5 Summary

In the presented work information about structure and organisation of sex linked DNA regions of hemp should be obtained with help of molecular and cytogenetic methods. With specific probes the sex-chromosomes of hemp should be marked. Therefore different approaches to discover and isolate sex linked DNA fragments were developed and applied. Most successful was the transformation of male and PAR specific RAPD and AFLP markers respectively.

The male specific RAPD marker OPC-11_{2700} and the PAR specific AFLP marker AGA_AAT_330 could successfully be transformed into different SCAR markers. The SCAR marker C11Seq originating from the RAPD marker OPC-11_{2700} showed complete cosegregation with male sex when applied to 74 plants of a segregating progeny. Two PAR specific SCAR markers (330Komp and 330CA) could be developed from the AFLP marker AGA_AAT_330. The amplification pattern produced by the marker 330Komp showed cosegregation with AFLP marker AGA_AAT_330. The other SCAR marker (330CA) produced a codominant amplification pattern. To use the PAR specific fragment as probe for *in situ* hybridization, increasing of the fragment´s length by amplifying the flanking regions left and right of the fragment was necessary. PCR Walking was used successfully to amplify about 4,0 kb of each side of the fragment´s flanking regions.

In situ hybridization of chromosome specimens could be adapted to hemp successfully. The sites for 5S- and 25S-rDNA genes could be located for the first time. Thus two of the ten chromosome pairs of hemp could be marked. The probe C11Seq originating from the RAPD marker OPC-11_{2700} showed a clear signal on two chromosomes when hybridized to chromosomes of the hemp accession CAN 18. Due to the different size of both chromosomes it was assumed, that this signal was located on the sex chromosomes. Signals of probes developed from the AFLP marker AGA_AAT_330 were repetitively localized on the heterochromatic regions of all chromosomes.