

Research Paper :

## Effect of weeds and their compost on microbial biomass and nutrient status under waterlogged condition

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### ABSTRACT

Laboratory incubation experiment was carried out to study the changes in the microbial biomass nitrogen and microbial biomass carbon under waterlogged condition of paddy soil with the use of parthenium and chromolaena as green manure and their compost. Based on the content of total C of plant material organic material applied at the rate of 0.5, 1.0 and 2.0 per cent level of organic carbon. The increase in extractable C and N in Mudigere soil alone was 30.81 mg kg<sup>-1</sup>, at 60th day of flooding. On 120<sup>th</sup> day of flooding the EC values of Mudigere soil alone was 32.47 mg kg<sup>-1</sup>. Similarly with time, the EN values also increased. The highest EC value was recorded in T<sub>10</sub>: Mudigere soil + Chromolaena compost @ 2.0 % C at day 60 and 90 was 112.11 and 153.52 mg kg<sup>-1</sup> soil, respectively. The EC: EN ratio in control was 7.91 in Mudigere soil whereas on 120th day of flooding the value was 7. On 120 day, it ranged from 85 to 381 mg kg<sup>-1</sup> soil. On 120th day lowest biomass nitrogen (BN) (215 mg kg<sup>-1</sup>) was recorded in T<sub>5</sub>: Mudigere soil + Parthenium green manure @ 0.5 % C. Increasing the C level resulted in increasing BN and BC, but to different degrees, depending on the native of C sources. Addition of different levels of organic manures to soils showed highly significant changes in nutrient content of soil over control at 60 and 120 days after flooding.

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Microbes are an integral component of a living soil. It is widely being recognized that the presence and abundance of microbial wealth make soils healthy in terms of growth enhancement and protection against pests and diseases. Adding of organic manures significantly increase the microbial density and diversity in soils. Sensitive changes in microbial biomass, quantum and characters of biomass that develops upon flooding, fertilization and residue management practices. Although microbial biomass, only accounts for about 1 to 3 per cent of the soil organic matter, it exhibits a rapid turnover and can be considered as a driving force of major nutrient cycles. Hence an attempt was made to assess the microbial biomass and major nutrients of paddy soil upon addition of parthenium and chromolaena as green manure and their compost under flooded condition.

### MATERIALS AND METHODS

Soil samples were collected from Typic Paleustalf, paddy growing areas of Mudigere, Chickmagalur district of Karnataka State. Based on the total C content of the plant material, amount of organic material required for soil incorporation was calculated. There were three levels of organic material application to soil to achieve 0.5, 1.0 and 2.0 per cent level of organic carbon.

There were 13 treatments and 3 replications, T<sub>1</sub>:

Mudigere soil (MS) (Control), T<sub>2</sub>: MS+ Chromolaena as green manure @ 0.5 % C, T<sub>3</sub>: MS+ Chromolaena as green manure @ 1.0 % C, T<sub>4</sub>: MS+ Chromolaena as green manure @ 2.0 % C, T<sub>5</sub>: MS+ Parthenium as green manure @ 0.5 % C, T<sub>6</sub>: MS+ Parthenium as green manure @ 1.0 % C, T<sub>7</sub>: MS+ Parthenium as green manure @ 2.0 % C, T<sub>8</sub>: MS+ Chromolaena compost @ 0.5 % C, T<sub>9</sub>: MS+ Chromolaena compost @ 1.0 % C, T<sub>10</sub>: MS+ Chromolaena compost @ 2.0 % C, T<sub>11</sub>: MS+ Parthenium compost @ 0.5 % C, T<sub>12</sub>: MS+ Parthenium compost @ 1.0 % C and T<sub>13</sub>: MS+ Parthenium compost @ 2.0 % C.

Appropriate amount of organic materials were incubated with 500 g of soil in 2000 ml capacity polypropylene pots. Excess amount of water was added and mixed well to create puddled and flooded conditions. At periodic intervals, destruction sampling was done for analyzing various electro-chemical and bio-chemical properties at 60 and 120 days after flooding. For all measurements wet soil samples were taken. Results were expressed on oven dry weight basis after taking account of moisture per cent.

The NH<sub>4</sub><sup>+</sup>-N of soil extracted with 2 M KCl was estimated by subsequent steam distillation (Bremner, 1965). Phosphorus was extracted with 0.03 N NH<sub>4</sub>F in 0.025 N HCl and estimated according to Bray and Kurtz (1945). Potassium extractable with N, N NH<sub>4</sub>OAc and