocular, two temporal, five infra-labials (of which three in contact with chin-shields).

Dorsal: Seventeen row, smooth.

Ventral: 213-220, angulate laterally; anal divided.

Sub-caudal: 40-48, paired.

Length: 590-800 mm. variable tail length.

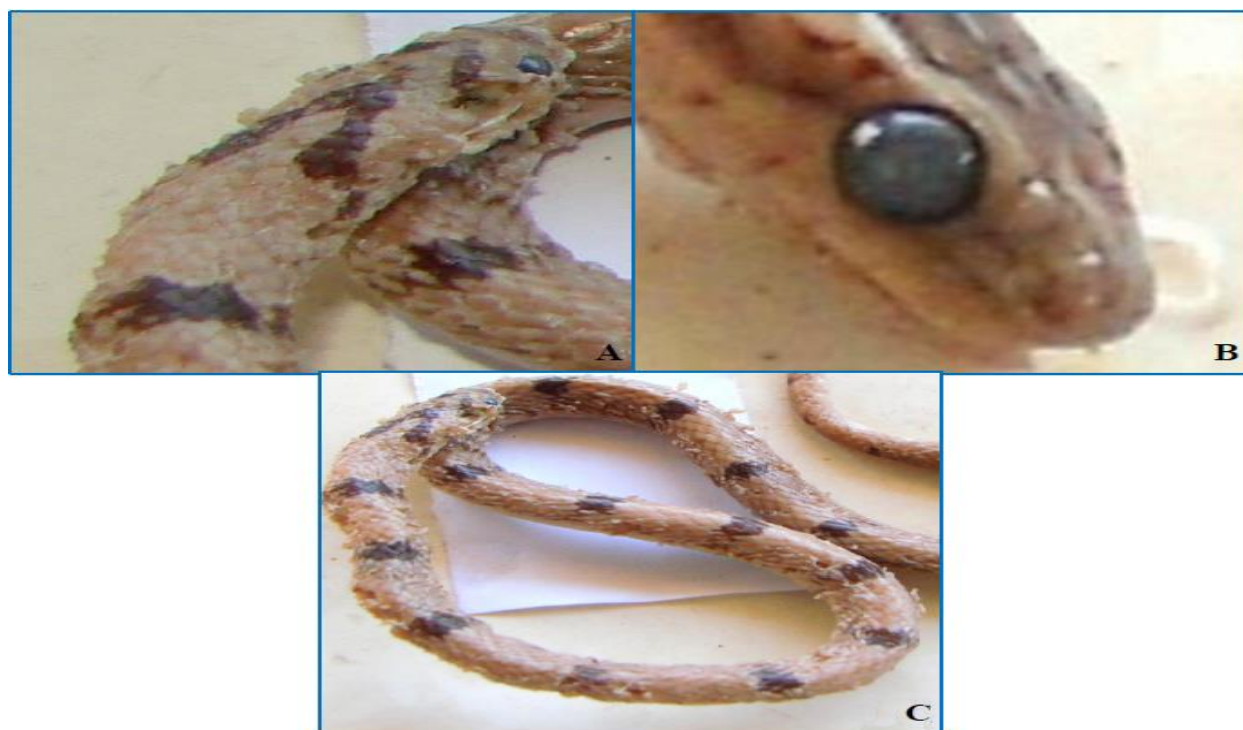


Plate 1 A- Arrow shaped bands in head and neck region. B- Large eye. C- Bands, banding pattern and body-shape

Description

Head: Rectangular in shape. An arrow shaped deep brown band present in the head region extending up to in between the eyes (Plate- 1.A). Large eyes (Plate- 1.B).

Neck: Another angular deep brown band also observed in this region (Plate 1.-A).

Dorsal: Slender, triangular body (Plate- 1.C); Yellow or light brown in colour; The bands strictly limited within the dorsal scales, not extending lateral sides or ventral scales; The

number of bands in between neck to vent and tail bands are variable. From neck to vent the number of bands varies from 22-30. In the tail region, the bands are eight to nine in number. The total number of bands on dorsal surface ranges from 32-41. The bands are deep brown in colour (Plate- 1.C) . The width of the bands is two-scales wider (minimum) or more. The inter-band difference is variable.

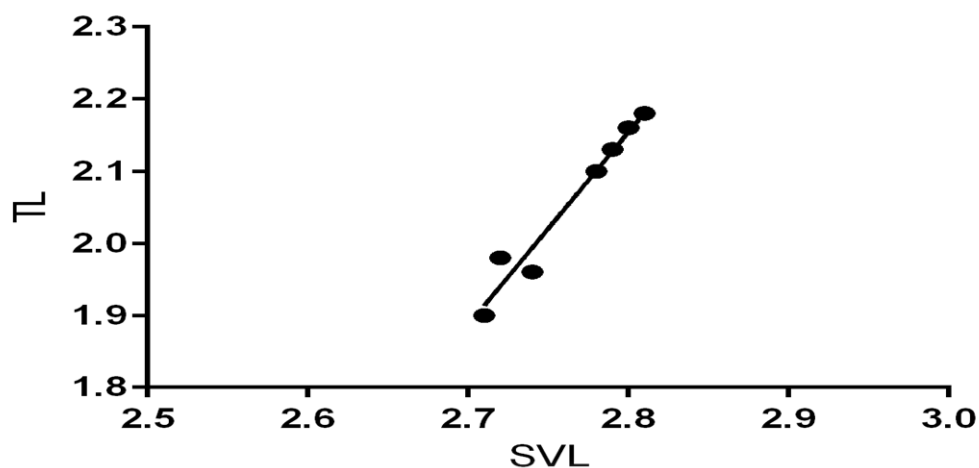


Figure 1: Regression of tail length (TL) on snout-vent length (SVL) in *O. arnensis* (in log scale) ($Y=2.675X - 5.337$, $P<0.0001$, $r^2=0.9596$)

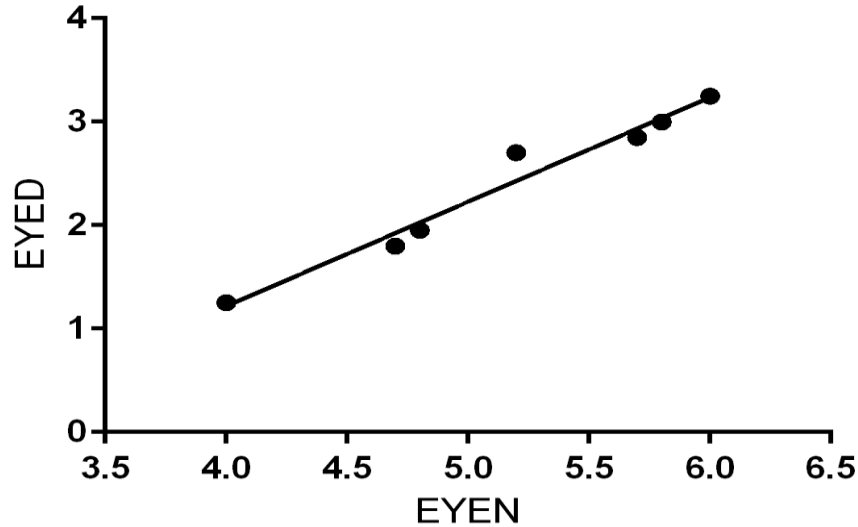


Fig. 2: Regression of EYED on EYEN (in mm.) in *O.arnensis* ($Y = 1.010X - 2.823$; $P < 0.0001$; $r^2 = 0.9681$)

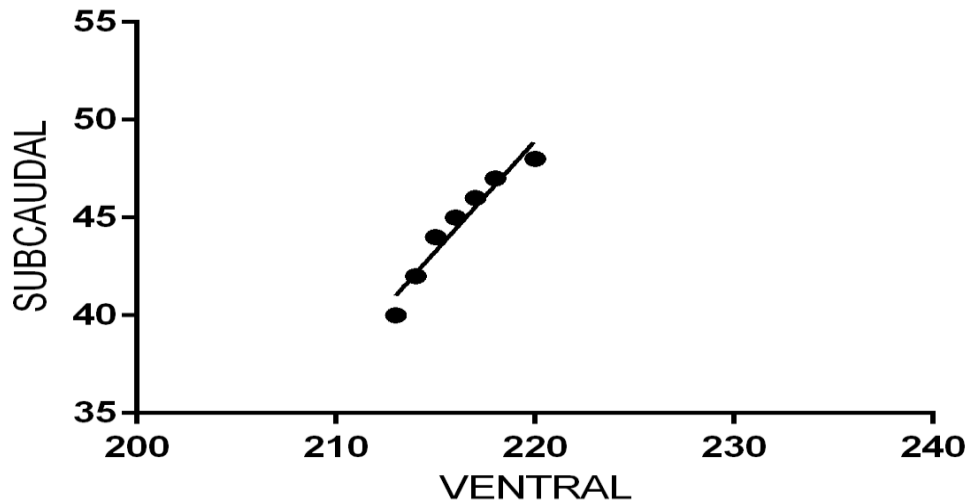


Fig. 3: Regression of no. of subcaudal on ventral in *O.arnensis* ($Y = 1.131X - 199.9$; $P < 0.0004$; $r^2 = 0.9347$)

Statistical analysis is based on snout-vent length and tail length (log Scale) of the species concerned. The result shows significant variation ($r^2=0.9596$, $P<0.0001$) (Fig. 1.). Distance between eye to nostril (EYEN) and diameter of eye (EYED) in percentage of snout-vent length when calculated, shows significant variation ($r^2=0.9681$, $P<0.0001$) (Fig. 2.). Statistical analysis is also done considering two parameters i.e. number of ventral and that of sub-caudal in seven specimens of *O. arnensis*. This result also shows significant variation ($r^2=0.9347$, $P<0.0004$) (Fig. 3.).

Discussion

Boulenger [1] reported seven upper labials in *Simotes arnensis* (a synonym of *Oligodon arnensis* as proposed by Wall [2] and Abyerami and Sivashanthini [20] also mentioned same observation in *Oligodon arnensis*. But Wall [2] reported that second was rarely divided and the series then counted eight in case of supra-labials. Sharma [21] reported six or seven supra-labials and Ganesh and Asokan [22] mentioned seven supra-labials (rarely six or eight) in *Oligodon arnensis*. The present observation is in consistent with the findings of most of the workers.

In the present study, there are five infra-labials in *Oligodon arnensis*, Wall [2] mentioned that occasionally there were five infra-labials while Boulenger [1] reported four lower labials (in contact with anterior chin shields) in *S. arnensis*. Our observation is within the range of reports of others. In the present study the dorsal scales are smooth, arranged in seventeen rows in *O. arnensis*. This observation is supported by the studies of Boulenger [1] and Sharma [21]. But Abyerami and Sivashanthini [20] mentioned that the arrangements of dorsal scales are in 17:17:15 rows while Ganesh and Asokan [22] reported same arrangement of smooth dorsal scales.

Number of ventrals ranges from 213- 220, angulate laterally in the present study. Boulenger [1] reported that the number of ventrals were 170-202, angulate laterally while Sharma [21] mentioned 164-202, angulate laterally. Wall [2] reported 164-202 ventrals but Abyerami and Sivashanthini [20] viewed 169-177 ventrals though Ganesh and Asokan [22] reported 161-199 ventrals in male and 166-201 in female. Anal shield is divided in the present study. The study of Boulenger [1], Sharma [21] and Abyerami and Sivashanthini [20] reported the same findings in *O. arnensis* while Ganesh and Asokan [22] viewed that anal was mostly divided but Wall [2] observed angulate and entire anal shield in *O. arnensis*. The number of ventrals in the present study greatly varies with the observations of other workers. It is supposed that the variation of the number of ventral is subjected to analysis of geographical variation [23].

In the present study, the number of sub-caudal is 40-48, paired. Boulenger [1], Sharma [21], Abyerami and Sivashanthini [20] and Ganesh and Asokan [22] reported 41-59, 40-59, 48-51, paired, and 41-59, paired sub-caudal respectively in *Oligodon arnensis*. But Wall [2] reported that number of sub-caudal were rarely a few at the base of tail and divided and at the same time he mentioned 41-59 sub-caudal.

In the present study, the variable banding pattern is observed in the said specimens. In the head neck region two arrow shaped brown bands are observed. 22 to 30 brown bands are present in between neck to vent and eight to nine brown bands are observed in the tail region. The bands are seen only in the dorsal surface and the inter-bands widths are variable. Observations recorded by Boulenger [1] showed variable number of cross bands in the body with angular or transverse bands in head. Wall [2] recorded 19 to 40 bands, 1 to 4 scales width, oblique streak in head and another dark oblique streak in neck region. Deoras [18] viewed 31 to 41 crossbars in *O. arnensis*. Sharma [21] reported that distinct crossbars or transversely arranged spots on the body of the snake. Abyerami and Sivashanthini [20] reported transverse black bands varied from 25 to 27 in between head to tail tip and head with chevron marking. Ganesh and Asokan [22] recorded zebra pattern marking in head and 10 to 30 blackish bands present from neck to end of tail in *O. arnensis*. The pattern of bandings, number of bands and variable length of inter-bands are almost similar to our study with a few exceptions.

The size of *O. arnensis* ranges from 590-800 mm in the present study. Boulenger [1] mentioned 330 mm, Wall [2] recorded 630 mm as maximum length in *O. arnensis*, While Sharma [21] reported that the size never exceeds 650 mm, at the same time Ganesh and Asokan [22] reported 700 mm in length of *O. arnensis*. So the reports of these workers raise a lot of controversy regarding actual length range. So it can be concluded that the size of *O. arnensis* varies widely.

In *Oligodon arnensis*, significant correlations exist in between snout-vent length and tail length and in between EYED and EYEN. The same relationship is also observed in other species of snakes like *Lycodon aulicus* and *L. striatus* [24] and in *Dendrelaphis cyanochloris* and *D. underwoodi* in between snout-vent length and head length [23].

Eye size is an important taxonomical character as it reflects the preferential habitat and light intensity [23]. As *O. arnensis* is a semi-fossorial specimen and possesses a nocturnal habitat, the eye size (eye-diameter ranges from 1.25-3.25mm.) is also large.

The prime thing of the present study is to record all the characteristic features of *O. arnensis* from taxonomic view point as the species is almost unavailable at present in locality of Rampurhat, Birbhum, West- Bengal though the species was abundant in recent past.

Acknowledgement

We thank Dr. B. D. Mukherjee, Teacher-in Charge, Rampurhat College (Govt. Sponsored), Rampurhat, Birbhum for providing necessary facilities. We are grateful to Mr. Alokesh Das, Assistant Professor, Dept. of Botany and Mr. Sangram Halder, Librarian, Rampurhat College for their cooperation. We are thankful to Mr. Dilip Chakraborty for his assistance.

References

1. Boulenger, G. A. (1893). Catalogue of the snakes in the British Museum (Natural History) vol. 1. pp 229-230.
2. Wall, F. Col. A review of the Indian Species of the Genus *Oligodon* suppressing the Genus *Simotes* (Ophidia). Records of the Indian Museum. 1923;vol.xxv. 305-331.
3. Leviton, A. E. A new snake of genus *Oligodon* from Annam. J. Washington Acad. Sci. 1953;43(12): 422-424.
4. Pauwels, O. S. G., Wallach, V., David, P. and Chanhom, L. A new species of *Oligodon* Fitzinger, 1826 (Serpentes, Colubridae) from southern peninsular Thailand. Nat. Hist. J. Chulalongkorn Univ. 2002;2(2): 7-18.
5. Leong, T. M. and Grismer, L. L. A new species of Kukri snakes, *Oligodon* (Colubridae), from Pulau Tioman, West Malaysia. Asiatic Herpetological Research.2004;10 : 12-16.
6. David, P., Vogel, G. and Pauwels, O. S. G. (2008a). A new species of the genus *Oligodon* Fitzinger, 1826

- (Squamata: Colubridae) from southern Vietnam and Cambodia. *Zootaxa*, 1939: 19-37.
7. David, P., Vogel, G. and Rooijen, J. van. (2008b). A revision of the *Oligodon taeniatus* (Günther, 1861) (Squamata, Colubridae) group, with the description of three new species from the Indo Chinese region. *Zootaxa*. 1965: 1-49.
 8. Green, M. D., Orlov, N. L. and Murphy, R. W. Towards a phylogeny of the Kukri Snakes, Genus *Oligodon*. *Asian Herpetological Research*. 2010;1 (1) : 1-21.
 9. Orlov, N. L., Ryabov, S. A., Nguyen, T. T. and Nguyen, T. Q. Rediscovery and redescription of two rare snake species; *Oligodon lacroixi* Angel-et Bourret, 1933 and *Maculophis bellus chopaiensis* (Bourret, 1934) [Squamata: Ophidia: Colubridae] from Fanispan Mountains, northern Vietnam. *Russian J. Herpetology*. 2010;17(4): 310-322.
 10. David, P. and Vogel, G. A new species of the genus *Oligodon* Fitzinger, 1826 (Squamata: Colubridae) from Pulau Nias, Indonesia. *Zootaxa*, 2012;6(1): 276-278.
 11. Neang, T., Grismer, L.L. and Daltry, J. C. (2012). A new species of kukri snake (Colubridae: *Oligodon* Fitzinger, 1826) from the Phnom Samkos Wild life Sanctuary, Cardamom Mountains, southwest Cambodia. *Zootaxa*, 3388 : 41-55.
 12. Archarji & Ray, (1936) from Assam, India. *Russian Journal of Herpetology*, 1936;20 (4):247-252
 13. Sangma, M. A. and Saikia, P. K. New record of Snakes in Tura Peak of West Garo Hills, Meghalaya, India. *Journal on New Biological Reports*. 2014;3 (3) : 262-270.
 14. Maurya, V. Singh, J.P. and Dhakate, P.M. First record of red khukri snake (*Oligodon kheriensis*) from Uttarakhand, India : expanding the current known dispersal range of species. *Int. J. Sci. Res.* 2017;6(1): 276-278.
 15. Fellows Sandeep. Species diversity of snakes in Panchmarhi Biosphere Reserve. *Entomol. Ornithol. Herpetol.* 2014;4: 136.
 16. Gayen, D., Dey, S. and Singha Roy, U. Reptile Rap: Diversity of snakes in and around Durgaopur city, WB, India. *Zoo's Print*. 2017;32(9): 17-22.
 17. Deoras, P. J. (1992). *Snakes of India*. National Book Trust, India. pp.118.
 18. Dwibedy, S. K. Batesian Mimicry : The main cause of non-venomous snake death in Odisha. *Int. J. Recent Sci. Res.* 2017;8(10); 20493-20497.
 19. Abyerami, S. and Sivashanthini, K. Diversity of snakes from the Jaffna Peninsula, Sri Lanka. *Pak. J. Biol. Sci.*, 2008;11(16): 1969-1978.
 20. Sharma, R. C. (2007). *Fauna of India and adjacent Countries. Reptilia* : vol 111. Pp -166 (Published by Z.S. I. Kolkata, India.).
 21. Ganesh, S. R. and Asokan. J. R. Catalogue of Indian herpetological specimens in collection of the Government Museum, Chennai, India. *Hamadryad*. 2010;35(1): 46-63.
 22. Rooijen, J. van and Vogel, G. A new species of *Dendrelaphis* (Serpentes: Colubridae) from Java, Indonesia. *The Raffles Bulletin of Zoology*. 2008;56(1): 189-197.
 23. Bhakat, S., Sinha A. K. and De, P. Redescription of five species of the genus *Lycodon* (Boie, 1826) (Serpentes, Colubridae) on the basis of morphological variation collected from Birbhum, West Bengal, India. *Int. J. Appl. Nat. Sci.* 2018;7(2):53-64.
 24. Vogel, G. and Rooijen, J. Van. A new species of *Dendrelaphis* (Serpentes: Colubridae) from Southeast Asia. *Zootaxa*, 2007;1394;:25-45.

Cite this article as: P. DE, S. Bhakat and A. K. Sinha. Redescription of *Oligodon arnensis*, Shaw, 1802 (Reptilia: Colubridae) collected from Birbhum, West Bengal, India. **Indian J. Pharm. Biol. Res.** 2018; 6 (1):42-47.

All © 2018 are reserved by Indian Journal of Pharmaceutical and Biological Research

This Journal is licensed under a **Creative Commons Attribution-Non Commercial -Share Alike 3.0 Unported License**. This article can be downloaded to **ANDROID OS** based mobile.