





**Table 1. DNA content of haploid genomes and oligonucleotide length required for unique recognition.**

Organism	Base pairs	Oligonucleotide length (N)*
<b>Viruses</b>		
<i>Phage lambda</i>	$4.6 \times 10^4$	9
<b>Bacteria</b>		
<i>D. pneumoniae</i>	$1.7 \times 10^6$	11
<i>E. coli</i>	$4.1 \times 10^6$	12
<b>Fungi</b>		
<i>S. cerevisiae</i>	$1.7 \times 10^7$	13
<i>N. crassa</i>	$2.1 \times 10^7$	13
<b>Plants</b>		
<i>C. reinhardtii</i>	$10^8$	14
<i>A. thaliana</i>	$10^8$	14
<i>Z. mays</i>	$6.6 \times 10^9$	17
<i>A. cepa</i>	$1.5 \times 10^{10}$	18
<b>Animals</b>		
<i>C. elegans</i>	$10^8$	14
<i>D. melanogaster</i>	$1.3 \times 10^8$	14
<i>B. rerio</i>	$10^9$	16
<i>M. musculus</i>	$2.2 \times 10^9$	17
<i>H. sapiens</i>	$3.3 \times 10^9$	17

\* (N) is unique when  $4^N \geq 2 \times \text{Base Pairs}$ .

ble helices can be formed with as few as seven base pairs and, equally importantly, which demonstrated that there is a significant increase in duplex stability for each additional base pair up to about 16 base pairs (Figure 1). The work of Gilham with random length oligothymidylates covalently attached to cellulose demonstrated their potential power for affinity chromatography (Gilham, 1962; Gilham and Robinson, 1964) which led to an important procedure for isolation of eukaryote mRNAs (Aviv and Leder, 1972). However, although data was available on duplex stability involving mixtures of oligonucleotides of defined length with DNA (McConaughy and McCarthy, 1967; Niyogi, 1969), there was no systematic data obtained with pure oligonucleotides of defined sequence and length.

Our approach was to prepare deoxyribo-oligonucleotide-celluloses using simple oligonucleotides of defined length and sequence synthesized by the Khorana method and to use these oligonucleotide-celluloses, in the form of thermally-eluted columns, to establish the stability of duplexes with a variety of complementary, or partially complementary deoxyribo- and ribo-oligonucleotides (Astell *et al.*, 1973; Astell and Smith, 1971, 1972; Gillam *et al.*, 1975). The results and conclusions of this time-consuming but critical series





























