It can be concluded that adopting an integrated farming system combining cropping, poultry, fisheries and mushroom production enhance the net income of the lowland rice farmer.

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SAND GRAIN MINERALOGY OF THE SOILS OF LOWER BHAVANI PROJECT COMMAND AREA

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ABSTRACT

The study of the soils of Lower Bhavani Command Area revealed that the total light minerals in coarse sand fractions are in the range of 96-97, 92-96, 93-96, 87-92 and 94-97 per cent in Irugur (Igr), Sathyamangalam (Sty), Kangayampalayam (Kgp), Koduveri (Kdv) and Peelamedu (Plm) series, respectively, In fine sand fractions they are in the range of 91-96,91-98,94-97,84-90 and 92-95 of per cent in these series. Generally light minerals dominate distinctly over the heavier ones due to relative resistance or weathering of the former. Quartz predominates over the other light minerals. Surface horizon showed more quartz than feldspar. The total amount of heavy minerals in both fractions is the least in Igr followed by Plm, Sty and Kdv series.

KEY WORDS : Sand Grain Mineralogy, LBP soils.

The composition and mineralogy makeup influences the physical and chemical properties of soil. Mineralogical analyses serve as an effective guide for planning the reclamation processes. Also, mineralogical investigations provide an opportunity to develop a better understanding of weathering and pedogenic processes. Further, they form a strong basis for sustainable crop production. The mineralogy studies of soils of Lower Bhavani Project (LBP) area are much inadequate and hence the present study was under taken to investigate the sand grain mineralogy of LBP Command Area.

MATERIALS AND METHODS

The Lower Bhavani Project Command Area covering the taluks of Sathyamangalam, Gopichettypalayam, Bhavani, Perunthurai, Kangayam, Erode of Periyar District of Tamil Nadu lies between $77^0 2$ to $77^0 6$ E and $11^0 28$ to $12^0 00$ N. This study area lies 171.91m above sea level. The slopes ranged from 3 to 8 per cent. The study area experiences mean annual precipitation of about 685 mm, 50 per cent of which is received during September, October and November while January to April are the driest period. The mean annual winter and summer temperature are 32.2,30.5 and 34.7^0 C, respectively. The soil temperature and moisture regimes are"Isohyperthermic and Ustic" respectively. The physiography of the area generally has terraced conditions slopping towards Bhavani river which serves as draining line.

The natural vegetation of the area comprises of nut grass, hariyalli grass, *Acacia* and neem. The geological formation of the study area consists of rocks of Dharwar age followed by charnokites and peninsular gneiss. Five pedons at the rate of one each of the five soil series, *viz;* Irugur (Igr), Sathyamangalam (Sty), Kangayampalayam (Kgp), Koduveri (Kdv) and Peelamedu (Plm) were studied for the present investigation.

The Igr soil series is a member of fine loamy, non acid, kaolinitic, iso-hyperthermic family of Lythic Haplustalf. The Sty soil series is a member of fine loamy, mixed Isohyperthermic family of Typic Ustochrept. The Kgp soil series is a member of fine, non acid, mixed, isohyperthermic family of Typic Ustifluvent. The Kdv soil series is a member of fine, mixed, isohyperthermic family of Typic Haplustalf. The Plm soil series is a member of fine loamy, montmorillonitic. isohyperthermic family of Typic Chromusert.

The mechanical analysis was carried out as per the International Pipette Method to get fine sand and coarse sand fractions. The coarse sand and fine sand grains minerals were identified on numerical basis, Milner, 1962).

RESULTS AND DISCUSSIONS

Light minerals

The light minerals in coarse sand fractions are in the range of 96- 97, 92-96,93-96, 87-92 and 94-97 per cent in pedons of Igr, Sty, Kgp, Kdv and Plm series respectively. In the fine sand fractions, they are in the range of 91-96,91-98,94-97,84-90 and 92-95 per cent in Igr, Sty, Kgp, Kdv and Plm series respectively. In all the five series, light minerals dominate distinctly over the heavier ones

Table 1. Sand grain mineralogy of the soil of Lower Bhavani Project Command Area

Horizon	Depth in cm	Light fraction	Heavy fraction	Light Minerals			Heavy Minerals								
				Qz	Fel	Ms	Gar	Hy	Hb	Mt	Ru	Tou	Lim	Chi	Zir
Pedon I Upper terrace, excessively drained, heavy erosion, weathered gneiss, 3-8% slope															
Lithic Haplustalf															
Ap	0-9	97(96)	3(4)	92(89)	5(7)	3(4)	32(25)	..(10)	36(30)	..(24)	..	..	32(11)	..	..
Bt	9-23	96(95)	9(5)	91(88)	8(10)	1(2)	..(13)	..(21)	45(27)	16(10)	12(4)	..	20(45)	..	..
C	23-45	96(91)	4(9)	93(89)	7(10)	..(1)	23(8)	32..	..(22)	....	25(21)	..	20(49)	..	..
Pedon II Middle terrace, moderately drained, lightly erosion, quartzlytic gneisis, 3-5% slope															
Typic Ustochrept															
Ap	0-16	96(98)	4(2)	86(82)	13(12)	1(6)	26(21)	5(15)	28(24)	..	23(25)	8	10(8)	..(6)	..
BA1	16-38	95(94)	5(6)	88(86)	1(10)	1(4)	21(18)	..(25)	31(22)	.5	29(21)	5	9(6)	..(8)	..
BA2	38-82	95(94)	5(6)	93(87)	7(10)	.(3)	16(15)	8(20)	23(21)	3	38(19)	4	8(11)	..(14)	..
C	82-125	92(91)	8(9)	88(87)	12(10)	.(3)	18(12)	6(28)	19(21)	5	32(26)	12	8(8)	..(5)	..
Pedon III Alluvialfan, moderately drained, slighterosion, mixed weathered gneiss, 1-3% slope															
Typic Ustifluvent															
Ap	0-18	93(94)	7(6)	88(93)	9(7)	3..	..(3)	..(14)	32(18)	9(11)	..	5(8)	..	10(16)	44(30)
A	28-52	95(97)	5(3)	96(97)	4(3)	..	38	13(28)	13(14)	9(13)	..(5)	3(4)	6(2)	2(12)	16(22)
C1	52-78	96(97)	4(3)	92(95)	6(5)	2	5(18)	..	28(19)	5(8)	..	6(7)	2..	11(14)	32(29)
C2	78-148	93(95)	7(5)	90(96)	8(4)	2	14(12)	..(16)	25(12)	11(15)	..	.(3)	8(2)	3(12)	15(20)
Pedon IV Middle terrace, poorly drained, moderate erosion, weathered gneiss, 1-3% slope															
Typic Haplustalf															
Ap	0-21	92(90)	8(10)	91(87)	9(11)	..(2)	27(22)	14(11)	6(8)	5(10)	6(8)	9(12)	..	9(10)	24(19)
BA1	21-46	88(86)	12(14)	94(90)	4(9)	2(1)	24(17)	9(6)	8(6)	4(4)	8(11)	4(10)	..	12(14)	3(32)
BA2	46-75	87(84)	13(16)	96(90)	2(9)	2(1)	32(28)	6(4)	11(5)	3(4)	8(11)	1(4)	..	6(9)	33(35)
C	75-112	87(84)	13(16)	95(92)	2(8)	3..	20(16)	4(3)	13(9)	..(7)	10(12)	1(4)	..	7(8)	45(41)
Pedon V Plain, imperfect drainage, moderate erosion. grainitic gneiss, 1-3% slope															
Typic Chronustert															
A	0-18	97(95)	3(5)	90(88)	8(9)	2(3)	15(9)	18(16)	17(14)	..	4(6)	4(6)	5(7)	..(4)	37(30)
A12	18-46	96(94)	4(7)	85(87)	12(13)	1(2)	13(5)	10(13)	18(16)	10(12)	7(8)	4(6)	5(9)	..(5)	25(20)
A13	46-90	96(94)	4(6)	97(85)	12(13)	1(2)	15(4)	9(12)	10(18)	5(7)	6(9)	4(6)	8(12)	..(5)	35(23)
A14	90-145	96(94)	4(6)	86(83)	13(16)	1(1)	12(6)	9(6)	8(13)	12(10)	10(20)	3(5)	7(10)	..(6)	30(20)
CC	145-190	94(92)	6(8)	91(90)	8(9)	..(1)	8(5)	7(10)	10(12)	2(4)	32(30)	3(5)	..(6)	..(1)	38(25)

Figures in parentheses indicate minerals in finesand; QZ - Quartz, Fel - Feldspar, MS - Muscovite, Gar - Garnate, HY - Hyperthene, HB - Hornblende, Mt - Magnetite, Ru - Rutile, Tou - Tourmaline, Lim - Limonite, Chi - Chlorite, Zir - Zircon.

due to relative resistance of weatherability of the former.

Eventhough the light minerals dominate the heavier ones in both coarse and fine sand fractions, it will be worthy of mention that there is relatively less light minerals in the fine sand fractions than that of coarse sand fractions. This explains the fact that the fine sand fraction is the result of advanced weathering. Generally, there is a declining trend of light minerals with depth in pedons of all the series, excepting Kgp series.

The Irugur series has the highest amount of light minerals followed by Plm, Kgp, Sty and Kdv series in decreasing order. This indicates that Kdv series is the most weathered and pedogenetically matured owing to the presence of the lowest among of light minerals on its pedons. The less amounts of light minerals in Plm series also reflected its basin type of topographic position favouring retention of more moisture and accelerated chemical weathering. In Kgp series, the sandgrain mineralogy is not of any regular in view of its stratified arrangements in pedon. The content of light minerals in this series is also fairly high.

Among the light minerals in all the series, quartz dominates over the others probably due to gradual removal of easily weatherable minerals during long periods of weathering (Sahu *et al.*, 1983) and its relative resistance to weathering (Dhar *et al.*, 1988). Reduced amounts of feldspars are present when compared to quartz especially in fine fractions and there is no occurrence of any apatite minerals. This indicates the relatively more weatherable nature of feldspar and apatite than quartz. Such variation could be ascribed to the more weathering of feldspars and relative accumulation of silica which would have been dehydrated and converted into quartz.

The most interesting thing observed in the present investigation is that the surface horizon has shown comparatively more quartz than feldspars. The accumulation of quartz in the surface horizons could be ascribed to the constant depletion of K form the surface horizons by crop removal which might have accelerated the more weathering of feldspars to maintain the K equilibrium leading to the relatively accumulation of quartz. Similar observations, were also made by Barua *et al.* (1990).

The abundance of quartz reveals that the soils could have been derived from acid igneous rock sources of parent materials like granites or granitic gneisses. These results are in confirmation with Subbiah and Manickam (1986) and Sahu *et al.* (1990). The heavy minerals in coarse sand fractions are in the range of 3-9, 4- 8, 4-7, 8-13 and 3-6 per cent in the pedons of Igr, Sty, Kgp, Kdv and Plm series respectively. The total amount of heavy minerals is the least in Igr series followed by Plm, Kgp, Sty, and Kdv in decreasing order. However, there is not much spectacular difference in heavy minerals composition among the five series, because of similar wetness of weathering environment under this command area. There is relatively more of heavy minerals in the fine sand fractions than in coarse sand fraction confirming the greater magnitude of weathering involved.

Heavy minerals

Among the heavy minerals, Zircon is almost dominating in Kgp, Kdv and Plm series. in Igr series, hornblende and limonite minerals are present in considerable amounts whereas biotite is practically absent . Besides, rutile is present in considerable quantities in Igr and Sty series. In the Plm series, the distribution of light minerals and heavy minerals fraction is found to be more homogeneous within each pedon because of characteristic churning process in vertisols. But variation in contents of light and heavy minerals noticed among the pedons could be attributed to difference in chemical composition of the parent materials and degree of weathering.

The least amount of horneblende notice in Kdv series indicates that the pedons had undergone comparatively strong weathering. The Igr series is found to be rich in horneblende ranging from 34-45 per cent indicating that these pedons are comparatively less weathered followed by Sty and Plm series with 19-31 and 7-18 per cent of these minerals indicating that these pedons had undergone moderate weathering. The Kdv and Kgp series showed irregular distribution of chlorite.

The outcome of this study will help in a better understanding of these soils in addition to forming a sound basis of soil management.

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EFFECT OF AGROCHEMICALS ON FLOWER PRODUCTION, BUD AND BOLL SHEDDING AND YIELD OF COTTON (*Gossypium hirsutum*)

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ABSTRACT

With a view to explore the possibilities of reducing bud and boll shedding of cotton, an experiment was conducted at the Tamil Nadu Agricultural University, Coimbatore, during the winter season of 1984-85 (Aug - Feb) under irrigated condition. Different ratios of NPK with and without 25 kg Z_nSo_4/ha, different foliar sprays such as NAA (40 ppm), CCC (40 ppm) and DAP (3%) individually or in combination with and without topping formed the treatments. The study revealed that application of 80:60:60 kg of NPK either with 25 $ZnSo_4$/ha or with foliar spray combination of NAA (40 ppm) + DAP (3%) and with topping at fifteenth node increased the dry matter production, number of bolls per plant and seed cotton yield followed by application of 80:40:40 kg NPK with 25 kg $ZnSo_4$/ha and they were comparable between themselves. The bud and boll shedding was significantly reduced by the foliar spray combination of NAA (40 ppm) + DAP (3%) along with topping at fifteenth node resulting in increased seed cotton yield. The flower production was significantly reduced due to the spraying of NAA and CCC either individually or in combinations.

KEY WORDS : Agrochemicals, Cotton, Flower Production, Bud, Boll Shedding

The cotton crop under irrigated conditions is known for its loss of buds and bolls through physiological causes and pest attack. The yield of cotton is proportional to the number of bolls produced per plant which in turn depends upon the number of flowers per plant as well as amount of shedding of squares. Kamalanathan (1960) observed 40.5 per cent bud shedding due to causes other than insects. Bhatt *et al* (1982) reported that foliar spraying of NAA or DAP was equally effective in reducing the physiological shedding of fruiting bodies. Damodharan (1975) stated that spraying of CCC reduced the rate of flowering. Salem and Roshdy (1983) reported that application of $ZnSO_4$ increased the boll number per plant. So the use of growth regulators such as alpha naphthalene acetic acid (NAA) and 2 chloro-ethyl trimethyl ammonium chloride (CCC) and nutrient spray of diammonium phosphate (DAP) 3 per cent and nutrient management of NPK and $ZnSO_4$ and topping were tried for the purpose of reducing bud and boll shedding. The main objective of use of growth regulating chemicals was to attain vegetative growth and fruiting to achieve higher retention of bolls per plant.

MATERIALS AND METHODS

Field experiment was conducted at the Tamil Nadu Agricultural University, Coimbatore, under irrigated condition with MCU 9 cotton *(Gossypium hirsutum* L.) during the winter season of 1984-85 on sandy clay loam soil with a P_H of 8.0 and EC of 0.135 m.mhos/cm. Soil was low in available N (130 kg/ha), medium in available P_2O_5 (16.8 kg/ha) and high in available K_2O (490 kg/ha). The experiment was laid out in a randomised block design with three replication. Different ratios of