iJRASET
International Journal For Research in Applied Science and Engineering Technology

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 9 **Issue:** I **Month of publication:** January 2021

DOI: https://doi.org/10.22214/ijraset.2021.32775

www.ijraset.com

Call: 08813907089 | E-mail ID: ijraset@gmail.com

International Journal for Research in Applied Science & Engineering Technology (IJRASET)
ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.429
Volume 9 Issue I Jan 2021- Available at www.ijraset.com

Social Distancing - Types, Origin and Natural Occurrence in Animal

Satyesh Chandra Roy
Former Professor and Head, Department of Botany and Co-ordinator, Centre of Advanced Studyfor Cell and Chromosome Research, UGC Emeritus Professor, University of Calcutta

Abstract: ***In the present global crisis due to the outbreak of COVID -19, varieties of new norms have been applied like lockdown and social distancing with a hope of slowing and prevention of transmission of disease respectively. To slow down the spread of infection during pandemic several social distancing measures recommended by WHO are used including closing of educational institutions and work places. Social distancing to combat COVID 19 has a great impact on the society and people are wondering whether this will work and all these measures are new to the present generations. But nature has an answer. People are feeling social distancing as unnatural but it is a part of the natural world when we see the animal behaviour. The origin and history of social distancing have been discussed including the types of social distancing. The natural occurrence of social distancing in animals has been discussed.***

Keywords: Social distancing, Origin, Natural occurrence in animal

I. INTRODUCTION

In December 2019 the world was badly affected by a pandemic that took more lives in a short time that started from Wuhan, China which was known as COVID-19. This disease is caused by a deadly and dangerous type of Coronavirus. In Indonesia the disease COVID- 19 has been categorized as a national disaster status refers to Act concerning Disaster Management by the Government of Indonesia. Then large scale restrictions like Lockdown, Travel limitations, Social Restrictions, Physical Distancing or Social Distancing and people under surveillance to control the spread of disease [1]. But the agenda for social distancing and isolation have been found to attack culture and tradition of the country. Changes in public behaviour were staying at home more, washing hands with soap and Social distancing. It is sometimes difficult to adhere to rules strictly as it depends on the attitude of human being. In ASEAN countries, some citizens believe that pandemic is dangerous and others mainly religious people believe that it has been created by God. The Muslim population of Indonesia under Ulema Muslim Council (MUI) has issued Fatwa that explained the implementation of worship in the COVID 19 pandemic situation rather than following norms issued by Government. Even other religious groups Hindu and Buddhists of Indonesia have a faith that whether pandemic strikes them or not is a fate as it has been created by God and is under the power of the creator of the universe. If it is destined to die of a pandemic nobody can avoid it [2, 3, 4].

With this background the present article has been written to show that Social Distancing, Self-isolation are not a new norm but it already exists in nature. This natural occurrence of social distancing is found in animals.

The word Social distancing is now very common to all people from children to old not only in India but also throughout the world due to pandemic disease Covid 19. The social distancing or physical distancing is one type of measure to prevent the spread of contagious disease by maintaining a physical distance between people for reducing the close contact with each other. In this way the disease transmission can be stopped resulting in fewer infected persons and death. Social distance measure is important as it can reduce the pandemic to reach the peak or it can help in forming the “flattening of curve “and thus to avoid overloading of health system particularly hospital beds. Measures taken by the experts for stopping the infection to reach the peak will be beneficial to people to get more effective treatments.

II. TYPES OF SOCIAL DISTANCING

Changes in societies due to pandemic may be of three types such as Social Distancing, Self-quarantine and Self- isolation.

Social Distancing or physical distancing is a non-pharmaceutical prevention to avoid contact between those who are infected with a disease causing pathogen and those who have not been identified and thus not yet isolated [5]. It has been advised that individuals should be apart from one another at least for six feet as per guidelines from Centre for Disease Control and Prevention, 2020 to reduce transmission of disease.

Self quarantine is a travelling restriction of people who might have been exposed to an infected person but are not ill as the pathogen has the incubation period for approximately 6.4days , ranging from 2.1 days to 11.1 days([6]. People who had direct contact with infected person, travelled to countries with widespread transmission or had contact with persons having symptoms with fever and coughing are strongly advised to go to self-quarantine as advised by World Health Organization 2020 .

Self-Isolation is the separation of ill persons with contagious disease from others in a hospital or at home under medical supervision for protecting other non-infected individuals.

Brazil has used two types of social distancing during the present pandemic. These are Vertical Social Distancing and Horizontal Social Distancing. In the former only older people are distanced while in case of later all age groups are distanced. This policy has been used in Brazil to do the comparative study of the spread of infection taking no distancing as control. Scientists in Brazil thought that vertical social distancing is the health policy i.e., restricting older people, high risk individuals, would be enough to control the infection of Covid- 19. But the results showed that the vertical social distancing policy is ineffective. They use the SEIR (Susceptible –Exposed- Infected- Removed)- Net Model , for a network of social group interactions [7].

In their study they found that Vertical distancing is not effective but is better than no social distancing. Horizontal distancing shows about 75% reduction of all age groups and also lowers the peak of infections. It is also recommended that strong horizontal health policy should be maintained for several months to reduce the epidemic outbreak. Social distancing is one of the important factors in flattening the curve of infection. This is also necessary for the protection of health and life by staying at home but it is detrimental to other parts of well being particularly the mental health. It leads to stress, anxiety and feelings of isolation. Although social distancing is a physical separation from friends, family and others but it is to be kept in mind that it does not mean socially cut off from them. With the advancement of technology Video chat and You tube has made our life easier to cope with the difficult time which is more or less similar with physical seeing someone. Internet based communications are the important key to make a great success in social distancing. The closure of educational institutions, Work places and mass gathering cancellations are other social distancing measures at individual and group level modes to reduce and delay the peak of the epidemic and protect health care capacity.

III. ORIGIN

The term social distancing was first introduced in 21st century. But Italian Professor Rebecca Messbarger of the Medical Humanities Program at Washington University in St. Louis has found its mention in a book “The Decameron “ written by Giovanni Boccaccio of Italy. This is one of the oldest examples of social distancing during epidemic of Bubonic Plague of 1348. During 1918 Spanish Flu pandemic, social distancing interventions like school closures, ban on public gatherings and others are imposed in St. Louis shortly after the detection of first case in the city. But in another city Philadelphia social distancing measure was not taken after first case of infection so the fatality rate was higher than St. Louis. So the mandate of social distancing measure has been recommended by all countries in the occurrence of any pandemic. However, the term Social Distancing becomes very common in the present pandemic of Corona virus as nobody thought that a virus, hundred times smaller than bacteria, would make human closeness a big problem.

In Sociology there is also a type of social distancing where it is used in ethnic, class, gender, status and many other kinds of relations. Social distance is measured here according to the Bogardus Social Distance Scale or some modifications of it. Emory Bogardus first developed the concept of “ Social Distance” in 1925 and modified in 1933. It is still used in measuring prejudice or for measuring attitudes toward a variety of groups. Bogardus first used Social Distance in America with the entrance of many immigrants and development of conflicts [8, 9] .

Before 1880 the majority of immigrants were from Germany, Scandinavia or the British Isles. They are protestants [10] .

These immigrants are referred to as the “first wave” [11]. Another set of immigrants called “ Second Wave” came from Italy, Poland, Russia. Austria, Hungary and also from Southern and Eastern Europe. These new immigrants use languages that seemed to the first wave of immigrants as strange. Again their customs andreligions were different and majority of them settled in slum areas of large industrial cities and mixed with similar racial or ethnic backgrounds. They developed many rampant diseases and many older Americans wanted to stop them particularly due to their terrible living conditions. Then many Asians were immigrated into the West Coast and faced discrimination and finally racial and ethnic conflicts took place. Then Social Distance of Bogardus was used in America. According to Park (1923) the concept of Social Distance refers to “an attempt to reduce to something like measurable terms the grades and degrees of understanding and intimacy which characterize personal and social relations generally” [10].

In the Victorian era in the mid nineteenth century “crinoline” is used in a woman`s skirt. The crinoline is a stiff petticoat made of cotton or linen with a circumference of up to six yards although crinolines were reduced in size after 1870.

This was used to create a barrier or social distancing between the genders (Fig.1) . It was found in Spanish court in the 15th century and these voluminous skirts were found in the 18th century in privileged and royal classes. It requires a house with large spaces to move comfortably from one room to another. At that time status depends on the size of the skirt. The bigger your skirt, the higher is your status. Between 1850 and 1860 middle class families also started to wear Crinoline as a new fashion and also to maintain woman`s social safety by making social distance from male members. It is another tool to oppress woman`s mobility and freedom. These skirts also helped to avoid infections of small pox and cholera by maintaining social distance. Many women continued to use this long skirt from unwanted male contact in middle class societies. So it can be called a fashionable style of social distancing. At that time social distancing using crinoline was nothing with health but for etiquette and class [12].

President George W. Bush of United States first made social distancing a Federal Policy to avoid spread of pandemic after the Anthrax attack and Bird flu outbreak. His effort began in 2005 when Mr. Bush concerned with bioterrorism after the September 11, 2001 attack. He also took initiative in Social distancing after reading a book on "The Great Influenza" by John M. Barry about the Spanish Flu outbreak in 1918. Mr. Bush in his speech at the National Institutes of Health said that "A pandemic is a lot like a forest fire. If caught early it might be extinguished with limited damage. If allowed to smolder undetected , it can grow to an inferno that can spread quickly beyond our ability to control it " [13] .

IV. NATURAL OCCURRENCE OF SOCIAL DISTANCING IN SOME ANIMALS

People are feeling social distancing as unnatural but it is a part of the natural world if we go through the behaviour of mammals, insects and birds. They stay apart and change their behaviour to prevent spread of diseases that could kill them. In some animals particularly birds and bats stay apart as their normal habit when they sit together in an electric wire. Some animals expel their members from their own community if they are infected with pathogen. Animals can detect certain diseases through their specialized senses before any visible symptoms appear and stay apart to avoid getting ill. Birds, Monkeys, Fish and even insects will avoid their members if they are found to be sick. So social distancing is not a new phenomenon, animals have been doing it for long time.

A. Monkeys and Others

It is known that some micro-organisms are present in our digestive systems (micro-biomes). These are also present in animals like monkeys and others. These micro-organisms play a critical role in maintaining health of the body as well as detrimental in developing some diseases. Research workers from the University of Texas under Dr. Eva Wikberg studying on Animal behaviour found that the gut microbiomes may help in forming social groups in a number of host taxa. These research workers tried to find out the factors responsible for forming a pattern in social groups of wild Colabus monkey at Boabeng-Flema at Ghana. The demographic and behavioural data were collected during May to August 2007 and October 2008 to April 2009 with 16sRNA sequencing of faecal samples collected during that period. Their observations show the method of transmission of disease through social connectedness during intergroup encounters. Wikberg said that this observation has similarity with the current situation in which scientists are trying to understand how social distancing during COVID-19 outbreak helps to reduce transmission [14,15].Those monkeys with similar gut microbes come close to each other and they form groups on the basis of the microbes present in their gut and dietary similarities. They identify groups from the odour of the faecal matters. Research team have identified 45 distinct social groups within Colabus monkeys of Ghana. The Importance of the use of interventions such as Social distancing has been clearly found in the life of wild monkeys (Fig.2). In other words the "Gut microbiomes" are one of the important factors to form the microbial meta-community of an animal social group. In addition to monkeys, other animals like lobsters, insects and birds can also detect the disease and avoid sick members [16]. Thus animals maintain healthy life by doing Social distancing after identifying the sick individual. This method of staying away from them may be their evolutionary tool for which they are sustaining from early age (Fig. 2). Similarly Vampire bats practice social distancing when any member of the group becomes ill although foods are provided to the sick members. When animals get sick they change their behaviours and become less active. An experiment was done by Dr. Patricia Lopes of the Department of Evolutionary Biology and Environmental Studies at The University of Zurich to study the change in behaviour of wild animals after being sick. Lopes and his team injected mice with lipopolysaccharides (a component of the bacterial cell wall) to simulate infection which results in disease symptoms and immune response. They used a novel combination of experimental manipulations of free living mice, radio frequency tracking of animals, social-network analysis and disease modelling. They found in their experiments that sick mice remove themselves from their groups. It was also found that animals in the same social group did not avoid the sick mouse. It was the sick mouse that removes itself from the group to protect relatives in the same group from catching the disease.

Thus animals are using Social distancing and Self- isolation by themselves long ago for their survival in evolution. Dr. Eva Wikberg, Assistant Professor of the University of Texas at San Antonio (UTSA) in the Department of Anthropology rightly pointed out that "Social microbial transmission among monkeys informs us how diseases spread. This has parallel to our current situation in which we are trying to understand how social distancing during the COVID-19 pandemic and future pandemics outbreaks may influence disease transmission" [15].

The natural instinct of this adaptive behaviour of mammals helps in the evolutionary processes [17]. From the behaviour of Chimpanzees, it has been noted that animals are able to know when they are sick since they take up self medication for curing of self and group- mates, In other words, animals have evolved mechanisms for protecting themselves from infection and illness long before we could use medicines after exhibiting signs of symptoms of disease. Thus the importance of disease is one of the important factor of natural selection and the evolutionary significance of higher apes showing the evolutionary continuity from primates to *Homo sapiens* involving aspects of cognition, behaviour, social organisation and culture [18]. From research studies on wild life it has been noted that wild life diseases have great implications on their survival. As animals manage their disease through self isolation and self medication, so they are still persisting in the evolutionary history. Thus wild mammals are the most adaptable species in the management of disease and changes in the environment. Wild animals have evolved a number of behavioural strategies to avoid health-threatening pathogens and parasites. Different strategies used are grooming to remove ticks, lice and fleas, licking to apply saliva on the wound, feeding and eliminative behaviours to avoid parasites and pathogens, quarantine for disease control and to stop transmission of pathogens to group mates.

Another type of unusual quarantine behaviour is found in animals particularly in cats and dogs that is the cannibalization of new born sick infants showing inactivity and hypothermia to save the rest of the litter. Some newborn becomes sick if they do not receive sufficient colostrums or suffers from inadequate genetically acquired resistance, then these sick newborns will be a reservoir for the multiplication of pathogen.

Then it causes infection to other newborn members so they cannibalise the sick one [19]. Another Primate Mandrill like Baboon is found in the rain forest of Southern Cameroon, Equatorial Guinea and Congo. The infected Mandrill is detected by the smell of faeces. Grooming is the natural habit of mandrills but they change their habit when any one is sick to avoid contact with infected animals. Thus all of these behaviours are found recently in human during present corona virus infection. But this process of physical distancing was used by animals from early days. Social distancing to fight COVID 19 is profoundly impacting human society, many people have an idea that it does not work. But the nature has an answer. If we study the history of evolution we find that our hominid ancestors faced many pressures from contagious disease that we are facing today and they survive all these hurdles using social distancing, self isolation and self medication.

B. Bats

Research works on Vampire Bats by Stockmaier and their groups of Smithsonian Tropical Research Institute in Panama found that these bats are highly social creature living in colonies of hundreds of thousands of individuals. Socialization is the most important of their survival strategy. They care for one another through mutually beneficial behaviours like reciprocal grooming and food sharing habits by licking each other`s mouth to share food containing regurgitated food [20]. Research groups made an experiment to show the changes in the social behaviour of bats to sick ones. Some bats of small captive bat colony were injected with bacteria that made them sick. Foods were supplied to bats and they were allowed to interact freely with one another. Injected bats were then separated and no foods were supplied to them to keep them in a fasting state for 26 to 28 hours. After that these bats were again returned to the cage containing normal bats. Sick bats received less grooming from healthy ones. The fasting sick bats were hungry and were begging for food- sharing, only those who are closely related (close family members) were sharing foods to sick bats indicating a change in their social behaviour to avoid spread of disease. Sick individuals also stopped the social cluster and remained distant from conspecific. This type of reaction was also observed in Egyptian Fruit Bat in captive adult and free-ranging juvenile individuals using LPS (Lipopolysaccharide) , a bacterial endotoxin, to simulate an infection without use of infectious pathogen . GPS tracking showed that free-ranging sick individuals failed to leave the roost to forage to reduce transmission among group members [21]. When Bats, bees, lobsters and others have suffered epidemics they adjust their social habits through social distancing but the method varies from animal to animal. Researchers found that i) healthy lobsters avoid sick ones; ii) Infected bats curb their own socialization; iii) ill bees do not return their hives to protect others in the group; iv)Female gorillas will join new social group when troop mates are infected ; v) monkeys stop grooming to infected ones and take social distancing, self isolation and self medication.

C. Honey Bees

Throughout evolution animals have developed mechanisms to fight with diseases for their survival. Bees also have developed some behavioural changes to save their colony from spread of viruses (Fig. 3). Kazlauskas and others made an experiment with Honey bees after injecting with bacterial LPS (lipopolysaccharide ; E*scherichia coli* LPS serotype 0111: B4, Sigma, USA) into the thorax of bees. Alterations in the social behaviour were noted in their experiments. Social interaction between LPS treated and non-treated bees showed that healthy bees isolate the sick individual from the group. Self-removal from the colony has also been noted. All these behaviours could represent adaptive methods which is found to occur in nature to prevent disease transmission [22]. Moribund honeybees left their nests and die in isolation to prevent spread of infection to others.

Research workers at the University of Illinois tracked bees after infected with Israeli Acute Paralysis Virus (IAPV). The results showed that infected bees maintain social distancing to avoid other bees from their colony to prevent spread of infection. In another experiment , when the immune response of the bees were simulated without viral infection in the bees causing infection then the same type of behaviour was noted indicating that the immune response is responsible for typical social distancing behaviour. Infected bees carry a specific chemical which helps to identify the infected bees by the "bouncer bees" guarding the colony [23] . It has been noted that these infected bees are accepted by distantly related different colonies (outsider) without rejecting them. It may be that bouncer bees of other colonies do not identify the chemical substance present in the body of the infected ones. In this way there is a transmission of virus to other colony.

D. Ants

Ants live in densely packed colonies but when infectious or contagious disease occurs in any individual ant, it becomes sick and there is change in the behaviour in both sick and healthy ants which helps inreducing disease transmission. Sick ants self isolate and healthy ones do not make interactions with other infected ants in the colony (Fig 4). Healthy ants also keep watch on the queen and nurses which are very susceptible to infections and so they isolate the queen and nurses from sick ones particularly from forager ants which collect food from outside. As there is a chance of forager ants to catch infections more so they interact less with other ants. Nathalie Stroeymeyt at the University of Lausanne , Switzerland and his colleagues studied colonies of *Lasius niger* ants using an automated tracking system. When the forager ants were exposed to spores of fungus, the spores were attached to the cubicle of ants and finally entered within their body. Within two to three days ants were killed. Infected ants show changes in their behaviour by spending more time outside the nest and reduced their contact with other ants. These changes in behaviour reduce the spread of infection and protect healthy workers and queen from the disease. Thus social ants give us a lesson how to tackle the infectious disease and also to sacrifice themselves by dying in isolation [24]. It was observed that Social insects like ants are the most practitioners of social distancing in nature. The ant colonies can create optimal conditions for living in small spaces with large number of ants to prevent spread of contagious diseases. This can be compared with our slum areas as they live in large numbers in a small room in small spaces [25, 26]. Hawley and Buck said "Social distancing can be profoundly disruptive to our society, but it can also stop a disease outbreak in its tracks. Just ask ants. " Infected ant workers leave their nests to die in social isolation so that infection does not spread to other members. In an experiment, research workers under Dr. Chapuisat in the Department of Ecology and Evolution of the University of Lausanne, Switzerland transferred colonies of ants (*Temnothorax unifasciatus)* in the laboratory in the same nest containing a single queen and her offspring with closely related workers of ants. The worker ants made separate nests as cavities within the main nests in a front arena as they are foraging. Again when they exposed a sample of workers to spores of the entomopathogenic fungus *Metarhizium anisopliae* , It was found that most of the workers who died from the infection left the nests hours or days before death to minimize the risk of infection to other members of the nests i.e. self exclusion [27]. These behavioural changes observed in social insects following infections provide fitness benefits to the colony as well as host adaptations. All these behaviours finally help in their survival in their evolution.

When someone sneezes , we cannot distinguish between specific types of infections whether it is a common flu or something else. But infected ants can detect the specific type of infection and then change their social behaviour showing thereby that they have some mechanisms to identify the infection [28]. It has been noted that communication in social animals including ants occurs through the use of chemicals and similar chemicals are also used to identify the infection. In ants Cuticular hydrocarbon has been identified to play a major role in a wide range of communication and interaction processes in the recognition of nest mates [29]. This chemical may also help in the changes in behaviour of infected ants. Animals that effectively follow social distancing or physical distancing during an outbreak of infection , their chances of staying healthy and going on to produce more offspring are more. In this way ants are still continuing the process of evolution from very early days. This was noted in the University of North Carolina, Washington [26].

Birds are generally healthy but show some behavioural changes when ill. Social distances are not found much in bird like animals. Birds also can detect those that are sick and then intentionally distance themselves. However, birds always maintain a small individual space around them. For example, swallows always space themselves at regular intervals on a telephone or electric wire.

V. SELF MEDICATION IN ANIMAL

Almost all wild animals for example Birds, bees, lizards, dogs, elephants, chimpanzee and others do self medication for their survival. These animals eat selected plant materials to prevent diseases or to kill parasites, bacteria and viruses to stay healthy. Most of us have noticed that dog is eating grass leaves when the animal has stomach upset or infected with parasite. After eating grass they vomit to eliminate parasites or make them feel better. This type of self medication by animal is called Zoopharmacognosy. Animals have the ability (innate ability) to detect therapeutic constituents of plants from their wild environments.

Chimpanzees were eating rough and bristle leaves when they have infection with some parasites causing upset in stomach. The idea of taking bristle leaves is to rub their intestines to get rid of parasites. Huffman studied in details on the self medication of Primates. He observed some important findings such as i) animals use those plants as medicine which are not their regular diet; ii) plants which have no nutritional value to the animal; iii) animals generally consume plants during rainy season when parasite infection is very common ; iv) other animals not infected do not participate . Research groups of Huffman made studies in 25 regions and it was found that they use nearly 40 plants [30] Barbara Fruth and her team from the Max Plank Institute for Evolutionary Anthropology in Leipzig made detailed studies in the Congo Basin among great Apes including Bonobos, sometimes called Pygmy Chimps . Researchers wait in the forest watching a particular colony when they pass their stool and then search on the ground their faeces to see how they cope with intestinal parasites.

The team of Fruth made their field works on Bonobos community in the Salonga National Park about 25 metres from the village. They found that ailing Bonobos or Apes went to the forest for searching the leaves of some vine and collect leaves and keep these leaves flat on their tongues [31]. Animals sometimes layer more than one leaves on the tongue and fold the leaves with saliva to form a ball and then swallow it without chewing. Bonobos went again to the same region of the forest to collect the same leaf when they still have stomach upset. Apes including Bonobos are very intelligent animals and so they pass this behaviour to their progeny by communicating vocally or through gestures [31, 33]. Fruth and others observed that Bonobos and Apes took leaves of a plant named *Manniophyton fulvum* , a shrub used by local man to make animal traps. This medicinal plant is not their regular diet. Probably they are using these leaves as they have very rough surfaces with hairs made of silica to scour the parasites from the lining of intestine same as rubbing by sandpaper. In Africa villagers use this plant as suppositories, enemas and for the treatment of haemorrhoids. It is strange to think how the Apes have learned the same method of treatment used by human. It has also been observed that Sparrows and Finches collect used cigarette butts containing nicotine to reduce mite infections in their nests. Again it is difficult to explain how Honey bees and Ants did layer their nests with resin to prevent bacterial infection. These instinct behaviours are the processes of their adaptation in the evolutionary process. Gorilla also collect the correct leaf and swallowed it when they have stomach problem. Thus animals with this type of genetic background of self medication and adaptation live longer and have more progeny. It is possible that Folk Medicines may develop by villagers after watching the process of self medication of animals like Apes and others in the forest. Butterfly lays their eggs generally on the leaves of Milkweed as these leaves contain chemical known as Cardenolides to defend parasite. Cardenolides are also used by us to relieve pain and also to treat asthma. de Roode says " If we can learn from animals that have used medicinal plants for millions of years and then look at what they use it for , then we could learn many interesting things." [33] When animals particularly social animals face infections they change their behaviour to maintain physical distancing for their survival. This is called Behavioural Immunity which we are now practising for immunity in the outbreak of COVID 19 as there is no vaccine for the disease. Ants have used this type of action for millions of years for their survival in evolution. Thus from the findings of the animal behaviour it has been learnt that social distancing or physical distancing is not a new phenomenon which has already been practised by wild animals including insects long ago as the only means to prevent transmission of infection .

We are now practising social distancing is practised at all levels in order to ease spread of pandemic but our animal counterparts effectively follow social distancing when confronted with disease from the very beginning of their existence. Different animals show their intelligence in the emerging infections by practising different ways like i) Healthy lobsters avoid sick lobsters ; ii) Infected Bats curb their own socialization ; iii) Sick bees fail to return to their hives altogether, thereby protecting the group ; iv) Female Gorillas form a new social group in response to infectious skin lesions on troop mates; v) Mandrill monkeys stop grooming ill peers; vi) Ants shift to modular social structures to limit spread (34).

VI. CONCLUSION

Thus animals can help us to understand the importance of maintaining social or physical distancing during COVID 19 as this method is a part of the natural world practiced by all types of animals. But the biggest human advantage is the ability to develop non-behavioural tools such as Vaccines, which prevent disease without the need of old disgusting Social distancing methods. Vaccines can maintain modern social interactive method of living even in case of contagious diseases. So we are all waiting for proper Vaccines to restore our usual normal life.

VII. ACKNOWLEDGEMENTS

Author would like to express his sincerest thanks to his wife Chayna Roy and daughter Soma Chatterjee for their constant inspirations and his youngest daughter Shampali Roy for going through the manuscript in the completion of this article. He has not taken any fund or sponsorship from anywhere.

VIII. COMPETING INTEREST

Author has no competing interest.

REFERENCES

[1] Caraka, R.E, Lee,Y, Kurniwan,R, Herliansyah,R et al. Impact of COVID-19 large scale restriction on environment and economy in Indonesia. GlobalJ. Env. Sci. Manage. 2020; 6(S1) : 65-84.
[2] Sumaryana, A, Toharudin, T, Caraka, R.E, et al . Short Communication: Covid-19 Pandemic and Attitude of Citizens in Bandung City Indonesia (case study in Cibiru Subdistrict). Int. J.of Crimin. And Sociology. 2020 ; 9 : 241- 246.
[3] Djalante, R, Lassa, J, Setiamarga, D, Sudjatma, et al. Review and analysis of current responses to COVID-19 in Indonesia . Progress in Disaster Science. 2020 (a) ; 6 : 100091.
[4] Djalante, R, Nurhidayah, L, Lassa, J, Hoang Van Minh, Mahendradhata, Y et al. The ASEAN`s response to COVIS-19 : A Policy Science analysis. Progress in Disaster Science . 2020 (b); 8 :100129.
[5] Mack A, Choffines ER, Sparling PF, Hamburg M.A, Lemon S. M (eds) Ethical and legal considerations in mitigating Pandemic disease : Workshop Summary. 2007; National Academic Press
[6] Backer J.A, Klinkenberg D, Wallinga J. Incubation period of 2019 novel coronavirus (2019-n CoV) infections among travellers from Wuhan, China, 20 – 28 January . 2020. Eurosurveillance. 2020; 25(5). doi: 2020.200006
[7] Duczmal L. H, Almeida A.C.L , Duczmal D.B, Alves C.R.L, Magalhaes F. C. O , de Lima M. S , Silva I. R , Takahasi . Vertical social distancing policy is ineffective to contain the COVID 19 pandemic. Cad. Saude Publica.2020; 36(5) : e00084420. Reports in Public Health.
[8] Bogardus E. S. Measuring Social Distances. J. Appl. Sociol. 1925; 9 : 299-308.
[9] Bogardus E. S. A Social Distance Scale. Sociology and Social Res. 1933 ; 17: 265-271.
[10] Wark C, Galliher J. F, Bogardus E, The origins of the social distance scale. Amer. Soc. 2007 ; 383- 395.
[11] Uschan M.V. The 1910s : A cultural history of the United States through the decades. 1999; San Diego CA. Lucent. Page not found
[12] Rabinovitch-Fox E. The Fashionable History of social distabcing . The Conversation. March 2020; Page not found.
[13] Lipton E, Steinhauer J. The Untold story of the birth of social distancing. The New York Times. April 22, 2020 ; Page not found.
[14] Wikberg Eva. Even animals may resort to physical distancing to prevent microbes : Study. May 11, 2020; The Week. Page not found.
[15] Wikberg Eva, Diana Christie, Sicotte P, Ting N. Interactions between social groups of Colobus monkeys (Colobus vellerosus) explain similarities in their gut microbiomes. Animal Behaviour. 2020 ; 163 : 17-31.
[16] Nazir M. Research shows even animals benefit from social distance to prevent disease. Phys. Org. News. May 2020; https://phys.org/news/2020-05-animals-benefit-social-distancedisease
[17] Lopes Patricia C, Per Block , Konig Barbara . Infection induced changes reduce connectivity and the potential for disease spread in wild mice contact networks. Scientific Reports. Aug. 22 , 2016 ; DOI : 10.1038/srep31790
[18] Horacio Fabrega Jr. Sickness and Healing the Evolutionary Foundations of Mind and Minding. Mens Sana Monogr. 2011 ; 9(1): 159 – 182. doi: 10.4103/0973-1229.77433
[19] Hart B L. Behavioural defences in animals against pathogens and parasites : with pillars of medicine in humans. Phil. Trans. Royal Soc. B. 2011; 366 : 3406 – 3417.
[20] Stockmaier S, Bolnick D. J, Page Rachel A, Carter G. C. Sickness effects on social interactions depend on the type of behaviour and relationship. J. of Animal Ecology. 2020 ; 89 (6) Page not found. https://doi.org/10.1111/1365-2656.13193
[21] Moreno K.R , Weinberg Maya , Harten Lee, Salinas Ramos V.B, Gerardo L, Herera M, Gabor- Czirjak A , Yossi Yovel. Sick Bats stay home alone : Social distancing during the acute phase response in Egtptian Fruit Bats (Roysetius aegyptiacus) bio Rxiv Preprint . 2020; doi,org/10.1101/2020.07.06.189357
[22] Kazlauskas N, Klappenbach M , Amaicha M. Depinol , Locatelli Fernando F. Sickness behaviour in Honey Bees . Frontiers in Physiology. 2016; 7: Article 261.10 pages. Doi: 10.3389/fphys.2016.00261
[23] Claudia Lopez- Lloreda . Sick Bees social distance, but within their colony. Science . June 4 , 2020 ; Page not found.
[24] Wong Sam. Sick ants clear of their co workers to stop disease spreading. Life Newsletter. November 28 , 2018 ; Page not found.
[25] Bos N, LEFE`VRE T, Jensen A.B , Dettore P. Sick ants become unsociable . J. Evol. Biol. 2012 ; 25: 342 – 351
[26] Hawley D, Buck Julia . Social distancing works – just ask lobsters, ants and Vampire Bats. 2020 ; Reports in Green Technology.
[27] Chapuisat M. Social Evolution : Sick ants face death alone. Current Biology . 2009. 20 (3). DOI: 10.1016/j.cub.2009.12.037

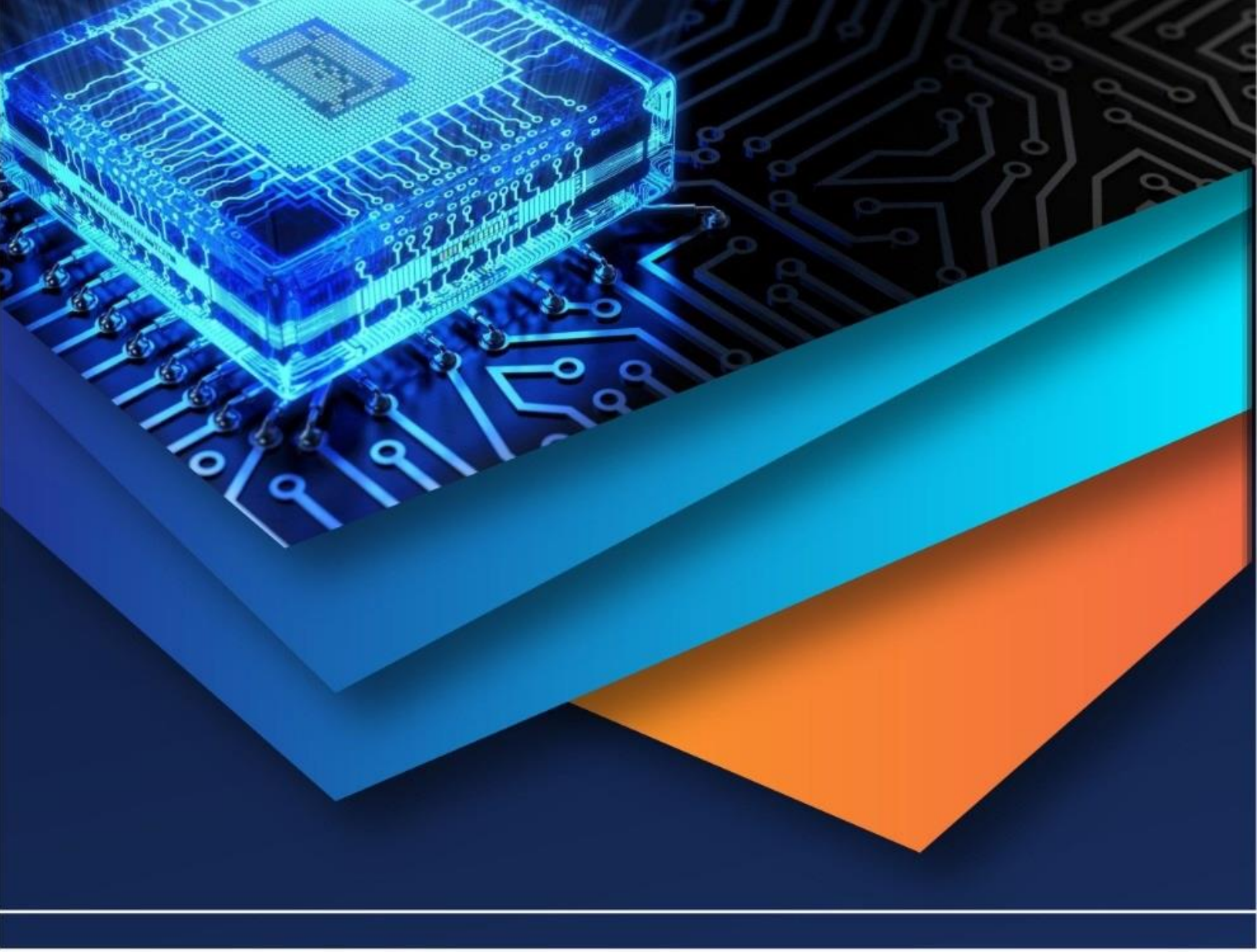
[28] Konrad M, Pull C.D, Metzier D, Seif K, Naderlinger E , Grasse A V, Cremer S. Ants avoid super infections by performing risk-adjusted sanitary care . Proc. Natl. Acad. Sci. USA 2018 ; 115 : 2782 – 2787.
[29] Zweden van , J S & d'Ettorre P. Nestmate recognition in social insects and the role of hydrocarbons in Insect Hydrocarbons . (G.J Blomquist and A. G Bagneres , Eds.). 2010 ; Chapter 11 pp 222 – 243. https://www.researchgate.net/publication/236628782 DOI: 10.1017/CBO9780511711909.012
[30] Huffman M. Current evidence for self medication in Primates : A multidisciplinary perspective. Phys. Anthropol. 1997 ; 104 (Suppl. 25) : 171- 200.
[31] Fruth B , Nono Bondjengo lkombe , Gaby Kitengie Matshimbe , Fowler Andrew. New evidence for self medication in Bonobos : Manniophyton fulvum leaf and stem strip swallowing from Luikotale , Salonga National Park , DR Congo. 2014. Amer. J. Primatol. 76 (2) : 146- 158.
[32] Shurkin J. News Feature : Animals that self medicate. Proc. Natl. Acad. Sci. USA. 2014; 111(49) : 17339 – 17341
[33] Osaka Tedx , Huffman M. Animal Self Medication . 2012 ; www.youtube.com/watch?v=WNn7b5VHowM Accessed November 4, 2014
[34] Cohen Arianne . Bats, Bees, Lobsters and Gorillas practice social distancing too. 2020; Report from Fast Company. August 13.

Fig.! Social distancing maintained by Crinoline (Taken from Ref. 7)

Fig. 2. Staying away from Sick one

Fig. 3 .Bees are social insects like ants. Here, worker bees surround the queen bee (marked with red paint).*Source: Scott Bauer, USDA Agricultural Research Service*

ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.429
Volume 9 Issue I Jan 2021- Available at www.ijraset.com



10.22214/IJRASET

45.98

IMPACT FACTOR: 7.129

IMPACT FACTOR: 7.429

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY