

**EXPERIMENTAL STUDY ON SWISS WHITE MICE TO EVALUATE THE ANTI-ANXIETY EFFECT OF COMMON WILD FIG EXTRACT (*FICUS THONNINGII*)**Aduema Wadioni^{*1}, Akunneh-Wariso C.², Vidona W. B.³ and Ejiofo D. C.⁴¹Department of Human Physiology, Faculty of Basic Medical Sciences, PAMO, University of Medical Sciences, Port Harcourt, Nigeria.²Department of Human Physiology, Abia State University, Uturu, Abia State, Nigeria.³Department of Human Physiology, Gregory University, Uturu, Abia State, Nigeria.⁴Department of Medical Physiology, Imo State University, Imo State, Nigeria.***Corresponding Author: Dr. Aduema Wadioni**

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ABSTRACT

Since prehistoric times, man has relied on herbal plants as source of medicine in curing various ailments. This study was carried out to assess the anti-anxiety-like effect of the ethanol extract of Wild fig (*Ficus thonningii*) in Swiss white (CD-1) mice. Thirty Swiss mice were randomly divided into three groups (1-3), n=10. Group 1 (control) was administered normal rat fed and saline, while group 2 (low dose) and group 3 (high dose) were administered 10mg/kg w/w and 20mg/kg w/w of the plant extract. The Elevated plus Maze (EPM) was used to assess anxiety related behaviors. Data were analyzed using the statistical tools (one way ANOVA and student t' test). Results revealed anxiety like behavior in the low and high dose treated mice when compared to the control. Therefore, administration *Ficus thonningii* reduced anxiety like behavior in mice.

KEYWORDS: *Ficus thonningii*, Elevated plus Maze, anxiety, mice.**INTRODUCTION**

Since prehistoric times, mankind has relied on plants as a source of food, shelter and medicine.^[1] Before the invention of allopathic medicine, man used plant medicines for curing ailments.^[2] Today, apart from their commercial exploitation in manufacturing, cosmetic and pharmaceutical industries, plants are still extensively used in ethno medical and ethno veterinary practice. Plant-based medicines have also contributed significantly to the development of conventional drugs. One of such plants is: *Ficus thonningii*. *Ficus thonningii* is a species of *Ficus*. It is native to Africa. Recent phylogenetic analysis suggests several distinct species may be classified as *F.thonningii*. *Ficus thonningii* is a multistemmed tree of the Moraceae family. It is a fruit bearing tree that has been used traditionally for treating diseases. The tree is mainly distributed in the upland forests of tropical and subtropical Africa and it grows best in light, deep and well-drained soil.^[3] The leaves have been used traditionally to treat diarrhoea, gonorrhoea, diabetes mellitus,^[4] bronchitis, urinary tract infections^[5], mental illness^[6], bone movement disorders, ringworm, thrush, scabies, and athlete's foot rot.^[7] *Ficus thonningii* exudes white, sticky latex that turns pinkish with time^[8]. The latex has been traditionally used for treating fever, tooth decay and ringworm^[8], cataract in the eye^[7], and as a vermifuge.^[9] The roots of the plant have been

reportedly used for preventing miscarriages and for stopping nose-bleeding.^[10] Additionally, the roots are also used for relieving stomach pains, diarrhoea, and pneumonia and chest pains.^[4,11] Stem bark extract of *Ficus thonningii* is commonly used for the treatment of sore throat, arthritis, diarrhoea, ulcers^[11] and to enhance fertility.

It is a traditionally important plant species with both nutritional and therapeutic benefits. Commonly known as the common wild. The fruits which are about 10–20 mm in diameter are usually yellow, turning pinkish when ripe.^[3] A full botanical and taxonomic description and a detailed review of the nutritional benefits, phytochemical content, and pharmacological properties of *F. thonningii* has been reported. The stem bark is used for treating colds, arthritis, inflammation, pneumonia, bronchitis, diarrhea, constipation, bowel disorders and to stimulate lactation.^[11,12,13,14] *F. thonningii* roots are used for treating malaria, fever, hepatitis; for preventing miscarriages and for stopping bleeding.^[10,1] In spite of the various measures of treatment and prevention of anxiety and fear, as well as other behavioral changes, they still remain a major problem. Therefore, most researchers have resorted to traditional medicine to solve this problem.



Figure 2.1.1: The leaves and fruit of the common wild fig.

MATERIALS AND METHODS

Animals

Thirty (30) Adult male mice weighing between 17-22g from animal room of the department of physiology, Abia state university, were used for this research work. These animals were kept in the animal room of Department of Physiology, Abia State University, and were feed for two (2) weeks with clean drinking water for acclimatization. All rules applying to animal safety and care were observed. Two (2) weeks were used for chronic administration of the plant extract before the experiments procedure was started.

Experiment procedures

They mice which were 30 in numbers and were group into three (3) groups and each group contain ten (10) mice. Group 1 was the control group; group 2 was the low dose while group 3 was the high dose.

Drug Administration

The LD₅₀ of the plant (*ficus thonningii*) was first established for the mice and the drugs was administered orally for two weeks using an oral cannula, the low dose was given 10mg/kg of the extract each day and the high dose was given 20mg/kg each day. The control groups were isolated and drugs were not administered to them.

Ethical Approval

I hereby declare that principle of Laboratory animal care was followed. All animals have been examined and approved by the appropriate ethics committee.

Apparatus and Experimental Protocols

Elevated plus maze

The EPM set-up was built according to the description of Lister^[15] as reported by John.^[16] The apparatus is in the configuration of a '+' and comprised two open arms(50x10cm) across each other and perpendicular to two closed arms(50x10x20cm) with a central

platform(10x10cm). The closed arms had a high(20cm) wall to enclose the arm. The entire apparatus was 50cm above the floor. The apparatus was made of wooden materials, painted black.

Experimental procedures

Mice was placed in the central square of the plus-maze facing the open arm and was then allowed to explore the apparatus for 5minutes.The maze was then cleaned with methylated spirit and allowed to dry between tests.

Behaviors scored were

Stretch attends posture: frequency with which the animal demonstrates forward elongation of the head and shoulders followed by retraction to original position.

Rearing: frequency with which the animal stands on its hind legs.

Grooming: frequency and duration of time the animal spent licking or scratching itself while stationary.

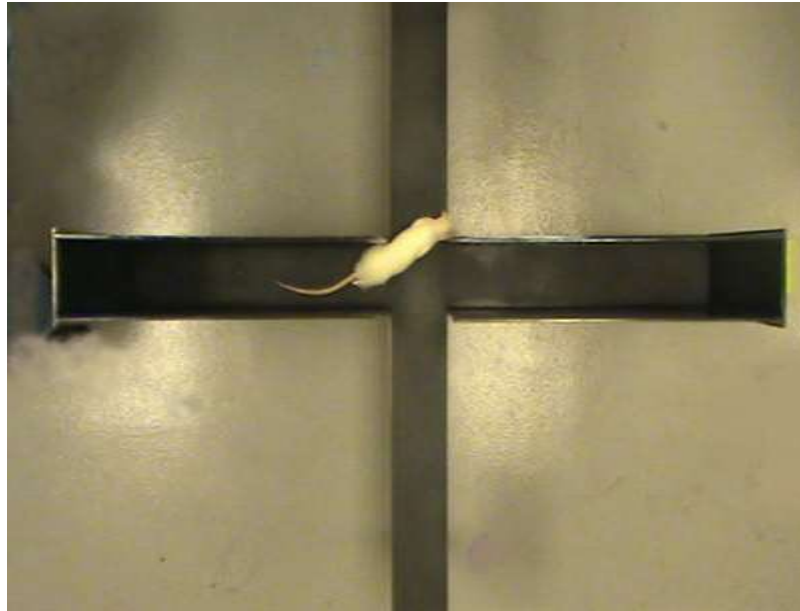
Defecation: Number of fecal bole produce.

Closed arm entries: frequency with which the animal enters the closed arms. All four of the mouse paws should be in the closed arms to be regarded as an entry.

Open arm: Time the animal spent in the open arms.

Closed arm: Time the animal spent in the closed arms.

Head dipping: frequency with which the animal lowered its head over the sides of the open arms toward the floor.



Elevated Plus Maze Apparatus

Statistical analysis

Values were shown as mean and \pm SEM (standard error of mean). Testing method includes one way (ANOVA), followed by post hoc. $P < 0.05$ was considered statistical significance and $P < 0.001$ as highly significant respectively.

RESULTS

Behaviors scored in the Elevated plus Maze (EPM)

Open Arm Durations

The anxiety behavior following the administration of graded doses of the *Ficus thoninigi* leave and the control diets, were:

Control: 7.80 1.30secs

Low dose: 22.80 6.26secs

High dose: 22.20 4.76secs

The open arm durations for both the low and high dose were significantly higher ($P < 0.001$) compared to the control group (Fig.1). However, the high dose group did not differ when compared to the low dose group of mice.

Close Arm Entries

The values of the closed arm entries following administration of graded doses of *F.thoningii* and control diets were:

Control group: 5.60 \pm 1.14/5mins

Low dose: 4.80 \pm 0.83/5mins

High dose: 2.60 \pm 0.89/5mins

The low and high dose groups were of the significantly lower ($p < 0.01$; $P < 0.001$) compared to control (Fig.2).

Close Arm Durations

The values for the closed arm durations among the different experimental groups were:

Control group: 112.40 \pm 2.30secs

Low dose: 73.00 \pm 9.74secs

High dose: 71.60 \pm 18.71secs

In the elevated plus maze test for anxiety, the closed arm durations for the low and high dose groups were significantly lower ($P < 0.001$) compared to control (Fig.3). However, there was no significant difference between the low and high dose groups.

Head dips

The frequencies of head dips among the different experimental groups were as follows:

Control group: 3.00 \pm 1.00/5mins

Low dose: 5.40 \pm 1.14/5mins

High dose: 7.40 \pm 1.14/5mins

The low dose group was significantly higher ($P < 0.01$) compared to control (Fig.4). However, the value of the high dose group was also significantly higher ($P < 0.001$) when compared to the control group of mice.

Stretch Attend Posture

The frequencies of the stretch attend posture between the three experimental groups were:

Control group: 8.60 \pm 1.14/5mins

Low dose: 4.80 \pm 1.30/5mins

High dose: 2.40 \pm 1.14/5mins

The low and high dose groups were both significantly lower ($P < 0.01$; $P < 0.001$) compared to control (Fig, 5).

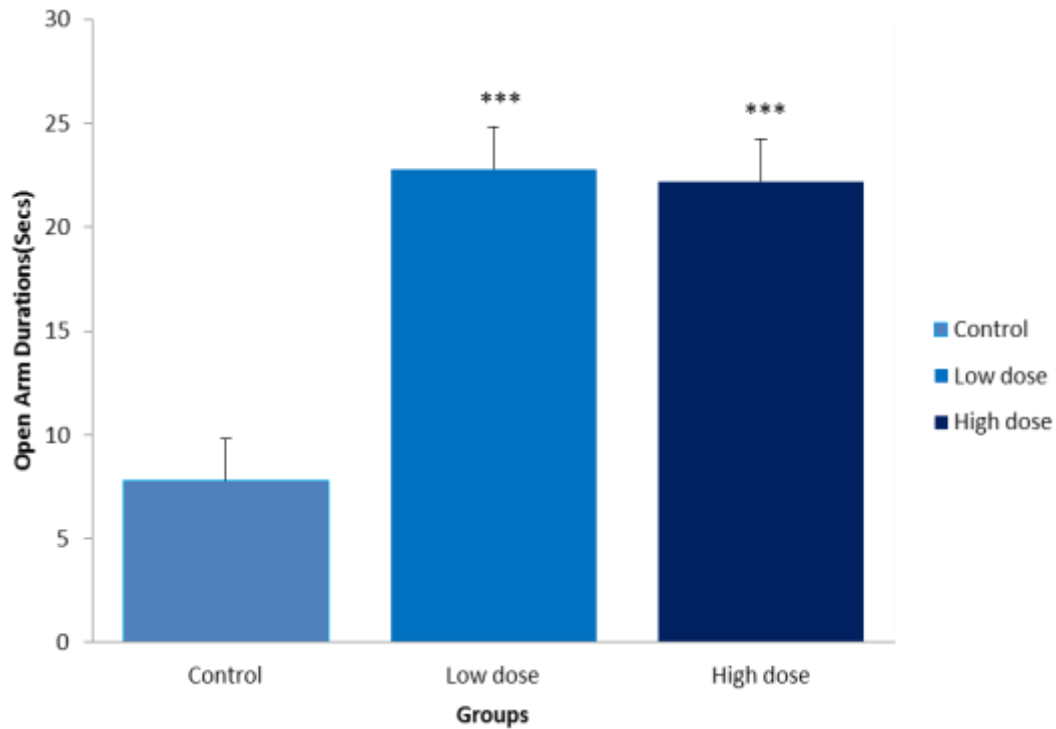


Fig. 1: Effects of administration of *F.thoningii* diet on open arm durations in the elevated plus maze test of the different experimental groups.

Values are mean \pm SEM, n = 10.

* **= $p < 0.001$ vs control.

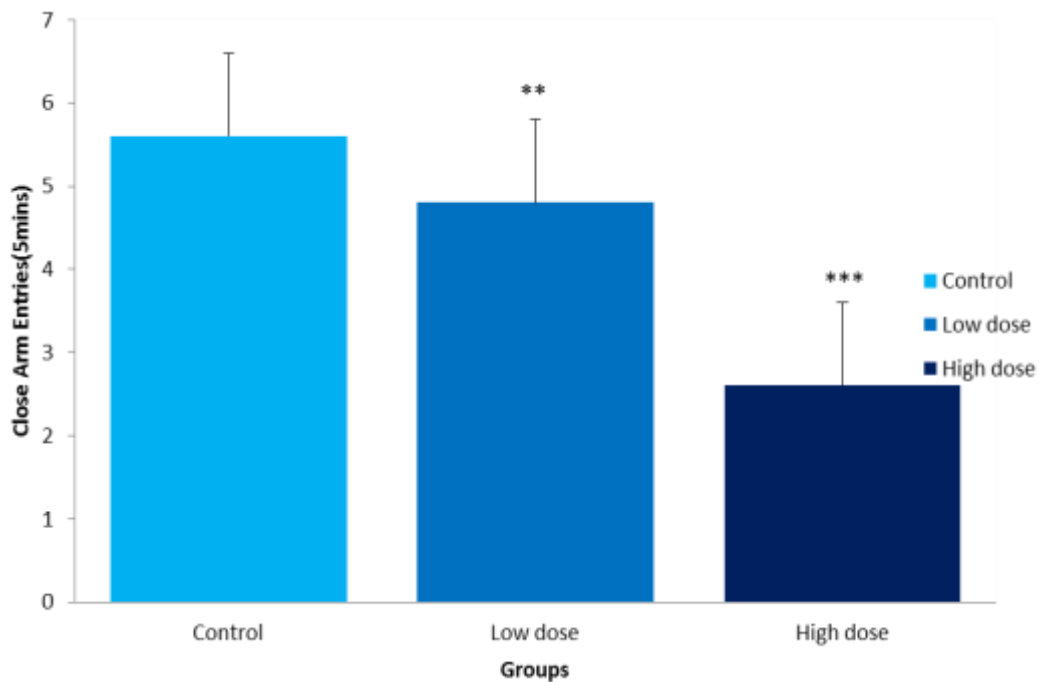


Fig 2: Effects of administration of *F.thoningii* diet on closed arm entries in the elevated plus maze test of the different experimental groups.

Values are mean \pm SEM, n = 10.

**= $P < 0.01$ vs control;

* **= $p < 0.001$ vs control.

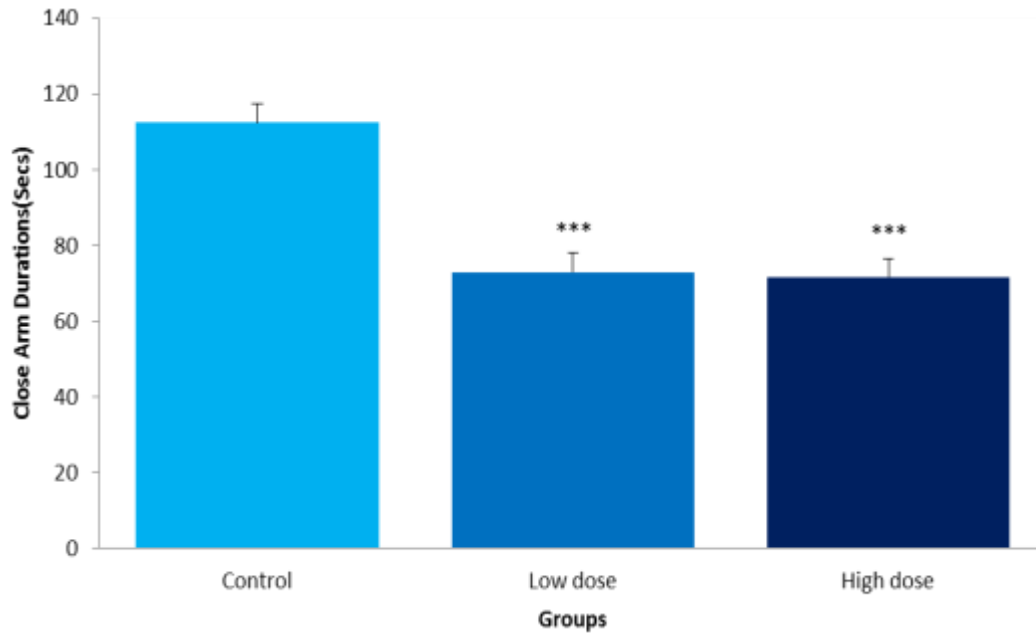


Fig 3: Effects of administration of *F.thoningii* diet on closed arm durations in the elevated plus maze test of the different experimental groups.

Values are mean \pm SEM, n = 10.

* **= $p < 0.001$ vs control.

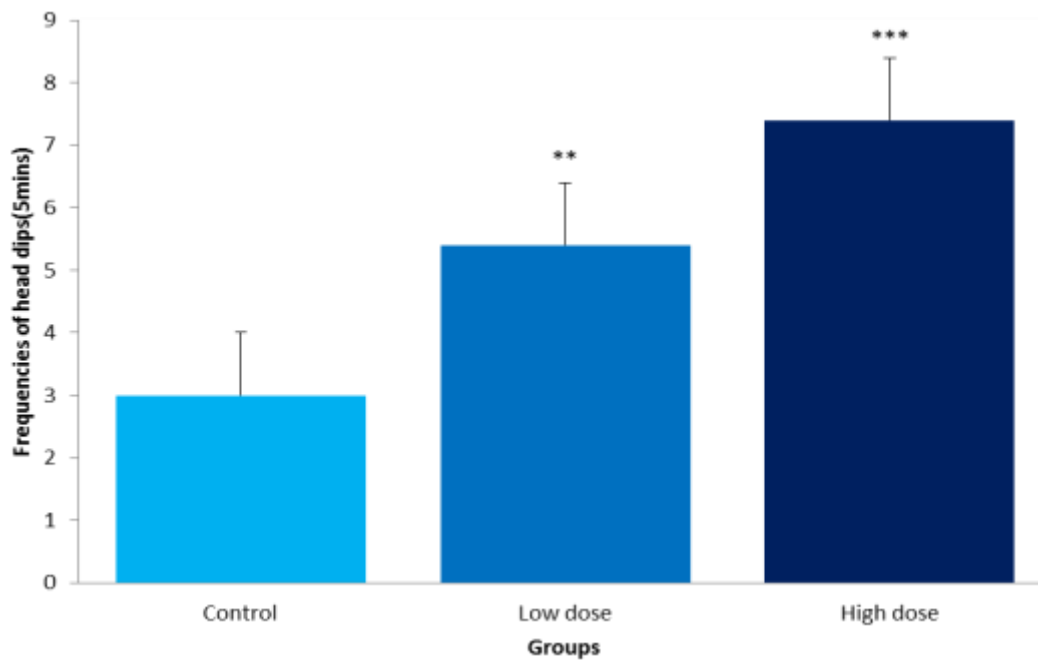


Fig 4: Effects of administration of *F.thoningii* diet on head dips in the elevated plus maze test of the different experimental groups.

Values are mean \pm SEM, n = 10.

**= $P < 0.01$ vs control;

* **= $p < 0.001$ vs control.

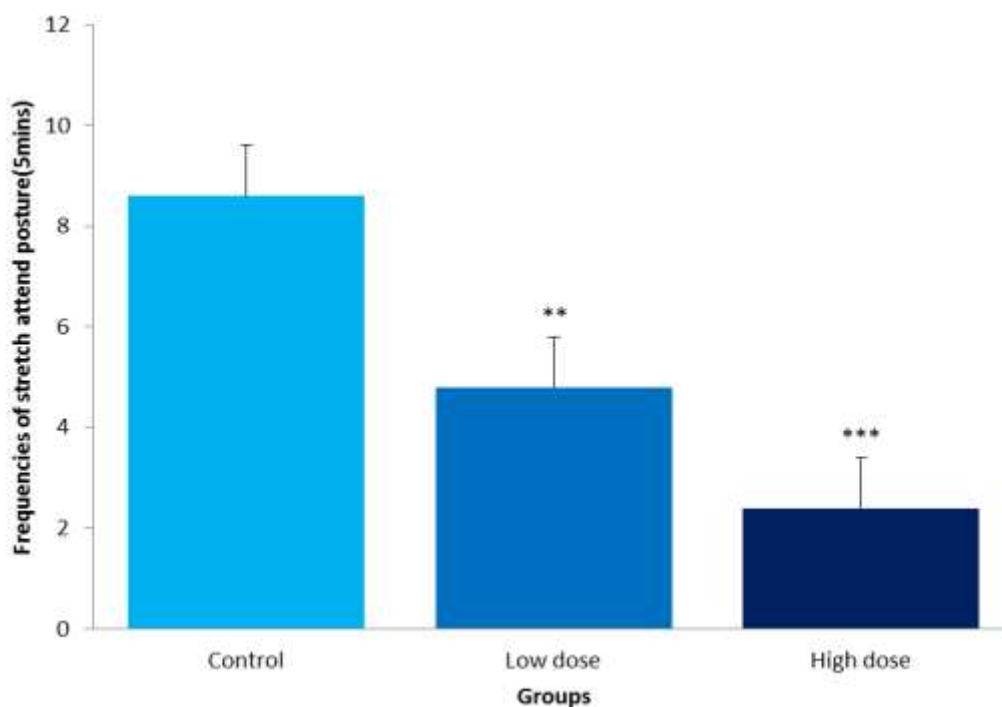


Fig.5: Effects of administration of *F.thoningii* diet on frequencies of stretch attend posture in the elevated plus maze test of the different experimental groups.

Values are mean \pm SEM, n = 10.

**=P<0.01 vs control;

* **=p< 0.001 vs control.

DISCUSSION

The elevated plus maze (EPM) is a widely used behavioral test for assessing anti-anxiety behavior in rodent.^[17] It is an established and reliable test for detecting anxiolytic-like effect of agents.^[18,19] In this study, behaviors, such as time spent in the open /close arm, frequencies of entry in the open /close arm, stretch attend posture and head dipping were used to assess the level of anxiety in mice. Decrease in anxiety-like behaviors characterized by reduced entry frequency into the close arm, increased open arm entry and head dipping frequencies in the wild fig treated groups, implies anxiogenic effect of *F.thoningii*. An increase in duration of the entries into the open arms is regarded as a powerful marker for an anxiolytic substance effect.^[20] In this study, administration of *Ficu thoningii* remarkably decrease the level of anxiety in mice which was characterized by reduced entry and duration into the closed arm across the period of the study when compared to the control. behaviors, such as, grooming, Stretch attend posture and head dipping, have also been demonstrated as credible indices in measuring rodent response to stress.^[17,21] Furthermore, Striking decrease in anxiety-like response, such as SAP and head dipping frequencies were observed with *F.thoningii* treatments. Increase in the duration and frequencies of the entries into the open arms in the elevated plus maze test had been confirmed as a potent sign of an anxiolytic substance effect.^[22] Several researchers have reported that flavonoids exhibit a wide range e of biological

activities, such as antioxidant, anti-inflammatory, and anti-angiogenic effects.^[23,24] It is possible that the chemical components with antioxidant activities such as flavonoid, play essential roles in the anxiolytic properties of *Ficus thoningii* leave as observed in the study. This is in consonance with report related to anxiolytic effect of plant extracts.^[25,26]

CONCLUSION

Ficus thoningii may prove effective in ameliorating anxiety like behavior in mice. It would be worthwhile to explore the potential of this plant in the management/treatment of anxiety disorders.

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Conflict of interest

I hereby write to confirm that there is no conflict of interest in respect to the publication of this piece.

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