RESPONSE OF WHEAT (*T. AESTIVUM*) TO ZINC TREATMENTS AT INCREASED TEMPERATURE

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Key Words: Zinc, Temperature, Pigment, Leaf area

ABSTRACT

Zinc is an essential micronutrient in agricultural crops. Wheat (*T. aestivum*) plants were grown at two different conditions, glass house and open condition, with significant difference in temperature. Pigment concentration, leaf area, panicle weight, panicle length, grain number had significant difference in their values were observed between the plants grown in glass house and open condition and also a significant difference in the concentration of zinc treated soil was observed among them.

INTRODUCTION

Zinc deficiency is a common problem in agricultural crops. Sommer and Lipman (1926) proved convincingly that zinc was essential for higher plants. Several workers (Ambler and Brown, 1969; Polson and Adams, 1970) have found the differential varieties response in crop plants to zinc on the basis of growth and yield analysis, but at higher concentration it acts as a toxic substance. However, it is not known that at different temperatures what will be the response of the plants to different concentrations of zinc.

The present paper reports the results of the experiments carried out to evaluate the effects of different concentrations of zinc on wheat plants grown at two different temperature differing by about 5°C.

MATERIAL AND METHODS

Pot culture method was used for present studies. 5 kg of soil was taken in each pot. Soils were treated with zinc as zinc sulphate with five different concentrations of 1.10, 50 and 100 ppm and control. Equal number of seeds of wheat were sown in each pot. Each treatment was taken in triplicate in two sets. One set was kept in open while the other set was kept inside a glass house. Concentration of foliar pigment were measured at fortnightly intervals, while the panicle weight, panicle length, grain weight, grain number and leaf area were measured at the end of the growth period.

RESULTS AND DISCUSSION

These was a significant difference in the values of chlorophyll a, chlorophyll b, total chlorophyll and carotenoid between the plants growing in the open and glass house conditions (Fig. 1). The range of chl. a had been 0.677 mg/g to 0.799 mg/g. The highest value of 0.799 mg/g observed with control in glass house condition. Chl. a in open and glass house condition had significant difference in control, 1 ppm, 10 ppm, 50 ppm and 100 ppm plants but the chl. a in 50 ppm of open and 10 ppm of glass house condition did not show significant difference between each other.

The chl. b varied between 0.453 mg/g to 0.615 mg/g. Maximum value of chl. b had 0.615 mg/g with control in open condition, while minimum value was 0.453 mg/g in glass house condition with 1 ppm treatment. The maximum value of total chlorophyll were recorded 1.124 mg/g with control in open condition, while minimum value was 1.298 mg/g with 10 ppm in glass house condition. Values of total chlorophyll have shown significant difference among each other.

The maximum value of carotenoid was 0.407 mg/g with 10 ppm zinc treatment, while minimum value was 0.307 mg/g with 100 ppm zinc treatment in glass house condition. Carotenoid have shown significant difference among each other in both the condition and all the concentrations of zinc treatment.

The leaf area decreased with increased doses of zinc in open and glass house conditions (Fig. 2). There was significant difference between open and glass house condition plants and also had significant difference among the plants of different concentrations of zinc.

Penicle weight, grain number and grain weight in-
significant difference in both conditions and different doses of zinc also. The present study revealed that the pigment and morphological characters of wheat are severely affected by zinc levels in soil, and also with the increased in temperature.

It is clear from the present study that zinc treatment in open condition is not so harmful to chlorophyll a as it is there in glass house condition. However, chlorophyll b deterioration was irregular with different doses. Carotenoid showed similar trend as in chlorophyll a.

Muthuchelian et al (1988) have studied the effect of zinc on Pigeonpea and reported that decrease in total chlorophyll, chlorophyll a, chlorophyll b by 94%, 96% and 85% respectively. Similar results are obtained in our study.

Decrease in the leaf area with increasing zinc doses, under the present study is in agreement with the studies of Sarkar and Arey, 1990; Shiende et al, 1993; Puste and Jana, 1988; and Singh et al. 1988.

ACKNOWLEDGEMENT

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REFERENCES


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Ethnoecological studies on Baiga ethnic system

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Summary: Present investigation considers Baiga as a focal component of ethnoecological system. It is concluded from the study that the forest system not only provides physical resources but also acts as an economic resource system to the Baiga population. It is estimated that 76% of the Baiga's total income comes from various forest produce. The increasing demand for money towards urban produce will obviously result in increased exploitation pressure on the surrounding forest system causing degradation and simplification of life supporting system and thus the resultant ecological and economic crisis to be faced by the ethnic community in the long term.

Key words: Ethnoecology, Ethnoecosystem, Exploitation pressure, Tribal.

Introduction

'Ethnoecology' is emerging as an important interdisciplinary science which concerns with ecological studies of 'ethnoecosystems' of specific ethnic communities adopting holistic approach. The tribal people are repository of accumulated experience and knowledge of vast indigenous flora and fauna. Living close to nature the tribals are familiar with the thousands of wild plants and animals by empirical reasoning and have developed their own method of conserving them.

A cross sectional review of the literature reveals that the research in the area has mostly been centred around 'ethnobotany', 'ethnozoology' and ethnobiology [Mishra, 1986] and has mostly been based on personal fancy of the workers. A number of workers have attempted ethnoecological studies considering different tribal populations as focal component of the ethnoecosystem, to mention a few are Mishra (1986); Singh (1988); Singh (1990); Chaturvedi (1990); Khatoon (1991) and Awasthi and Shukla (1992).

Present paper reports on ethnoecology of Baiga ethnic system in Sidhi district. The study considers Baiga as a focal component of ethnoecological system. The aspects of study include ethnic population analysis, forest and urban impacts and dependence of Baiga ethnic system.

Materials and Methods

Present investigation was carried out in two tribal villages Bhanwarsale and Bhojori, coming under Kusma taluk (situated in the close vicinity of forest).
A. SEX RATIO:

<table>
<thead>
<tr>
<th>Village</th>
<th>Male</th>
<th>Female</th>
<th>Sex Ratio Males/1000 Females</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bhanwarkhoh</td>
<td>61</td>
<td>68</td>
<td>897.05</td>
</tr>
<tr>
<td>Gandhigram</td>
<td>136</td>
<td>117</td>
<td>1182.39</td>
</tr>
</tbody>
</table>

B. EDUCATIONAL STATUS:

<table>
<thead>
<tr>
<th>Village</th>
<th>Illiterate</th>
<th>Primary/Middle</th>
<th>Higher Secondary</th>
<th>% of Literacy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bhanwarkhoh</td>
<td>123</td>
<td>05</td>
<td>01</td>
<td>4.65</td>
</tr>
<tr>
<td>Gandhigram</td>
<td>210</td>
<td>37</td>
<td>06</td>
<td>16.99</td>
</tr>
</tbody>
</table>

C. OCCUPATIONAL STATUS:

<table>
<thead>
<tr>
<th>Village</th>
<th>Occupation</th>
<th>Agriculture</th>
<th>Forest Labour</th>
<th>Multiple Occupation</th>
<th>Domestic Labour</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bhanwarkhoh</td>
<td>Agriculture</td>
<td>No. of families</td>
<td>11</td>
<td>01</td>
<td>07</td>
<td>03</td>
</tr>
<tr>
<td></td>
<td>Landless Adult Labour</td>
<td>No. of individuals</td>
<td>63</td>
<td>02</td>
<td>45</td>
<td>19</td>
</tr>
<tr>
<td></td>
<td>Urban Self Employment</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Forest Labour</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gandhigram</td>
<td></td>
<td>No. of families</td>
<td>08</td>
<td>09</td>
<td>02</td>
<td>01</td>
</tr>
<tr>
<td></td>
<td></td>
<td>No. of individuals</td>
<td>49</td>
<td>15</td>
<td>07</td>
<td>02</td>
</tr>
</tbody>
</table>

D. MAN AND DOMESTIC ANIMAL RATIO:

<table>
<thead>
<tr>
<th>Village</th>
<th>Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bhanwarkhoh</td>
<td>1 : 1.3</td>
</tr>
<tr>
<td>Gandhigram</td>
<td>1 : 1.2</td>
</tr>
</tbody>
</table>

It is concluded from the study that the more exposure of the ethnic population to urban system will result in increased demand and thus more and more money out of the forest resources. Obviously Baiga population is a dynamic system and will increase with time and thus resulting in increased utilization demand for general and specific forest produce and this ultimately will result in degradation and simplification of life supporting forest system and accelerated ecological and economic crisis for the ethnic community. Mishra (1986), Singh (1990), Khatoon (1991) and Awasthi and Shukla (1992) have expressed nearly similar views while working with different ethnic communities.
Evaluation and Status Assessment of Panna National Park (MP)

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Abstract

An evaluation and status assessment of Panna National Park was attempted. The national park came into existence on July 22, 1982 and even after functioning of ten years the park got no working plan. The wild animal population showed an increase in population till 1988 and then declined in 1990 and 1991. Rehabilitation and socio-economic impact assessment of the people revealed that of the 13 villages displaced only three villages received compensation. Most of the villagers who had farms now turned into laborers having miserable socio-economic status. Obviously, there is an urgent need for a management plan for the national park not only from forestry view point but also from the ecological aspect of the management.

The national park concept began in USA as a way of preserving ageless monumental scenery together with its wildlife, which started with establishment of National Park at Yellowstone in 1872. Since then a number of countries have followed the concept and a number of national parks and sanctuaries have come up in the world (1-6). In India the first step was 1897 Act for the preservation of wild birds and game, followed by similar 1912 Act which however remained a dead letter in the states. In 1935 through the efforts of the the Indian Society for Preservation of Wildlife in Uttar Pradesh, the Government of India held a conference in Delhi on wild life which gave impetus to the movement resulted in creation of Hailey (Corbett) National Park. In 1952 Government of India formed an Indian board of wildlife whose main function was to devise ways and means for conservation and control of wildlife through co-ordinated legislation and practical measures and to sponsor the setting up of national parks, sanctuaries and zoological gardens. Since then a number of national parks and sanctuaries have come up in India. In India today there are 70 national parks and 70 sanctuaries. In Madhya Pradesh the number of national parks and sanctuaries is 11 and 32, respectively.

The Panna National Park

The creation of Panna National Park came as a natural step in environmental planning of the state. The National Park was conceived as Gangau Sanctuary with an area of 285 km² in 1971. The sanctuary area was expanded in 1979 to make its area 478 km² including an area of 36 km² of Chhatarpur district. The status of Gangau sanctuary was upgraded to a National Park and was notified on 17 October 1981. The Panna National Park became functional on 22 July, 1982.

The national park is situated between 24° 25' and 24° 50' N latitude and between 79° 45' and 81° 10' E longitude. It has an area of 543 km². The park lies on either banks of river Ken which forms the border between Panna and Chhatarpur district of MP. Roughly two third area of the park lies in Panna district and rest in Chhatarpur district.

The Panna National Park comprises an impressive diversity of vegetation which ranges from spreading grasslands through mixed and
of wild animals representing members of all trophic levels. The main representatives are listed in Table 2. There are about 24 major wild animal species, among them the most significant are: tiger, panther, sambar, chital, blue bull, chinkara, spotted deer, wild boar, langur, and wild dogs. The year-wise census figures from 1984 to 1991 are given in Table 3. The tiger and panther population showed a continuous increase to the initial population from 1984 to 1988. The tiger population was 28 in 1984 which increased to 37 in 1988 but declined to 30 in 1990 and 28 in 1991. The panther increased from initial 27 (1984) to 31 in 1988 and suddenly decreased to 17 (1990) and 16 in 1991. The sambar population also reduced from the initial 634 (1984) to 463 in 1991. However, the sambar population showed a declining trend in population growth.

Till 1988 the animal population exhibited significant increase but after that the sudden fall in the population and sometimes even less than the initial population were recorded. This reveals that either the census records in the forest department are faulty or may be attributed to external disturbance such as killings.

This also indicates that perhaps proper management of wild life is also lacking in the park. The decrease in animal population may also be attributed to epidemic disease. A proper survey for health condition and the postmortem of animals may help in understanding the problem.

The geographical area of the National Park is suitable at present. According to Panwar (7) and Singh (8) a tiger population of 30 adults requires a minimum area of 400 km² if the resource conditions are optimum. With the present situation the area of the National Park is enough to maintain the present number of carnivore and herbivore animals. With the application of proper management practices the animal population will naturally increase and perhaps in the next ten years it will be an important requisite to increase the park area.

Forest fire is also one of the causes of migration of wild animals. The young ones which cannot move away fast or birds which cannot fly are burned alive. The supply of main requirements of wildlife such as suitable cover and shelter, water supply may be through natural or artificial sources and salt leaks should be maintained.

**Rehabilitation and Socio-Economic Impact Assessment**

A rehabilitation and socio-economic impa-
Table 4. The occupation status before and after displacement.

<table>
<thead>
<tr>
<th></th>
<th>Pre-displacement</th>
<th></th>
<th>Post-displacement</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of</td>
<td>Agri-</td>
<td>Landless</td>
<td>Total</td>
<td>Agri-</td>
</tr>
<tr>
<td>families</td>
<td>culture agri.</td>
<td></td>
<td>Forest</td>
<td>culture</td>
</tr>
<tr>
<td></td>
<td>labor agri.</td>
<td></td>
<td></td>
<td>depend</td>
</tr>
<tr>
<td></td>
<td>depend</td>
<td></td>
<td></td>
<td>families</td>
</tr>
<tr>
<td>221</td>
<td>134</td>
<td>45</td>
<td>179</td>
<td>42</td>
</tr>
<tr>
<td>10%</td>
<td>66.6</td>
<td>20.36</td>
<td>80.91</td>
<td>19.08</td>
</tr>
<tr>
<td>66.6</td>
<td>20.36</td>
<td>80.91</td>
<td>19.08</td>
<td>10%</td>
</tr>
</tbody>
</table>

still to be displaced and people are residing in the park premises.

In Panna National Park the main factors affecting wildlife may be enumerated as below: Construction activities such as roads, buildings and related deforestation and disturbance; human activities such as cutting and grazing animals by surrounding villagers and also due to people residing inside premises; inadequate water supply during summer; noise pollution due to nearby diamond mines.

The following measures should immediately be adopted for better management of the national park and wildlife: A working plan should be prepared immediately taking care for the management of wildlife by the forest department; natural habitat of the wildlife should be protected carefully; The staff on duty should be trained and should have a correct idea about the habitat requirement of the different wildlife; habitat improvement should be done immediately by constructing water holes, salt licks, and by raising crops of better and nourishing fodder grasses and trees; the enforcing of wildlife protection Act should be observed strictly; shooting and hunting of endangered species should totally be banned; people still residing in the park area should be displaced and rehabilitated immediately to reduce disturbance to wildlife; and public should be made aware of the advantage of preserving wildlife.

References