

\* EFOUJGJDBUJPO PG \$PSF .JDSPPSHBOJTN JO  
GSPN %JGGFSFOU \*ODVCBUJPO &OWJSPONFOU

7LQJWELX =XRWDR =KXQJJKXD 3HQRQJ /LX

6WDWH (QYLURQPHQWDO 3URWHFWLRQ .H\ /DERUDWRU\ RI 'ULQNLQJ :DWHU 6RXUFH 0DQDJPHHQW DQG  
&RQWURO 6KHQ]KHQ .H\ /DERUDWRU\ RI (PHUJLQJ &DQWDLQDOLWLRQPHQWVFKRQ]KQ &KQWURQQLQJ &KLQD  
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&RUUHVSRLQGLQJ=KXQJJKXD 6FLHQ]KHQ \$FDGHP\ RI (QYLURQPHQWDO 6FLHQFHV 6KHQ]KHQ \*XDQJGRQJ &KLQD  
5HF GDWGXDU\ \$FF GDWH )HEUXDU\ 3XE GDWH )HEUXDU\  
&RSULJKW < =KX 7 HW DO 7KLV LV DQ RSHQ DFFHV DULWFOH GLVWULEXWHG XQGHU WKH WHUPV  
GLVWULEXWLRQ DQG UHSURGXFWRQ LQ DQ\ PHGLXP SURYLGHG WKH RULJLQDO DXWKRU DQG VRXUFH D

\$EVWUDFW

\$QDPPR\ QRYHO DQG VXVWDLQDEOH ZDVWHZDWHU WUHDWPHQW WHFKQRORJ\ LPSRVVLEOH LVRODWLRQ RI SXUH DQDPPR\ EDFWHULD PDNHV WKH LVVXH DERXW DQDPPR\ FRQVUWLD PHDQLQJIXO EXW VWLOO ODFNV RI LQYHVWLJDWLRQ QRZDGD DQDPPR\ FRQVUWLD ZH LQYHVWLJDWHG PLFURELDO FRPPXQLWLHV RI VL[ DQD DFWLYLWLHV E\ FORQLQJ 6 U51\$ JHQH UHJLRQ ,W LV IRXQG WKDW WKH VWDEOH VWUXFWXUH HYHQ ZLWK GLIIHUHQW RULJLQV H J DFWLYDWHG VWRGJH DQG JUR &KORUREL &KORURIOH\ %DFWHURLGHWHHQ \$JURDWHLRQDOLWLRQV FRPPRQ DFFRPSDQLQJ EDFWHULD DQDPPR\ FRQVUWLD VHUYLQJ DV FRUH PLFURRUJD QLWURJHQ UHPRYDO SURILOH DQDO\VLV VXJJHVWHG WKDW 300KWRUFRUWHQ UHPRY SHUFHQWDJH 2Q WKH FRQWUDJURJFHV DQDPPR\ EDFWHULD \$SGLFHUFRUWHU DQD SUHVHQW LQ DQDPPR\ FRQVUWLD ZLWK DEQRUPDO QLWURJHQ UHPRYDO SHUIRUP EHLQJ LQKLELWHG 7KHVH ILQGLQJV ZRXOG DGYDQFH WKH XQGHVWDQGLQJ RI FRUHHODWHV ZLWK WKH VWDELOLW\ DQG UREXVWQHVV RI DQDPPR\ FRQVUWLD

.H\ZRUG\$QDPPR\ 1LWURJHQ UHPRYDO 0LFURELDO FRPPXQLW\ &RUH PLFURRUJDQLVP

,QWURGXFWRQ

H DQDHURELF DPPRQLXP R\GLDWLRQ \$QDPPR\ LV DQ LQRYDWLYH QWRJHQ UHPRYDO SURFHVV WR FRQYHUW DPPRQLXP DQG QLWULWH RU QLWUDWH WR IRUP QLWURJHQ JDV ,W QHGV QR &2' DGGLWLRQ UHGXFHV R\JHQ GHPDQG DQG SURGXFHV ORZ VOXGJH FRPPDQV Z AppAZA ZAWDGGIWLPLDZ PA€ 4 EDFWHULD FRPPXQLW\ KDYH EHQ FDUULHG R\WKH SHULYVWHQWOK HULVWHG ZL WKHUH DUH VWLOO VRPH ERWROHQHFNV HOYFLGDWLRQV DQDPPR\ UHJLVWLRQV LQYHVWLJDWLRQV FRPPXQLW\ DPRQJ ZK\FKORUODWLRQ RI DQDPPR\ EDFWHULD EXW D RSHUDWLRQ RI DQDPPR\ SURFHVV %DFW GHSHQGHW RQ DQDPPR\ SURFHVV DQDPPR\ HQURQPHQWV DFFRUGLQJ WR WKH SUHYL EDFWHULD VWUDLQV DUH WKH FRPPRQ R

WHULD > @

H LVRODWLRQ RI DQDPPR\ EDFWHULD PHR FRUH FRUHHODWLRQV FRUHHODWLRQV WUHDWLRQDQDO\VLV SODWULPHQV ERGLKSRVWHQW WKDW DOWKRXJK WKH FKDQJH RI > @ KLJKHVW SXPL @ 90q \$ D @ YEP0D @ XQDQDWH DQDPPR\ FRUHHODWLRQV DQDPPR\ DQDPPR\ E\ WKH PHWKRQ RQS SHUF D QHQV R\WKH LQGLVSHAL DQDPPR\ WUHDWLRQV &OHDUO\ WKHUH DUH VWLOO VRPH R\WKH FRUHHODWLRQV DQDPPR\ EDFWHULD ERUODWLRQV LQWURJHQ DQDPPR\ SURYWH YDOXH DQDRP FDQVUWLD > @ \$FWXDOO\ QR PDWWHU LQ WKH QDWXUDO HQYLURQPHQW RU LQ WKH HQJLQHHLQJ SURFHVVV WKH FDXSOLQJ EHW EDFWHULD LV YHU\ FDPPRQYHULPHWKRQXUWKH DAKDYHDAEHHQ FRSHWLWLRQ UHODWLRQV KLS EXW PRVW EDFWHULD DUH LQWHUDFWLQJ DQG FRQVWLWXWLQJ WKH PHWD@°p

DFWLYLWLHV DQG SOLVYQZHWHQ DOWPRYLDQ HVWLJDWHG WR  
IXUWKHU HOXFLGDWH WKH DQDPPR[ FRQVRUWLD EHKDYLRU

ODWHULDO DQG OHWKRGV

6DPSOLQJ

,Q WKLV VWXG\ VL[ DQDPPR[ EDFWHULDO FRQVRUWLD ZHUH FROOHFWHG IURP  
GLVHULQJ WEDWLRQ HQYLURQPHQWV 6DPSOH 6 VWDQGV IRU EDFWHULDO  
FRQVRUWLXP REWDLQHG IURP DQDPPR[ SLORW VFDOH SODQW > @ 6  
SDUDPHWHUV EDFWHULDO FRQVRUWLXP JRW IURP DFWLYDWHG VOXGJH DQG  
FXOWLYDWHG LQ DQDHURELF IHUPHQWHU IRU PRUH WKDQ RQH \HDU 6 LV  
DQDPPR[ FRQVRUWLXP LV DOVR IURP DFWLYDWHG VOXGJH EXW ZDV VHULRXVO\  
GDPDJHG E\ RYHUKHDWLQJ 6 GHQRWHV WKH DQDPPR[ FRQVRUWLXP

FXOWLYDWLRQ DQG HQULFKPHQW RI DQDPPR[ EDFWHULD LQ DQDHURELF  
FRQGLWLRQV

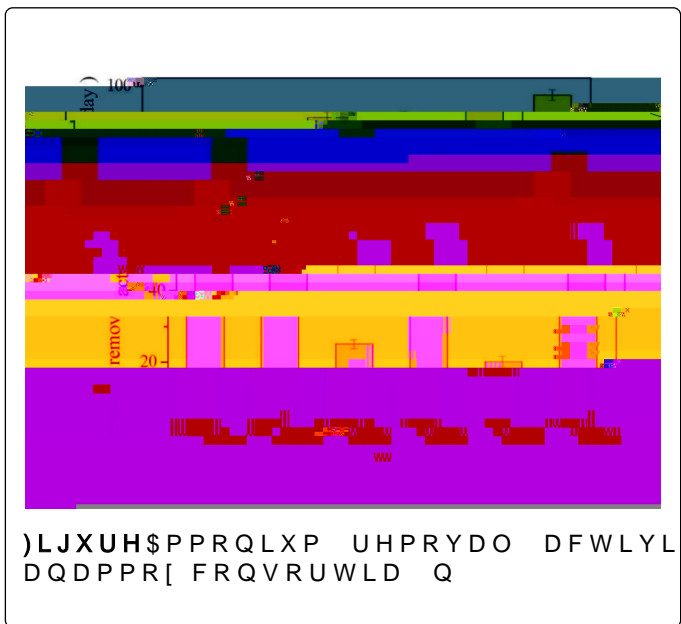
6 ZDV WKH LQKLELWHG DQDPPR[ FRQVRUWLXP E\ RYHU KHDWLQJ DQG WKLV  
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RI IXQFW~~3ODQFWRP, FHWKLV~~ SDUW WKH SUHWUHDWPHQW E\  
XOWUDVRXQG DV SURSRVHG SUHYLRXVO\ > @ ZDV LJQRUHG LQGXFLOJ WKH  
LQFRPSOHWH VHSUDUDWLRQ RI WKH DQDPPR[ EDFWHULD (YHQ WKRXJK WKH  
LQFUHDVHG ~~3ODQFWRP, FHWKLV~~ HUYHG DW WKH ERWWRP RI WKH  
SHUFROO VROXWLRQ 6 \$V PHQWLRQHG LQ WKH PHWKRGV 6 ZDV WKH RQH  
DQDHURELFD~~3ODQFWRP, FHWKLV~~ O\ FXOWXUHG LQ WKH ODE IRU PRUH WKDQ WHQ \HDUV DQG WKXV \\  
EDFWHULD FRPPXQLW\ VHHPV WR EH VWDEOH DQG WKH 3ODQFWRP\FHWHV  
DFFRXQWV IRU DV KLJK DV )RU WKH VWHDG\ RSHUDWLRQ RI WKH UHDFWRUV  
ZH FRXOG UHJDUG WKDW 6 DQG 6 DOO KDYH VWHDG\ EDFWHULD FRPPXQLW\

3URWHREDFWHULXP\$B@D@L@R@DFGHMHWV 3ODQFWRPIFHWHV  
DQGLWURVRPRQDV 3ODQFWRPIFHWHV 3ODQFWRPIFHWHV LQ )LJXUH



)LJXUH 78 9(11 DQDO\VLV RI WKH DQDPPR[ FRQVRUWLD D ,W LV  
WKH DQDO\VLV UHVXOW RI VDPSON 6 DQG 6

WKH DQDPPR[ FRQVRUWLD DQG WKH FRUUHVSRQGLQJ GHFUHDVHG DPPRQLXP  
UHPRYDO DFWLYLWLHV



)LJXUH\$PPRQLXP UHPRYDO DFWLYLWLHV RI WKH LQYHVWLJDWHG  
DQDPPR[ FRQVRUWLD Q

&RQFOXVLRQV

,Q WKLV VWXG\ ZH H[SORUHG WKH 6 U51\$ JHQH DQDO\VLV WR DQDO\]H WKH  
FRPPXQLW\ FRPSRVLWLRQ DQG FRUH PLFURRUJDQLVP RI WKH VL[ DQDPPR[  
FRQVRUWLD REVLDEHQHGHFWLWLRQ HYLURQPHQWV  
UHVXOWV VKRZ WKDW WKH VWDEOH DQDPPR[ FRQVRUWLD KDYH VLPLODU  
FRPPXQLW\ VWUXFWXUHV LQWHUQALV HWK DFWLYDWHG VOXGJH  
DQG JURXQGHZDWHU HULD VSHFLDO REVLDEHQHGHFWLWLRQ WR

