Bidirectional movement of transport of radioactive inorganic nutrition (P32) between parasite the host during Orobanche and Dendrophthe falcata

Chiranjeet Bhattacharya, Meghana Bhattacharya, Dr. Mihir Kumar Bhattacharya

Abstract: Orobanche and Dendrophthe falcata are angiosperm parasite stimulates phosphorus absorption rate of the host plant. An accumulation of phosphate, at the parasite contact zone of the host stem, has been observed. Redistribution of Phosphate in the top leaves of the infected host is considerably reduced as compared to the healthy one. This is due to the tapping of Phosphate by parasite from the host. Additional proofs have also been obtained to indicate a bidirectional flow of P32 between parasite and the host. Singh et al. (11) have demonstrated an accumulation of phosphate compounds in the parasite which is perhaps indicating an active transport mechanism at the point of host-parasite contact. Similar accumulation of phosphorus in Loranthus–host associate has been reported (7). Littlefield et al (4), reported a substantial movement of sugar from host’s body to dodder but was unable to establish any evidence of movement from the parasite to the host. Some recent studies have indicated transmission of viruses by Cascuta. Price (8); Lackey (3); Weathers (13); Miller & Troutman (5)]. On the hand, Polak (6) was unable to transmit a virus by dodder. No reference of movement.

Key words: Phosphorus 32; Dendrophthe falcata; Orobanche aegyptiaca pers; Ficus glomerata etc.

I. Introduction

Many people give statement that Orobanche and falcata are take nutrients to host but we prove that it will also give nutrients to host. Common Orobanche and Dendrophthe falcata is an unusual angiosperm parasite with multiple hosts. Its vestigial photosynthetic apparatus is unable to meet its total demand. The mechanism of its metabolic adjustment with different Hosts is still to a large extent unknown. The prevailing view that there is perhaps an unidirectional flow of organic food, inorganic nutrients and water from host to parasite is questioned in the present study.of inorganic nutrients from the parasite to the host has been found, in the literature. P32 is measured in Geiger molar counter in molar mass as well as in gram.

The present study with P32 as tracer revealed that the parasite exerts an active force on the points of contact with the host to change the normal flow of nutrients in the host stems towards its own requirements. Additional proofs where also obtained to indicate a bi directional flow of P32 between the parasite and the host.

II. Methods and Material

Experiment 1

Firstly, we take braches of Ficus glomerata having orobanche and another having dendrophthe falcata infections and another of without both infections after that we will keepered their roots in water for some time. And then we fed ita type of Hoagland solution containing radioisotope P32 (60 c/ 100ml) under normal light conditions inside the laboratory. Samples of Hoagland solution were taken after samples of host were taken after 42 hours to observe the rate of Phosphorus uptake. Simultaneously leaf samples of host from three sites (below infection, infection zone and above infection). Were after that along with a parasite for test in radioisotope. Radioautograms of infection plants were taken to establish the pattern of P32 distribution following for orobanche and falcata infection.

Experiment 2

In study, pot grown Ficus ficus glomerata or nerium indicum and Impatiens balsamina, a scrub and herbs respectively. Were chosen as hosts and to observe the flow of P32 from parasite to host. The free end of the parasite was cut, dipped into the nutrient solution tagged with radioactive Phosphate(60 /100ml) for 24hrs under normal laboratory conditions. At the end of experiment period samples were taken from the different parts of the host and parasite as mentioned in Table 1. Samples were dried in an oven at 65degree Celsius for 72hrs and then ground to fine power. 100 mg of each powered sample was spread uniformly on a planchet, a
Bidirectional movement of transport of radioactive inorganic nutrition (P32) between parasite.

Radioactivity was measured in an open window GM counter and X-ray. This report proves that the parasites are not total parasites because it also gives nutrients to its parasite. Radioactive was measured in an open window GM counter. The result is shown in the figure.

### III. Result

Result will give us as counts per minute. Background: 29 counts/minute efficient of counts/minute Efficiency of counter: 1% approximately.

In case of infection Orobanche, a root parasite and dendrophthoe falcata arise in Phosphate absorbed rate in the host record. Radioactive plate (Fig. 2) further demonstrated an accumulation of phosphate at the parasite contact zone of the host stem. Study of the redistribution of phosphate in the infected plant body (Fig. 1 B) revealed that the top leaves in the host possess only 38% of the redistribution phosphate found in lower epidermis of leaves. On the other hand, the top leaves have about 63% of the restriction phosphate found in the lower epidermis of a very healthy plant. Obviously, this is due the tapping of phosphate by the parasite from the host as shown in the histogram. Distribution of Phosphate in whole stem (Fig. 1. C) does not seem to affect very badly in leaves. P32 is used which is also generally known as phosphorus 32 which is a radioisotope. Which is measured in gram and mole, ml (Millie Litter) etc.

Result is clearly shown that in Table 1 indicate in parasite is able to absorb P32 through the cut portions and transfers almost an equal amount to the host’s only stem part. There redistribution patterns of entering in stem of host from parasite body has been depend on the what type of plant is taken as host and quality of plant. In the woody scrub Nerium indicum the distribution is very fairly equal in upper epidermis of the leaves and in lower regions of the leaves have infection zone. While in the herb Ficus glomerata and Impatien balsamina, the younger leaves pull up more than nine times of the entering phosphorus as compared to the lower epidermis of leaves. P32 is used in this experiment for testing that Orobanche like root parasites can also give nutrients to host plant. This is tested by radioisotope and GM that is Geiger molar counter for net weight and permanent weight for that material or element.

### IV. Discussion

The normal distribution of phosphate in plants, as described by Biddulph (1), Brewer and Bramley (2), Rabideau et al (9) and Stumpf (12) is disturb due to Orobanche and dendrophthoe falcata infection. Orobanche and Dendrophthoe falcata changes the normal course of nutrients translocate in host’s body. The present result is that further indication that is the contact with zone of Parasite infection accumulates Phosphorus and perhaps actively transported the same towards Parasite. This causes young leaves to run into a state very high deficiency nutrients.

In the above study of host and parasite relation between Orobanche and dendrophthoe falcata and exchange of nutrients between host parasite and adjustment of parasite to different hosts, still remains to a extent unsolved. The results support the ideas about host is not merely a nutrition substrate for the total parasite Orobanche and Dendrophthoe falcata but they have very close physiological contact between their metabolic processes through the infection sites. Ficus glomerata, or natrium indicum and Impatiens balsamina, angiosperm etc.

### V. Figures and Tables

1.) A dendrophthoefalacata parasite 2.) Orobanche aegyptiaca pers.
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Figure 1-

Table: 1. Distribution of selected plant

<table>
<thead>
<tr>
<th>Period</th>
<th>Location</th>
<th>Radioactive Accumulation</th>
<th>Radioactive Mobility</th>
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<tr>
<td>12</td>
<td>Control</td>
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<td>456</td>
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<tr>
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<td>789</td>
<td>098</td>
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<td>Upper</td>
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<td>12</td>
<td>Stem</td>
<td>123</td>
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</tr>
<tr>
<td>12</td>
<td>Total</td>
<td>123</td>
<td>456</td>
</tr>
</tbody>
</table>

Figure 2-

Figure 3-

*Fig. 3.17 Radiogram showing distribution of P32 in host (biringal, 1-5) and parasite (6). 1, host root; 2, host-parasite contact zone; 3 & 4, host stem and 5, first leaf of host.*
VI. Conclusion

Orobanche and Dendrophthoe falcata are angiosperm parasite stimulate phosphorus absorption rate of the host plant. An accumulation of phosphate, at the parasite contact zone of the host stem, has been observed. Redistribution of Phosphate in the top leaves of the infected host is considerably reduced as compared to the healthy one. Result is clearly shown that in Table 1 indicate in parasite is able to absorb P32 through the cut portions and transfers almost an equal amount to the host’s only stem part. There redistribution patterns of entering in stem of host from parasite body has been depend on the what type of plant is taken as host and quality of plant.

Acknowledgment Dedicate

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