SUMMARY

CHAPTER 1:

Seasonal and pinealectomy induced alterations in organs like gonads, thyroid, adrenals, pancreas, spleen and uropygeal gland have been evaluated in terms of their weights during recrudescent, breeding and regression phases of the feral pigeons, Columba livia. Decreased adrenal and thyroid weights corresponding to increasing gonadal weights during breeding indicate some sort of antagonism between them. Increased spleen weight during recrudescence may be associated with haemopoietic activities. Changes in urogygeal gland weight tend to indicate it to be a probable target organ of gonadal steroids. Pinealectomy produced an opposite pattern of changes and thereby pineal has been considered to be progonadal in nature in feral pigeons. Based on the observed alterations in weights of various organs after pinealectomy, tentative relationships between pineal and other endocrines have been discussed.

CHAPTER 2:

Seasonal and pinealectomy induced alterations in some blood parameters like glucose, haemoglobin, erythrocyte sedimentation rate (ESR) and hemostasis have been evaluated during recrudescent, breeding and regression phases of the feral pigeons, Columba livia. All the parameters were noted to show phase specific alterations which were definitely affected by pinealectomy. Whereas the lowered blood glucose level post-pinealectomy has been correlated with anti-insulinic role of pineal, the deviations in other parameters have been thought to be due to as yet unknown subtle alterations at many levels.

CHAPTER 3:

Seasonal and pinealectomy induced alterations in hepatic and muscle glycogen and phosphorylase have been followed during the three reproductive phases of the feral pigeons, Columba livia. Phase specific alterations in these parameters have hightened the importance of muscle glycogen in the period of gonadal activation and that of liver glycogen during breeding. Pinealectomy suppressed to a greater extent the normal seasonal responses and led to reduced hepatic glycogen content during both recrudescent and breeding periods. Possible anti-insulinic and anti-avian pancreatic polypeptide role of pineal in wild pigeons

are discussed in the text.

CHAPTER 4 :

Seasonal and pinealectomy induced alterations in SDH, ATPase and G6Pase activities of gonad, liver, muscle and kidney have been evaluated during the three phases of breeding cycle in feral pigeons, Columba livia. Increased activities of these enzymes during the reproductively active phases tend to denote geared metabolic efficiency to meet the exigencies of breeding. Pinealectomy induced both tissue specific and season specific alterations in the activity of these enzymes. Reduced SDH activity and increased ATPase activity together with alterations in G6Pase activity denote uneconomical metabolic processes and has been discussed in detail in the text.

CHAPTER 5 :

In order to understand the effect of annual cyclic reproductive activities and pinealectomy on lipid metabolism quantitative alterations in total lipids, phospholipids, cholesterol and triglycerides in liver, muscle and adipose tissue have been assessed in the feral pigeons, Columba livia. Elevated cholesterol content and loss of hepatic and muscle triglycerides have been

the feature during recrudescence and breeding. The adipose tissue triglyceride content remained insensitive during the breeding cycle. Pinealectomy not only suppressed the mobilization of triglycerides from liver and muscle during recrudescence and breeding and led to significant loss in phospholipid content. These changes are taken to indicate the involvement of pineal in subtle modulations of lipid metabolism in relation to the breeding cycle in wild pigeons.

CHAPTER 6 :

Ionic content of tissues and serum during seasonal breeding activity as well as post-pinealectomy has been estimated in the feral pigeon, Columba livia. Seasonal reproductive activity was marked by reduced Na^+ content and increased K^+ content in serum and tissues. Higher tissue content of Ca^+ has also been recorded. Pinealectomy induced decreased Na^+ content in serum and increased content in tissues while K^+ content was increased in serum and season specific differential changes were shown by the K^+ content of tissues. Ca^{++} content also tended to show differential tissue and season specific changes in the pinealectomized condition. These changes are correlated with changing metabolic profile during normal annual cyclicity and the involvement of pineal thereof albeit indirectly.

CHAPTER 7 :

Seasonal variations in the ascorbic acid (AA) content of liver, muscle, kidney and gonads of normal and pinealectomized feral pigeon, Columba livia, have been followed. Increased AA content in tissues during regression or recrudescence and its depletion during breeding indicate the utilization of AA in the breeding activities. In gonad, pinealectomy induced increase in AA content of tissues during recrudescence and breeding. Apparently, normal mobilization but reduced utilization can be supposed.

CHAPTER 8 :

Changes in the total protein content and the activities of acid and alkaline phosphatases in various tissues have been evaluated in normal and pinealectomized feral pigeon, Columba livia, during the three reproductive phases. In general, increasing activity of both the phosphatases and decreasing protein was the feature in all the tissues during recrudescent and breeding phases. Pinealectomy tended to bring about nonspecific alterations of all parameters from the normal which varied not only on a seasonal basis but also on tissue basis. Involvement of phosphatases in gonadal activation during reproductively active phases and the skewing up of the adaptive changes due to pinealectomy have been discussed in the text.